Syllabi

Four Year Undergraduate Programme (FYUGP)

Gauhati University

Effective from Academic Year 2023-24

GAUHATI UNIVERSITY
Guwahati-781014

Contents

ARTS

COMMERCE AND MANAGEMENT

SCIENCE

TECHNOLOGY

Note: The contents are organized in alphabetical order. Other contents are going to be added subsequently to this version. This version is: NEP_syll_v1.1.

ARTS

FYUGP CURRICULUM 2023
(AS PER NEP 2020)
MAJOR COURSE IN ARABIC

In accordance with the Regulations of the Four Years Under Graduate Programme (FYUGP, NEP) of Gauhati University

DEPARTMENT OF ARABIC
GAUHATI UNIVERSITY
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GUWeb: http://web.gauhati.ac.in/syllabus

GAUHATI UNIVERSITY

SUBJECT: ARABIC

STREAM: ARTS

TYPE OF DEGREE: BACHELOR DEGREE IN ARTS WITH MAJOR IN ARABIC

MEDIUM OF INSTRUCTION: ENGLISH /ARABIC/ASSAMESE

A Brief Outline of the FYUGP (NEP) Syllabus

In all courses
No. of total required classes: 60
No. of contact classes: 40
No. of non-contact classes: 20
In this syllabus
All are Theory papers
Practical credits: 0

Course designer:
Dr. Abu Bakkar Siddique
Head, Department of Arabic, Gauhati University
E-mail: bakkar@gauhati.ac.in

UG SEMESTER-I							
COURSE LEVEL: 100-199				CONTACT HOURS: 60			
Sl. No.	Paper Code	Status/ Paper Type	Title of the Paper	Credit	Internal Marks	Final Marks	Total
1	ARA101	CORE COMPULSORY	BASICS OF ARABIC LANGUAGE	4	20	80	100
		UG SEMESTER-II					
COURSE LEVEL: 100-199				CONTACT HOURS: 60			
2	ARA 102	CORE COMPULSORY	SYNTAX AND SEMANTICS OF ARABIC LANGUAGE	4	20	80	100
UG SEMESTER-III							
COURSE LEVEL: 200-299				CONTACT HOURS: 60			
3	MAJOR ARA201	COMPULSORY	ARABIC PROSE AND POETRY-I	4	20	80	100

UG SEMESTER-IV							
COURSE LEVEL: 200-299				CONTACT HOURS: 60			
4	Major-ARA202	COMPULSORY	ARABIC PROSE AND POETRY-II	4	20	80	100
5	Major-ARA203	(Disciplinary Elective)	FUNCTIONAL ARABIC-I	4	20	80	100
6	Major-ARA204	(Disciplinary Elective)	ARABIC TRANSLATION, COMPOSITION AND GRAMMAR	4	20	80	100
7	Major-ARA205	(Disciplinary Elective)	HISTORY OF ARABIC LITERATURE (FROM PRE-ISLAMIC TO EARLY ISLAMIC PERIOD)	4	20	80	100
UG SEMESTER-V							
COURSE LEVEL: 300-399				CONTACT HOURS: 60			
8	Major-ARA301	COMPULSORY	ARABIC PROSE AND POETRY-III	4	20	80	100
9	Major-ARA302	(Disciplinary Elective)	FUNCTIONAL ARABIC-II	4	20	80	100
10	Major-ARA 303	(Disciplinary Elective)	ARABIC GRAMMAR AND RHETORIC-I	4	20	80	100
11	Major-ARA304	(Disciplinary Elective)	HISTORY OF THE ARABS (PRE-ISLAMIC TO RASHIDUN CALIPHATE)	4	20	80	100
UG SEMESTER-VI							
COURSE LEVEL: 300-399				CONTACT HOURS: 60			
12	Major-ARA305	COMPULSORY	ARABIC PROSE AND POETRY-IV	6	20	80	100
13	Major-ARA306	(Disciplinary Elective)	FUNCTIONAL ARABIC-III	6	20	80	100

14	Major-ARA 307	(Disciplinary Elective)	HISTORY OF MODERN ARABIC LITERATURE-I	6	20	80	100
15	Major-ARA308	(Disciplinary Elective)	HISTORY OF THE ARABS (UMAYYAD AND ABBASID)	6	20	80	100

PAPER WISE CONTENTS OF THE MAJOR PAPERS (15)

WITH LEARNING OUTCOMES

UG SEMESTER-I							
COURSE LEVEL: 100-199				CONTACT HOURS: 60			
Sl. No.	Paper Code	Status/ Paper Type	Title of the Paper	Credit	Internal Marks	Final Marks	Total
1	ARA101	CORE	BASICS OF ARABIC LANGUAGE	4	20	80	100

BASICS OF ARABIC LANGUAGE

I. An Introduction to Language and its family **(15 classes)**
   (a) Definition, origin and functions of language
   (b) Semitic language and its family
   (c) Arabic language : Standard and Colloquial
   (d) Features and characteristics of Arabic language

II. Arabic Alphabet and word formation **(15 classes)**
   (a) Arabic Alphabet
   (b) Shapes of Arabic letters
   (c) Pronunciation of Arabic letters (مخارج الحروف)
   (d) Moon and Sun letters

III. Sentence formation in Arabic **(15 classes)**
   (a) Usage of pronouns (الضمائر)
   (b) Usage of demonstrative pronouns (اسماء الإشارة)
   (c) Usage of Nominal sentences (الجمل الاسمية)
   (d) Usage of Verbal sentences (الجمل الفعلية)

IV. Practice of Arabic conversation **(15 classes)**
   (a) Conversation at home
   (b) Conversation over phone
   (c) Conversation at school
   (d) Conversation at market

Reading References:

1. Dr. V. Abdur Rahim: Durus Al Lughat Al Arabiyah li Ghairin Natiqitina Biha Vol. I and II
2. Prof. Syed Ahsanur Rahman : Teach yourself Arabic
3. Md. Harun Rashid Khalid Perwez : Arabic Conversation Book
4. Syed Nabi Hyderabadi: Minhaj Al Arabiyah Vol. I, II and III
5. Dr. Golam Sarwar: Persian Linguistics
6. Dr. Bakshi Hazrat Ali Ahmed: Semiyo-Hamio Bhakhar Porichoy

Course Objectives:

To achieve basic information of Arabic language and its proficiency in speaking, reading and writing.

Learning outcomes:

1. The learners will be able to recognize Arabic alphabet and pronounce them correctly.
2. The course will help the learners in social interactions and be able to convey basic information in Arabic.
3. The course will guide the learners to comprehend simple written texts on common topics.
4. At the end of the course the students will be at ease to compose simple texts in Arabic.
5. The course will lead the students to comprehend simple audio-video texts in Arabic.

Graduate Attributes:

1. Creativity
2. Learning how-to-learn skills
3. Value inculcation

<table>
<tr><th colspan="2"></th><th colspan="4">UG SEMESTER-II</th><th colspan="2"></th></tr>
<tr><td colspan="4">COURSE LEVEL: 100-199</td><td colspan="4">CONTACT HOURS: 60</td></tr>
<tr><td>Sl. No.</td><td>Paper Code</td><td>Status/ Paper Type</td><td>Title of the Paper</td><td>Credit</td><td>Internal Marks</td><td>Final Marks</td><td>Total</td></tr>
<tr><td>2</td><td>ARA 102</td><td>CORE</td><td>SYNTAX AND SEMANTICS OF ARABIC LANGUAGE</td><td>4</td><td>20</td><td>80</td><td>100</td></tr>
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SYNTAX AND SEMANTICS OF ARABIC LANGUAGE

I. Basic Grammar **(15 classes)**
  - (a) Words and parts of speech (الكلمة واقسامها)
  - (b) The pronouns (الضمائر)
  - (c) Demonstrative (اسماء الإشارة) and interrogative pronouns (حروف الاستفهام)
  - (d) Number and gender (العدد والجنس)
  - (e) Possession (الاضافة) and Adjective (الصفة)

II. Verb **(15 classes)**
  - (a) Past Tense (الفعل الماضي)
  - (b) Present and future tense (الفعل المضارع)
  - (c) Imperative verb (فعل الامر)
  - (d) Negative verb (فعل النهي)

III. Kinds of sentences **(15 classes)**
  - (a) Nominal sentence (الجملة الاسمية)
  - (b) Verbal sentence (الجملة الفعلية)
  - (c) Imperative sentence (الجملة الإنشائية)
  - (d) Conditional sentence (الجملة الشرطية)

IV. Vocabulary enrichment and use of words in sentences with meanings : **(15 classes)**
  - (a) Time related
  - (b) Nature related
  - (c) House related
  - (d) School related

Reading References:

1. Teach yourself Arabic : Prof. Syed Ahsanur Rahman
1. معلم اللغة العربية Arabic Grammar –I (Text and Exercises) published by MESCO-ALEEF, Hyderabad
2. The Syntax of Arabic: Joseph E Aoun, Elabbas Benmamoun, Lina Choueiri
3. Prof. Moinuddin Azmi : Essential Arabic Syntax
4. Abul Hashim: Arabic Made Easy
5. Hyder Ali: Asomiya Arobi Byakaron
6. Prof. Rafiul Imad Faynan : The Essential Arabic
7. A Practical Approach to the Arabic Language Vol. I by Dr. Wali Akhtar Nadwi
8. A New Arabic Grammar of the written language by J. A. Haywood and H. M. Nahmad
9. النحو الواضح لعلى الجارم و مصطفى أمين
10. النحو الهادي لمحمد هداية الله القاسمي
11. الجديد في العربية للدكتور إحسان الرحمن
12. Pear Ali Ahmed: An Approach to Practical Arabic Grammar

Course Objectives:

To enable a student to construct grammatically correct sentences in Arabic by following grammatical rules and the semantics.

Learning outcomes:

1. The course will assist the students in learning correct use of written Arabic applying fundamental morphological and syntactic elements of Arabic.
2. To familiarize the students with the distinctive features and purposes of various Arabic structures
3. To comprehend Arabic grammar through practice.
4. The course will acquaint the students with the morphological thought of learning Arabic grammar.

Graduate Attributes:

1. Complex problem-solving

2. Analytical reasoning/thinking

UG SEMESTER-III

COURSE LEVEL: 200-299	CONTACT HOURS: 60

Sl. No.	Paper Code	Status/ Paper Type	Title of the Paper	Credit	Internal Marks	Final Marks	Total
3	MAJOR ARA201	COMPULSORY	ARABIC PROSE AND POETRY-I	4	20	80	100

UNIT-I **(15 classes)**
PROSE

SL. No.	Title	Selected from the Book	Name of the Author/ Publisher
1	تحية و التعارف	اللغة العربية الوظيفية	المجلس القومي لترويج اللغة الإردية، نيو دلهي
2	الأم		
3	أسرتي	اللغة العربية لغير الناطقين بها	جمعية الدعوة الإسلامية العالمية، طرابلس، الجماهيرية العظمى
4	فى المطعم		

UNIT –II **(15 classes)**
PROSE

SL. No.	Title	Selected from the Book	Name of the Author/ Publisher
1	فى السوق	اللغة العربية لغير الناطقين بها	جمعية الدعوة الإسلامية العالمية، طرابلس، الجماهيرية العظمى
2	فى المزرعة		
3	فى الفصل الدراسي		
4	الوقت	لمحات من أدب العرب ج 1	قسم اللغة العربية بجامعة غوهاتي

UNIT –III **(15 classes)**
POETRY

SL. No.	Title	Selected from the Book	Name of the Author/ Publisher
1	شرو خير	ديوان أبي العتاهية	أبو العتاهية
2	تربية الأمهات	ديوان معروف الرصافي	معروف الرصافي
3	دعاء	اللغة العربية لغير الناطقين بها	ميخائيل نعيمة
4	نبذة عن حياة المؤلفين		

UNIT-IV **(15 classes)**
POETRY

SL. No.	Title	Selected from the Book	Name of the Author/ Publisher
1	أكبر من كل الكلمات	حبيبتي	نزار قباني
2	نشيد الشبان المسلمين	الشوقيات	أحمد شوقي
3	علّموا الفتاة	اللغة العربية لغير الناطقين بها	الأستاذ أحمد الفقيه حسن
4	نبذة عن حياة المؤلفين		

Reading References:

1. لمحات من أدب العرب، نشرت من قبل قسم اللغة العربية و آدابها بجامعة غوهاتي
2. ديوان أبي العتاهية
3. الشوقيات
4. اللغة العربية الوظيفية
5. مختارات من أدب العرب

Course Objectives:

To teach the students about the cultural heritage and socio-cultural beliefs of the Arabs.

Learning Outcomes:

1. To use Arabic literature to instill moral and ethical principles in learners.
2. To present the learner with opportunity to appreciate modern and contemporary Arabic literature.
3. To give the learner the ability to understand the concepts expressed by contemporary poets and authors and their contribution to Arabic literature.
4. To investigate the history and evolution of Arabic literature listing the notable writers.
5. To determine the similarities and contrasts between classical Arabic literature and Modern Arabic literature.

Graduate Attributes:

1. Creativity
2. Value inculcation

UG SEMESTER-IV

COURSE LEVEL: 200-299	CONTACT HOURS: 60

Sl. No.	Paper Code	Status/ Paper Type	Title of the Paper	Credit	Internal Marks	Final Marks	Total
4	MAJOR ARA202	COMPULSORY	ARABIC PROSE AND POETRY-II	4	20	80	100

Sl. No.	Title	Selected from the Book	Name of the Author/ Publisher
UNIT-I **(15 classes)** PROSE			
1	الحرية و المساوة و الإخاء فى الإسلام	لمحات ج 2	قسم اللغة العربية بجامعة غوهاتي
2	بلادي	القراءة العربية	عبد القدوس القاسمي ، محمد ساجد القاسمي
3	كيف اتعلم اللغة جيدا		
UNIT –II **(15 classes)** PROSE			
1	ابو بكر الصديق	القراءة العربية	عبد القدوس القاسمي ، محمد ساجد القاسمي
2	الصحة و الطعام		
3	الإتحاد قوة	اللغة العربية لغير الناطقين بها	جمعية الدعوة الإسلامية العالمية، طرابلس، الجماهيرية العظمى
UNIT –III **(15 classes)** POETRY			
1	لو كنت عصفورا	ديوان يحيى اللبابيدي	يحيى اللبابيدي
2	نشيد الزكاة	ديوان يوسف العظم	يوسف العظم
3	أغر عليه لنبوة خاتم	ديوان حسان بن ثابت	حسان بن ثابت
4	نبذة عن حياة المؤلفين		
UNIT-IV **(15 classes)** POETRY			
1	الله مولى دنانير و مولائي	ديوان أبي نواس	أبو نواس
2	أيها الحب أنت سر بلائي	ديوان أبي القاسم الشابي	أبو القاسم الشابي
3	اللغة العربية	ديوان حافظ ابراهيم	حافظ ابراهيم
4	نبذة عن حياة المؤلفين		

Reading References:

1. لمحات من أدب العرب، نشرت من قسم اللغة العربية و آدابها بجامعة غوهاتي
2. ديوان أبي نواس
3. ديوان أبي القاسم الشابي
4. ديوان حافظ ابراهيم
5. ديوان حسان بن ثابت

Course Objectives:

To teach the students about the cultural heritage and socio-cultural beliefs of the Arabs.

Learning Outcomes:

1. To use Arabic literature to instill moral and ethical principles in learners.
2. To present the learner with opportunity to appreciate modern and contemporary Arabic literature.
3. To give the learner the ability to understand the concepts expressed by contemporary poets and authors and their contribution to Arabic literature.
4. To investigate the history and evolution of Arabic literature listing the notable writers.
5. To determine the similarities and contrasts between classical Arabic literature and Modern Arabic literature.

Graduate Attributes:

1. Creativity

2. Value inculcation

UG SEMESTER-IV							
COURSE LEVEL: 200-299				CONTACT HOURS: 60			
Sl. No.	Paper Code	Status/ Paper Type	Title of the Paper	Credit	Internal Marks	Final Marks	Total
5	MAJOR ARA203	(Disciplinary Elective)	FUNTIONAL ARABIC-I	4	20	80	100

UNIT-I (15 classes)			
Sl. No.	Title	Selected from the Book	Name of the Author/ Publisher
1	بلادي	اللغة العربية الوظيفية	المجلس القومي لترويج اللغة الإردية، نيو دلهي
2	جزاء الوالدين	القراءة الراشدة	أبو الحسن على الندوي
3	أدب الأكل و الشرب		
UNIT –II (15 classes)			
1	عيد الأضحى	القراءة العربية	عبد القدوس القاسمي ، محمد ساجد القاسمي
2	قيمة الزمان		
3	كيف أقضي يومي	القراءة الراشدة	أبو الحسن على الندوي
UNIT –III (15 classes)			
1	جزاء المعروف	اللغة العربية لغير الناطقين بها	جمعية الدعوة الإسلامية العالمية، طرابلس، الجماهيرية العظمى
2	فى مكتب البريد	اللغة العربية الوظيفية	المجلس القومي لترويج اللغة الإردية، نيو دلهي
3	قيمة الوقت		
UNIT-IV (15 classes)			
1	معرفة الوقت بالساعة	اللغة العربية الوظيفية	المجلس القومي لترويج اللغة الإردية، نيو دلهي
2	أوقات الفراغ		
3	الغذاء الصحي		

Reading References:

1. **لمحات من أدب العرب نشرت من قبل قسم اللغة العربية وآدابها بجامعة غوهاتي**
2. عبد القدوس القاسمي ، محمد ساجد القاسمي القراءة العربية
3. اللغة العربية لغير الناطقين بها
4. اللغة العربية الوظيفية
5. القراءة الواضحة لواحد الزمان القاسمي
6. القراءة الراشدة لأبي الحسن على الندوي

Course Objectives:

To develop communicative skills in Arabic and to inculcate the values of communications among the students.

Learning outcomes:

1. To acquaint the reader with Arabic business jargon.
2. To raise knowledge of diverse Arabic documents.
3. To increase the ability to translate several widely-used papers from Arabic to English and the other way around.
4. To become more accustomed to regular conversations in the areas of business and industry.
5. To develop the communicating skill in Arabic among the learners.

Graduate Attributes:

1. Creativity
2. Communication skill
3. Learning how to learn skill
4. Value inculcation

UG SEMESTER-IV							
COURSE LEVEL: 200-299				CONTACT HOURS: 60			
Sl. No.	Paper Code	Status/ Paper Type	Title of the Paper	Credit	Internal Marks	Final Marks	Total
6	MAJOR ARA203	(Disciplinary Elective)	ARABIC TRANSLATION, COMPOSITION AND GRAMMAR	4	20	80	100

ARABIC TRANSLATION, COMPOSITION AND GRAMMAR

UNIT-I: Arabic terminologies (15 classes)

(a) Academic
(b) Administrative
(c) Political
(d) Economic

UNIT-II: Translation (15 classes)

a) Translation from English to Arabic
    1. Academic
    2. Political/ Commercial
b) Translation from Arabic to English
    1. Academic
    2. Political/ Commercial

UNIT-III (15 classes)

- ✓ Comprehension of text

UNIT-IV (15 classes)

- ✓ Essay / Letter writing

Reading References:

1. Method of Translation: English - Arabic (منهج الترجمة) by Muinuddin Azmi
2. Let's Translate (English-Arabic-English) by Abul Kalam
3. Advanced Arabic Composition by Raji M. Rammuni
4. The Oxford English Arabic Dictionary of Current usage
5. Teach Yourself Arabic by Prof. S. A. Rahman
6. A New Arabic Grammar of the written language by J. A. Haywood and H. M. Nahmad
7. أسس الترجمة من الأنجليزية إلى العربية و بالعكس للدكتور عز الدين، محمد نجيب

Course Objectives:

To achieve advanced language proficiency especially in speaking, listening, reading and writing.

Learning outcomes:

1. To make it possible for the pupils to comprehend and participate in basic conversational forms during the chosen social occasions.
2. To improve LSRW (Listening, Speaking, Reading and Writing) of Arabic in students.
3. To impart advanced knowledge in Arabic-to-English translation and to inform the students about the range of commercial translation.
4. To teach the students how to translate simple documents.
5. To develop in the learner the capacity to comprehend contemporary essays and to prepare them for writing articles on current themes.

Graduate Attributes:

1. Critical thinking
2. Communication skills
3. Learning how to learn skills

UG SEMESTER-IV							
COURSE LEVEL: 200-299				CONTACT HOURS: 60			
Sl. No.	Paper Code	Status/ Paper Type	Title of the Paper	Credit	Internal Marks	Final Marks	Total
7	MAJOR ARA205	(Disciplinary Elective)	HISTORY OF ARABIC LITERATURE (Pre-Islamic to Early Islamic Period)	4	20	80	100

HISTORY OF ARABIC LITERATURE

(Pre-Islamic to Early Islamic Period)

UNIT-I: Pre Islamic literature (15 classes)

1. Growth and development of pre-Islamic Arabic prose and poetry
2. Features and characteristics of pre-Islamic Arabic prose and poetry
3. Prominent prose writers of the period : Quss Bin Saida Al Ayadi, Aksam Bin Saifi Al Tamimi, Kaab Bin Luai, Hashim Bin Abd Munaf, Amr Bin Madi karnab Al Zubaidi
4. Prominent poets of the period : Muhalhil Bin Rabia, Labeed Bin Rabia, Antara Bin Shaddad, Nabigha Zubyani

UNIT-II: The Suspended Ode or the Muallaqat (15 classes)

1. Imru’ul Qays
2. Tarafa bin Al-‘Abd
3. Zuhayr bin Abi Sulma
4. ‘Amr bin Kulthum

UNIT-III : (15 classes)

1. Development of Arabic Prose during early Islamic period
2. Development of Arabic Poetry during early Islamic period
3. Features and characteristics of Arabic Prose during early Islamic period
4. Features and characteristics of Arabic Poetry during early Islamic period

UNIT-IV (15 classes)

1. Compilation of the holy Quran during early Islamic period
2. Khitabah literature in early Islamic period
3. Prominent Khateebs of the period: Prophet Muhammad (pbuh) and Ali bin Abi Talib.
4. Prominent figures of Arabic Poetry literature during early Islamic period Hassan bin Thabith, Ka'ab bin Zuhayr, Abdullah Bin Rawaha and Khansa

Reading references:

1. A History of Arabic Literature by K. A. Fariq
2. A Literary History of the Arabs by R. A. Nicholson
3. Life and works of Hassan Bin Thabith by Prof. Raina Khanam Mazumdar
4. A History of the Arabic Literature by Clement Huart
5. تاريخ الأدب العربي لأحمد حسن الزيات
6. تاريخ الأدب العربي لعمر فروخ
7. تاريخ آداب اللغة العربية لجرجي زيدان
8. تاريخ الأدب العربي لشوقي ضيف

Course Objectives:

To acquaint the students with the literary developments of the Arabs during pre-Islamic and early Islamic period and to inculcate the values in them.

Learning outcomes:

1. To comprehend the unique qualities of Arabic literature through the ages.
2. To gauge the breadth of the many literary and poetic forms in Arabic literature
3. To introduce students to the aesthetic, cultural, and social facets of Arabic literature during the chosen eras.
4. To comprehend Arab literary traditions to get analytical and comprehensive understanding of literary works, writers, trends, etc.
5. Too emphasize the connection between Bedouin life in Arabia and Arabic literature from pre-Islamic to early Islamic period.

Graduate Attributes:

1. Analytical reasoning / thinking
2. Research related skills
3. Leadership readiness/ qualities

UG SEMESTER-V							
COURSE LEVEL: 300-399				CONTACT HOURS: 60			
Sl. No.	Paper Code	Status/ Paper Type	Title of the Paper	Credit	Internal Marks	Final Marks	Total
8	MAJOR ARA-301	COMPULSORY	ARABIC PROSE AND POETRY-III	4	20	80	100

UNIT-I **(15 classes)** PROSE			
SL. No.	Title	Selected from the Book	Name of the Author/ Publisher
1	غلام عابد	لمحات من أدب العرب ج 4	قسم اللغة العربية وأدابها بجامعة غوهاتي
2	جارية سوداء		
3	حقوق المرأة وواجباتها في الإسلام		
UNIT –II **(15 classes)** PROSE			
1	باب بر الوالدين وباب فضل صلة أصدقاء الأب	صحيح مسلم	الإمام مسلم بن الحجاج القشيري
3	الصداقة	لمحات من أدب العرب ج 3	قسم اللغة العربية وأدابها بجامعة غوهاتي
4	سورة القدر	القرآن الكريم	
UNIT –III **(15 classes)** POETRY			
1	القبرة و ابنها	الشوقيات	احمد شوقي
2	عروس فرشت لها الأرض بالزهر	لمحات من أدب العرب ج 4	خليل مطران
3	يا مرحبا	ديوان عبد الرحمن الشكري	عبد الرحمن الشكري
4	نبذة عن حياة المؤلفين		
UNIT-IV **(15 classes)** POETRY			
1	الموت	ديوان ابي نواس	أبو نواس
2	أنا	ديوان نازك الملائكة	نازك الملائكة
3	يا عين جودي	ديوان خنساء	خنساء
4	نبذة عن حياة المؤلفين		

Reading References:

1. لمحات من أدب العرب، نشرت من قسم اللغة العربية و آدابها بجامعة غوهاتي
2. ديوان أبي نواس
3. ديوان الخنساء
4. ديوان عبد الرحمن الشكري
5. ديوان لبيد بن ربيعة

Course Objectives:

To teach the students about the cultural heritage and socio-cultural beliefs of the Arabs.

Learning Outcomes:

1. To use Arabic literature to instill moral and ethical principles in learners.
2. To present the learner with opportunity to appreciate modern and contemporary Arabic literature.
3. To give the learner the ability to understand the concepts expressed by contemporary poets and authors and their contribution to Arabic literature.
4. To investigate the history and evolution of Arabic literature listing the notable writers.
5. To determine the similarities and contrasts between classical Arabic literature and Modern Arabic literature.

Graduate Attributes:

1. Creativity
2. Value inculcation

UG SEMESTER-V							
COURSE LEVEL: 300-399				CONTACT HOURS: 60			
Sl. No.	Paper Code	Status/ Paper Type	Title of the Paper	Credit	Internal Marks	Final Marks	Total
9	MAJOR ARA-302	(Disciplinary Elective)	FUNCTIONAL ARABIC-II	4	20	80	100

UNIT-I **(15 classes)**			
Sl. No.	Title	Selected from the Book	Name of the Author/ Publisher
1	المدارس	اللغة العربية الوظيفية	المجلس القومي لترويج اللغة الأردية، نيو دلهي
2	صحة البيئة		
3	صيدلية		
UNIT –II **(15 classes)**			
1	شجرة الزيتون	اللغة العربية لغير الناطقين بها	جمعية الدعوة الإسلامية العالمية، طرابلس، الجماهيرية العظمى
2	النمل		
3	زكاء الطفل		
UNIT –III **(15 classes)**			
1	نصائح الطبيب	اللغة العربية لغير الناطقين بها	جمعية الدعوة الإسلامية العالمية، طرابلس، الجماهيرية العظمى
2	فى العيادة		
3	تنظيم الوقت	القراءة العربية	عبد القدوس القاسمي ، محمد ساجد القاسمي
UNIT-IV **(15 classes)**			
1	فى العطلة	القراءة العربية	عبد القدوس القاسمي ، محمد ساجد القاسمي
2	الحرية		
3	الطالب الزكي		

Reading References:

1. **المنتخب من العربية الوظيفية ثاني**
2. عبد القدوس القاسمي ، محمد ساجد القاسمي القراءة العربية،
3. اللغة العربية لغير الناطقين بها
4. اللغة العربية الوظيفية
5. القراءة الواضحة لواحد الزمان القاسمي
6. القراءة الراشدة لأبي الحسن على الندوي

Course Objectives:

To develop communicative skills in Arabic and to inculcate the values of communications among the students.

Learning outcomes:

1. To acquaint the reader with Arabic business jargon.
2. To raise knowledge of diverse Arabic documents.
3. To increase the ability to translate several widely-used papers from Arabic to English and the other way around.
4. To become more accustomed to regular conversations in the areas of business and industry.
5. To develop the communicating skill in Arabic among the learners.

Graduate Attributes:

1. Creativity
2. Communication skill
3. Learning how to learn skill
4. Value inculcation

<table>
<tr><th colspan="8">UG SEMESTER-V</th></tr>
<tr><td colspan="4">COURSE LEVEL: 300-399</td><td colspan="4">CONTACT HOURS: 60</td></tr>
<tr><td>Sl. No.</td><td>Paper Code</td><td>Status/ Paper Type</td><td>Title of the Paper</td><td>Credit</td><td>Internal Marks</td><td>Final Marks</td><td>Total</td></tr>
<tr><td>10</td><td>MAJOR ARA-303</td><td>(Disciplinary Elective)</td><td>ARABIC GRAMMAR AND RHETORIC</td><td>4</td><td>20</td><td>80</td><td>100</td></tr>
</table>

ARABIC GRAMMAR AND RHETORIC

UNIT-I (15 classes)

✓ تعريف الفعل و أقسامه : الفعل الماضي (تصريفاً و تدريباً)
✓ الماضي المطلق، المعروف ، المجهول، المثبت، المنفي
✓ الماضي القريب، المعروف ، المجهول، المثبت، المنفي
✓ الماضي البعيد ، الماضي الاستمراري

UNIT-II (15 classes)

✓ الفعل المضارع (تصريفاً و تدريباً)
✓ المضارع المعروف ، المجهول، المثبت، المنفي
✓ الفعل المضارع المنفي بلم ، الفعل المضارع المنفي بلن
✓ توكيد الفعل المضارع : بنون التوكيد الثقيلة و الخفيفة ، توكيد الفعل المضارع بلام التوكيد

UNIT-III (15 classes)

✓ الفعل الأمر (تصريفاً و تدريباً)
✓ الفعل النهي
✓ اسم الفاعل
✓ اسم المفعول

UNIT-IV (Rhetoric) (15 classes)

✓ علم البلاغة ، علم المعاني، علم البيان وعلم البديع : تعريفا وتمثيلا
✓ التشبيه واقسامه
✓ المجاز واقسامه
✓ الكناية واقسامها

Reading References:

1. معلم اللغة العربية Arabic Grammar –I (Text and Exercises) published by MESCO-ALEEF, Hyderabad
2. A Practical Approach to the Arabic Language by Dr. Wali Akhtar Nadwi
3. A New Arabic Grammar of the written language by J. A. Haywood and H. M. Nahmad
4. النحو الواضح لعلى الجارم و مصطفى أمين
5. النحو الهادي لمحمد هداية الله القاسمي
6. الجديد في العربية للدكتور إحسان الرحمن

Course Objectives:

To deliver a sentence with more information to the audience. It provides the students a greater appreciation and understanding of Arabic language and literature.

Learning outcomes:

1. The course will assist the students in learning correct use of written Arabic applying fundamental morphological and syntactic elements of Arabic.
2. To familiarize the students with the distinctive features and purposes of various Arabic structures
3. To comprehend Arabic grammar through practice.
4. The course will acquaint the students with the morphological thought of learning Arabic grammar.
5. To make the students understand the basic concepts of Arabic Rhetoric.

Graduate Attributes:

1. Creativity
2. Communication skill
3. Learning how to learn skill

UG SEMESTER-V							
COURSE LEVEL: 300-399			CONTACT HOURS: 60				
Sl. No.	Paper Code	Status/ Paper Type	Title of the Paper	Credit	Internal Marks	Final Marks	Total
11	MAJOR ARA-304	(Disciplinary Elective)	HISTORY OF THE ARABS (Pre-Islamic to Rashidun Caliphate)	4	20	80	100

HISTORY OF THE ARABS

(Pre-Islamic to Rashidun Caliphate)

UNIT-I: Arabia before the advent of Islam **(15 classes)**

(a) Ancient civilizations
(b) The Arabian peninsula
(c) Inhabitants of Arabia
(d) Conditions of the Arabia at the advent of Islam i.e. political, economic, cultural, religious, social and moral

UNIT-II: The rise of Islam **(15 classes)**

(a) Life of Prophet Muhammad (PBUH)
(b) Migration of Prophet Muhammad (PBUH) to Madinah and aftermath
(c) Wars fought by the prophet
(d) Prophet as a reformer and a nation builder

UNIT-III: Caliph Abu Bakr Siddique and Umar Farooq **(15 classes)**

(a) Life of Abu Bakr Siddique and his accession
(b) Achievements of Abu Bakr Siddique as a caliph (Apostasy movement, battle of Yamama, invasions etc.)
(c) Life of Umar Farooq and his accession
(d) Achievements of Umar Farooq as a caliph (Invasions, battle of Qadissia, battle of Yarmok, Conquest of Syria etc.)

UNIT: IV: Caliph Uthman bin Affan and Ali bin Abi Talib **(15 classes)**

(a) Life of Uthman bin Affan and his accession
(b) Administration, character and achievements of Uthman bin Affan
(c) Life of Ali bin Abi Talib and his accession
(d) Achievements of Ali bin Abi Talib as a caliph (Invasions, battle of Camel, battle of Siffin, emergence of Kharijites and his martyrdom etc.)

Reading References:

1. A Study of Islamic History by K. Ali
2. Concise History of Muslim World, Vol. I by Rafi Ahmad Fidai
3. Sirat-un-Nabi by Allamah Shibli Nu'mani
4. History of the Arabs by Philip K. Hitti
5. Study materials prepared by the Department of Arabic, Gauhati University

Course Objectives:

To present opposing viewpoints and alternative hypothesis on various issues; effectively apply reading, writing, critical thinking and analytical skills to address significant issues in the political world.

Learning Outcomes:

1. To introduce the students with the culture and history of the Arabs.
2. To comprehend historical and cultural context of the evolution of Islam and its expansion.
3. To assess the evolution of Islam throughout the period of the Prophet and the just caliphs.
4. To educate the learners on the socio-political structure of the Arabs through the ages
5. To acquaint the students with the administrative traits of the pious caliphs.

Graduate Attributes:

1. Creativity
2. Learning how-to-learn skills
3. Value inculcation

UG SEMESTER-VI							
COURSE LEVEL: 300-399				CONTACT HOURS: 60			
Sl. No.	Paper Code	Status/ Paper Type	Title of the Paper	Credit	Internal Marks	Final Marks	Total
12	MAJOR ARA 305	COMPULSORY	ARABIC PROSE AND POETRY-IV	4	20	80	100

UNIT-I **(15 classes)** PROSE			
Sl. No.	Title	Selected from the Book	Name of the Author/ Publisher
1	الكأس الأولى	النظرات	المنفلوطي
2	ربي لمن خلقت هذا النعيم	ما تراه العيون	محمود تيمور
3	مرتا البانية	دمعة و ابتسامة	جبران خليل جبران
4	نبذة عن حياة المؤلفين		
UNIT –II **(15 classes)** PROSE			
1	رسالة من مكة المكرمة	لمحات من أدب العرب ج 5	ابو الحسن علي الندوي
2	القميص الأحمر	لمحات من أدب العرب ج 5	الحسن البصري
3	أخلاق المؤمن		
4	نبذة عن حياة المؤلفين		
UNIT –III **(15 classes)** POETRY			
1	وما أنا بالساعي بفضل زمامها	ديوان الحماسة	حاتم الطائي
2	الى أمي	ديوان محمود درويش	محمود درويش
3	العلم ثروة أمة و يسار	ديوان جميل صدقي الزهاوي	جميل صدقي الزهاوي
4	نبذة عن حياة المؤلفين		
UNIT-IV **(15 classes)** POETRY			
1	اوجب الواجبات إكرام أمي	ديوان معروف الرصافي	معروف الرصافي
2	وما بعض الإقامة في ديار	ديوان الحماسة	قيس بن الخطيم
3	الرشد أجمل سيرة يا أحمد	ديوان احمد شوقي	احمد شوقي
4	نبذة عن حياة المؤلفين		

Reading References:

1. لمحات من أدب العرب، نشرت من قسم اللغة العربية و آدابها بجامعة غوهاتي
2. ديوان الحماسة لأبي تمام
3. النظرات لمصطفى لطفي المنفلوطي
4. دمعة وابتسامة لجبران خليل جبران
5. ديوان جميل صدقي الزهاوي
6. ديوان محمود درويش
7. ديوان معروف الرصافي

Course Objectives:

To teach the students about the cultural heritage and socio-cultural beliefs of the Arabs.

Learning Outcomes:

1. To use Arabic literature to instill moral and ethical principles in learners.
2. To present the learner with opportunity to appreciate modern and contemporary Arabic literature.
3. To give the learner the ability to understand the concepts expressed by contemporary poets and authors and their contribution to Arabic literature.
4. To investigate the history and evolution of Arabic literature listing the notable writers.
5. To determine the similarities and contrasts between classical Arabic literature and Modern Arabic literature.

Graduate Attributes:

1. Creativity
2. Value inculcation
3. Critical thinking
4. Multi-cultural competence and inclusive spirit
5. Value inculcation

UG SEMESTER-VI

COURSE LEVEL: 300-399	CONTACT HOURS: 60

Sl. No.	Paper Code	Status/ Paper Type	Title of the Paper	Credit	Internal Marks	Final Marks	Total
13	MAJOR ARA-306	(Disciplinary Elective)	FUNCTIONAL ARABIC-III	4	20	80	100

UNIT-I **(15 classes)**

Sl. No.	Title	Selected from the book	Name of the Author/Publisher
1	في الفصل	اللغة العربية الوظيفية	المجلس القومي لترويج اللغة الإردية، نيو دلهي
2	ترحيب صديق		
3	في المستشفى		
4	الغابات	اللغة العربية لغير الناطقين بها	جمعية الدعوة الإسلامية

UNIT –II **(15 classes)**

1	رحلة إلى دلهي	القرأة الواضحة ج 2	مولانا وحيد الزمان القاسمي
2	فن المراسلة	اللغة العربية الوظيفية	المجلس القومي لترويج اللغة الإردية، نيو دلهي
3	المكتبة العامة		
4	مكانة المرأة في الإسلام		

UNIT –III **(15 classes)**

1	من أخلاق المسلمين	القرأة العربية	عبد القدوس القاسمي ، محمد ساجد القاسمي
2	في المطعم	اللغة العربية الوظيفية	المجلس القومي لترويج اللغة الإردية، نيو دلهي
3	تسوق		
4	الكهرباء		

UNIT-IV **(15 classes)**

1	مكالمة هاتفية	اللغة العربية الوظيفية	المجلس القومي لترويج اللغة الإردية، نيو دلهي
2	العلوم التكنولوجيا		
3	في فندق		
4	حلم البخيل	اللغة العربية لغير الناطقين بها ج 3	جمعية الدعوة الإسلامية

Reading References:

1. اللغة العربية لغير الناطقين بها، جمعية الدعوة الإسلامية
2. اللغة العربية الوظيفية، المجلس القومي لترويج اللغة الإردية، نيو دلهي
3. القرأة العربية، عبد القدوس القاسمي ، محمد ساجد القاسمي
4. القرأة الواضحة ، مولانا وحيد الزمان القاسمي

Course Objectives:

To develop communicative skills in Arabic and to inculcate the values of communications among the students.

Learning outcomes:

1. To acquaint the reader with Arabic business jargon.
2. To raise knowledge of diverse Arabic documents.
3. To increase the ability to translate several widely-used papers from Arabic to English and the other way around.
4. To become more accustomed to regular conversations in the areas of business and industry.
5. To develop the communicating skill in Arabic among the learners.

Graduate Attributes:

1. Creativity
2. Communication skill
3. Learning how to learn skill
4. Value inculcation

UG SEMESTER-VI							
COURSE LEVEL: 300-399			CONTACT HOURS: 60				
Sl. No.	Paper Code	Status/ Paper Type	Title of the Paper	Credit	Internal Marks	Final Marks	Total
14	MAJOR ARA-307	(Disciplinary Elective)	HISTORY OF MODERN ARABIC LITERATURE-I	4	20	80	100

HISTORY OF MODERN ARABIC LITERATURE-I

UNIT-I: DEVELOPMENT OF POETRY IN MODERN ARABIC LITERATURE (15 classes)

- ✓ Mahmoud Sami Al-Baroudi
- ✓ Hafiz Ibrahim
- ✓ Ahmad Shauqi
- ✓ Maruf Rusafi

UNIT-II : DEVELOPMENT OF NOVEL IN ARABIC LITERATURE (15 classes)

- ✓ Muhammad Husain Haykal
- ✓ Naguib Mahfouz
- ✓ Taha Hussain
- ✓ Tayyib Saleh

UNIT-III: DEVELOPMENT OF SHORT STORY IN ARABIC LITERATURE (15 classes)

- ✓ Mahmud Taimur
- ✓ Mustafa Lutfi Manfaluti
- ✓ Yusuf Idris
- ✓ Ahsan Abdul Quddus

UNIT-IV : DEVELOPMENT OF DRAMA IN ARABIC LITERATURE (15 classes)

1. Marun Al Naqqash
2. Taufiq Al Hakim
3. Ali Ahmad Ba-kathir
4. Mikhail Naimy

Reading References:

1. A Literary History of the Arabs by R. A. Nicholson
2. Modern Arabic Literature by Prof. Ismat Mahdi
3. A History of the Arabic Literature by Clement Huart
4. تاريخ الأدب العربي لأحمد حسن الزيات
5. تاريخ آداب العرب لمصطفى صادق الرافعي
6. تاريخ آداب اللغة العربية لجرجي زيدان
7. تاريخ الأدب العربي لشوقي ضيف

Course Objectives:

To acquaint the students with the literary developments of the Arabs during pre-Islamic and early Islamic period and to inculcate the values in them.

Learning outcomes:

1. To comprehend the unique qualities of Arabic literature through the ages.
2. To gauge the breadth of the many literary and poetic forms in Arabic literature
3. To introduce students to the aesthetic, cultural, and social facets of Arabic literature during the chosen eras.
4. To comprehend Arab literary traditions to get analytical and comprehensive understanding of literary works, writers, trends, etc.
5. Too emphasize the connection between Bedouin life in Arabia and Arabic literature from pre-Islamic to early Islamic period.

Graduate Attributes:

1. Analytical reasoning / thinking
2. Research related skills
3. Multi-cultural competence and inclusive spirit
4. Value inculcation

UG SEMESTER-VI							
COURSE LEVEL: 300-399				CONTACT HOURS: 60			
Sl. No.	Paper Code	Status/ Paper Type	Title of the Paper	Credit	Internal Marks	Final Marks	Total
15	MAJOR ARA-308	(Disciplinary Elective)	HISTORY OF THE ARABS (UMAYYAD AND ABBASID PERIOD)	4	20	80	100

HISTORY OF THE ARABS
(UMAYYAD AND ABBASID PERIOD)

UNIT-I: (15 classes)

- ✓ Mu’awiyah and the establishment of the Umayyad dynasty
- ✓ Yazid bin Mu’awiyah
- ✓ Abdul Malik Bin Marwan
- ✓ Waleed Bin Abdul Malik,

UNIT-II (15 classes)

- ✓ Umar Bin Abdul Aziz
- ✓ Hisham Bin Abdul Malik,
- ✓ Administration under the Umayyads
- ✓ Downfall of the Umayyad Dynasty

UNIT-III (15 classes)

- ✓ Abul Abbas As Saffah and the establishment of the Abbasid dynasty
- ✓ Abu Jafar al-Mansur
- ✓ Harun Al-Rashid
- ✓ Al-Amin and Al-Mamun

UNIT-IV (15 classes)

- ✓ Rise and fall of the Barmakids
- ✓ Expansion of Islamic Empire under Abbasid Dynasty
- ✓ Educational , scientific and literary developments
- ✓ Downfall of the Abbasid dynasty

Reading References:

1. A Study of Islamic History by K. Ali
2. Concise History of Muslim World by Rafi Ahmad Fidai
3. History of the Arabs by Philip K. Hitti
4. Study materials developed by the Department of Arabic, Gauhati University
5. Islam: Its concepts and History by Syed Mahmudunnasir
6. الموجز في تاريخ الإسلام: تاليف الشيخ غلام رسول مهر والتعريب للدكتور عبيد الرحمان الطيب
7. A Short History of the Saracens by Syed Ameer Ali

Course Objectives:

To present opposing viewpoints and alternative hypothesis on various issues; effectively apply reading, writing, critical thinking and analytical skills to address significant issues in the political world.

Learning Outcomes:

1. To introduce the students with the culture and history of the Arabs.
2. To comprehend historical and cultural context of the evolution of Islam and its expansion.
3. To educate the learners on the socio-political structure of the Arabs through the ages
4. To acquaint the students with the administrative traits of the Umayyad and Abbasid caliphs.
5. To acquaint the students with the scientific and literary progress during the Umayyad and Abbasid regime.

Graduate Attributes:

1. Analytical reasoning / Thinking
2. Research related skills
3. Multicultural competence and inclusive spirit
4. Value inculcation

Four-Year Undergraduate Programme
Subject: Assamese
Semester: First
Course Name: অসমীয়া ভাষা আৰু সাহিত্যৰ ইতিহাস (১৮২৬ চন পৰ্যন্ত)
Core Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399

[এই কাকতখনৰ গোট-১ত অসমীয়া ভাষা-সাহিত্যৰ বুৰঞ্জী (খৃঃ ১৮২৬লৈ) সম্বন্ধে পৰিচয়মূলক অধ্যয়ন কৰিব লাগিব। ঠিক তেনেদৰে গোট-২, গোট-৩ আৰু গোট-৪ত যুগ অনুযায়ী দাঙি ধৰা নিৰ্বাচিত পাঠসমূহ অধ্যয়ন কৰাৰ জৰিয়তে সেই সেই প্ৰতিটো যুগৰ ভাষিক আৰু সাহিত্যিক পটভূমিৰ লগতে বৈশিষ্ট্যসমূহৰ লগত পৰিচয় হ’ব লাগিব।]

Unit No.	Unit Content	No. of Classes	Marks
১	অসমীয়া ভাষা আৰু সাহিত্যৰ ইতিহাস (১৮২৬ চন পৰ্যন্ত) : ভাষিক আৰু সাহিত্যিক পটভূমি, সাহিত্যিক আৰু সাহিত্য-কৰ্ম	১২	২০
২	প্ৰত্ন (উদ্ভৱকালীন/প্ৰত্ন/মিশ্ৰ) অসমীয়া আৰু প্ৰাক্-শংকৰী যুগৰ সাহিত্য **নিৰ্বাচিত পাঠঃ** লোকগীতঃ ‘একবাৰ হৰি বোল মন ৰচনা’ ‘কানাই পাৰ কৰা হে’ চৰ্যাগীতঃ ‘উষ্চা উষ্চা পৰৱত তই সবৰী বালী’ বড়ু চণ্ডী দাসঃ ‘বিজয় নাম বেলাতে’ (‘জন্মখণ্ড’, *শ্ৰীকৃষ্ণ কীৰ্তন*) হেম সৰস্বতীঃ *প্ৰহলাদ চৰিত* (সম্পূৰ্ণ) মাধৱ কন্দলিঃ ‘লংকাৰ বিৱৰণ’ (‘সুন্দৰাকাণ্ড’, *ৰামায়ণ*)	১২	২০
৩	শংকৰদেৱকালীন সাহিত্য **নিৰ্বাচিত পাঠঃ** শংকৰদেৱঃ ‘নাৰায়ণ কাহে ভকতি কৰো তেৰা’ (বৰগীত) মাধৱদেৱঃ ‘চোৰধৰা’ (ঝুমুৰা) ৰাম সৰস্বতীঃ ‘ভীমচৰিত’ (বধকাব্য) সুকবি নাৰায়ণ দেৱঃ বেউলাৰ নৃত্য (*পদ্মা পুৰাণ*)	১২	
৪	শংকৰদেৱৰ পৰৱৰ্তীকালৰ সাহিত্য **নিৰ্বাচিত পাঠঃ** ভট্টদেৱঃ ‘অৰ্জুনৰ বিষাদ যোগ’ (*কথাগীতা*) মহেশ্বৰ নেওগ (সম্পা.): ‘গুৰু শিষ্যৰ মণিকাঞ্চন সংযোগ’(*গুৰু চৰিত কথা*) সূৰ্যকুমাৰ ভূঞা (সম্পা.): ‘অসমৰ ৰণোদ্যম’ (*সাতসৰী অসম বুৰঞ্জী*) সুকুমাৰ বৰকাথঃ ‘হাতীৰ লক্ষণ’ (*হস্তীবিদ্যাৰ্ণৱ*)	১২	

পঠন-সামগ্ৰীঃ

অসমীয়া সাহিত্যৰ চানেকি (প্ৰথম, দ্বিতীয়, তৃতীয় খণ্ড): হেমচন্দ্ৰ গোস্বামী
অসমীয়া সাহিত্যৰ বুৰঞ্জী: দেৱেন্দ্ৰ নাথ বেজবৰুৱা
অসমীয়া সাহিত্যৰ বুৰঞ্জী: ডিম্বেশ্বৰ নেওগ
অসমীয়া সাহিত্যৰ সমীক্ষাত্মক ইতিবৃত্ত: সত্যেন্দ্ৰনাথ শৰ্মা
অসমীয়া সাহিত্যৰ ৰূপৰেখা: মহেশ্বৰ নেওগ
অসমীয়া সাহিত্যৰ বুৰঞ্জী (প্ৰথম খণ্ড): বিশ্বেশ্বৰ হাজৰিকা (সম্পা.)
অসমীয়া সাহিত্যৰ বুৰঞ্জী (দ্বিতীয় খণ্ড): শিৱনাথ বৰ্মন (সম্পা.)
পুৰণি অসমীয়া সাহিত্যৰ প্ৰাঞ্জল ধাৰা: তিলক চন্দ্ৰ মজুমদাৰ
বৈষ্ণৱ যুগৰ অসমীয়া সাহিত্য: ভুৱনেশ্বৰী বৈশ্য
অসমীয়া পাঞ্চালী গীত: নবীন চন্দ্ৰ শৰ্মা
চৰ্য্যাপদ: পৰীক্ষিত হাজৰিকা
গোৱালপৰীয়া লোকগীত সংগ্ৰহ: বীৰেন্দ্ৰনাথ দত্ত (সম্পা.)
অসমীয়া লোকগীত সঞ্চয়ন: হেমন্তকুমাৰ শৰ্মা (সম্পা.)
শ্ৰীকৃষ্ণ কীৰ্তন: লীলাৱতী শইকীয়া বৰা (সম্পা.)
অসমৰ বৈষ্ণৱ ধৰ্ম আৰু সাহিত্য: কনক চন্দ্ৰ চহৰীয়া
মধ্যযুগৰ অসমীয়া ভাষাৰ ৰূপতাত্ত্বিক বিশ্লেষণ: লক্ষ্মী হাজৰিকা
স্নাতকৰ কথাবন্ধ: মহেশ্বৰ নেওগ (সম্পা.)
কবিতা মঞ্জৰী: নিৰ্মলপ্ৰভা বৰদলৈ
অসমীয়া কথা সাহিত্য: বিৰিঞ্চি কুমাৰ বৰুৱা
Assamese: Its Formation And Development: Banikanta Kakati
Aspect of Early Assamese Literature: Banikanta Kakati (Ed.)

Graduate Attributes: জ্ঞান-আধাৰ, সমাজমুখিতা আৰু পৰিৱেশমুখিতা
Course Objective: এই কাকতখনৰ উদ্দেশ্য আৰম্ভণিৰ পৰা ১৮২৬ খ্ৰীষ্টাব্দলৈ অসমীয়া ভাষা সাহিত্যৰ উদ্ভৱ আৰু বিকাশ সম্বন্ধে আভাস দিয়া।
Learning Outcome: কাকতখনৰ জৰিয়তে ছাত্ৰ-ছাত্ৰীসকলে পুৰণি আৰু মধ্যযুগীয় অসমীয়া সাহিত্যৰ গীত-পদ, কাব্য আৰু নাটৰ স্বৰূপ জানিব পাৰিব, লগতে তদানীন্তন অসমীয়া ভাষা সম্পৰ্কে ধাৰণা লাভ কৰিব পাৰিব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Second
Course Name: অসমীয়া ভাষা আৰু সাহিত্যৰ ইতিহাস (১৮২৬ চনৰ পৰা ২০০০ চনলৈ)
Core Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399

[এই কাকতখনৰ গোট-১ত অসমীয়া ভাষা-সাহিত্যৰ বুৰঞ্জী (খৃঃ ১৮২৬-২০০০) সম্বন্ধে পৰিচয়মূলক অধ্যয়ন কৰিব লাগিব। ঠিক তেনেদৰে গোট-২, গোট-৩ আৰু গোট-৪ত যুগ অনুযায়ী দাঙি ধৰা নিৰ্বাচিত পাঠসমূহ অধ্যয়ন কৰাৰ জৰিয়তে সেই সেই প্ৰতিটো যুগৰ ভাষিক আৰু সাহিত্যিক পটভূমিৰ লগতে বৈশিষ্ট্যসমূহৰ সৈতে পৰিচয় হ'ব লাগিব।]

Unit No.	Unit Content	No. of Classes	Marks
১	অসমীয়া ভাষা আৰু সাহিত্যৰ ইতিহাস (১৮২৬-২০০০) : ভাষিক আৰু সাহিত্যিক পটভূমি, সাহিত্যিক আৰু সাহিত্য-কৰ্ম	১২	২০
২	**নিৰ্বাচিত পাঠঃ** মাইলচ্ ব্ৰন্সনঃ 'আভাস' (অচমিয়া-ইংৰাজী অভিধান) আনন্দৰাম ঢেকিয়াল ফুকনঃ 'ইংলেণ্ডৰ বিৱৰণ' হেমচন্দ্ৰ বৰুৱাঃ 'অসমত স্ত্ৰী শিক্ষা' কমলাকান্ত ভট্টাচাৰ্যঃ 'জাতীয় গৌৰৱ' চন্দ্ৰকুমাৰ আগৰৱালাঃ 'প্ৰকৃতি' লক্ষ্মীনাথ বেজবৰুৱাঃ 'বৰবৰুৱাৰ বিমান বিহাৰ' সত্যনাথ বৰাঃ 'জীৱনৰ অমিয়া'	১২	২০
৩	**নিৰ্বাচিত পাঠঃ** যতীন্দ্ৰনাথ দুৱৰাঃ 'পোহৰ' (কথা-কবিতা) ৰঘুনাথ চৌধাৰীঃ 'অন্তিম জ্যোতি' ৰজনীকান্ত বৰদলৈঃ 'মিৰি-জীয়ৰী' জ্যোতিপ্ৰসাদ আগৰৱালাঃ 'নিমাতী কইনা'	১২	২০
৪	**নিৰ্বাচিত পাঠঃ** চৈয়দ আব্দুল মালিকঃ 'কাঠফুলা' (গল্প) ভবেন্দ্ৰ নাথ শইকীয়াঃ 'গহ্বৰ' বাণীকান্ত কাকতিঃ 'কবিৰ অহৈতুকী প্ৰীতি' নৱকান্ত বৰুৱাঃ 'এটা প্ৰেমৰ পদ্য' নীলমণি ফুকনঃ 'কেনে আছোঁ মোক নুসুধিবা'	১২	২০

পঠন-সামগ্ৰীঃ

অৰুনোদই:	মহেশ্বৰ নেওগ (সম্পা.)
অচমিয়া আৰু ইংৰাজী অভিধান:	মাইলছ্ ব্ৰন্সন
অসমীয়া সাহিত্যৰ ৰূপৰেখা:	মহেশ্বৰ নেওগ
অসমীয়া সাহিত্যৰ সমীক্ষাত্মক ইতিবৃত্ত:	সত্যেন্দ্ৰনাথ শৰ্মা
অসমীয়া সাহিত্যৰ পূৰ্ণ ইতিহাস:	হৰিনাথ শৰ্মা দলৈ
অসমীয়া ব্যাকৰণ আৰু ভাষাতত্ত্ব:	কালিৰাম মেধি

অসমীয়া ভাষাৰ উদ্ভৱ সমৃদ্ধি আৰু বিকাশ: উপেন্দ্ৰনাথ গোস্বামী
অসমীয়া ভাষাৰ ৰূপতত্ত্ব: লীলাৱতী শইকীয়া বৰা
উদ্ভৱকালীন অসমীয়া ভাষা: সুবাসনা মহন্ত
মধ্যযুগৰ অসমীয়া ভাষাৰ ব্যাকৰণ: দীপ্তি ফুকন পাটগিৰি
সাৰথি: সত্যনাথ বৰা
স্নাতকৰ কথাবন্ধ: মহেশ্বৰ নেওগ (সম্পা.)
সঞ্চয়ন: মহেশ্বৰ নেওগ (সম্পা.)
জ্যোতিপ্ৰসাদ ৰচনাৱলী: সত্যেন্দ্ৰনাথ শৰ্মা (সম্পা.)
অসমীয়া সাহিত্যৰ বুৰঞ্জী (পঞ্চম খণ্ড): ৰঞ্জিৎ কুমাৰ দেৱগোস্বামী (সম্পা.)
অসমীয়া সাহিত্যৰ বুৰঞ্জী (ষষ্ঠ খণ্ড): হোমেন বৰগোহাঞি (সম্পা.)
আধুনিক অসমীয়া কবিতা: কামালুদ্দিন আহমেদ
আধুনিক কবিতা: হৰেকৃষ্ণ ডেকা
শ্ৰেষ্ঠ অসমীয়া চুটিগল্প: শৈলেন ভৰালী (সম্পা.)
এশবছৰৰ অসমীয়া উপন্যাস: নগেন ঠাকুৰ (সম্পা.)
প্ৰসঙ্গঃ ঊনবিংশ শতিকাৰ অসমীয়া সাহিত্য: ভীমকান্ত বৰুৱা
সাহিত্য আৰু প্ৰেম: বাণীকান্ত কাকতি
ৰঘুনাথ চৌধাৰীৰ কাব্য বিচাৰ: উমেশ ডেকা আৰু নীলমোহন ৰায় (সম্পা.)
কবিতা মঞ্জৰী: নিৰ্মলপ্ৰভা বৰদলৈ (সম্পা.)
চন্দ্ৰকুমাৰৰ কবিতা সমগ্ৰ: নগেন শইকীয়া (সম্পা.)
Studies in Assamese Vocabulary: Ramesh Pathak
The Origin and Growth of the Assamese Language: Dimbeswar Neog

Graduate Attributes: জ্ঞান-আধাৰ, সমাজমুখিতা আৰু পৰিৱেশমুখিতা
Course Objective: এই কাকতখনৰ উদ্দেশ্য ১৮২৬ খ্ৰীষ্টাব্দৰ পৰৱৰ্তী সময়ৰ পৰা ২০০০ চনলৈ অসমীয়া ভাষা-সাহিত্যৰ ইতিহাস আৰু ধাৰাসমূহৰ বিষয়ে আভাস দিয়া।
Learning Outcome: এই কাকতখনৰ জৰিয়তে ছাত্ৰ-ছাত্ৰীসকলে বৃটিছকালীন মিছনেৰীসকলে ৰচনা কৰা অসমীয়া সাহিত্যৰ লগতে তাৰ পৰৱৰ্তী ৰোমান্টিক আৰু আধুনিক অসমীয়া সাহিত্যৰ বিষয়ে জানিব পাৰিব, তদুপৰি সেই সময়ছোৱাৰ ভাষাৰ বিষয়ে ধাৰণা লাভ কৰিব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Third
Course Name: অসমৰ সংস্কৃতি অধ্যয়ন
Core Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399

[এই কাকতখনৰ গোট-১ত অসমৰ অধিবাসী আৰু সংস্কৃতিৰ স্বৰূপ সম্বন্ধে এটি সাধাৰণ ধাৰণা লাভ কৰিব লাগিব। সেইদৰে গোট-২, গোট-৩ আৰু গোট-৪ত যথাক্ৰমে অসমৰ লোকসংস্কৃতি, জনজাতীয় সংস্কৃতি আৰু মাৰ্গীয় বা শাস্ত্ৰীয় সংস্কৃতিৰ লগত পৰিচয় হোৱাৰ লগতে নিৰ্বাচিত উপাদানসমূহৰ বিষয়ে জানিব লাগিব।]

Unit No.	Unit Content	No. of Classes	Marks
১	অসমৰ মানুহ আৰু সংস্কৃতি সংস্কৃতিৰ স্বৰূপ, সংজ্ঞা আৰু শ্ৰেণীবিভাগ অসমৰ অধিবাসীঃ আৰ্য (নৰ্দিক), মঙ্গোলীয় (তিব্বতবৰ্মী), অষ্ট্ৰিক, দ্ৰাবিড়	১২	২০

২	অসমৰ লোক সংস্কৃতি
	মৌখিক গীত-পদঃ দেৱ-দেৱীৰ নাম, বিহুগীত;
	লোকাচাৰঃ জন্ম, বিবাহ আৰু মৃত্যুৰ লগত জড়িত;
	উত্সৱ-পাৰ্বণঃ কৃষিৰ লগত জড়িত;
	ধৰ্মীয় পৰম্পৰাঃ শৈৱ, শাক্ত আৰু বৈষ্ণৱ;
	পৰিৱেশ্য কলাঃ পুতলা নাচ, ওজা পালি, খুলীয়া ভাউৰীয়া, কুশানগান, ভাৰীগান, ঢুলীয়া;
	হস্তশিল্প আৰু লোক-কলা, স্থাপত্য-ভাস্কৰ্য
		১২	২০

৩	অসমৰ জনজাতীয় সংস্কৃতি পাৰ্বত্য আৰু ভৈয়ামৰ জনজাতি; আৰ্য্যভূত আৰু অনাৰ্য্যভূত; বড়ো, ৰাভা, কাৰ্বি, মিচিং, সোণোৱাল কছাৰী	১২	২০
৪	অসমৰ মাৰ্গীয় (শাস্ত্ৰীয়) সংস্কৃতি সত্ৰীয়া সংস্কৃতিঃ নৃত্য, গীত, বাদ্য, ভাওনা, মুখাশিল্প, পুথিচিত্ৰ, ভাস্কৰ্য অৰ্দ্ধমাৰ্গীয়ঃ ব্যাসসঙ্গীত, দেৱদাসী নৃত্য	১২	২০

পঠন-সামগ্ৰীঃ

অসমীয়া জাতিৰ ইতিবৃত্তঃ	অসম সাহিত্য সভা
অসমৰ লোক সংস্কৃতিঃ	বিৰিঞ্চি কুমাৰ বৰুৱা
অসমীয়া ভাষা আৰু সংস্কৃতিঃ	বিৰিঞ্চি কুমাৰ বৰুৱা
অসমৰ সংস্কৃতিঃ	লীলা গগৈ
অসমৰ মানুহৰ নৃ-বৈজ্ঞানিক পৰিচয়ঃ	ভুবন মোহন দাস
অসমৰ জনজাতিঃ	প্ৰমোদ চন্দ্ৰ ভট্টাচাৰ্য (সম্পা.)
পুৰণি কামৰূপৰ ধৰ্মৰ ধাৰাঃ	বাণীকান্ত কাকতি
অসমৰ লোক সংস্কৃতিঃ	নিৰ্মলপ্ৰভা বৰদলৈ

অসমীয়া লোক সংস্কৃতিৰ আভাসঃ	নবীন চন্দ্ৰ শৰ্মা
লোক সংস্কৃতিঃ	নবীন চন্দ্ৰ শৰ্মা
অসমীয়া সংস্কৃতি অধ্যয়ন	কনক চন্দ্ৰ চহৰীয়া
অসমৰ সংস্কৃতি সমীক্ষাঃ	নবীন চন্দ্ৰ শৰ্মা আৰু কনক চন্দ্ৰ চহৰীয়া (সম্পা.)
দৰঙী লোকসাহিত্যৰ ৰূপৰেখাঃ	কনক চন্দ্ৰ চহৰীয়া
পুৰণি অসমীয়া সমাজ আৰু সংস্কৃতিঃ	মহেশ্বৰ নেওগ
অসমৰ জনজাতি আৰু সংস্কৃতিঃ	মলিনা দেৱী ৰাভা (সম্পা.)
সংমিশ্ৰণত অসমীয়া সংস্কৃতিঃ	আব্দুছ ছাত্তাৰ
অসমৰ জনজাতীয় সামাজিক লোকাচাৰঃ	উপেন ৰাভা হাকাচাম আৰু প্ৰফুল্ল কুমাৰ নাথ (সম্পা.)
অসমীয়া সংস্কৃতিঃ	হৰিপ্ৰসাদ নেওগ আৰু লীলা গগৈ (সম্পা.)
অসমীয়া জাতি আৰু সংস্কৃতিঃ	পৰমানন্দ ৰাজবংশী (সম্পা.)
সত্ৰ সংস্কৃতিৰ ৰূপৰেখাঃ	কেশৱানন্দ দেৱ গোস্বামী
অসমীয়া সংস্কৃতিলৈ জনজাতীয় বৰঙনিঃ	নাহেন্দ্ৰ পাদুন
অসমত শৈৱ সাধনা আৰু শৈৱ সাহিত্যঃ	হৰিনাথ শৰ্মা দলৈ
অসমৰ জনকৃষ্টিঃ	যোগেশ দাস
অসমৰ জনজাতীয় সংস্কৃতিঃ	উপেন ৰাভা হাকাচাম
অসমীয়া পুথিচিত্ৰঃ	নৰেন কলিতা
জনজাতি আৰু গাৰো জনজাতিঃ	বিমল মজুমদাৰ
Bihu: Springtime festival of Assam:	Prafulla Dutta Goswami
History and Civilization of the people of Assam:	Pratap Ch. Choudhury
The Assamese:	Audrey Cantlie

Graduate Attributes: জ্ঞান-আধাৰ, একতা, আৰু সমাজমুখিতা

Course Objective: এই কাকতখনৰ উদ্দেশ্য সংস্কৃতিৰ বিষয়ে সাধাৰণ ধাৰণা দিয়াৰ লগতে অসমৰ মানুহৰ জীৱন-ধাৰণ সম্বন্ধে আভাস দিয়া।

Learning Outcome: এই কাকতখন অধ্যয়ন কৰিলে অসমৰ মানুহ আৰু তেওঁলোকৰ সংস্কৃতিগত আচৰণ আৰু ৰূপ তথা সেইবোৰৰ সমল সম্বন্ধে জনাৰ লগতে অসমীয়া সংস্কৃতিৰ স্বৰূপ আৰু বৈশিষ্ট্যৰ বিষয়ে জানিব পৰা যাব।

Theory Credit: 4

Practical Credit: 0

No of required classes: 48

No of contact classes: 40

No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Fourth
Course Name: ভাষাবিজ্ঞান পৰিচয়
Core Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	ভাষা আৰু ভাষা-বিজ্ঞানৰ আদিপাঠঃ ভাষাৰ জন্ম-কাহিনী, মানৱীয় ভাষাৰ বৈশিষ্ট্য (হকেট), ভাষা-বিজ্ঞানৰ ইতিহাস আৰু বিভিন্ন শাখা-প্ৰশাখা (বৰ্ণনামূলক, ঐতিহাসিক, তুলনামূলক, প্ৰায়োগিক), ভাষাৰ শ্ৰেণী-বিভাজনঃ বংশগত (ভাষা পৰিয়ালৰ প্ৰাথমিক ধাৰণা) আৰু আকৃতিগত- (বিশ্লেষাত্মক, সংশ্লেষণাত্মক)	১২	২০
২	ধ্বনিবিজ্ঞান আৰু ধ্বনিতত্ত্বৰ আদিপাঠঃ ধ্বনি ,ধ্বনি-উত্পাদন প্ৰক্ৰিয়া; ধ্বনিগোটঃ বৰ্ণ আৰু উপধ্বনিৰ ধাৰণা, বিভাজ্য আৰু অবিভাজ্য ধ্বনি, স্বৰধ্বনি আৰু ব্যঞ্জন ধ্বনি, আন্তঃৰাষ্ট্ৰীয় ধ্বনিলিপিৰ পৰিচয়, ৰূপধ্বনিসাপেক্ষতা	১২	২০
৩	ৰূপতত্ত্ব আৰু বাক্যতত্ত্বৰ আদিপাঠঃ ৰূপ, প্ৰাকৃতি, মুক্ত আৰু বদ্ধ প্ৰাকৃতিঃ প্ৰত্যয়, শব্দমূল; শব্দসাধনৰ সৰ্গ আৰু শব্দৰূপৰ সৰ্গ; ব্যাকৰণগততা (Grammaticality), বাক্য আৰু অৰ্থৰ মাজৰ সম্পৰ্ক, বাক্যতাত্ত্বিক উপাদানঃ শব্দক্ৰম, সহ-সম্পৰ্ক (Co-occurrence), বাক্যগত উপাদান।	১২	২০
৪	ভাষাৰ ভিন্নৰূপঃ উপভাষা, ব্যক্তিভাষা, ভাষা-সম্প্ৰদায়, পৰিস্থিতি-নিৰ্দ্ধাৰক উপভাষা; ভাষা-ভিন্নতাৰ কাৰকঃ আঞ্চলিক, ভৌগোলিক, সামাজিক; ভাষা-সংযোগঃ ভাষা-ঋণ, পিজিন, ক্ৰেওল (প্ৰথমিক ধাৰণা)	১২	২০

পঠন-সামগ্ৰীঃ

অসমীয়া ব্যাকৰণৰ মৌলিক বিচাৰঃ	গোলোক চন্দ্ৰ গোস্বামী
আধুনিক ভাষাবিজ্ঞান পৰিচয়ঃ-	ফণীন্দ্ৰ নাৰায়ণ দত্তবৰুৱা
ভাষা আৰু ভাষাচিন্তাঃ-	নগেন ঠাকুৰ
ভাষাতত্ত্বঃ-	দীপ্তি ফুকন পাটগিৰি
ভাষাবিজ্ঞানঃ-	উপেন্দ্ৰ নাথ গোস্বামী
ভাষাবিজ্ঞানৰ জিলিকনিঃ-	প্ৰণীতা দেৱী
ভাষাবিজ্ঞান প্ৰৱেশঃ-	বসন্ত কুমাৰ ভট্টাচাৰ্য
ভাষাৰ্থ বিজ্ঞানঃ	ভগৱান মৰল
A Short Story of Linguistics:	R.H. Robins

Contemporary Linguistics: An Introduction:	Eds. William O’Grady, Michael Dobrovolsky and Francis Katamba
Linguistics:	David Crystal

Graduate Attributes: জ্ঞান-আধাৰ, অনুসন্ধান আৰু যোগাযোগ-কৌশল
Course Objective: এই কাকতখনৰ উদ্দেশ্য ভাষাৰ বিজ্ঞানসন্মত ৰূপ আৰু ভাষাবিজ্ঞানৰ ধাৰাসমূহৰ বিষয়ে আভাস দিয়া।
Learning Outcome: এই কাকতখন অধ্যয়নৰ কৰিলে ছাত্ৰ-ছাত্ৰীসকলে ভাষাৰ উদ্ভৱ আৰু বিকাশৰ বিষয়ে জনাৰ লগতে ইয়াৰ বিজ্ঞানসন্মত ৰূপসমূহ তথা ভাষাবিজ্ঞানৰ ধাৰাসমূহৰ বিষয়ে অৱগত হ’ব পাৰিব। তদুপৰি তেওঁলোকে ভাষাৰ ভিন্নতা, পৰিৱৰ্তন আদি সম্বন্ধেও জানিব পাৰিব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Fourth
Course Name: অসমীয়া কবিতা
Elective Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

[ছাত্ৰ ছাত্ৰীসকলে এই কাকতৰ যোগেদি অসমীয়া কবিতাৰ প্ৰাচীন যুগৰ পৰা আধুনিক যুগলৈ পৰিচয় হ'ব পাৰিব৷ কাকতখনৰ প্ৰথম গোটত পুৰণি অসমীয়া কবিতা, দ্বিতীয় গোটত প্ৰাক্-ৰোমাণ্টিক আৰু ৰোমাণ্টিক (প্ৰথম প্ৰবাহৰ) কবিতা, তৃতীয় গোটত প্ৰধান ৰোমাণ্টিক কবিসকল (দ্বিতীয় প্ৰবাহৰ) কবিতাক প্ৰতিনিধিত্বমূলকভাৱে স্থান দিয়া হৈছে৷ কাকতখনৰ চতুৰ্থ গোটত ছাত্ৰ-ছাত্ৰীসকলে অসমীয়া আধুনিক কবি নৱকান্ত বৰুৱা, অজিৎ বৰুৱা আৰু নীলমণি ফুকনৰ কবিতা অধ্যয়ন কৰিব পাৰিব৷]

Unit No.	Unit Content	No. of Classes	Marks
১	মাধৱ কন্দলি : ৰামবিহীন অযোধ্যাৰ বৰ্ণনা (ৰামায়ণ, অযোধ্যা কাণ্ড) শংকৰদেৱ : শৰৎ বৰ্ণনা (ভাগৱত, দশম) দুৰ্গাবৰ : মায়া অযোধ্যাৰ সৃষ্টি (গীতিৰামায়ণ)	১২	২০
২	ভোলানাথ দাস : মেঘ লক্ষ্মীনাথ বেজবৰুৱা : মালতী চন্দ্ৰকুমাৰ আগৰৱালা : অজেয়	১২	২০
৩	ৰঘুনাথ চৌধাৰী : গোলাপ অম্বিকাগিৰী ৰায়চৌধুৰী : মোৰ বীণা দেৱকান্ত বৰুৱা : মনোৰমা	১২	২০
৪	নৱকান্ত বৰুৱা : পলস অজিৎ বৰুৱা : মনকুঁৱলী সময় নীলমণি ফুকন : ব্ৰহ্মপুত্ৰত সূৰ্যাস্ত	১২	২০

পঠন-সামগ্ৰীঃ

অসমীয়া সাহিত্যৰ বুৰঞ্জী (দ্বিতীয় খণ্ড) : শিৱনাথ বৰ্মন (সম্পা.)
অসমীয়া সাহিত্যৰ বুৰঞ্জী (পঞ্চম খণ্ড) : ৰঞ্জিৎ কুমাৰ দেৱ গোস্বামী (সম্পা.)
অসমীয়া সাহিত্যৰ বুৰঞ্জী (ষষ্ঠ খণ্ড) : হোমেন বৰগোহাঞি (সম্পা.)
আধুনিক অসমীয়া কবিতা : পূৰ্ণ ভট্টাচাৰ্য্য
আধুনিক অসমীয়া কবিতা : এম. কামালুদ্দিন আহমেদ
আধুনিক কবিতা : হৰেকৃষ্ণ ডেকা
সঞ্চয়ন : মহেশ্বৰ নেওগ (সম্পা.)
কবিতা মঞ্জৰী : নিৰ্মলপ্ৰভা বৰদলৈ (সম্পা.)

যোৱা শতিকাৰ কবিতাঃ অসমীয়া নৱন্যাসী সাহিত্যৰ পৰম্পৰা : দিলীপ বৰুৱা

Graduate Attributes: সমাজমুখিতা, পৰিৱেশমুখিতা, সহমৰ্মিতা
Course Objective: এই কাকতখনৰ উদ্দেশ্য পুৰণি অসমীয়া কবিতাৰ লগতে অসমীয়া ৰোমান্টিক আৰু আধুনিক কবিতাৰ বিষয়ে আভাস দিয়া।
Learning Outcome: এই কাকতখনৰ জৰিয়তে অসমীয়া কবিতাৰ ঐতিহ্যৰ বিষয়ে জনাৰ লগতে ইয়াৰ ধাৰা আৰু আন্দোলনসমূহৰ বিষয়ে জানিব পৰা যাব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Fourth
Course Name: অসমীয়া লিপিৰ পৰিচয়
Elective Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	লিপিৰ পৰিচয় আৰু ভাৰতীয় লিপি; অসমীয়া লিপিৰ উদ্ভৱ আৰু বিকাশ	১২	২০
২	অসমৰ শিলালিপিঃ নগাজৰী খনিকৰ গাঁৱৰ লিপি, সুৰেন্দ্ৰ বৰ্মাৰ উমাচল লিপি, ভূতি বৰ্মাৰ বৰগঙ্গা লিপি, হৰ্জ্জৰ বৰ্মাৰ তেজপুৰ লিপি, কানাই বৰশী বোৱা লিপি, মসুদ্ৰ পালৰ আমবাৰী লিপি, গছতলৰ লিপি	১২	২০
৩	অসমৰ তাম্ৰশাসনৰ লিপিঃ ভাস্কৰ বৰ্মাৰ ডুবি আৰু নিধনপুৰ শাসনৰ লিপি, হৰ্জ্জৰ বৰ্মাৰ হায়ুংথল লিপি, বনমাল বৰ্মাৰ তেজপুৰ আৰু পৰ্বতীয়া শাসনৰ লিপি, বলবৰ্মাৰ নগাঁও আৰু হাওৰাঘাট শাসনৰ লিপি	১২	২০
৪	অসমীয়া হাতেলিখা পুথিৰ লিপিঃ কায়থেলী লিপি, বামুণীয়া লিপি, গড়গঞা লিপি; হাতেলিখা পুথিৰ লিখন কলা, লেখন সামগ্ৰী আৰু পাঠ সমীক্ষাৰ সাধাৰণ ধাৰণা	১২	২০

পঠন-সামগ্ৰীঃ

অসমীয়া প্ৰাচীন লিপিঃ সৰ্বেশ্বৰ কটকী
অসমীয়া লিপিঃ উপেন্দ্ৰ নাথ গোস্বামী
অসমীয়া লিপিৰ পৰিচয়ঃ কনক চন্দ্ৰ চহৰীয়া
বিশ্বলিপিৰ ভূমিকাঃ নাৰায়ণ দাস
অসমীয়া লিপিতত্ত্ব অধ্যয়নঃ সতীশ চন্দ্ৰ ভট্টাচাৰ্য
প্ৰাচ্য শাসনাৱলীঃ মহেশ্বৰ নেওগ
পাঠসমীক্ষাঃ মহেশ্বৰ নেওগ
পাঠ সমীক্ষা প্ৰসঙ্গতঃ ৰামচৰণ ঠাকুৰীয়া
পাঠ সমীক্ষাঃ সূত্ৰ আৰু প্ৰয়োগবিধিঃ মালিনী গোস্বামী
পুৰণি পুথি অধ্যয়ন আৰু সম্পাদনাঃ কেশৱানন্দ দেৱ গোস্বামী
Development of Script in Ancient Kamrup: T. P. Verma
Inscriptions of Ancient Assam: M.M. Sarma (ed.)
Kamrupasasanavali: D Sarma (pub.)
The evolution of Assamese Script: Mahendra Bora

Graduate Attributes: জ্ঞান-আধাৰ, অনুসন্ধান, পৰীক্ষণমুখিতা

Course Objective: এই কাকতখনৰ উদ্দেশ্য লিপিৰ পৰিচয় দিয়াৰ লগতে অসমীয়া লিপিৰ উদ্ভৱ আৰু বিকাশ সম্বন্ধে আভাস দিয়া।
Learning Outcome: এই কাকতখন অধ্যয়ন কৰিলে ছাত্ৰ-ছাত্ৰীসকলে লিপিৰ স্বৰূপ আৰু ইতিহাস সম্পৰ্কে অৱগত হোৱাৰ উপৰি অসমীয়া লিপিৰ ঐতিহ্য আৰু ধাৰা তথা মধ্যযুগীয় অসমীয়া লিপিৰ ৰেহ-ৰূপ, ইয়াৰ লিখন পদ্ধতি আৰু পাঠ সমীক্ষা সম্পৰ্কত সাধাৰণ জ্ঞান লাভ কৰিব পাৰিব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Fourth
Course Name: অসমীয়া লোকসাহিত্য অধ্যয়ন
Elective Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	লোকসাহিত্যৰ প্ৰকৃতি বিচাৰ আৰু শ্ৰেণীবিভাগঃ লোকগীত, লোককথা, লোকোক্তি; আঞ্চলিক আৰু জনগোষ্ঠীয় লোকসাহিত্য	১২	২০
২	উত্সৱ অনুষ্ঠান বিষয়ক লোকগীত, দেৱ-দেৱীৰ লগত জড়িত প্ৰাৰ্থনা আৰু মন্ত্ৰ, প্ৰেম-বিৰহ বিষয়ক গীত, শ্ৰমমূলক গীত, দাৰ্শনিক ভাবাপন্ন গীত, নিচুকনি গীত, খেল-ধেমালিৰ গীত	১২	২০
৩	মালিতা আৰু বাৰমাহী বিলাপ গীতঃ পুৰাকথাজাতীয় মালিতা, বুৰঞ্জীমূলক মালিতা, জনশ্ৰুতিমূলক মালিতা, কাল্পনিক মালিতা, বাস্তবিক মালিতা; বাৰমাহী বিলাপ গীত	১২	২০
৪	লোককথাঃ পুৰাকথা বা অতিকথা, জনশ্ৰুতি বা কিম্বদন্তী, সাধুকথা; লোকোক্তিঃ প্ৰবাদ-প্ৰবচন, যোজনা-পটন্তৰ আৰু সাঁথৰ	১২	২০

পঠন-সামগ্ৰীঃ

অসমীয়া জনসাহিত্যঃ	প্ৰফুল্লদত্ত গোস্বামী
অসমীয়া লোকসাহিত্যৰ ৰূপৰেখাঃ	লীলা গগৈ
অসমৰ লোকসাহিত্যঃ	শশী শৰ্মা
অসমীয়া লোক সাহিত্যঃ	(.সম্পা) প্ৰহলাদ কুমাৰ বৰুৱা
কামৰূপী লোকগীত সংগ্ৰহঃ	হেমন্ত কুমাৰ শৰ্মা (সম্পা.)
গোৱালপৰীয়া লোকগীত সংগ্ৰহঃ	বীৰেন্দ্ৰনাথ দত্ত (সম্পা.)
দৰঙী লোকগীত সংগ্ৰহঃ	(.সম্পা) কনক চন্দ্ৰ চহৰীয়া
আয়তীৰ উৰুলিঃ	ফুলকুমাৰী কলিতা (.সম্পা)
অলৌ গুটিতলৌ গুটি-: অসমৰ খেলধেমালিৰ গীত-মাতঃ	উপেন ৰাভা হাকাচাম, ধনেশ্বৰ কলিতা (সম্পা.)
অসমৰ জনজাতীয় লোকসাহিত্যঃ	কনক চন্দ্ৰ চহৰীয়া
বাৰ মাহৰ তেৰগীতঃ	প্ৰফুল্লদত্ত গোস্বামী (.সম্পা)
হেন◌া-হুচা: অসমীয়া জনজাতীয় লোকসাহিত্যৰ সংকলনঃ	(.সম্পা) উপেন ৰাভা হাকাচাম
অসমীয়া লোকসাহিত্যৰ বুৰঞ্জীঃ	অসম সাহিত্য সভা

Graduate Attributes: জ্ঞান-আধাৰ, একতা, আৰু সমাজমুখিতা

Course Objective: এই কাকতখনৰ উদ্দেশ্য অসমীয়া মৌখিক লোকসাহিত্যৰ প্ৰকৃতি আৰু প্ৰকাৰভেদ সম্বন্ধে আভাস দিয়া।

Learning Outcome: এই কাকতখন অধ্যয়ন কৰিলে লোকসাহিত্যত প্ৰতিফলিত সমাজ সম্পৰ্কে জানিব পৰা যাব, লগতে অসমৰ জাতি-জনজাতিৰ লোক-সংগীত, শিশু মনস্তত্ত্ব, সৃজনীমূলকতা, কাহিনী-কথন আদিৰ বিষয়ে সম্যক ধাৰণা উপজিব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Fifth
Course Name: **প্ৰাচীন ভাৰতীয় আৰু মধ্যভাৰতীয় আৰ্যভাষাৰ ৰূপৰেখা**
Core Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	ভাৰতীয় আৰ্যভাষাৰ বিৱৰ্তনঃ বৈদিক-সংস্কৃতৰ উত্থান, পালি-প্ৰাকৃত-অপভ্ৰংশ ভাষাৰ বিকাশ	১২	২০
২	ভাৰতীয় আৰ্যভাষাৰ বিভিন্ন স্তৰৰ নিৰ্বাচিত পাঠ (ক) সংস্কৃতঃ নীতিশতক শ্লোক (১-৫) (খ) অশোকৰ অনুশাসনঃ গিৰ্ণাৰ-১ (গ) পালিঃ ধম্মপদৰ চিত্তবগ্গ (১-৫) (ঘ) প্ৰাকৃতঃ গাহাসত্তসঈ (প্ৰথম পাঁচটা গাথা) (ঙ) অপভ্ৰংশঃ সংনেহ ৰাসউ (প্ৰথম প্ৰক্ৰমৰ প্ৰথম চাৰিটা শ্লোক)	১২	২০
৩	সংস্কৃত-পালি-প্ৰাকৃত ভাষাৰ তুলনাঃ স্বৰধ্বনি, ব্যঞ্জনধ্বনি	১২	২০
৪	সংস্কৃত-পালি-প্ৰাকৃতৰ ধ্বনিগত পৰিৱৰ্তনৰ প্ৰক্ৰিয়াঃ সমীভৱন, স্বৰ-সংগতি, অপিনিহিতি, বিষমীভৱন, নাসিক্যীভৱন, মহাপাৰাণতা, অল্পপ্ৰাণতা, সমাক্ষৰ লোপ	১২	২০

পঠন-সামগ্ৰীঃ
পালি প্ৰকাশঃ বিধুশেখৰ শাস্ত্ৰী
পালিঅপভ্ৰংশ ভাষা আৰু সাহিত্যঃ নগেন ঠাকুৰ-প্ৰাকত-
প্ৰাকৃত সাহিত্যঃ সত্যেন্দ্ৰনাৰায়ণ গোস্বামী
প্ৰাকৃত সাহিত্য চয়নঃ নগেন ঠাকুৰ
প্ৰাকৃত পাঠঃ কেশৱানন্দ দেৱগোস্বামী আৰু ভীমকান্ত বৰুৱা (.সম্পা)
প্ৰাকৃত ভাষা সাহিত্য পৰিচয়ঃ- ভূৱনেশ্বৰী বৈশ্য
সংস্কত, পালি-প্ৰাকৃত আৰু অসমীয়া ব্যাকৰণঃ লীলাৱতী শইকীয়া বৰা
সন্দেশ ৰাসকঃ কেশৱানন্দ দেৱগোস্বামী
ধম্মপদঃ সত্যেন্দ্ৰনাৰায়ণ গোস্বামী
অশোকৰ অনুশাসনমালাঃ নগেন ঠাকুৰ
ভৰ্তৃহৰি বিৰচিত নীতিশতকম্ঃ অদিতি বৰুৱা
A Comparative Old Indo-Aryan Grammar: S. Biswas

Graduate Attributes: জ্ঞান-আধাৰ, অনুসন্ধান, একতা
Course Objective: এই কাকতখনৰ উদ্দেশ্য ভাৰতীয় আৰ্যভাষাৰ উদ্ভৱ আৰু বিকাশ সম্বন্ধে আভাস দিয়া।

Learning Outcome: এই কাকতখন অধ্যয়নৰ জৰিয়তে ভাৰতীয় আৰ্যভাষাৰ ঐতিহ্য আৰু ধাৰা সম্পৰ্কে জনাৰ লগতে ইয়াৰ লগত সংলগ্ন সাহিত্য সম্পৰ্কে অৱগত হ'ব পাৰিব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Fifth
Course Name: অসমীয়া নাটক
Elective Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	অসমৰ লোকনাট্য প্ৰাচীন অসমৰ সংস্কৃত নাটক অংকীয়া নাট আৰু ঝুমুৰা প্ৰাক্-স্বাধীনতা যুগৰ অসমীয়া নাটক (শ্বেক্সপীয়েৰীয় আৰু ইবছেনীয় ধাৰাৰ বিশেষ উল্লিখনসহ) উত্তৰ-স্বাধীনতা যুগৰ অসমীয়া নাটক (এবছাৰ্ড নাটক, অনাতাঁৰ নাটক, বাটৰ নাট আৰু ভ্ৰাম্যমান নাটকৰ বিশেষ উল্লিখনসহ)	১২	২০
২	শংকৰদেৱঃ পাৰিজাত হৰণ মাধৱদেৱঃ পিম্পৰা গুচোৱা গোপাল আতাঃ জন্মজাত্ৰা	১২	২০
৩	গুণাভিৰাম বৰুৱাঃ ৰামনৱমী জ্যোতিপ্ৰসাদ আগৰৱালাঃ কাৰেঙৰ লিগিৰী	১২	২০
৪	অৰুণ শৰ্মাঃ আহাৰ প্ৰমোদ দাসঃ হনুমান সাগৰ বান্ধা চাউ	১২	২০

পঠন-সামগ্ৰীঃ

অসমৰ লোকনাটঃ	নবীনচন্দ্ৰ শৰ্মা
অসমীয়া নাটক স্বৰাজোত্তৰ কালঃ :	শৈলেন ভৰালী
অসমীয়া নাট্য সাহিত্যঃ	সত্যেন্দ্ৰনাথ শৰ্মা
অসমীয়া নাট্য সাহিত্যৰ জিলিঙনি (আদিৰ পৰা ১৯৬৭ পৰ্যন্ত):	হৰিশ্চন্দ্ৰ ভট্টাচাৰ্য
আধুনিক অসমীয়া নাটক: পৰীক্ষা নিৰীক্ষা আৰু বিভিন্ন ধাৰাঃ	কুলদা কুমাৰ ভট্টাচাৰ্য
আহাৰঃ	অৰুণ শৰ্মা
উদ্ভট নাটকঃ	বিনোদ শৰ্মা
নাটক আৰু অভিনয় প্ৰসংগঃ	সত্যপ্ৰসাদ বৰুৱা
নাটক আৰু মঞ্চকলাঃ	অজিত ভৰালী
অসমীয়া লোক নাট্য পৰম্পৰাঃ-	শৈলেন ভৰালী
ছশ বছৰৰ অসমীয়া নাটক পৰম্পৰা আৰু পৰিৱৰ্তনঃ :	অজিত শইকীয়া (.সম্পা)
থিয়েটাৰে আলো তত্ত্ব ও প্ৰয়োগঃ :	ৰঞ্জিতকুমাৰ মিত্ৰ
থিয়েটাৰ দৃশ্যেৰ বিকাশ ও সমীক্ষাঃ	ৰঞ্জিতকুমাৰ মিত্ৰ
নাট্যচিন্তা নাট্যচৰ্চাঃ-	ভূপেন গোস্বামী
নাট্যশিল্প আৰু অভিনয় তত্ত্বঃ	অৰ্পণ বেজবৰুৱা
মঞ্চলেখাঃ	অতুলচন্দ্ৰ হাজৰিকা

মঞ্চ দৃশ্যের পরিকল্পনা ও নির্মাণঃ রঞ্জিতকুমাৰ মিত্র
Bhaona : The Ritual Play of Assam : M. Neog
Indian Theatre : N. Jain
Key Concept in Drama and Performance: K. Pickering
Music and Drama: A. D. Ranade
Performance Studies: An Introduction : R. Schechner

Graduate Attributes: জ্ঞান-আধাৰ, সমাজমুখিতা, সহমর্মিতা
Course Objective: এই কাকতখনৰ উদ্দেশ্য ছাত্ৰ-ছাত্ৰীসকলক অসমীয়া নটকৰ ইতিহাস, ধাৰা আৰু উচ্চ অৱস্থান সম্বন্ধে আভাস দিয়া।
Learning Outcome: এই কাকতখন অধ্যয়ন কৰিলে ছাত্ৰ-ছাত্ৰীসকলে প্ৰাচীন কালৰে পৰা বৰ্তমানলৈকে অসমীয়া নাটকৰ ঐতিহ্য আৰু ধাৰা সম্পৰ্কে জনাৰ লগতে নিৰ্বাচিত শ্ৰেষ্ঠ নাটক সম্পৰ্কে অৱগত হ’ব পাৰিব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Fifth
Course Name: **অসমীয়া চুটিগল্প আৰু উপন্যাস**
Elective Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	অসমীয়া চুটিগল্পৰ ইতিহাস (আৰম্ভণিক পৰা ২০০০ খ্ৰীষ্টাব্দলৈকে)	১২	২০
২	অসমীয়া উপন্যাসৰ ইতিহাস (আৰম্ভণিক পৰা ২০০০ খ্ৰীষ্টাব্দলৈকে)	১২	২০
৩	চুটিগল্প লক্ষ্মীনাথ বেজবৰুৱাৰ 'মুক্তি' লক্ষ্মীনাথ ফুকনৰ 'মেধি' হোমেন বৰগোহাঞিৰ 'হাতী'	১২	২০
৪	উপন্যাস যোগেশ দাসৰ 'ডাৱৰ আৰু নাই' মামণি ৰয়চম গোস্বামীৰ 'চেনাবৰ সোঁত'	১২	২০

পঠন-সামগ্ৰীঃ

আধুনিক গল্প সাহিত্যঃ ত্ৰৈলোক্যনাথ গোস্বামী
চুটিগল্পঃ উদয় দত্ত
গল্পগুচ্ছঃ অসম সাহিত্য সভা প্ৰকাশিত
অসমীয়া চুটিগল্পৰ অধ্যয়নঃ প্ৰহলাদ কুমাৰ বৰুৱা
অসমীয়া চুটিগল্পৰ প্ৰবাহঃ লীলাৱতী শইকীয়া (.সম্পা)
অসমীয়া চুটিগল্প: ঐতিহ্য আৰু বিৱৰ্তনঃ অপূৰ্ব বৰা (.সম্পা)
শ্ৰেষ্ঠ অসমীয়া চুটিগল্পঃ শৈলেন ভৰালী (.সম্পা)
উপন্যাস আৰু অসমীয়া উপন্যাসঃ গোবিন্দপ্ৰসাদ শৰ্মা
এশ বছৰৰ অসমীয়া উপন্যাসঃ নগেন ঠাকুৰ (.সম্পা)
অসমীয়া উপন্যাসৰ ভূমিকাঃ সত্যেন্দ্ৰনাথ শৰ্মা
অসমীয়া উপন্যাসৰ গতিধাৰাঃ সত্যেন্দ্ৰনাথ শৰ্মা

Graduate Attributes: সমাজমুখিতা, সহমৰ্মিতা, প্ৰেৰণা

Course Objective: এই কাকতখনৰ উদ্দেশ্য অসমীয়া চুটিগল্প আৰু উপন্যাসৰ বিষয়ে আভাস দি আধুনিক কথা-সাহিত্যৰ সৈতে পৰিচয় কৰোৱা।

Learning Outcome: এই কাকতখন পঢ়িলে ছাত্ৰ-ছাত্ৰীসকলে সমাজ বিৱৰ্তনৰ বিভিন্ন দিশ সম্বন্ধে জানিব পাৰিব, লগতে ঐতিহাসিক আৰু সামাজিক ঘটনা সম্বন্ধে অৱগত হ'ব পাৰিব।

Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Fifth
Course Name: অসমীয়া গদ্য সাহিত্য (আৰম্ভণিৰ পৰা ২০০০ খ্ৰীষ্টাব্দলৈ)
Elective Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	শঙ্কৰদেৱৰ ‘ৰুক্মিণী হৰণ’ নাটৰ অন্তৰ্গত ‘ৰুক্মিণীৰ প্ৰেমপত্ৰ’ মাধৱদেৱৰ ‘অৰ্জুন ভঞ্জন’ নাটৰ অন্তৰ্গত ‘নন্দ-যশোদাৰ কলহ' বৈকুণ্ঠনাথ ভট্টাচাৰ্যৰ ‘সংক্ষেপে কৃষ্ণলীলা’	১২	২০
২	গোপালচৰণ দ্বিজৰ শ্ৰীভক্তিৰত্নাকৰ কথাঃ ‘গুৰু সেৱা মাহাত্ম্য’ ৰঘুনাথ মহন্তৰ শ্ৰীৰামায়ণ কথাঃ ‘ৰামৰ বন গমন’ ৰত্নাকৰ কন্দলি ,অৰ্জুন দাস বৈৰাগীৰ ‘ত্ৰিপুৰাত মদন পূজাৰ আড়ম্বৰ মোট খোলাৰ কৌতুক’ (ত্ৰিপুৰা বুৰঞ্জী)	১২	২০
৩	কৰতি মন্ত্ৰঃ হেমচন্দ্ৰ গোস্বামী সম্পাদিত অসমীয়া সাহিত্যৰ চানেকী, ১ম খণ্ড সপ্তদশ শতিকাৰ চামধৰা গড়ৰ ৰণজয়ৰ শিলৰ ফলি মণিৰাম দেৱান বৰভাণ্ডাৰ বৰুৱা ‘সত্ৰাধিকাৰৰ অভিষেক উত্সৱ’	১২	২০
৪	নিধিলিবাই ফাৰৱেলৰ ‘নগয়া দ্ৰোহী লোকৰ চৰিত্ৰ বৰ্ণন’ লম্বোদৰ বৰাৰ ‘সদানন্দৰ কলাঘুমটি’ সত্যেন্দ্ৰনাথ শৰ্মাৰ ‘অঙ্কীয়া নাটৰ ৰস-বিচাৰ’	১২	২০

পঠন-সামগ্ৰীঃ

অসমীয়া কথা সাহিত্যঃ	বিৰিঞ্চি কুমাৰ বৰুৱা
অসমীয়া গদ্য সাহিত্যৰ গতিপথঃ	হৰিনাথ শৰ্মাদলৈ
স্নাতকৰ কথাবন্ধঃ	(.সম্পা) মহেশ্বৰ নেওগ
ক্ৰমবিকাশত অসমীয়া কথাশৈলীঃ	প্ৰফুল্ল কটকী
অসমীয়া গদ্যৰীতিঃ	স্মৃতিৰেখা ভূঞা
প্ৰাচ্য শাসনাৱলীঃ	(.সম্পা) মহেশ্বৰ নেওগ
অঙ্কাৱলীঃ	কালিৰাম মেধি
সাতসৰী অসম বুৰঞ্জীঃ	(.সম্পা) সূৰ্যকুমাৰ ভূঞা
প্ৰাচীন অসমীয়া গদ্যশৈলীঃ	অৰ্পনা কোঁৱৰ
ভাষা সাহিত্যৰ সুবাসঃ-	লীলাৱতী শইকীয়া বৰা
ঊনবিংশ শতিকা আৰু লম্বোদৰ বৰাঃ	জগন্নাথ বৰ্মণ

Graduate Attributes: জ্ঞান-আধাৰ, সমালোচনাত্মক চিন্তন, বিশ্লেষণাত্মক মনোভাব

Course Objective: এই কাকতখনৰ উদ্দেশ্য আৰম্ভণিৰে পৰা অসমীয়া ভাষাত ৰচিত গদ্যৰ বিষয়ে আভাস দিয়া।
Learning Outcome: এই কাকতখন অধ্যয়ন কৰিলে অসমীয়া গদ্যসাহিত্যৰ ইতিহাস, স্তৰ বিভাজন, গদ্যৰ বৈশিষ্ট্য, পৰিৱৰ্তনৰ ধাৰা, চিন্তা-শিল্প আদি সম্পৰ্কে জানিব পৰা যাব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Sixth
Course Name: সাহিত্য আৰু সাহিত্য সমালোচনা
Core Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	সাহিত্য আৰু সাহিত্য সমালোচনাৰ অন্তঃসম্পৰ্ক সংজ্ঞা আৰু প্ৰকাৰভেদঃ কাব্য, দৃশ্য কাব্য (প্ৰাচ্য দৃষ্টিভংগীত), কবিতা, নাটক, চুটিগল্প আৰু উপন্যাস (পাশ্চাত্য দৃষ্টিভংগীত)	১২	২০
২	শব্দশক্তি আৰু ৰস এৰিষ্ট'টলৰ ধাৰণাত ট্ৰেজেদি, কমেদি আৰু এপিক (মহাকাব্য)	১২	২০
৩	ছন্দঃ পদ বা পয়াৰ, দুলড়ি, ছবি, ঝুনা, কুসুমমালা অলংকাৰঃ অনুপ্ৰাস, যমক, শ্লেষ, বক্ৰোক্তি, উপমা, ৰূপক, ভ্ৰান্তিমান, উৎপ্ৰেক্ষা কবিতাত অনুকৰণ আৰু কল্পনাৰ প্ৰভাৱ আধুনিক কবিতাত কল্পনা আৰু প্ৰতীকবাদ	১২	২০
৪	এবছাৰ্ড নাটক আৰু ব্ৰেখটীয় মহাকাব্যিক নাটক বাস্তৱিক আৰু মনঃস্তাত্ত্বিক কথা সাহিত্য	১২	২০

পঠন-সামগ্ৰীঃ

ট্ৰেজেডী বিচাৰ : শৈলেন ভৰালী
ধ্বনি আৰু ৰসতত্ত্ব : মুকুন্দমাধৱ শৰ্মা
নন্দনতত্ত্বঃ প্ৰাচ্য আৰু পাশ্চাত্য : ত্ৰৈলোক্যনাথ গোস্বামী
সাহিত্য উপক্ৰমণিকা : মহেন্দ্ৰ বৰা
সাহিত্যৰ তত্ত্ব আৰু প্ৰয়োগ : বিমল মজুমদাৰ
চুটিগল্প : উদয় দত্ত
উপন্যাস : প্ৰহ্লাদকুমাৰ বৰুৱা
সাহিত্যবিদ্যা পৰিক্ৰমা : তীৰ্থনাথ শৰ্মা
সাহিত্যদৰ্পণ : বিশ্বনাৰায়ণ শাস্ত্ৰী
সাহিত্যৰ বাদ-বৈচিত্ৰ্য : নগেন শইকীয়া
সাহিত্যঃ সংজ্ঞা আৰু আংগিক : পৰাগ কুমাৰ ভট্টাচাৰ্য্য
আধুনিকতাবাদ আৰু অন্যান্য প্ৰবন্ধ : হৰেকৃষ্ণ ডেকা
Romantic Imagination: C.M. Bowra

Graduate Attributes: সহমৰ্মিতা, সমালোচনাত্মক মনোভাব, বিশ্লেষণ-ক্ষমতা
Course Objective: এই কাকতখনৰ উদ্দেশ্য প্ৰাচ্য-পাশ্চাত্য সমালোচনাৰ আভাস দি ছাত্ৰ-ছাত্ৰীসকলক সাহিত্য-সমালোচনাৰ বাবে প্ৰস্তুত কৰি তোলা।

Learning Outcome: এই কাকতখন পড়িলে ছাত্ৰ-ছাত্ৰীসকলে প্ৰাচ্য-পাশ্চাত্য সমালোচনাৰ বিভিন্ন দিশ সম্বন্ধে জানিব পাৰিব, লগতে সাহিত্যৰ কেতবোৰ ভাগ সম্বন্ধে অৱগত হ'ব পাৰিব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Sixth
Course Name: অসমৰ আৰ্যভিন্ন ভাষা
Elective Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	আৰ্যভিন্ন ভাষাৰ পৰিচয় আৰু অসমত তেওঁলোকৰ বিস্তৃতি (বিশেষকৈ চীন-তিব্বতীয় আৰু অষ্ট্ৰিক ভাষা)	১২	২০
২	আৰ্যভিন্ন ভাষাৰ উত্তৰণ আৰু স্থিতি (বৰো, ৰাভা, কাৰ্বি, মিচিং আৰু গাৰো ভাষাৰ উল্লিখনেৰে বৃটিছ সময়ৰ পৰা বৰ্তমান সময়লৈ)	১২	২০
৩	অসমৰ আৰ্যভিন্ন ভাষাৰ সাধাৰণ বৈশিষ্ট্য (ধ্বনিতাত্ত্বিক, ৰূপতাত্ত্বিক আৰু বাক্যতাত্ত্বিক)	১২	২০
৪	আৰ্য আৰু আৰ্যভিন্ন ভাষাৰ পাৰস্পৰিক প্ৰভাৱ (ক) আৰ্যভিন্ন ভাষাৰ ওপৰত অসমীয়া ভাষাৰ প্ৰভাৱ (খ) অসমীয়া ভাষাৰ ওপৰত আৰ্যভিন্ন ভাষাৰ প্ৰভাৱ	১২	২০

পঠন-সামগ্ৰীঃ

অসমৰ ভাষা : ভীমকান্ত বৰুৱা
অসমৰ ভাষা : বিভা ভৰালী আৰু বনানি চক্ৰৱৰ্তী(সম্পা.)
অসমীয়া অৰু অসমৰ তিব্বতবৰ্মীয় ভাষা : উপেন ৰাভা হাকাচাম
ভাৰতীয় ভাষাৰ পৰিচয় : নগেন ঠাকুৰ
ভাষাবৈজ্ঞানিক অধ্যয়নত তুলনা প্ৰসংগ : উপেন ৰাভা হাকাচাম, প্ৰণীতা দেৱী (সম্পা.)
গাৰো ভাষাৰ মৌলিক বিচাৰ : প্ৰণীতা দেৱী
মিচিং ভাষাৰ পৰিচয় : নাহেন্দ্ৰ পাদুন
পৃথিৱীৰ বিভিন্ন ভাষা : নগেন ঠাকুৰ
তিব্বত বৰ্মীয় ভাষাৰ সম্বন্ধ বাচক শব্দৰ অধ্যয়ন : প্ৰণীতা দেৱী
A Descriptive Analysis of Bodo Language: P.C. Bhattacharya
Assamese and Bodo : A Comparative and Contrastive Study : Madhuram Boro
Karbi People and their Language : Arpana Konwar
Languages of North-East : P.N. Dutta Baruah
Linguistic Survey of India (Vol.II, Part II) : G.A. Grierson
North-East India Linguistics : Stephen Morey and Mark Post
Sino-Tibetan: A Conspectus : Paul K. Benedict
Studies in Sino-Tibetan Languages : S.N. Goswami
Structure of Garo : Pranita Devi

Graduate Attributes: জ্ঞান-আধাৰ, ভ্ৰাতৃত্ববোধ, ভাষা-বিশ্লেষণ ক্ষমতা
Course Objective: এই কাকতখনৰ উদ্দেশ্য অসম তথা উত্তৰ-পূৰ্বাঞ্চলৰ আৰ্যভিন্ন ভাষাৰ আভাস দিয়া।
Learning Outcome: এই কাকতখন অধ্যয়নৰ জৰিয়তে অসমীয়া ভাষাৰ লগত আৰ্যভিন্ন ভাষাৰ পাৰস্পৰিক ভাষিক সম্পৰ্ক জনাৰ লগতে আৰ্যভিন্ন ভাষাসমূহৰ সাম্প্ৰতিক স্থিতি সম্পৰ্কে পৰ্যালোচনা কৰিব পৰা যাব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Sixth
Course Name: ব্যাকৰণ আৰু অসমীয়া ব্যাকৰণ
Elective Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

Unit No.	Unit Content	No. of Classes	Marks
১	ব্যাকৰণ : সংজ্ঞা, ইতিহাস (প্ৰাচ্য আৰু পাশ্চাত্য—পাণিনীয় আৰু গ্ৰীক ধাৰাৰ উল্লিখন), ব্যাকৰণৰ উপাদান (ধ্বনি, ৰূপ, শব্দ আৰু বাক্য), অসমীয়া ব্যাকৰণৰ ইতিহাস	১২	২০
২	অসমীয়া ভাষাৰ ধ্বনিতত্ত্ব বিভাজ্য ধ্বনি : স্বৰধ্বনি, ব্যঞ্জনধ্বনি অবিভাজ্য ধ্বনি : শ্বাসাঘাত, সন্ধি, অনুনাসিকতা, সুৰ-লহৰ	১২	২০
৩	অসমীয়া ভাষাৰ ৰূপতত্ত্ব : প্ৰাকৃতি, প্ৰকৃতি, সৰ্গ(প্ৰত্যয়, বিভক্তি), পদ আৰু পদৰ শ্ৰেণীবিভাজন (নামপদ, ক্ৰিয়াপদ), বচন, লিংগ, কাৰকবাচক শব্দৰূপ, ধাতুৰূপ (কাল, ভাব, দশা, পুৰুষ)	১২	২০
৪	অসমীয়া ভাষাৰ বাক্যতত্ত্ব : অসমীয়া বাক্যৰ শ্ৰেণীবিভাজন, বাক্যৰ উপাদান পদৰ সংগতি আৰু ক্ৰম, নিকটস্থ অংগবিচাৰ, খণ্ডবাক্য গঠনৰ নিয়ম, ৰূপান্তৰ উৎপাদক ব্যাকৰণ	১২	২০

পঠন-সামগ্ৰীঃ

অসমীয়া বৰ্ণ প্ৰকাশ : গোলোক চন্দ্ৰ গোস্বামী
অসমীয়া ব্যাকৰণ আৰু ভাষাতত্ত্ব : কালিৰাম মেধি
অসমীয়া ব্যাকৰণৰ মৌলিকবিচাৰ : গোলোক চন্দ্ৰ গোস্বামী
অসমীয়া ব্যাকৰণ প্ৰৱেশ : গোলোক চন্দ্ৰ গোস্বামী
অসমীয়া ভাষাৰ ব্যাকৰণ : উপেন্দ্ৰনাথ গোস্বামী
অসমীয়া ভাষাৰ ৰূপকথা : উপেন্দ্ৰনাথ গোস্বামী
অসমীয়া ভাষাৰ ৰূপতত্ত্ব : লীলাৱতী শইকীয়া বৰা
উচ্চতৰ অসমীয়া ব্যাকৰণ : ৰমেশ পাঠক
ব্যাকৰণ আৰু প্ৰাকৃতিবিজ্ঞান : ৰমেশ পাঠক
ব্যৱহাৰিক ধ্বনিবিজ্ঞান : দীপংকৰ মৰল
ব্যাকৰণঃ প্ৰাচ্য আৰু পাশ্চাত্য : খগেশসেন ডেকা
ভাষাবিজ্ঞান উপক্ৰমণিকা : অৰ্পণা কোঁৱৰ
Assamese; Its Formation and Development : B.K. Kakati
Syntactic Structure : Noam Chomsky

Graduate Attributes: জ্ঞান-আধাৰ, যোগাযোগ-কৌশল, অনুসন্ধানমূলক মনোভাব
Course Objective: এই কাকতখনৰ উদ্দেশ্য উচ্চ ব্যাকৰণৰ ৰীতি অনুযায়ী অসমীয়া ভাষাৰ বৈয়াকৰণিক আভাস দিয়া।
Learning Outcome: এই কাকতখন অধ্যয়ন কৰিলে ছাত্ৰ-ছাত্ৰীসকলে ব্যাকৰণৰ সংজ্ঞা, ইতিহাস (প্ৰাচ্য-পাশ্চাত্য) আদিৰ লগতে অসমীয়া ভাষাৰ ধ্বনিতত্ত্ব, ৰূপতত্ত্ব আৰু বাক্যতত্ত্ব সম্বন্ধে জ্ঞান লাভ কৰিব পাৰিব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

Four-Year Undergraduate Programme
Subject: Assamese
Semester: Sixth
Course Name: তুলনামূলক ভাৰতীয় সাহিত্য
Elective Course
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 400-499

[এই পাঠ্যক্রমৰ (পাঠ্য) অধ্যয়নৰ জৰিয়তে তুলনামূলক ভাৰতীয় সাহিত্য সম্পৰ্কে পৰিচয় কৰাই দিয়াৰ লগতে আধুনিক ভাৰতীয় সাহিত্য (বাংলা, হিন্দী, ওড়িয়া, ব্ৰজবুলি) সম্পৰ্কে সামান্যভাৱে পৰিচয় কৰাই দিয়াৰ প্ৰয়াস কৰা হ'ব।]

Unit No.	Unit Content	No. of Classes	Marks
১	তুলনামূলক সাহিত্যৰ পৰিচয় সংজ্ঞা, অধ্যয়নৰ পদ্ধতি আৰু প্ৰধান সম্প্ৰদায়সমূহ (Schools), ভাৰতীয় সাহিত্যৰ ধাৰণা আৰু ভাৰতীয় সাহিত্য অধ্যয়নৰ ইতিহাস	১২	২০
২	ভাৰতীয় কাব্য সাহিত্যৰ পৰিচয় (ব্ৰজবুলি আৰু আধুনিক কবিতা) বিদ্যাপতি : ৰাধাৰ বয়ঃসন্ধি চণ্ডীদাস : শ্ৰীৰাধাৰ পূৰ্বৰাগ জ্ঞানদাস : প্ৰথম মিলন গোবিন্দদাস : বৰ্ষাভিসাৰ ৰবীন্দ্ৰনাথ ঠাকুৰ : সোণাৰ তৰী জয়শংকৰ প্ৰসাদ : ভাৰত মহিমা	১২	২০
৩	ভাৰতীয় চুটিগল্পৰ চানেকি শৰৎচন্দ্ৰ চট্টোপাধ্যায় : মন্দিৰ (বাংলা) প্ৰেমচান্দ : শিশু (হিন্দী) ৰাজকিশোৰ ৰায় : বিয়াৰমুকুট (ওড়িয়া) অনিতা দেশাই : সঙ্গত (ইংৰাজী)	১২	২০
৪	ভাৰতীয় উপন্যাসৰ চানেকি মাণিক বন্দোপাধ্যায় : পদ্মানদীৰ মাঝি ফকীৰ মোহন সেনাপতি : ঊনিশ পুৰা দুকঠা (অনু. ভামতী দেৱী)	১২	২০

পঠন-সামগ্ৰীঃ
আধুনিক বাংলা সাহিত্য : মোহিতলাল মজুমদাৰ
আধুনিক ভাৰতীয় সাহিত্য : শৈলেন ভৰালী
বঙ্গসাহিত্যে উপন্যাসেৰ ধাৰা : শ্ৰীকুমাৰ বন্দোপাধ্যায়
তুলনাত্মক সাহিত্য : দিলীপ বৰা
তুলনামূলক ভাৰতীয় সাহিত্য : নীৰাজনা মহন্ত বেজবৰা

প্ৰেমচন্দ ঔৰ উনকা যুগ : ৰামবিলাস শৰ্মা
তুলনামূলক ভাৰতীয় সাহিত্য : প্ৰফুল্ল কুমাৰ নাথ
তুলনামূলক সাহিত্যঃ তত্ত্ব আৰু প্ৰয়োগ : প্ৰফুল্লকুমাৰ নাথ
উপন্যাস আৰু লনামূলক ভাৰতীয় উপন্যাস : প্ৰফুল্লকুমাৰনাথ
প্ৰেমচন্দৰ চুটিগল্প : মামণি ৰয়চম গোস্বামী (অনূদিত)
নিৰ্বাচিত ভাৰতীয় চুটিগল্প : নৱকান্ত বৰুৱা (সম্পা.)
বাংলা ছোটগল্প : শিশিৰ কুমাৰ দাশ
Aspects of Comparative Literature : Indranath Choudhury (Ed.)
Comparative Literature : Indian Dimensions : Swapan Mazumdar

Graduate Attributes: সহমৰ্মিতা, ভ্ৰাতৃত্ববোধ, সাহিত্য -বিশ্লেষণ ক্ষমতা
Course Objective: এই কাকতখনৰ উদ্দেশ্য ছাত্ৰ-ছাত্ৰীসকলক তুলনামূলক সাহিত্যৰ ধাৰণা দিয়াৰ লগতে ভাৰতীয়, বাংলা, ব্ৰজবুলি, হিন্দী, উড়িয়া আৰু ভাৰতীয় ইংৰাজী সাহিত্যৰ সৈতে পৰিচয় কৰাই দিয়া। **Learning Outcome:** এই কাকতখন অধ্যয়ন কৰিলে ছাত্ৰ-ছাত্ৰীসকলে আধুনিক ভাৰতীয় সাহিত্যৰ বৰ্তমানৰ স্থিতি সম্পৰ্কে জানিব পাৰিব, লগতে এইবোৰৰ সৈতে অসমীয়া সাহিত্যৰ তুলনামূলক বিচাৰ-বিশ্লেষণ কৰিব পাৰিব।
Theory Credit: 4
Practical Credit: 0
No of required classes: 48
No of contact classes: 40
No of non-contact classes: 8

GAUHATI UNIVERSITY

FYUGP CORE SYLLABUS

IN BENGALI

COURSE DETAILS

a. Four - year Undergraduate programme

b. Subject - Bengali

c. Semester – First

d. Course Name – Core paper wise course names of each semester are included in the syllabus (Colum no. g)

e. Based on UG CBCS Syllabus

f. Course Level - 100

g. Syllabus -

SEMESTER I

Paper Code - **BEN CORE PAPER-1** **Credits –4**

Paper Title – শিশু ও কিশোর সাহিত্য External Marks – 80

Internal Marks - 20 *

Units	Topics	No. of Class	Marks
I	**অবনীন্দ্রনাথ ঠাকুর - বুড়ো আংলা**	15	20
II	**সুকুমার রায় – আবোল তাবোল** নির্বাচিত পাঠ - খিচুড়ি, গোঁফচুরি, সৎপাত্র, খুড়োর কল, বাবুরাম সাপুড়ে	15	20
III	**লীলা মজুমদার - পদিপিসির বর্মিবাক্স**	15	20
IV	**সত্যজিৎ রায় – প্রোফেসর শঙ্কু** নির্বাচিত পাঠ - ব্যোমযাত্রীর ডায়েরি, প্রোফেসর শঙ্কু ও আশ্চর্য পুতুল, প্রোফেসর শঙ্কু ও গোলক-রহস্য	15	20

*Candidates have to attend one Sessional Exam. of 40 marks and submit two Home Assignments each of 20 Marks for Internal Assessment Marks. Internal Assessment marks will be given out 20 marks by averaging the marks obtained in Sessional Examination and Home Assignments.

h. Reading list-

Reference Books:

১। আশা গঙ্গোপাধ্যায় - বাংলা শিশু-সাহিত্যের ক্রমবিকাশ (১৮০০-১৯০০), ডি. এম. লাইব্রেরী

২। খগেন্দ্রনাথ মিত্র - শতাব্দীর শিশু-সাহিত্য (১৮১৮-১৯৬০), পশ্চিমবঙ্গ বাংলা আকাদেমি

৩। নবেন্দু সেন - প্রসঙ্গায়নে বাংলা শিশুসাহিত্য, সাহিত্যলোক

৪। নবেন্দু সেন - বাংলার শিশু-সাহিত্য তথ্য তত্ত্ব ও বিশ্লেষণ, পুথিপত্র

৫। বুদ্ধদেব বসু - সাহিত্যচর্চা, দে'জ

৬। পার্থজিৎ গঙ্গোপাধ্যায় - শিশুসাহিত্যের সোনালি অধ্যায়, সাহিত্যলোক

৭। শিবাজী বন্দ্যোপাধ্যায় - গোপাল-রাখাল দ্বন্দ্বসমাস: উপনিবেশবাদ ও বাংলা শিশুসাহিত্য, প্যাপিরাস

i. (ii) Learning Outcome -

শিশু ও কিশোর সাহিত্য

The course will enable the students to get familiar with the Juvenile Literature which includes prose, poetry, fiction along with the contributions of individual authors in the fields of Modern Bengali Literature.

Moreover, the course will help to develop their social and cultural knowledge.

j. Theory Credit – (External Marks 80)

k. Practical Credit – (Internal Marks 20)

l. No. of Required Classes - 15 classes per unit of all papers

m. No. of Contact Classes - 60

n. No. of Non-Contact Classes - 0

o. Particulars of Course Designer -

1. Dr. Binita Rani Das,

Convenor and HOD ,

Department of Bengali,

Gauhati University, Guwahati, Assam.

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2. Dr. Sanjay Bhattacharjee,

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GAUHATI UNIVERSITY

FYUGP CORE SYLLABUS

IN BENGALI

COURSE DETAILS

a. Four-year Undergraduate programme

b. Subject - Bengali

c. Semester – Second

d. Course Name – Core paper wise course names of each semester are included in the syllabus (Colum no. g)

e. Based on UG CBCS Syllabus

f. Course Level - 100

g. Syllabus -

SEMESTER 2

Paper Code - BEN CORE PAPER-2 **Credits–4**
Paper Title - উনিশ শতকের বাংলা সাহিত্যপাঠ External Marks – 80
Internal Marks - 20 *

Units	Topics	No. of Class	Marks
I	**মাইকেল মধুসূদন দত্ত - বীরাঙ্গনা কাব্য** নির্বাচিত পাঠ—নীলধ্বজের প্রতি জনা, সোমের প্রতি তারা, লক্ষ্মণের প্রতি সূর্পনখা, পুরুরবার প্রতি ঊর্বশী, দুষ্মন্তের প্রতি শকুন্তলা	15	20
II	**ঈশ্বরচন্দ্র বিদ্যাসাগর - শকুন্তলা**	15	20
III	**বঙ্কিমচন্দ্র চট্টোপাধ্যায় - কপালকুণ্ডলা**	15	20
IV	**দীনবন্ধু মিত্র - সধবার একাদশী**	15	20

*Candidates have to attend one Sessional Exam. of 40 marks and submit two Home Assignments each of 20 Marks for Internal Assessment Marks. Internal Assessment marks will be given out 20 marks by averaging the marks obtained in Sessional Examination and Home Assignments.

h. Reading list-

Reference Books:

১। ভবানীগোপাল সান্যাল - বীরাঙ্গনা কাব্য, মাইকেল মধুসূদন দত্ত, মডার্ণ বুক এজেন্সী

২। যোগীন্দ্রনাথ বসু - মাইকেল মধুসূদন দত্তের জীবনচরিত, অশোক পুস্তকালয়

৩। গোলাম মুরশিদ – আশার ছলনে ভুলি, আনন্দ

৪। ক্ষেত্র গুপ্ত - মধুসূদনের কাব্য-আত্মা ও কাব্য-শিল্প, এ কে সরকার এণ্ড কোং

৫। শ্রীমোহিতলাল মজুমদার - কবি শ্রীমধুসূদন, গ্রন্থনিলয়

৬। আশুতোষ ভট্টাচার্য - গীতিকবি মধুসূদন, দে'জ

৭। ব্রজেন্দ্রনাথ বন্দ্যোপাধ্যায় ও সজনীকান্ত দাস (সম্পাদিত), ঈশ্বরচন্দ্র বিদ্যাসাগর – শকুন্তলা, বঙ্গীয় সাহিত্য

পরিষৎ

৮। উজ্জ্বলকুমার মজুমদার - ঈশ্বরচন্দ্র বিদ্যাসাগর সংকলিত শকুন্তলা ও সীতার বনবাস, সান্যাল এণ্ড কোং

৯। শঙ্খ ঘোষ - বিদ্যাসাগর, প্যাপিরাস

১০। নরেশচন্দ্র জানা – শকুন্তলা ও সীতার বনবাস: বিদ্যাসাগর, সাহিত্যলোক

১১। ইন্দ্র মিত্র - করুণাসাগর বিদ্যাসাগর, আনন্দ

১২। ক্ষেত্র গুপ্ত – বাংলা উপন্যাসের ইতিহাস, প্রথম খণ্ড, গ্রন্থনিলয়

১৩। অমিত্রসূদন ভট্টাচার্য – বঙ্কিমচন্দ্র জীবনী, আনন্দ

১৪। সুবোধচন্দ্র সেনগুপ্ত – বঙ্কিমচন্দ্র, এ মুখার্জী এণ্ড কোং

১৫। শ্রীকুমার বন্দ্যোপাধ্যায় – বঙ্গসাহিত্যে উপন্যাসের ধারা, মডার্ণ বুক এজেন্সী

১৬। আশুতোষ ভট্টাচার্য - বাংলা নাট্যসাহিত্যের ইতিহাস, এ মুখার্জী এণ্ড কোং

১৭। দর্শন চৌধুরী – উনিশ শতকের নাট্যবিষয়, সাহিত্য প্রকাশ

১৮। দীনবন্ধু মিত্র – দীনবন্ধু রচনাবলী, সাহিত্য সংসদ

১৯। অজিতকুমার ঘোষ – বাংলা নাটকের ইতিহাস, দে’জ

i. (ii) Learning Outcome -

উনিশ শতকের বাংলা সাহিত্য পাঠ

The course will help the students to understand the features of the 19th century's texts of Bengali poetry, prose, fiction and drama along with the contribution of the writers in the different fields of modern Bengali literature. Partially they will also come to know about the socio-economic and political study of that particular era.

This course is also help them to enrich their cultural knowledge, emotional intelligence and creativity.

j. Theory Credit – (External Marks 80)

k. Practical Credit – (Internal Marks 20)

l. No. of Required Classes - 15 classes per unit of all papers

m. No. of Contact Classes - 60

n. No. of Non-Contact Classes - 0

o. Particulars of Course Designer -

1. Dr. Binita Rani Das,

Convenor and HOD ,

Department of Bengali,

Gauhati University, Guwahati, Assam.

Email- dasdrbinita@gmail.com

2. Dr. Sanjay Bhattacharjee,

Associate Professor,

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email-santanuroychowdhury9@gmail.com

GAUHATI UNIVERSITY

FYUGP CORE SYLLABUS

IN BENGALI

COURSE DETAILS

a. Four-year Undergraduate programme

b. Subject - Bengali

c. Semester – Third

d. Course Name – Core paper wise course names of each semester are included in the syllabus (colum no. g)

e. Based on UG CBCS Syllabus

f. Course Level - 200

g. Syllabus -

SEMESTER 3

Paper Code - BEN CORE PAPER-3 **Paper Title – বিশ শতকের বাংলা সাহিত্যপাঠ**			**Credits –4** External Marks – 80 Internal Marks –20 *
Units	**Topics**	**No. of Class**	**Marks**
I	**বুদ্ধদেব বসু - সাহিত্যচর্চা** নির্বাচিত পাঠ - রবীন্দ্রনাথ ও উত্তরসাধক, রামায়ণ, উত্তর তিরিশ, শিশুসাহিত্য	15	20
II	**জীবনানন্দ দাশের শ্রেষ্ঠকবিতা** নির্বাচিত পাঠ - বোধ, হায়চিল, সিন্ধুসারস, শিকার, গোধূলিসন্ধির নৃত্য, রাত্রি, বনলতা সেন, মৃত্যুর আগে, আট বছর আগের একদিন	15	20
III	**শরৎচন্দ্র চট্টোপাধ্যায় - শ্রীকান্ত** (১ম পর্ব)	15	20
IV	**উৎপল দত্ত - টিনের তলোয়ার**	15	20

*Candidates have to attend one Sessional Exam. of 40 marks and submit two Home Assignments each of 20 Marks for Internal Assessment Marks. Internal Assessment marks will be given out 20 marks by averaging the marks obtained in Sessional Examination and Home Assignments.

h. Reading list-

Reference Books:

১। অধীরকুমার দে – আধুনিক বাংলা প্রবন্ধ সাহিত্যের ধারা, উজ্জ্বল সাহিত্য মন্দির

২। হীরেন্দ্রনাথ দত্ত - বাংলা প্রবন্ধ সাহিত্য, আনন্দ

৩। সুনীলকুমার বন্দ্যোপাধ্যায় – বাংলা প্রবন্ধ সাহিত্যের ভূমিকা, মডার্ণ বুক এজেন্সী

৪। অশ্রুকুমার শিকদার - আধুনিক বাংলা কবিতার দিগবলয়, অরুণা প্রকাশনী

৫। প্রদ্যুম্ন মিত্র - জীবনানন্দের চেতনাজগৎ, দে’জ

৬। অম্বুজ বসু - একটি নক্ষত্র আসে, দে’জ

৭। অরুণকুমার মুখোপাধ্যায় - কালের পুত্তলিকা, দে'জ

৮। অরুণকুমার মুখোপাধ্যায় - কালের প্রতিমা, দে'জ

৯। সরোজ বন্দ্যোপাধ্যায় - বাংলা উপন্যাসের কালান্তর, দে'জ

১০। শ্রীকুমার বন্দ্যোপাধ্যায় – বঙ্গসাহিত্যে উপন্যাসের ধারা, মডার্ণ বুক এজেন্সী

১১। আশুতোষ ভট্টাচার্য - বাংলা নাট্যসাহিত্যের ইতিহাস, এ মুখার্জী এণ্ড কোং

১২। দর্শন চৌধুরী – উনিশ শতকের নাট্যবিষয়, সাহিত্য প্রকাশ

১৩। উৎপল দত্তের স্মরণ সংখ্যা - তথ্য ও সংস্কৃতি বিভাগ, পশ্চিমবঙ্গ সরকার

১৪। অজিতকুমার ঘোষ – বাংলা নাটকের ইতিহাস, দে’জ

i. (ii) Learning Outcome -

বিশ শতকের বাংলা সাহিত্য পাঠ

The course will help the students to understand the features of the 20th century's texts of Bengali poetry, prose, fiction and drama along with the contribution of the writers in the different fields of 20th century's Bengali literature.

This course will also enable their understanding of identity, heritage and culture, and inviting them to think imaginatively about society.

j. Theory Credit – (External Marks 80)

k. Practical Credit – (Internal Marks 20)

l. No. of Required Classes - 15 classes per unit of all papers

m. No. of Contact Classes - 60

n. No. of Non-Contact Classes - 0

o. Particulars of Course Designer -

1. Dr. Binita Rani Das,

Convenor and HOD ,

Department of Bengali,

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2. Dr. Sanjay Bhattacharjee,

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GAUHATI UNIVERSITY

FYUGP CORE SYLLABUS

IN BENGALI

COURSE DETAILS

a. Four-year Undergraduate programme

b. Subject - Bengali

c. Semester – Fourth

d. Course Name – Core and Major Elective Paper wise course names of each semester are included in the syllabus (Colum no. g)

e. Based on UG CBCS Syllabus

f. Course Level - 200

g. Syllabus -

SEMESTER-4

Paper Code– BEN CORE PAPER-4 **Credits–4**
Title of Paper – প্রাচীন ও মধ্যযুগের বাংলা সাহিত্যের ইতিহাস External Marks – 80
Internal Marks –20 *

Units	**Topics**	**No. of Class**	**Marks**
I	বাংলা সাহিত্যের যুগ বিভাগ (প্রাচীন যুগ, আদিমধ্য যুগ,অন্ত্যমধ্য যুগ) জয়দেবও বাংলা সাহিত্য, চর্যাগীতি—গ্রন্থপরিচয়, আবিষ্কার, নামকরণ, ঐতিহাসিক মূল্য, সমাজচিত্র শ্রীকৃষ্ণকীর্তন—গ্রন্থপরিচয়, আবিষ্কার, নামকরণ, ঐতিহাসিক মূল্য, সমাজচিত্র তুর্কি আক্রমণ অনুবাদ কাব্যের ধারা—ভাগবত (মালাধর বসু), রামায়ণ (কৃত্তিবাস ওঝা), মহাভারত- (কবীন্দ্র পরমেশ্বর, শ্রীকর নন্দী, কাশীরাম দাস)	15	20
II	চৈতন্য-পূর্ব, চৈতন্য সমসাময়িক ও চৈতন্য পরবর্তী পদাবলি সাহিত্য—চণ্ডীদাস, বিদ্যাপতি, মুরারি গুপ্ত, জ্ঞানদাস, গোবিন্দদাস, বলরামদাস	15	20

	মঙ্গলকাব্যের ধারা—মনসামঙ্গল (বিজয় গুপ্ত, নারায়ণ দেব, বিপ্রদাস পিপলাই, কেতকাদাস ক্ষেমানন্দ, জগজ্জীবন ঘোষাল) চরিতকাব্য—বৃন্দাবনদাসের চৈতন্যভাগবত, লোচনদাসের চৈতন্যমঙ্গল, কৃষ্ণদাস কবিরাজের শ্রীশ্রীচৈতন্যচরিতামৃত		
III	ধর্মমঙ্গলের কাহিনিধারা ও কবি—রূপরাম চক্রবর্তী, ঘনরাম চক্রবর্তী শিবায়ন—শঙ্কর কবিচন্দ্র, রামেশ্বর ভট্টাচার্য অন্যান্য মঙ্গলকাব্য—দুর্গামঙ্গল, অন্নদামঙ্গল, রায়মঙ্গল	15	20
IV	আরাকান রাজসভার সাহিত্য (দৌলত কাজী, সৈয়দ আলাওল) নাথসাহিত্য মৈমনসিংহ ও পূর্ববঙ্গ গীতিকা বাউলগান মহারাষ্ট্র পুরাণ শাক্ত পদাবলি	15	20

*Candidates have to attend one Sessional Exam. of 40 marks and submit two Home Assignments each of 20 Marks for Internal Assessment Marks. Internal Assessment marks will be given out 20 marks by averaging the marks obtained in Sessional Examination and Home Assignments.

h. Reading list-

Reference Books:

১। অসিতকুমার বন্দ্যোপাধ্যায়–বাংলা সাহিত্যের সম্পূর্ণ ইতিবৃত্ত, মডার্ন বুক এজেন্সি

২। অসিতকুমার বন্দ্যোপাধ্যায়– বাংলা সাহিত্যের ইতিবৃত্ত (৫ম–৮ম খণ্ড), মডার্ন বুক এজেন্সি

৩। সুকুমার সেন– বাঙ্গালা সাহিত্যের ইতিহাস (৩য়-৪র্থ খণ্ড), আনন্দ

৪। ভূদেব চৌধুরী– বাংলা সাহিত্যের ইতিকথা, দে'জ

৫। বাংলা সাহিত্যের রূপরেখা–গোপাল হালদার, অরুণা

৬। শ্রীকুমার বন্দ্যোপাধ্যায়–বাংলা সাহিত্যের বিকাশের ধারা (২য় খণ্ড), ওরিয়েন্ট বুক

i. (ii) Learning Outcome -

প্রাচীন ও মধ্যযুগের বাংলা সাহিত্যের ইতিহাস

The course will help the students to understand and acquire knowledge about the history of Bengali literature of old and medieval period.

Paper Code –BEN MAJOR ELECTIVE PAPER-1 **Credits–4**
Paper Title- প্রাচীন ও মধ্যযুগের বাংলা সাহিত্য পাঠ
External Marks – 80
Internal Marks –20 *

Units	Topics	No. of Class	Marks
I	**হরপ্রসাদ শাস্ত্রী (সম্পাদিত)- হাজার বছরের পুরাণ বাংলা ভাষায় বৌদ্ধ গান ও দোঁহা** নির্বাচিত পাঠ–(কাআ তরুবর), ২ (দুলি দুহি), ৬ (কাহেরে ঘিণি), ৮ (সোনে ভরিতী), ১০ (নগর বাহিরি), ২৮ (উঁচা উঁচা), ৩৩ (টালত মোর), ৪০ (জো মণগোঅর), ৪৯ (বাজণাব পাড়ী), ৫০ (গঅণত গঅণত)	15	20
II	**অমিত্রসূদন ভট্টাচার্য (সম্পাদিত)- বড়ু চণ্ডীদাসের শ্রীকৃষ্ণকীর্তন সমগ্র** নির্বাচিত পাঠ— জন্মখণ্ড– ২,৮,৯ তাম্বূলখণ্ড - ১২,১৬,২২ বংশীখণ্ড - ৩০৯, ৩১০, ৩২৯, ৩৪৯ রাধাবিরহ - ৩৬৭, ৪১৩, ৪১৭	15	20
III	**অমরেন্দ্রনাথ রায় (সম্পাদিত)- শাক্ত পদাবলী** নির্বাচিত পাঠ—আগমনী ও বিজয়া পর্যায় আগমনী পর্যায় **রামপ্রসাদ সেন** -গিরি, এবার আমার উমা এলে ; ও গো রাণি, নগরে কোলাহল ;আজ শুভনিশি পোহাইল তোমার **কমলাকান্ত ভট্টাচার্য** -আমি কি হেরিলাম নিশি-স্বপনে ; কবে যাবে বল গিরিরাজ ; গিরিরাণি, এই নাও তোমার উমারে ; আমার উমা এলো' ব'লে রাণী এলোকেশে ধায় ; শরত কমলমুখে, আধ আধ বাণী মায়ের **দাশরথি রায়** - গিরি গৌরী আমার এসেছিল ; কৈ হে গিরি কৈ সে আমার প্রাণের উমা বিজয়াপর্যায় **রামপ্রসাদ সেন** - দিও না আজ উমায় যেতে ; ওহে প্রাণনাথ গিরিবর হে **কমলাকান্ত ভট্টাচার্য** - ওরে নবমী-নিশি ; কি হলো নবমী নিশি ; জয়া, বল গো পাঠানো হবে না ; আমার গৌরীরে ল'য়ে যায় হর আসিয়া;	15	20

	ফিরে চাওগো উমা তোমার বিধুমুখ হেরি **দাশরথি রায়** - নন্দি গিরি-নন্দিনী—ত্রিনয়নের নয়ন-তারা ; গিরি, যায় হে ল’য়ে হর প্রাণ- কন্যা গিরিজায় **মধুসূদন দত্ত** - যেয়ো না রজনি, আজি ল’য়ে তারাদলে		
IV	**খগেন্দ্রনাথ মিত্র ও অন্যান্য (সম্পাদিত)- বৈষ্ণব পদাবলী** নির্বাচিত পাঠ—বিদ্যাপতি, চণ্ডীদাস, জ্ঞানদাস, গোবিন্দ দাস, বলরাম দাস বিদ্যাপতি - এ সখি হামারি দুখের নাহি ওর ; আজু রজনী হাম ভাগে পোহায়লুঁ ; তাতল সৈকত বারিবিন্দু সম চণ্ডীদাস - রাধার কি হৈল অন্তরে ব্যথা ; কাল জল ঢালিতে সই কালা পড়ে মনে ;বঁধু তুমি সে আমার প্রাণ জ্ঞানদাস - আলো মুঞি জানো না ; রূপ লাগি আঁখি ঝুরে গুণে মন ভোর গোবিন্দদাস - নীরদ নয়নে নীর ঘন সিঞ্চনে ; যাঁহা যাঁহা নিকসয়ে তনু তনু-জ্যোতি ; কণ্টক গাড়ি কমল-সম পদতল বলরামদাস - দাঁড়াইয়া নন্দের আগে গোপাল কান্দে অনুরাগে ; চাঁদমুখে বেণু দিয়া সব ধেনু নাম লইয়া ; ব্রজবাসিগণ কান্দে ধেনু-বৎস শিশু	15	20

*Candidates have to attend one Sessional Exam. of 40 marks and submit two Home Assignments each of 20 Marks for Internal Assessment Marks. Internal Assessment marks will be given out 20 marks by averaging the marks obtained in Sessional Examination and Home Assignments.

h. Reading list-

Reference Books:

১। সুকুমার সেন - চর্যাগীতি পদাবলী, আনন্দ

২। নীলরতন সেন– চর্যাগীতিকোষ - সাহিত্যলোক

৩। তারাপদ মুখোপাধ্যা - চর্যাগীতি, বিশ্বভারতী গ্রন্থন বিভাগ

৪। জাহ্নবীকুমার চক্রবর্তী – চর্যাগীতির ভূমিকা, ডি. এম. লাইব্রেরী

৫। শশিভূষণ দাশগপ্ত - বৌদ্ধধর্ম ও চর্যাগীতি, ওরিয়েন্ট বুক

৬। বসন্তরঞ্জন রায়বিদ্বদ্বল্লভ - শ্রীকৃষ্ণকীর্তন, বঙ্গীয় সাহিত্য পরিষৎ

৭। নীলরতন সেন - শ্রীকৃষ্ণকীর্তন (২য় খণ্ড), সাহিত্যলোক

৮। তারাপদ মুখোপাধ্যায় – বড়ুচণ্ডীদাসের শ্রীকৃষ্ণকীর্তন কাব্য, মিত্র ও ঘোষ

৯। মুনমুন গঙ্গোপাধ্যায় - শ্রীকৃষ্ণকীর্তন পরিক্রমা, বঙ্গীয় সাহিত্য সংসদ

১০। নরেশচন্দ্র জানা – শ্রীকৃষ্ণকীর্তন চর্চা, ভারতবুক

১১। সনাতন গোস্বামী – বৈষ্ণব পদাবলী পরিচয়, শম্পা বুকহোম

১২। সত্যগিরি – বৈষ্ণবপদাবলী, পুস্তকবিপণি

১৩। নীলরতনসেন – বৈষ্ণব পদাবলী পরিচয়, সাহিত্যলোক

১৪। শঙ্করীপ্রসাদ বসু – বিদ্যাপতি ও চণ্ডীদাস,দে’জ

১৫। শশিভূষণ দাশগুপ্ত - শ্রীরাধার ক্রমবিকাশ: দর্শনে ও সাহিত্যে, এ মুখার্জী

১৬। সত্যবতী গিরি - বাংলা সাহিত্যে কৃষ্ণকথার ক্রমবিকাশ, দে’জ

১৭। শঙ্করীপ্রসাদ বসু –মধ্যযুগেরকবিওকাব্য, জেনারেল প্রিন্টার্স

১৮। শশীভূষণ দাশগুপ্ত - ভারতের শক্তিসাধনা ও শাক্ত সাহিত্য, সাহিত্য সংসদ

১৯। জাহ্নবীকুমারচ ক্রবর্তী - শাক্তপদাবলী ও শক্তিসাধনা, ডি. এম. লাইব্রেরী

i. (ii) Learning Outcome -

প্রাচীন ও মধ্যযুগের বাংলা সাহিত্যপাঠ

In the previous paper the students gained the overall knowledge about the history of old and medieval period. In this paper some texts from old and medieval period have been introduced so that students can go through the details of those literary practices and make a fair view on that.

Paper Code –BEN MAJOR ELECTIVE PAPER-2 **Credits–4**
Paper Title– লোকসাহিত্য পাঠ External Marks –80
Internal Marks –20 *

Units	Topics	No. of Class	Marks
I	**দক্ষিণারঞ্জন মিত্র মজুমদার—ঠাকুরমার ঝুলি** নির্বাচিত পাঠ –কিরণমালা, সাত ভাই চম্পা, নীলকমল ও লালকমল, শিয়াল পণ্ডিত	15	20
II	**অবনীন্দ্রনাথ ঠাকুর— বাংলার ব্রত** নির্বাচিত পাঠ –পূর্ণিপুকুর, মাঘমণ্ডল, কোজাগরী, আদর সিংহাসন, তুষলা ব্রত)	15	20
III	**বাউল ও ভাটিয়ালি** নির্বাচিত পাঠ - খাঁচার ভিতর অচিন পাখি, তোমায় হৃদমাঝারে রাখিব, মনমাঝি তোর বৈঠা নেরে, আমি যে গহীন গাঙের নাইয়া	15	20
IV	**বরুণকুমার চক্রবর্তী** – **লোকসংস্কৃতির সুলুক সন্ধানে** নির্বাচিত পাঠ - **প্রবাদ**, **ছড়া**, **ধাঁধা ও লোককথা** — পরিচিতি ও বৈশিষ্ট্য	15	20

h. Reading list-

Reference Books:

১. আশুতোষ ভট্টাচার্য— বাংলার লোকসংস্কৃতি

২. আশুতোষ ভট্টাচার্য— বাংলার লোকসাহিত্য

৩. বরুণকুমার চক্রবর্তী— বাংলার লোকসাহিত্য চর্চার ইতিহাস

৪. শীলা বসাক— বাংলার ব্রত পার্বণ

৫. নির্মলেন্দু ভৌমিক— বাংলা ছড়ার ভূমিকা

৬. ওয়াকিল আহমেদ— বাংলা লোকসংগীতের ধারা

৭. সৌগত চট্টোপাধ্যায়— বাংলার ছড়া, ছড়ার বাংলা

৮. সুশীল কুমার দে— বাংলা প্রবাদ

৯. নির্মলেন্দু ভৌমিক— বাংলা ধাঁধার ভূমিকা

i. (ii) Learning Outcome -

লোকসাহিত্য পাঠ

The course will help the students to understand the Bengali folk literature, especially folk tales, bratakathas, folksongs, proverbs, etc. This course will encourage them to study on oral literature.

Paper Code–BENMAJOR ELECTIVE PAPER-3 **Credits-4**
Paper Title–জীবনী সাহিত্য ও স্মৃতিকথা External Marks – 80
Internal Marks –20 *

Units	Topics	No. of Class	Marks
I	রবীন্দ্রনাথ ঠাকুর—ছেলেবেলা	15	20
II	শংকর– অচেনা অজানা বিবেকানন্দ (সন্ন্যাসী ও গর্ভধারিণী)	15	20
III	উপেন্দ্রনাথ বন্দ্যোপাধ্যায়– নির্বাসিতের আত্মকথা	15	20
IV	রাসসুন্দরী দেবী– আমার জীবন	15	20

*Candidates have to attend one Sessional Exam. of 40 marks and submit two Home Assignments each of 20 Marks for Internal Assessment Marks. Internal Assessment marks will be given out 20 marks by averaging the marks obtained in Sessional Examination and Home Assignments.

h. Reading list-

Reference Books:

১। রবীন্দ্রনাথ ঠাকুর- জীবনস্মৃতি, বিশ্বভারতী

২। শিশিরকুমার দা - আত্মজীবন,জীবনী ও রবীন্দ্রনাথ, দে'জ

৩। নীহাররঞ্জন রায় – রবীন্দ্রসাহিত্যের ভূমিকা, নিউ এজ পাবলিশার্স

৪। ক্ষুদিরাম দাস - রবীন্দ্র–প্রতিভার পরিচয়, মল্লিক ব্রাদার্স

৫। শঙ্করীপ্রসাদ বসু - বিবেকানন্দ ও সমকালীন ভারতবর্ষ (১-৭)

৬। শ্যামপ্রসাদ বসু– অনু থেকে অনন্ত – বিবেকানন্দ

৭। শান্তনু রায়চৌধুরী - নির্বাসিতের আত্মকথা - (সম্পাদিত ও আলোচনা)

৮। শান্তনু রায়চৌধুরী - নির্বাসিতের আত্মকথা : নিবিড় পাঠ

i. (ii) Learning Outcome -

জীবনীসাহিত্য ও স্মৃতিকথা

This course will enable the students to get familiar with the biographical literature and memories written by the renowned writers. Four texts from different writers have been included here.

j. Theory Credit – (External Marks 80)

k. Practical Credit – (Internal Marks 20)

l. No. of Required Classes - 15 classes per unit of all papers

m. No. of Contact Classes - 60

n. No. of Non-Contact Classes - 0

o. Particulars of Course Designer -

1. Dr. Binita Rani Das,

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Department of Bengali, Professor & Head,

Dept. of Bengali,

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Associate Professor,

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GAUHATI UNIVERSITY

FYUGP CORE SYLLABUS

IN BENGALI

COURSE DETAILS

a. Four-year Undergraduate programme

b. Subjec t- Bengali

c. Semester – Fifth

d. Course Name – Core and Major Elective Paper wise course names of each semester are included in the syllabus (Colum no. g)

e. Based on UG CBCS Syllabus

f. Course Level – 300

g. Syllabus -

SEMESTER 5

<table>
<tr><td colspan="4"><b>Paper Code– BEN CORE PAPER-5</b> <b>Credits–4</b>
<b>Paper Title– উনিশ শতকের বাংলা সাহিত্যের ইতিহাস</b> External Marks – 80
Internal Marks –20 *</td></tr>
<tr><th>Units</th><th>Topics</th><th>No. of Class</th><th>Marks</th></tr>
<tr><td>I</td><td><b>গদ্যসাহিত্য</b>—
শ্রীরামপুর মিশন, ফোর্ট উইলিয়াম কলেজ, রামমোহন রায়, ঈশ্বরচন্দ্র বিদ্যাসাগর, প্যারিচাঁদ মিত্র, কালীপ্রসন্ন সিংহ, বঙ্কিমচন্দ্র চট্টোপাধ্যায়, রবীন্দ্রনাথ ঠাকুর
<b>পত্র-পত্রিকা</b>—
সংবাদ প্রভাকর, তত্ববোধিনী, বঙ্গদর্শন, ভারতী</td><td>15</td><td>20</td></tr>
<tr><td>II</td><td><b>কাব্যসাহিত্য</b>—
ঈশ্বরগুপ্ত, মাইকেল মধুসূদন দত্ত, রঙ্গলাল বন্দ্যোপাধ্যায়, হেমচন্দ্র বন্দ্যোপাধ্যায়, নবীনচন্দ্র সেন, বিহারীলাল চক্রবর্তী, অক্ষয়কুমার বড়াল, মানকুমারী বসু, কামিনী রায়</td><td>15</td><td>20</td></tr>
<tr><td>III</td><td><b>কথাসাহিত্য</b>—
বঙ্কিমচন্দ্র চট্টোপাধ্যায়, ত্রৈলোক্যনাথ মুখোপাধ্যায়, রমেশচন্দ্র দত্ত, মীর মোসারফ হোসেন, স্বর্ণকুমারী দেবী, রবীন্দ্রনাথ ঠাকুর</td><td>15</td><td>20</td></tr>
</table>

IV	**নাট্যসাহিত্য—** বাংলা নাটকের সূচনাপর্ব, রামনারায়ণ তর্করত্ন, মাইকেল মধুসূদন দত্ত, দীনবন্ধু মিত্র, গিরিশ ঘোষ, জ্যোতিরিন্দ্রনাথ ঠাকুর, অমৃতলাল বসু, রবীন্দ্রনাথ ঠাকুর	15	20

*Candidates have to attend one Sessional Exam. of 40 marks and submit two Home Assignments each of 20 Marks for Internal Assessment Marks. Internal Assessment marks will be given out 20 marks by averaging the marks obtained in Sessional Examination and Home Assignments.

h. Reading list-

Refernce Books:

১। অসিতকুমার বন্দ্যোপাধ্যায় – বাংলা সাহিত্যের ইতিবৃত্ত (৯ম-১০ম খণ্ড), মডার্ন বুক এজেন্সি

২। অসিতকুমার বন্দ্যোপাধ্যায় - বাংলা সাহিত্যের সম্পূর্ণ ইতিবৃত্ত, মডার্ন বুক এজেন্সি

৩। সুকুমার সেন – বাঙ্গালা সাহিত্যের ইতিহাস (৪র্থ-৫ম খণ্ড), আনন্দ

৪। ভূদেব চৌধুরী - বাংলা সাহিত্যের ইতিকথা (৪র্থ পর্যায়), দে'জ

৫। শ্রীকুমার বন্দ্যোপাধ্যায় - বাংলা সাহিত্যের বিকাশের ধারা, ওরিয়েন্ট বুক

৬। ক্ষেত্র গুপ্ত - বাংলা উপন্যাসের ইতিহাস (৩য়, ৪র্থ, ৫ম, ৬ম খণ্ড), গ্রন্থনিলয়

৭। শ্রীকুমার বন্দ্যোপাধ্যায় – বঙ্গসাহিত্যে উপন্যাসের ধারা, মডার্ন বুক এজেন্সি

৮। আশুতোষ ভট্টাচার্য – বাংলা নাট্যসাহিত্যের ইতিহাস, এ মুখার্জী এন্ড কোং

৯। অজিতকুমার ঘোষ – বাংলা নাটকের ইতিহাস, দে'জ

i. (ii) Learning Outcome -

উনিশ শতকের বাংলা সাহিত্যের ইতিহাস

The course will help the students to understand and acquire knowledge about the history of nineteenth century Bengali literature.

Paper Code–BEN MAJOR ELECTIVE PAPER–4 **Credits–4**
Paper Title --বিশ শতকের বাংলা সাহিত্যের ইতিহাস
External Marks – 80
Internal Marks –20 *

Units	Topics	No. of Class	Marks
I	**প্রবন্ধ** রবীন্দ্রনাথ ঠাকুর, অবনীন্দ্রনাথ ঠাকুর, প্রমথ চৌধুরী, অন্নদাশঙ্কর রায়, বুদ্ধদেব বসু, বিবেকানন্দ	15	20
II	**কাব্য** রবীন্দ্রনাথ ঠাকুর, সত্যেন্দ্রনাথ দত্ত, যতীন্দ্রনাথ সেনগুপ্ত, মোহিতলাল মজুমদার, নজরুল ইসলাম, বুদ্ধদেব বসু, সুধীন্দ্রনাথ দত্ত, বিষ্ণু দে, জীবনানন্দ দাশ, সুকান্ত ভট্টাচার্য, শক্তি চট্টোপাধ্যায়, সুনীল গঙ্গোপাধ্যায়	15	20
III	**কথাসাহিত্য** রবীন্দ্রনাথ ঠাকুর, শরৎচন্দ্র চট্টোপাধ্যায়, বিভূতিভূষণ বন্দোপাধ্যায়, তারাশঙ্কর বন্দ্যোপাধ্যায়, মানিক বন্দ্যোপাধ্যায়, আশাপূর্ণা দেবী, সমরেশ বসু, মহাশ্বেতা দেবী	15	20
IV	**নাটক** রবীন্দ্রনাথ ঠাকুর, ক্ষীরোদপ্রসাদ বিদ্যাবিনোদ, দ্বিজেন্দ্রলাল রায়, তুলসী লাহিড়ী, বিজন ভট্টাচার্য, বাদল সরকার, উৎপল দত্ত, মনোজ মিত্র	15	20

*Candidates have to attend one Sessional Exam. of 40 marks and submit two Home Assignments each of 20 Marks for Internal Assessment Marks. Internal Assessment marks will be given out 20 marks by averaging the marks obtained in Sessional Examination and Home Assignments.

h. Reading list-

Reference Books:

১। অসিতকুমার বন্দ্যোপাধ্যায় – বাংলা সাহিত্যের ইতিবৃত্ত (৯ম-১০মখণ্ড), মডার্ন বুক এজেন্সি

২। সুকুমার সেন – বাঙ্গালা সাহিত্যের ইতিহাস (৪র্থ-৫ম খণ্ড), আনন্দ

৩। ভূদেব চৌধুরী - বাংলা সাহিত্যের ইতিকথা (৪র্থ পর্যায়), দে’জ

৪। শ্রীকুমার বন্দ্যোপাধ্যায় – বাংলা সাহিত্যের বিকাশের ধারা, ওরিয়েন্ট বুক

৫। শ্রীকুমার বন্দ্যোপাধ্যায় – বঙ্গসাহিত্যে উপন্যাসের ধারা, মডার্ন বুক এজেন্সি

৬। ক্ষেত্র গুপ্ত - বাংলা উপন্যাসের ইতিহাস (৩য়, ৪র্থ, ৫ম, ৬ম খণ্ড), গ্রন্থ নিলয়

৭। অজিতকুমার ঘোষ - বাংলা নাটকের ইতিহাস, দে’জ

৮। আশুতোষ ভট্টাচার্য - বাংলা নাট্যসাহিত্যের ইতিহাস, এ মুখার্জী এন্ড কোং

৯। সাধনকুমার ভট্টাচার্য - নাট্য সাহিত্যের আলোচনা ও নাটক বিচার, পুথিঘর

১০। পবিত্র সরকার - নাটমঞ্চ ও নাট্যরূপ, দে’জ

i. (ii) Learning Outcome -

বিশ শতকের বাংলা সাহিত্যের ইতিহাস

The course will help the students to understand and acquire knowledge about the history of twentieth century Bengali literature.

<table>
<tr><td colspan="2"><b>Paper Code–BEN MAJOR ELECTIVE PAPER–5</b>
<b>Paper Title– আধুনিক বাংলা সাহিত্য পাঠ</b></td><td colspan="2"><b>Credits–4</b>
External Marks – 80
Internal Marks –20 *</td></tr>
<tr><td><b>Units</b></td><td><b>Topics</b></td><td><b>No. of Class</b></td><td><b>Marks</b></td></tr>
<tr><td>I</td><td><b>বঙ্কিমচন্দ্র চট্টোপাধ্যায়—কমলাকান্তের দপ্তর</b>
নির্বাচিত পাঠ - মনুষ্যফল, বড়বাজার, বসন্তের কোকিল, ঢেঁকি, আমার মন</td><td>15</td><td>20</td></tr>
<tr><td>II</td><td><b>নজরুল ইসলাম—সঞ্চিতা</b>
নির্বাচিত পাঠ - বিদ্রোহী, আজ সৃষ্টিসুখের উল্লাসে, আমার কৈফিয়ৎ, পূজারিণী, সব্যসাচী, ফরিয়াদ</td><td>15</td><td>20</td></tr>
<tr><td>III</td><td><b>রবীন্দ্রনাথ ঠাকুর—গল্পগুচ্ছ</b>
নির্বাচিত পাঠ - দেনাপাওনা, অতিথি, আপদ, নিশীথে, দুরাশা, ছুটি</td><td>15</td><td>20</td></tr>
<tr><td>IV</td><td><b>তুলসী লাহিড়ী—নাটক</b>
ছেঁড়াতার</td><td>15</td><td>20</td></tr>
</table>

*Candidates have to attend one Sessional Exam. of 40 marks and submit two Home Assignments each of 20 Marks for Internal Assessment Marks. Internal Assessment marks will be given out 20 marks by averaging the marks obtained in Sessional Examination and Home Assignments.

h. Reading list-

Reference Books:

১। অধীরকুমার দে – আধুনিক বাংলা প্রবন্ধ সাহিত্যের ধারা, উজ্জ্বল সাহিত্য মন্দির

২। হীরেন্দ্রনাথ দত্ত – বাংলা প্রবন্ধ সাহিত্য, আনন্দ

৩। সুনীলকুমার বন্দ্যোপাধ্যায় – বাংলা প্রবন্ধ সাহিত্যের ভূমিকা, মডার্ন বুক এজেন্সি

৪। শ্রীসুবোধচন্দ্র সেনগুপ্ত - বঙ্কিমচন্দ্র, এ মুখার্জী এ্যাণ্ড কোং প্রাইভেট লিমিটেড

৫। প্রমথনাথ বিশী – রবীন্দ্রনাথের ছোটগল্প, মিত্র ও ঘোষ

৬। তপোব্রত ঘোষ – রবীন্দ্র ছোটগল্পের শিল্পরূপ, দে’জ

৭। অজিতকুমার ঘোষ – বাংলা নাটকের ইতিহাস, দে’জ

i. (ii) Learning Outcome -

আধুনিক বাংলা সাহিত্যপাঠ

In the last two previous papers the students gained the overall knowledge about the history of nineteenth and twentieth century Bengali literature. In this paper some texts form modern period has been introduced so that students can go through the details of those literary practices and make a fair view on that.

Paper Code– BEN MAJOR ELECTIVE PAPER–6
Credits–4
Paper Title– ছন্দ-অলংকার, প্রাচ্য কাব্যতত্ত্ব ও সমালোচনা সাহিত্য External Marks – 80
Internal Marks –20 *

Units	**Topics**	**No. of Class**	**Marks**
I	বাংলা ছন্দ— অক্ষর,যতি, পর্ব, মাত্রা, চরণ,পদ তানপ্রধান- ধ্বনিপ্রধান- শ্বাসাঘাত প্রধান ছন্দের বৈশিষ্ট্য ও ছন্দলিপি প্রস্তুতকরণ	15	20
II	বাংলা অলংকার— অনুপ্রাস, শ্লেষ, যমক, পুনরুক্তবদাভাস, বক্রোক্তি, উপমা, উৎপ্রেক্ষা, রূপক, অপহ্নুতি, সন্দেহ, নিশ্চয়, অতিশয়োক্তি, সমাসোক্তি, বিরোধাভাস, ব্যাজস্তুতি ও অলংকার নির্ণয়	15	20
III	অতুলচন্দ্রগুপ্ত—কাব্যজিজ্ঞাসা (রস, ধ্বনি)	15	20
IV	রবীন্দ্রনাথ ঠাকুর -সাহিত্য নির্বাচিত পাঠ – সাহিত্যের তাৎপর্য, সাহিত্যের সামগ্রী, সাহিত্যের বিচারক, ঐতিহাসিক উপন্যাস	15	20

*Candidates have to attend one Sessional Exam. of 40 marks and submit two Home Assignments each of 20 Marks for Internal Assessment Marks. Internal Assessment marks will be given out 20 marks by averaging the marks obtained in Sessional Examination and Home Assignments.

h. Reading list-

Reference Books:

১। ড. সুধীর কুমার দাশগুপ্ত - কাব্যালোক, এ. মুখার্জি এণ্ড কোং

২। অচিন্ত্য বিশ্বাস – কাব্যতত্ত্ব সমীক্ষা, বঙ্গীয় সাহিত্য সংসদ

৩। সুখেন বিশ্বাস - প্রাচ্যের নন্দনতত্ত্ব, দে’জ

৪। রবীন্দ্রনাথ ঠাকুর - সাহিত্য, বিশ্বভারতী

৫। শ্যামাপদ চক্রবর্তী - অলঙ্কার চন্দ্রিকা, কৃতাঞ্জলি

৬। প্রবোধচন্দ্র সেন - নূতন ছন্দ পরিক্রমা, আনন্দ

৭। অমূল্যধন মুখোপাধ্যায় - বাংলা ছন্দের মূলসূত্র, কলিকাতা বিশ্ববিদ্যালয়

i. (ii) Learning Outcome -

ছন্দ-অলংকার, প্রাচ্য কাব্যতত্ত্ব ও সমালোচনা সাহিত্য

The course will help the students to understand and acquire knowledge about the Prosody, rhetoric, Indian poetics etc. It will also help them to understand the various topics of literary criticism written by Rabindranath Tagore.

j. Theory Credit – (External Marks 80)

k. Practical Credit – (Internal Marks 20)

l. No. of Required Classes - 15 classes per unit of all papers

m. No. of Contact Classes - 60

n. No. of Non-Contact Classes - 0

o. Particulars of Course Designer -

1. Dr. Binita Rani Das,

Convenor and HOD ,

Department of Bengali,

Gauhati University, Guwahati, Assam.

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2. Dr. Sanjay Bhattacharjee,

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4. Dr. Barun Kumar Saha,

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5. Mr. Shyama Shyam Krishna Pujari Chattopadhyay,

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6. Dr. Munshi Mahammad Saiful Ahamed

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7. Dr. Santanu Roy Choudhury,

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GAUHATI UNIVERSITY

FYUGP CORE SYLLABUS

IN BENGALI

COURSE DETAILS

a. Four-year Undergraduate programme

b. Subject - Bengali

c. Semester – Sixth

d. Course Name – Core and Major Elective Paper wise course names of each semester are included in the syllabus (Colum no. g)

e. Based on UG CBCS Syllabus

f. Course Level - 300

g. Syllabus -

SEMESTER 6

Paper Code– BEN CORE PAPER−6
Credits-4
Paper Title– বাংলা ভাষার পরিচয় External Marks – 80
Internal Marks –20 *

Units	Topics	No. of Class	Marks
I	বাংলা ভাষার উদ্ভব ও ক্রমবিকাশ, প্রাচীন বাংলা ভাষার কাল ও বৈশিষ্ট্য, মধ্য বাংলা ভাষার কাল ও বৈশিষ্ট্য, বাংলা লিপি	15	20
II	আধুনিক বাংলা ভাষার কাল ও বৈশিষ্ট্য, বাংলার উপভাষা, বাংলার সাধু ও চলিত ভাষা	15	20
III	ধ্বনিপ্রকরণ স্বর ও ব্যঞ্জন ধনির শ্রেণিবিভাগ বা বর্গীকরণ, আদি, মধ্য ও অন্ত্য স্বরাগম, স্বর ও ব্যঞ্জনধ্বনিলোপ, অপিনিহিতি, অভিশ্রুতি, স্বরসঙ্গতি, ক্ষতিপূরক দীর্ঘীভবন, সমীভবন, ঘোষীভবন, অঘোষীভবন, নাসিক্যীভবন, স্বতোনাসিক্যীভবন, মূর্ধণ্যীভবন, স্বতোমূর্ধণ্যীভবন, সমমুখ বিমুখ ধ্বনি পরিবর্তন	15	20

IV	শব্দ প্রকরণ (জোড়কলম শব্দ, সঙ্কর শব্দ, লোক নিরুক্তি, সমরূপ, সমধ্বনি, শব্দদ্বৈত, অনুগামী শব্দ, ধ্বন্যাত্মক শব্দ, মুন্ডমাল শব্দ) ও শব্দভাণ্ডার	15	20

*Candidates have to attend one Sessional Exam. of 40 marks and submit two Home Assignments each of 20 Marks for Internal Assessment Marks. Internal Assessment marks will be given out 20 marks by averaging the marks obtained in Sessional Examination and Home Assignments.

h. Reading list-

Reference Books:

১। সুকুমার সেন –ভাষার ইতিবৃত্ত, আনন্দ

২। পরেশচন্দ্র মজুমদার - বাংলাভাষা পরিক্রমা, দে’জ

৩। রামেশ্বর শ’- সাধারণ ভাষাবিজ্ঞান ও বাংলাভাষা, পুস্তক বিপণি

৪। সুনীতিকুমার চট্টোপাধ্যায় – ভাষা-প্রকাশ ও বাঙ্গালা ব্যাকরণ, কলিকাতা বিশ্ববিদ্যালয়

৫। পবিত্র সরকার - বাংলা ব্যাকরণ প্রসঙ্গ, দে’জ

i. (ii) Learning Outcome -

বাঙলা ভাষার পরিচয়

The course will enable the students to get familiar with the development of the Bengali language from old to modern era. It will also help students to understand basic phonological and morphological processes related to Bengali language.

Paper Code– BEN MAJOR ELECTIVE PAPER−7
Credits-4
Paper Title– প্রতিবেশী সাহিত্য পাঠ
External Marks – 80
Internal Marks –20*

Units	Topics	No. of Class	Marks
I	**অসমিয়া** লক্ষ্মীনাথ বেজবরুয়ার নির্বাচিত রচনা নির্বাচিত পাঠ - ভদরি, রতনমুণ্ডা, ভোকেন্দ্র বরুয়া, পাতমুগি, কন্যা	15	20
II	**হিন্দি** প্রেমচন্দের গল্প নির্বাচিত পাঠ - ফিন, দুধের দাম, দ্বিতীয় শৈশব, শেষ কিস্তি, অমাবস্যার রাত, চক্রবৃদ্ধি, যুদ্ধযাত্রা	15	20
III	**ওড়িয়া** ফকির মোহন সেনাপতি— ছ মণ আঠ গুণ্ঠ	15	20
IV	**উর্দু**- সাদাত হোসেন মাণ্টো— টোবাটেক সিং নেপালী– ইন্দ্রবাহাদুর রায়— পরমাণ্ণ মনিপুরী–নোংথোম্বম কুঞ্জমোহন সিংহ— ইলিশ মাছের স্বাদ পাঞ্জাবী—অমৃতা প্রীতম— দুই নারী তামিল—অশোক মিত্র— রাত পোহাবার আগে	15	20

*Candidates have to attend one Sessional Exam. of 40 marks and submit two Home Assignments each of 20 Marks for Internal Assessment Marks. Internal Assessment marks will be given out 20 marks by averaging the marks obtained in Sessional Examination and Home Assignments.

h. Reading list-

Reference Books:

১। রামকুমার মুখোপাধ্যায় (সম্পাদিত) - ভারতজোড়া গল্পকথা, মিত্র ও ঘোষ

২. রামবহাল তেওয়ারি - হিন্দি সাহিত্যের ইতিহাস, পশ্চিমবঙ্গ বাংলা আকাদেমি

৩. বিপ্লব চক্রবর্তী - আধুনিক হিন্দি সাহিত্য: গতি ও প্রকৃতি, বঙ্গীয় সাহিত্য সংসদ

৪. সুধাংশুমোহন বালা - অসমীয়া সাহিত্যের ইতিহাস, সাহিত্য আকাদেমি

৫. নির্মল দাশ - উত্তর-পূর্বের বাংলা ছোটগল্প বীক্ষণ, অক্ষর

৬. উষারঞ্জন ভট্টাচার্য (সম্পাদিত) - লক্ষ্মীনাথ বেজবরুয়ার নির্বাচিত রচনা, সাহিত্য আকাদেমি

৭. প্রসূন মিত্র (অনুবাদ) - প্রেমচন্দের গল্পগুচ্ছ ,এন. বি. টি.

৮. প্রিয়রঞ্জন সেন - ওড়িয়া সাহিত্য, বিশ্ববিদ্যালয় সংগ্রহ

i. (ii) Learning Outcome -

প্রতিবেশী সাহিত্যপাঠ

In this course comparative literary approach will be implemented to analyze Assamese, Hindi, and Oriya literary texts. It will help students to get an overview of literature from neighbouring states.

Paper Code– BEN MAJOR ELECTIVE PAPER–8
Credits-4
Paper Title– সাহিত্যের শ্রেণিগত বৈশিষ্ট্য ও বিভিন্ন ধারা External Marks – 80
Internal Marks –20*

Units	Topics	No. of Class	Marks
I	প্রবন্ধ	15	20
II	কাব্য	15	20
III	উপন্যাস-ছোটগল্প	15	20
IV	নাটক	15	20

*Candidates have to attend one Sessional Exam. of 40 marks and submit two Home Assignments each of 20 Marks for Internal Assessment Marks. Internal Assessment marks will be given out 20 marks by averaging the marks obtained in Sessional Examination and Home Assignments.

h. Reading list-

Reference Books:

১। অশোককুমার মিশ্র – সাহিত্যের রূপরীতিকোষ, সাহিত্য সঙ্গী

২। কুন্তল চট্টোপাধ্যায় – সাহিত্যের রূপরীতি ও অন্যান্য প্রসঙ্গ, রত্নাবলী

৩। হীরেন চট্টোপাধ্যায় – সাহিত্য প্রকরণ, বঙ্গীয় সাহিত্য সংসদ

৪। বিমলকুমার মুখোপাধ্যায় – সাহিত্যবিচার: তত্ত্ব ও প্রয়োগ, দে’জ

৫। অভীক গঙ্গোপাধ্যায় – সাহিত্যের সংরূপ: পাশ্চাত্য প্রেক্ষিত,প্রজ্ঞাবিকাশ

৬। শুদ্ধসত্ত্ব বসু - বাংলা সাহিত্যের নানা দিক, বিশ্বাস বুক স্টল

৭। ক্ষুদিরাম দাস – বাংলা কাব্যের রূপ ও রীতি, বুকল্যান্ড

৮। শ্রীশচন্দ্র মজুমদার – সাহিত্যসন্দর্শন, বিভাস

i. (ii) Learning Outcome -

সাহিত্যের শ্রেণিগত বৈশিষ্ট্য ও বিভিন্ন ধারা

This course will help students to understand various literary genres and their characteristics.

Paper Code – BEN MAJOR ELECTIVE PAPER–9
Credits-4
Paper Title – অসমের বাংলা সাহিত্য পাঠ
External Marks – 80
Internal Marks –20*

Units	Topics	No. of Class	Marks
I	**ছোটগল্প** নির্বাচিত পাঠ অখিল দত্ত -অশ্রুনদী দেবীপ্রসাদ সিংহ—বাসাবদল আসরাফ আলির স্বদেশ –মলয়কান্তি দে দীপঙ্কর কর –হুমকির পর দেবব্রত চৌধুরী –আব্বাজানের হাড়	15	20
II	**উপন্যাস** সমর দেব – লুইতপারের উপকথা	15	20
III	**নাটক** প্রদ্যোৎ চক্রবর্তী–গুণধরের অসুখ	15	20
IV	**স্মৃতিকথা** মুক্তি চৌধুরী –এই তো আমার আমি	15	20

*Candidates have to attend one Sessional Exam. of 40 marks and submit two Home Assignments each of 20 Marks for Internal Assessment Marks. Internal Assessment marks will be given out 20 marks by averaging the marks obtained in Sessional Examination and Home Assignments.

h. Reading list-

Reference Books:

১। বিজিতকুমার ভট্টাচার্য - উত্তর-পূর্ব ভারতের বাংলা সাহিত্য, সাহিত্য প্রকাশনী

২। জ্যোতির্ময় সেনগুপ্ত - অসমের বাংলা লিটিল ম্যাগাজিন: ছোটগল্প চর্চার প্রেক্ষাপট ও ক্রমবিকাশ

৩। উষারঞ্জন ভট্টাচার্য - স্মরি বিস্ময়ে

i. (ii) Learning Outcome -

অসমের বাংলা সাহিত্যপাঠ

This course has Focused on Bengali literature of Assam. Short stories, novel, drama, and memories are included to give a complete overview of Bengali literature of this region.

j. Theory Credit – (External Marks 80)

k. Practical Credit – (Internal Marks 20)

l. No. of Required Classes - 15 classes per unit of all papers

m. No. of Contact Classes - 60

n. No. of Non-Contact Classes - 0

o. Particulars of Course Designer -

1. Dr. Binita Rani Das,

Convenor and HOD ,

Department of Bengali,

Gauhati University, Guwahati, Assam.

Email- dasdrbinita@gmail.com

2. Dr. Sanjay Bhattacharjee,

Associate Professor,

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3. Dr. Rama Das,

Assistant Professor,

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email- 39rmadas.mtb@gmail.com

4. Dr. Barun Kumar Saha,

Assistant Professor,

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email- barunbabai83@gmail.com

5. Mr. Shyama Shyam Krishna Pujari Chattopadhyay,

Assistant Professor,

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6. Dr. Munshi Mahammad Saiful Ahamed

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Head,

Dept. of Bengali,

R.G. Baruah College,

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Four-year Undergraduate Programme
Subject: Economics
First Semester
Course Name: Introductory Economics
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 100-199

Unit No	Unit Content	No. of Classes	Marks
1.	**The Essences of the Economic Problem:**	15	25
	Scarcityand Alternative Usability of Resources, Problem of Choice and Optimization by an Economic Agent. The Notion of Opportunity Cost. Notions of Individual Demand and Supply. Individual Demand Function, Demand Curve and the Law of Demand, Shift of the Demand Curve, The Idea and calculation of Elasticity: Price, Income and Cross Elasticities of Demand and their Significance. Cost of Production and Supply. Elasticity of supply.		
2	**Market and Its Role in the Economy**	**12**	**20**
	Market and its Different Forms - Perfectly Competitive Market versus Monopoly. Individual Demand to Market Demand, Individual Supply to Market Supply. Price determination in a Competitive Market. Stability of the Competitive Market Equilibrium. Consumers' and Producers' Surplus and Efficiency of theMarkets Equilibrium.		
3	**National Income and its Measurement**	**10**	**15**
	From Microeconomics to Macroeconomics. Income (Hicks' Definition), Domestic Income and National Income, GNP and its Measurement, Circular Flow of the Economy, NDP at Factor Cost as Domestic Income. Personal and Disposable Income, Purchasing Power Parity. Concepts of Unemployment, Inflation and Recession Balance of Payment –current and capital accounts		
4	**Macroeconomic Equilibrium and Income Determination**	**12**	**20**
	Idea of Equilibrium as Applied to a Basic Macroeconomy, Ex Post and Ex Ante Savings and Investment, Keynes' Approach of Aggregate Effective Demand and Determination of Income, Multiplier Analysis		
5	**Basic Concepts in Public Finance Operations**	**12**	**20**
	Definition of Tax,Direct and IndirectTax,TaxRate,Buoyancy andElasticityofaTax,Proportionate,ProgressiveandRegressiveTaxation. Government Budget and Its Revenue and Capital Components;		

	Fiscal and Primary Deficits.		

Readings:

1. N C Ray,*Microeconomic Theory*, MacMillan
2. Dominick Salvatore, Microeconomic Theory, Schaum's Outline Series, McGraw Hill
3. Soumyen Sikdar, *Principles of Macroeconomics*, Oxford

Graduate Attributes:

Course Objective:

The course is designed to expose the students to the basic idea of microeconomics, macroeconomics and public finance. The emphasis will be on thinking like an economist and the course will illustrate how the concepts of microeconomics, macroeconomics and public finance can be applied to analyze real-life situations.

Learning outcome:

This course aims to develop the simple conceptual frameworks which will enable students to understand and comments upon real economic issues like the basic economic problems, demand, supply, GDP and their inter-linkages and also simple ideas of public finance. It will also allow them to evaluate economic policies in terms of coherent logical structure.

Prerequisites: -

Theory Credit: 04

Practical Credit: -

No. of Required Classes:

No. of Contact Classes: 60

No. of Non-contact Classes: -

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Particulars of Course Designer 2:

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Particulars of Course Designer 3:

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Subject: Economics

Paper: Basic Elements of Economics

Semester: 2nd Semester

Existing base syllabus:

Course Level: 100-199

Course Objective: The course is designed to introduce the students to the basic ideas of Development Economics, Statistics, Indian economy and elements of the financial system. The focus will be on exposing the students to the various issues of the global and national economy along with the basic statistical tools for analysing these issues.

Graduate Attributes:

At the end of the course, the students will be able to:

- Understand and critically evaluate the various measures of development
- Use and apply the relevant statistical tools to systematically examine any given economic phenomenon
- Describe and analyse the Indian economy in terms of its income and demographic features
- Understand the functioning of a financial system
- Relate and analyse the current events of the global and national economy

Prerequisites: None

Theory credit: 4

Practical credit: None

Number of required classes

Number of contact classes: 50

Number of non-contact classes: 10

Basic Elements of Economics

Content	Marks/Classes
Unit 1: Basics of data collection - Primary and Secondary, Census versus Sample Survey, Distinction between population and sample, Distinction between population parameters and sample statistics, Principal steps in a sample survey, Methods of sampling - random, stratified, multi-stage and	25/20

systematic random sampling. Measures of Central Tendency – Mean: Arithmetic mean (simple and weighted), Geometric mean, Harmonic mean, Median, Mode. Measures of Dispersion: Range, Inter-quartile deviation, mean deviation, standard deviation, Variance.	
Unit 2: Index Number - Meaning and Types, Construction, uses and limitations of index numbers, Cost of Living Index Numbers. Consumer Price Index Numbers for Agricultural Labourers in India, Consumer Price Index Numbers for Industrial Workers in India (concept only)	10/8
Unit 3: Economic growth and development, Per Capita Income (PCI) as a measure of development, International comparison of PCI and role of Purchasing Power Parity (PPP). Human Development Index (HDI), Concept of Sustainable development.	25/10
Unit 4: Financial System and its functions, Formal and informal financial system~~,~~ Components of a financial system and their interdependence, Relationship between financial system and economic growth	20/10
Unit 5: Basic features of Indian economy, Trend of national and per capita income, Sector-wise composition of GDP, Basic demographic features – age, sex composition, density, urbanization, Labour force and Work force and Participation rate , Unemployment, Occupational Pattern, Demographic Dividend.	20/12

References

A.N. Agarwal: Indian Economy - Problems of Development and Planning, New Age International Publishers

B. V. Pathak: Indian Financial System, Pearson Education, Singapore.

Debraj Roy: Development Economics

Michael P.Todaro, Stephen C. Smith: Economic Development

Padmalochan Hazarika: Statistical Methods for Economics, Ashok book Stall

S.C. Gupta: Fundamentals of Statistics, Himalayas Publishing House, Seventh Edition

S.K.Misra, V K Puri: Economics of Development and Planning

V.K.Puri and S.K.Mishra: Indian Economy, Himalay Publishing House

William G. Cochran: Sampling Techniques, John Wiley, 2007.

Particular of course designer:

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Four-year Undergraduate Programme
Subject: Economics
Third Semester
Course Name: Intermediate Economics
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 200-299

Unit No	Unit Content	No. of Classes	Marks
1.	**Consumer's Behaviour**	**12**	**20**
	Consumer's Budget Constraints and Effects of Income and Price Changes on it, Consumer's Preference Ordering and Indifference Curves, Axioms of Preference and Properties of Indifference Curves: Consumer's Optimized Choice; Income and Substitution Effects, Derivation of Demand Theorem. Normal and Inferior Goods and the Giffen Paradox		
2	**Theory of Production and Cost**	**15**	**20**

	Total, Average and Marginal Product of a Single Variable Factor;
	Production Function with Two Variable Factors, Isoquant, Marginal Rate of Technical Substitution and Elasticity of Substitution;
	Homogeneity of Production Function and Returns to Scale,
	The Least Cost Factor Combination, Expansion path, cost curves-Short and Long-run.		

3	**Firm's Revenue and Equilibrium**	**9**	**14**
	Total, Average and Marginal Revenue of a Firm under Perfect Competition and Monopoly, Equilibrium of a Profit Maximizing Firm under Perfect Competition and Monopoly. Need for Regulation of Monopoly		
4	**Money, Interest, Income**	**10**	**17**
	Definition and Functions of Money, Classical Theory of Full Employment Equilibrium, Quantity Theory of Money Keynes' Critique of the Classical Theory, Liquidity Preference and the Rate of Interest, Keynesian Income Determination Model with Rate of Interest		
5	**Credit Creation, Money Supply and Inflation**	**8**	**14**
	Banking System and Credit Creation Process; Money Supply;		

	Inflation: Demand-pulled and cost-pushed, Effects on production and distribution; Central Bank's Tools of Monetary Control		
6	**Elements of International Trade Theory**	**6**	**15**
	Autarky versus Trade, Absolute and Comparative cost, Gains from Trade		

Readings:

1. N C Ray, *Microeconomic Theory*, MacMillan
2. Dominick Salvatore, *Microeconomic Theory*, Schaum's Outline Series, McGraw Hill
3. Soumyen Sikdar, *Principles of Macroeconomics*, Oxford
4. Dominick Salvatore, *International Economics*,

Graduate Attributes:

Course Objective:

The course is designed to provide a sound training in micro and macroeconomic theory and elementary exposure to International Economics. This involves more formal treatment of behavior of individual economic agents and outcome of their decisions on the aggregated levels. Students will also get further insights to the subjects of money, inflation and Credit system

Learning Outcome:

This course aims to develop the broad conceptual frameworks which will enable students to understand the contents upon real economic issues like consumer behavior, producer behavior, money, inflation, employment, International Economics and basic theories.

Prerequisites: -

Theory Credit: 04

Practical Credit: -

No. of Required Classes:

No. of Contact Classes: 60
No. of Non-contact Classes: -

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Fourth Semester

1. **Subject Name:** **Economics**
2. **Course Name:** **Public Finance**
3. **Existing Base Syllabus:** **GU -UGCBCS**
4. **Course Level:** **200-299**
5. **Graduate Attributes:**

   Course Description:
   This course introduces the nature and scope of Public Finance. It will look into efficiency and equity aspects of taxation and expenditure. It examines the objective of fiscal policy and explores Fiscal Federalism in India.

   Learning Outcomes**:**

   The course will be useful for students aiming for careers in the government sector, policy analysis, business and journalism.

6. **Pre-requisites:** This course requires successful completion of first and second semester courses in Economics.

7. **Theory Credit:** **04**
8. **Practical Credit:** **00**

9. **Number of Required classes:**
   a) **Number of Contact classes:** **50**
   b) **Number of No-contact classes:** **10**

10. **Reference Books and Materials:**

    1. Browning E K & Browning J M, Public Finance and the Price System, Pearson Education. Singapore.

    2. Hyman D N, Public Finance: A Contemporary application of Theory to Policy, Thomson South Western.

    3. Ulbrich H, Public Finance in Theory and Practice, Thompson South Western.
    4.Mukherjee S, Ghose A & Nag N N, Analytical Public Finance. Public Economics-Public Choice-Public Policies, New Central Book Agency (P), Kolkata.

    5. Musgrave & Musgrave., Public Finance in Theory and Practice, McGraw Hill, Singapore.

11. Particulars of Course Designer:

a) Name:Dr. Bandana Chowdhury,Contact:9706843319,email:bandana@gauhati.ac.in
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Public Finance
Class: 4th Semester
Paper Code:

Credit: 04
Total marks: 100

Unit 1: Meaning, Scope and Nature (10 classes, 15 marks)

Public Financeand its nature. Objectives of Fiscal Intervention: Allocation, Distribution and Stabilization. Parameters for policy evaluation: *Equity, Efficiency, Paternalism*

Unit 2: Market Failure and Public Intervention(10 classes, 15 marks)

Public Goods and the Free Rider Problem. Externalities: inefficiencies and corrections, property rights, Coase theorem

Unit 3: Taxation (10 classes, 20 marks)

Principles of taxation: Benefit vs Ability. Shifting and Incidence of tax. Economic effects, dead weight loss and distortion. Efficiency and equity considerations.

Unit 4: Public Expenditure (10 classes, 20 marks)

Principles of Expenditure Analysis, Fixed Quantity Subsidy for Marketed goods: overconsumption and underconsumption. Excise Subsidy: Allocative and Distributive Effect. Public Investment and Social Cost-Benefit Analysis

Unit 5: Public Debt and Budgeting (10 classes, 15 marks)

Sources of Public Debt and its redemption. Burden of Public Debt.
Strategies of Debt Management.
Budgeting: Incremental vs Zero-based budgeting. Outcome Budget.

Unit-6 Fiscal Policy and Federal Finance (10 classes, 15 marks)

Objectives and Strategies, Compensatory fiscal policy, pump priming, functional finance.Balanced Budget Multiplier.

Fiscal Federalism: Vertical and Horizontal Equity, Inter-governmental Transfers. Finance Commission of India.

Subject Name: **Economics**

Course Name: **Advanced Macroeconomics**

Existing Base Syllabus: **GU -UGCBCS**

Course Level: **200-299**

Graduate Attributes:

Learning Outcomes:

This course is designed to provide a comprehensive knowledge in macroeconomics. It provides basic ideas on macroeconomic indicators or variables. It discusses various alternative theories of output and employment determination in a closed economy in short-run, medium-run. In addition, it covers long run dynamic issues like growth and technical progress. It also provides different theoretical understanding of issues related to an open economy.

Pre-requisites: This course requires successful completion of Intermediate Economics course offered in the third semester.

Theory Credit: **04**

Practical Credit: **0**

Number of Required classes:

c) Number of Contact classes: 50

d) Number of Non-contact classes: 10

Reference Books and Materials:

- Debraj Ray, Development Economics, Oxford University Press, 2009
- Dornbusch, Fischer and Startz, Macroeconomics, McGraw Hill, 11th edition, 2010
- Dominick Salvatore, International Economics: Trade and Finance, John Wiley, 10th Edition 2011
- N. Gregory Mankiw. Macroeconomics, Worth Publishers, 7th edition, 2010
- Richard T. Froyen, Macroeconomics, Pearson Education Asia, 2nd edition, 2005
- Thirlwall, A. P. “Growth and Development” Palgrave, 9th edition, 2011.

Particulars of Course Designer:

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g) Name: Prof. Nissar A Barua; Contact: 9864034527, email: nissar12@gauhati.ac.in

Advanced Macroeconomics
Class: 4th Semester
Paper Code:

Credit: 04
Total Marks: 100

Course Outline:

Unit 1: Consumption Function: (15 Classes, 20 marks)

Average and Marginal Propensity to Consume; Factors influencing Consumption spending; Keynesian consumption function; An Overview of Post Keynesian theories of consumption: absolute income, relative income, permanent income & life cycle hypothesis.

Unit 2: Investment Function: (15 Classes, 20 marks)

Types of investment- Autonomous and Induced, residential investment and inventory investment; determinants of business fixed investment; marginal efficiency of capital, marginal efficiency of investment; Accelerator theory of Investment; Multiplier-Accelerator interaction.

Unit 3: Macro economic modeling: (14 Classes, 30 marks)

IS-LM model and policy analysis, Income determination in an open economy; Mundell-Fleming model; Exchange rate and its determination; Purchasing power parity; Demand-Supply and Balance of Payments theory.

Unit 4: Inflation, Unemployment and Expectations: (08 Classes, 15 marks)

Inflation-unemployment trade off and Phillips curve; Adaptive and Rational expectations; policy ineffectiveness debate.

Unit 5: Economic Growth: (08 Classes, 15 marks)

Harrod- Domar model**;** Solow model**;** Technological progress and elements of endogenous growth.

References:

1. Debraj Ray, Development Economics, Oxford University Press, 2009
2. Dornbusch, Fischer and Startz, Macroeconomics, McGraw Hill, 11th edition, 2010
3. Dominick Salvatore, International Economics: Trade and Finance, John Wiley, 10th Edition 2011
4. N. Gregory Mankiw. Macroeconomics, Worth Publishers, 7th edition, 2010
5. Richard T. Froyen, Macroeconomics, Pearson Education Asia, 2nd edition, 2005
6. Thirlwall, A. P. "Growth and Development" Palgrave, 9th edition, 2011.

Four-year Undergraduate Programme
Subject: Economics
Fourth Semester
Course Name: Introductory Quantitative Techniques for Economics
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 200-299

1. Preliminaries of Mathematics (Classes: 8) (Marks: 10)

Constants and Variables, Number system, Sets and set operations, Ordered pairs and Cartesian products, relations and functions, Types of functions: quadratic, polynomial, power, exponential, logarithmic, Limit and Continuity of a Function.

2. Differential Calculus (Classes: 12) (Marks: 20)

Differentiation of a function, Basic rules of differentiation, partial and total differentiation, second and higher order derivatives for single variable, economic applications of differentiation.

3. Integration of Functions (Classes: 12) (Marks: 20)

Meaning and significance of integration, basic rules of integration, significance of a constant after integration, applications: derivations of total functions (total cost, total revenue, consumption and saving functions) from marginal functions, Definite integral and its application-consumer’s surplus and producer’s surplus.

4. Single Variable Optimization (Classes: 8) (Marks: 20)

Local and global optima: geometric characterization, characterization using calculus: tests for maximization and minimization, applications: profit maximization, cost minimization, revenue maximization.

5. Correlation Analysis(Classes: 10) (Marks: 15)

Correlation, Coefficient of linear correlation, Properties of Correlation coefficient, Rank Correlation, Partial Correlation, Multiple Correlation.

6. Regression Analysis(Classes: 10) (Marks: 15)

Regression: Concept, Difference with Correlation Analysis, Properties, Estimation of regression line in a bivariate distribution-Least squares method, properties of regression coefficients.

Readings:

1. K. Sydsaeter and P. Hammond, *Mathematics for Economic Analysis*, Pearson Educational Asia: Delhi, 2002
2. Chiang A.C. and K. Wainwright, *Fundamental Methods of Mathematical Economics*, McGraw Hill International Edition
3. Baruah S.N., *Basic Mathematics and its Economic Applications*, MacMillan
4. Jay L. Devore, Probability *and Statistics for Engineers,* Cengage Learning, 2010.
5. John E. Freund, *Mathematical Statistics*, Prentice Hall, 1992.
6. Richard J. Larsen and Morris L. Marx, *An Introduction to Mathematical Statistics and its Applications,* Prentice Hall, 2011.
7. S.C Gupta. Fundamentals of Statistics

Graduate Attributes:

The course is designed to provide some ideas related to basic mathematics and elementary statistics. The main objective is to acquaint the students with the basic quantitative techniques like calculus, optimization techniques, correlation, regression etc. which are very much helpful for studying economic theories and analyzing economic phenomena. This course will enable students to have some basic ideas of elementary mathematics like number system, sets, functions, calculus and some basics on statistical measures to be applied for solvingeconomic problems.

Prerequisites: -

Theory Credit:	04
Practical Credit:	-
No. of Required Classes:	
No. of Contact Classes:	60
No. of Non-contact Classes:	-

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Advanced Microeconomics

Class: 4th Semester

Difficulty Level: 200-299

Credit: 4

Total Marks: 100

Course Objective:

The course is designed to provide a sound understanding of the concepts and theories of advanced microeconomics. Since students have been taught perfect competition, this course focuses on the main pillars of Microeconomics such as Imperfect Competition, General Equilibrium, Welfare Economics, and Information Economics. In addition, the principle of factor pricing, input markets, consumer theory, production and cost analysis have been included.

Learning Outcome:

- To provide a better understanding of the market structure.
- To provide an understanding of general equilibrium, welfare economics, market structure, game theory, and economics of information.
- To demonstrate that the theories discussed in class will usually be applied in real-life situations.

Unit 1: Input Markets (20 Marks) (10 Classes)

Labour and land markets - basic concepts (derived demand, productivity of an input, marginal productivity of labour, marginal revenue product); demand for labour; input demand curves; shifts in input demand curves; competitive labour markets; and labour markets and public policy.

Factors share & Technical progress- Backward bending supply curve of Labor.

Unit - 2: Theory of Production and Cost (15 Marks) (10 Classes)

Forms of Production Function; Cobb-Douglas, CES and Fixed coefficient Type – the Ideas of Partial and Total Factor Productivity– Derivation of Cost Function from Production Function – Multi-product Firm: production Efficiency Locus, Production Possibility Frontier.

Unit 3: Consumer Theory and Information Economics (20 Marks) (10 Classes)

A review of Indifference Curve, Violation of premises of Indifference curve approach, Revealed Preference Theory.

Inter-temporal choice, Choice under risk-Expected Return, variability and Expected utility hypothesis- Asymmetric information- Adverse Selection and Moral Hazard

Unit 4: Market Structure and Game Theory (25 Marks) (10 Classes)

Monopoly, Pricing with Market Power; Degree of Monopoly, Price Discrimination- Different Degrees; Multi-plant Monopoly.

Monopolistic competition: Product Differentiation, Perceived and Proportionate Demand Curves, Price-Output Determination.

Oligopoly and Game Theory (Two Person Zero Sum Game, Basic ideas and examples of non-zero-sum games, Prisoner's Dilemma), Applications of Game Theory in Oligopolistic Markets (Cournot Equilibrium).

Unit 5: General Equilibrium & Welfare Economics (20 Marks) (10 Classes)

Partial versus General Equilibrium Approaches- Walrasian General Equilibrium System.

Pareto optimality, Kaldor-Hicks compensation criteria, Social Welfare Function, Fundamental Theorems of Welfare Economics, Arrow's Impossibility Theorem.

Recommended Readings

1. Dominick Salvatore,Schaum's Outline of Microeconomics, McGraw-Hill Education
2. G.S. Maddala and Ellen Miller, Micro Economic Theory and Application, Tata McGraw Hill.
3. Koutsoyiannis. A, Modern Micro-Economics, ELBS/Macmillan.
4. Pindyck, R. &Rubinfield, D.L., " Microeconomics", Pearson
5. C. Snyder and W. Nicholson, Fundamentals of Microeconomics, Cengage Learning (India).
6. Anindya Sen, Microeconomics-Theory and Application, Oxford University Press

Number of required classes

No of Contact classes: 50

No of non-Contact classes:10

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Fifth Semester

Subject: Economics

Paper: Development Economics

Semester: 5th Semester

Existing base syllabus:

Course Level: 300-399

Course Objective: The course is designed to introduce the students to the basic ideas of Development Economics, namely the concepts and meaning of development. The focus will be on exposing the students to the various theories and strategies of development and relate them to issues of poverty, inequality and the environment.

Graduate Attributes:

At the end of the course, the students will be able to:

- Understand and critically evaluate the process of development.
- Interpret the various development strategies and theories to assess the different development paths followed by different societies of the world.
- Gain awareness on the real meaning of development and comprehend how poverty, inequality and environment are linked to the process of development.

Prerequisites: None

Theory credit: 4

Practical credit: None

Number of required classes

Number of contact classes: 50

Number of non-contact classes: 10

Syllabus

Unit 1: Concepts of Development (Marks - 20, No. of classes – 10)

Measurement of development: Traditional measure of development, HDI as a measureof development, Gender Related Development Index.Structural Change and Economic Development. Sustainable Development Goals, Climate Change Challenges and Global Coordination Initiatives.

Unit 2: Poverty, Inequality and Development (Marks - 15, No. of classes – 10)

Poverty - Conceptual Issues, Its Measurement, Poverty Trap - Definition, Causes and Economic Implications
Inequality - Conceptual Issues, Its Measurement, Connections between Inequality and Development

Unit 3: Theories of Economic Growth and Development (Marks - 25, No. of classes – 15)

The Lewis Growth Model
Kaldor Growth Model
Dependency School of Development
Haris-Todaro Model
Myrdal Cumulative Causation Theory
Issues relating to Informal Sector

Unit 4: Strategies of Development (Marks - 20, No. of classes – 15)

Rostow's Stages of Growth
Big Push Theory
Balanced and unbalanced Growth Theory
Leibenstein Critical Minimum Theory

Unit 5: Economic Development and Environmental Problems (Marks - 20, No. of classes – 10)

Causes of Environmental Problems
Rural Poverty and Environmental Destruction
Industrialisation and Environmental Pollution
Lowering the Peak of the Inverted-U-Shape Curve

References:

Bhattacharyya, R.N. (ed) (2004), Environmental Economics: An Indian Perspective, Oxford

University Press, New Delhi.

Ray, Debraj (2012), Development Economics, Oxford University Press, New Delhi.

Thirwall, A.P. (2006), Growth and Development: With Special Reference to Developing Economies, Palgrave.

Todaro, M., Smith, S (2015), Economic Development, Pearson.

Particular of course designer:

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INDIAN ECONOMY

5th Semester

Credit: 4 Total Marks: 100

Difficulty level: 300-399

Course objective/Description:

This course will give the students an idea of the Indian economy at the time of independence to the contemporary time. The course is expected to provide students a better pictureof the situation and appreciate the challengesand opportunities.

Course outcome:

 Help students to know the status of Indianeconomy in some development indicators since independence

 Built up an analytical thought among students to see the relevance of policies and its effects on different sectors.

Graduate Attributes:

This syllabus will help the students to update their knowledge along with the requisite data which will be of immense help in competitive exams and in getting jobs.

OTHER DETAILS

1. Subject Name- ECONOMICS
2. Course Name- 4-year Degree course (ECONOMICS)

Paper- Indian Economy

3. Existing base syllabus- CBCS present syllabus ECO-HC-5016 and 6016
4. 300-399
5. Theory credit-3
6. No of required classes- a) No of contact classes- 53

b) No of non-contact classes-07

Unit	Content	Classes	Marks
1	Broad Trends and Compositions	10	20
	State of the Indian Economy at the time of independence – Growth in GDP and per capita income and changes in sector-wise		

	composition during 1951-80 - BOP crisis brewing in 1980s – market oriented economic reforms initiated in 1991 – Growth trends, sector-wise composition, poverty and inequality in the post reform period		
2	Agriculture and the rural sector	13	25
	Land reforms – Green Revolution – Agrarian crisis of 1990s - Horticulture and livestock as new areas of growth – Role of PMGSY and MGNREGS in rural transformation - Challenges in the 21st century: GM crops, Climate smart agriculture and doubling of farmers' income – Reforms in agriculture		
3	Manufacturing and Service Sectors	12	20
	Slow growth of manufacturing and its impact on employment generation – Growing role of services in income and employment generation – Definition, composition and prospects of MSME		
4	Key Initiatives and Reforms	08	15
	GST – Direct Benefit Transfer – Jan Dhan Yojana and financial inclusion – Outstanding reforms: Land acquisition, Labour laws, and banking sector reforms – the challenge of formalizing of the economy		
5	India in the Global Economy	10	20
	Size of the Indian Economy in the global context - Trade openness in the post-reforms and post-WTO regime – trends in the trade-GDP ratio - Capital flows (FDI and FII) and their impact – BIMSTEC and India-ASEAN free trade initiatives		

Books Recommended:

1. Arvind Panagariya (2010): *India the Emerging Giant*, OUP
2. Jagdish Bhagyawati and Arvind Panagariya (2015)*Why Growth Matters*, OUP
3. Abhijit Banerjee, Rajan, Raghuram Rajan, Gita Gopinath, Mihir S. Sharma (2019) *What the Economy Needs Now*, Juggernaut Books, New Delhi
4. Statistical Appendix of the Latest Economic Survey, Ministry of Finance, Government of India

Moderator: Prof. Madhurjya P. Bezbaruah, GU

Prof. Ratul Mahanta, Department of Economics, GU

Contributors:

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Mr. Rajeeb Bora, Bongaigaon College, Ph no-86382 10363 email- rajibbora2012@gmail.com

Four-year Undergraduate Programme
Subject: Economics
Fifth Semester
Course Name: International Economics
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399

1. Evolution of International Trade Theories (Classes: 15) (Marks: 25)

The Ricardian theory- comparative advantage, Heckscher-Ohlin model, Factor price equalisation- Absolute and Relative, specific factors model, Empirical testing of H-O model: Leontief Paradox, factor-intensity reversal.

2. Advances in Trade Theories (Classes: 13) (Marks: 20)

International trade in the context of economies of scale and imperfect competition, technological gap model of Posner and product cycle theory of Vernon; multinational enterprises and international trade.

3. Trade Policy (Classes: 12) (Marks: 25)

Instruments of trade policy- tariff and quota- partial equilibrium analysis; political economy of trade policy- free trade vs. protection; controversies in trade policy, fixed versus flexible exchange rates; system of managed floating exchange rate.

4. International Economic Integration (Classes: 10) (Marks: 15)

Importance and forms of economic integration; costs of economic integration; Theories of Customs Union- partial equilibrium analysis.

5. International Monetary System(Classes: 10) (Marks: 15)

International monetary systems-definition, properties of a good international monetary system, Evolution of international monetary system from past to present; financial globalization and historical financial crises.

Readings:

1. Paul Krugman, Maurice Obstfeld, and Marc Melitz, *International Economics: Theory and Policy*, Addison-Wesley (Pearson India Education Services), 10th edition, 2019.
2. Dominick Salvatore, *International Economics: Trade and Finance*, John Wiley International Student Edition, 10th edition, 2011.
3. Bo Sodersten and Geoffrey Reed: International Economics, Macmillan, 3rd edition, 1994.
4. H G mannur, *International Economics: Theory and Practice*, Vikash Publishing House

Graduate Attributes: This course helps students to comprehend the economic relationships among countries in terms of both trade and monetary issues. It also assists the students in understanding and explaining the composition, direction and consequences of international trade, and the determinants and effects of trade policy. It covers extensive discussions on advances in trade theories over the years,trade policies as well as international monetary systems. Although the course is based on abstract theoretical models, students will also be exposed to real-world examples and case studies.

Prerequisites: Preliminary knowledge on international Economics as outlined in 3rd semester course on Intermediate Economics.

Theory Credit:	04
Practical Credit:	-
No. of Required Classes:	
No. of Contact Classes:	60
No. of Non-contact Classes:	-

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Four-year Undergraduate Programme
Subject: Economics
Fifth Semester
Course Name: Intermediate Quantitative Techniques for Economics
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399

1. Linear Algebra (Classes: 10) (Marks: 25)

Matrix: various types of matrices, vector and vector space-concept, matrix operations: addition, subtraction and multiplication; rank, norm and trace of a matrix, introduction to the concept of determinants and their properties, non-singularity of matrix, matrix inversion, solutions of simultaneous equations by using matrix inversion and Cramer's rule, simple market model and national income model.

2. Functions of Real Variables (Classes: 6) (Marks: 10)

Homogeneous and homothetic functions: concepts, Differentiable functions: concepts, Implicit Function Theorem and applications; convex, quasi-convex and concave functions.

3. Multi-variable Optimization (Classes: 12) (Marks: 20)

Unconstrained optimization: geometric characterization, characterization using calculus and applications: price discrimination and multi-plant firm; constrained optimization with equality constraints, Lagrange multiplier, applications: consumer's equilibrium and producer's equilibrium.

4. Elementary Probability Theory(Classes: 12) (Marks: 15)

Sample spaces and events; probability axioms and properties; addition and multiplication theorem of probability, counting techniques; conditional probability and Bayes' rule (concept only); Defining random variables; expected values of random variables.

5. Theoretical distributions (Classes: 10) (Marks: 15)

Functions of random variables (probability mass function and probability density function), Commonly used discrete and continuous distributions (Uniform, Binomial, Poisson and Normal).

6. Introduction to Time Series (Classes: 10) (Marks: 15)

Time Series Analysis-Concept and Components; Measurement of Trend-
Moving average and Least square method, Fitting of linear trend curves.

Readings:

1. K. Sydsaeter and P. Hammond, *Mathematics for Economic Analysis*, Pearson Educational Asia: Delhi, 2002
2. Chiang A.C. and K. Wainwright, *Fundamental Methods of Mathematical Economics*, McGraw Hill International Edition
3. Baruah S.N., *Basic Mathematics and its Economic Applications*, MacMillan
4. Jay L. Devore, Probability *and Statistics for Engineers,* Cengage Learning, 2010.
5. John E. Freund, *Mathematical Statistics*, Prentice Hall, 1992.

6. Richard J. Larsen and Morris L. Marx, *An Introduction to Mathematical Statistics and its Applications,* Prentice Hall, 2011.
7. S. C. Gupta and V.K. Kapoor. Fundamentals of Applied Statistics
8. S. C. Gupta and V.K. Kapoor. Fundamentals of Mathematical Statistics

Graduate Attributes:

This course is designed to give students the knowledge of mathematical tools like matrix algebra, multivariable optimization, etc. along with statistical tools of probability, theoretical distribution and time series to build up strong quantitative skill. On completion of this course, students are expected to be able to apply these quantitative tools for solving economic problems.

Prerequisites: Preliminary knowledge on Mathematical Economics as outlined in 4th semester course on Introductory Quantitative Techniques for Economics.

Theory Credit:	04
Practical Credit:	-
No. of Required Classes:	
No. of Contact Classes:	60
No. of Non-contact Classes:	-

Particulars of Course Designer 1:

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Particulars of Course Designer 3:

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Assam Economy

6th Semester

Credit: 4 Total Marks: 100

Difficulty level: 300-399

Course objective/Description:

This course will provide students an idea of Assam economy since independence to the contemporary time. The course is expected to help students to better appreciate the challenges and opportunities of the economy of Assam in the present context.

Course outcome:

- Help students to know the status of Assam economy in some development indicators since independence
- To enhance knowledge about the linkage between human capital formation and different sectors of an economy.
- Built up an analytical thought among students to see the relevance of policies and its effects on different sectors.

Graduate Attributes:

This syllabus will help the students to update their knowledge base on Assam along with the requisite data which will be of immense help in competitive exams and in getting jobs.

OTHER DETAILS

1. Subject Name- ECONOMICS

2. Course Name- 4 year Degree course (ECONOMICS)

Paper- Assam Economy

3. Existing base syllabus- CBCS present syllabus ECO-HE-6036 The Economy of Assam

4. 300-399

5. Theory credit-3

6. No of required classes- a) No of contact classes- 60

Unit	Content	Classes	Marks
1	**The Economy under Colonial Rule (1837 -1947)**		
	Imposition of Land Revenue and Its Impact, Prohibition of Opium Production and State Takeover of Opium Trade, Inflow of Colonial	10	15

	Investment in Plantation, Mining and Other Industries. Development of Water Transport and Railways, In-migration of Population and its Impact on the Economy: Shock of Partition and its Impact		
2	**Growth and Sectoral Composition in the Post-Independence Period**	15	25
	Population growth trends before and after 1971, Trends in Demographic Parameters: Population Density, Sex Ratio, Life Expectancy, Fertility Rate and Infant Mortality Rate – Work Force and Labour Force Participation, Occupational Distribution. Trends and Sector-wise Composition of GSDP, Trend in Per Capita NSDP in comparison with trends in all-India Per Capita Income Trends in Other Indicators of Development in Comparison with all-India standard: Life expectancy, Literacy, Enrolment and Forest Cover		
3	**Sectoral Status and Prospects**:	20	35
	Infrastructure: Status of Road, Rail and Air Connectivity within and out of the State; Potentials and Limitation of Waterways Development; Status of Power and Telecommunication **Agriculture:** Land Holding Patterns, Land Tenure and Land Reforms, Cropping Pattern, Production and Productivity of Principal Crop –Diversification of the Rural Economy to Horticulture, Fishery, Livestock and Non-farm activities – Prospects and Challenges of the Sector. **Industry:** Tea Industry and Role of Small Tea Growers, The Future of Hydrocarbon Industry. Traditional Handloom Handicraft and their Prospect; **Service Sector**: Size and Composition. Tourism Resources and their Economic Potentials: Policies for sustainable realization		
4	**State Finances**:	9	15
	Trends and composition of State Government receipts before and after GST regime. Composition of Public Expenditure and its implications. Sustainability of Government Borrowing. Fiscal Devolution to Local Bodies (Panchayats, Municipalities and Autonomous Councils)		
5	**Assam Economy in its Neighborhood**	6	10
	Mutual inter-dependence with neighboring States Stakes of Assam in the Act East Policy		

Readings:

Atul Goswami "Assam's Industrial Development: Urgency of New Direction", Economic and Political Weekly 1981

Department of Economics, Gauhati University, “Identity Aspirations, Developmental Backlogs and Governance Issues in Northeast India” Maliyata Offset Press, Mirza, 2016

Directorate of Economics and Statistics, Government of Assam, “Economic Survey Assam” [recent issues] https://des.assam.gov.in/information-services/economic-survey-assam

Directorate of Economics and Statistics, Government of Assam, “Statistical Handbook of Assam” 2018 or later addition

Guha, Amalendu, Planter’s Raj to Swaraj, Second Edition (paperback)

India Brand Equity Foundation “About Assam: Tourism, Industries In Assam, Agriculture, Economy & Geography”, June 2020, https://www.ibef.org/states/assam.aspx

J B Ganguli, "Economic Conditions and Change in North-East India" in A.P. Singha (ed) Changing North East India, Ludhiana: Gagan Publishers, 1986

J N Sarma, “Problems of Economic Development in Assam" Economic and Political Weekly, Vol. 1, No. 7, Pp. 281+283-286.

Planning and Development Department, Government of Assam “Assam Human Development Report 2014”

Moderator: Prof. Madhurjya P. Bezbaruah, GU

Prof. Ratul Mahanta, Department of Economics, GU

Contributors:

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Basics of Econometrics
Class: 6th Semester
Difficulty Level: 300-399
Number of Contact Class: 52
Number of Non-contact Class: 08
Credit: 4
Total Marks: 100

Course objective:

This course aims to provide students with an introduction to the theory and application of econometrics. The course will cover basic concepts such as linear regression, estimation techniques, hypothesis testing, and other topics related to the analysis of economic data. Students will gain an understanding of how econometrics can be used to explain economic relationships, forecast future outcomes, and analyze public policy.

Learning outcome:

The main learning outcomes of the paper include:

1. Understanding the basic concepts and principles of econometrics,
2. Developing an understanding of the components of a linear regression model, including the intercept and slope terms,
3. Applying linear regression analysis to real-world data,
4. Understanding the meaning and interpretation of a linear regression analysis results
5. Employ alternative estimation techniques such as multi-variable regression,
6. Understanding the assumptions underlying linear regression models and the implications of violating these assumptions
7. Using software tools to facilitate the application of econometric methods.

Unit-1: Statistical Background: (Marks: 15) (Class: 10)

Normal distribution, chi-square, t- distribution, and F-distribution; estimation of parameters, properties of estimators, Statistical Inferences, Hypothesis testing, Type I and Type II errors, power of a test; Level of Significance, Confidence Interval.

Unit-2: Simple Linear Regression Model: (Marks: 25) (Class: 12)

Two Variable Case, Estimation of model by method of ordinary least squares, properties of estimators, Gauss-Markov theorem, BLUE, goodness of fit; tests of hypotheses, scaling and units of measurement, confidence intervals, forecasting.

Unit-3: **Multiple Linear Regression Model: (Marks: 15) (Class: 10)**

Estimation of parameters, properties of OLS estimators, goodness of fit, $R^2$and adjusted R^2, partial regression coefficients, testing hypotheses – individual and joint, functional forms of regression models, qualitative (dummy) independent variables.

Unit-4: Violations of Classical Assumptions: (Marks: 15) (Class: 10)

Sources, Consequences, Detection and Remedies of Multicollinearity, heteroscedasticity, serial correlation

Unit-5: Specification Analysis: (Marks: 10) (Class: 10)

Omission of a relevant variable, inclusion of irrelevant variable, tests of specification errors

Unit-5: Applications: (Marks: 20) (Class: 8)

Use of MS Excel in applications and solutions for econometric models.

Reference books & materials

1. R P Hooda, Statistics for Business and Economics, Vikas Publishing
2. D. N. Gujarati and D.C. Porter, Essentials of Econometrics, McGraw Hill, 4th edition, International Edition, 2009.
3. Christopher Dougherty, Introduction to Econometrics, Oxford University Press,4th edition, Indian edition, 2011.
4. Wooldridge J.M., Introductory Econometrics: A Modern Approach, Cengage Learning India Pvt. Ltd, 2014

Co-ordinator
Prof. M.P. Bezbaruah
Prof. Ratul Mahanta
Members
Dr. Pranabjyoti Das
Dr. Kingshuk Chakraborty
Dr. Mofidul Hassan

Subject: Economics

Paper: FUNDAMENTALS OF FINANCIAL ANALYSIS

Semester: 6th Semester

Existing base syllabus: None

Course Level: 300-399

Course Objective: The course is designed to introduce the students to the basic ideas of finance and financial analysis.The focus will be on exposing the students to the various financial instruments, markets and strategies along with the tools for analysing the same.

Graduate Attributes:

At the end of the course, the students will be able to:

- Understand and undertake valuation of both debt and equity instruments
- Gain awareness on the structure and functions of financial markets
- Illustrate the trading in the stocks market and analyze the complexities of the derivative market.

Prerequisites: None

Theory credit: 4

Practical credit: 0

Number of required classes

Number of contact classes: 45

Number of non-contact classes: 15

Syllabus

Unit 1 Financial Markets(15 Classes, 25 marks)
Money Market: Structure and functions, Instruments in the money market. Liquidity Management Instruments in the Money Market
The Capital Market: Nature and functions, Primary Capital Market: Instruments of resource mobilization- *Public Issues: IPO & FPO, Right Issues, and Private Placement.* Pricing of new issues.
Secondary Capital Market: Trading & Settlement. Stock Market Index. Mutual Fund and its functional classification.

Unit- 2. Valuation of Financial Assets(12 Classes, 20 marks)
The law of One Price and Arbitrage, The valuation of debt instruments: Pure Discount Bonds. Coupon Bonds, Current Yield and Yield to Maturity, Valuing stock: Value of a Common Stock and the Dividend Discount Model: Zero Growth and Constant Growth.

Unit-3 Financial Analysis(12 Classes, 20 marks)
Financial Ratios: Liquidity Ratios, Leverage Ratios, Turnover Ratios, Profitability Ratios, Valuation Ratios. Dupont Analysis, Relationships, Interpretations and Analysis

Unit -4 Risk and Return (11 Classes, 20 marks)
Risk and Return of an Asset and a Portfolio.
Measurement of Market Risk. Beta of a stock.
The Risk Management Process. Dimensions of Risk Transfer.

Unit 5: The Derivative Market(10 Classes, 15 marks)
Nature of the Derivative Market, Traders and Instruments in a derivative market, Trading Strategies: Hedging, Speculation for ArbitrageStrategies.

References

Alexander G J, Sharpe W F & Bailey J V. ***Fundamentals of Investments*** Pearson Education, Singapore

Bodie Z, Merton R. C. &Cleeton D. L. ***Financial Economics***. Pearson/ Prentice Hall.

Madura J. ***Financial Institutions and Markets***, Thomson South Western.

Pathak B. V. ***Indian Financial System***, Pearson Education, Singapore.

Prasanna Chandra.**Fundamentals of Financial Management**. McGraw Hill Education

Rustagi, R.P. **Fundamentals of Financial Management**. Taxmann Publication Pvt. Ltd.

Particular of course designer:

1) Name: Prof Nissar A Barua

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6th Semester

Environmental Economics,

Full Marks 100, Total Credit = 4

Contact Classes: 55 Non-contact classes:05

Syllabus Components

1. **Subject Name** : Economics
2. **Course Name**: Environmental Economics
3. **Existing base Syllabus**: Existing CBCS Economics (Hons Course) Paper ECO-HE-6016 Environmental Economics and Non CBCS (M503) Introduction to Environmental Economics and (M605) Economics of Natural Resources and Sustainable Development
4. **Course Level**: 300-399 Higher level course which is required for majoring in Economics for the award of a degree
5. **Graduate Attributes:**

Course Objective:
This course focuses on economic causes of environmental problems. In particular, economic principles are applied to environmental questions and their management through various economic institutions, economic incentives and other instruments and policies. Economic implications of environmental policy are also addressed along with selected topics on international environmental problems. Selected topics of international environmental problems are also selected.

Learning Outcome:

- Help to develop a comprehensive knowledge and understanding of the issues related to environment and economy.
- Acquaint someone with the issues related to market failure of environmental goods and the instruments which can prevent the damages of market failure of environmental goods.
- Build up a critically analysis as to how an economy should use the natural resources in an optimum way, such that an economy can take up the path of sustainable development.
- Make aware of global environmental issues.

Unit	Topic	Marks	Class Hrs
Unit-1	**Introduction:** Basic concepts: Environment, Ecology, Economy and the ecosystem. Definition and scope of Environmental economics, why study environmental economics. Interaction between the environment and the economy, environmental economics and ecological economics, Environmental economics and resource economics.	20	10
Unit-2	**Market Failure in allocation of Environmental resources:** Externality and its types; Market Failure: Meaning, Causes of market failure; Environment as a public good, Solutions to market failure: Government Intervention; Common Property Resources and its management.	20	10
Unit-3	**The Design and Implementation of Environmental Policy:** Environmental Policies: Overview; Conventional Instruments: Command and Control (CAC) approach; Economic Instruments of Environmental Policies: Pigovian taxes and effluent fees, tradable permits and Liability rules. Monitoring and Enforcement: Meaning, Penalties, Cost of abatement.	20	15
Unit-4	**Sustainable Development:** Approaches to Sustainable Development: weak sustainability, strong sustainability, Safe minimum standard approach, ecological perspective and social perspective, Rules and indicators of Sustainable Development; Green Accounting (concept only)	20	10
Unit-5	**International Environmental Problems and Initiatives:** Transboundary pollution (Problems of International Externalities), Economics of Climate change and Variability: Causes and Consequence; Inter linkages and trade off between Environment and Development. Environmental Kuznet Curve. Trade and environment: pollution haven hypothesis. Global Intervention for Sustainable Development	20	10

Reference Books:

1. Charles Kolstad, Intermediate Environmental Economics, Oxford University Press,
2. Bhattacharyya R, Environmental Economics, Oxford University Press.
3. Nick Hanley, Jason F. Shogren and Ben White, Introduction to Environmental Economics,Oxford University Press.

4. Robert N. Stavins (ed.), Economics of the Environment: Selected Readings, W.W. Norton, 5th edition, 2005.
5. Roger Perman, Yue Ma, James Mc Gilvray and Michael Common, Natural Resource and Environmental Economics, Pearson Education/Addison Wesley, 3rd edition, 2003.
6. Maureen L. Cropper and Wallace E. Oates, 1992, ―Environmental Economics: ASurvey, ‖ Journal of Economic Literature, Volume 30:675-740.

7. Subhashini Muthukrishnan, Economics of Environment, PHI Learning Private Limited, 2nd edition, 2015.

1. Theory Credit: **4**
2. Practical Credit: 0
3. Number of required Classes: **Contact Classes:55 Non-contact classes:05**

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Four Year Undergraduate Course

Subject: Folklore
Semester: First
Course Name: Introduction to Folklore
Credits 4
Marks: 100 (80+20)

Unit-1: Definition, meaning and scope of folklore. The importance of studying folklore in context
Unit 2: Folklore and allied disciplines
Unit 3: Origin and beginning of folklore as a discipline.
Unit 4: Short History of folklore studies in North-East India and Assam.
Unit 5: Classification of folklore materials. Four sectors of folklore forms

Books recommended
Dorson, R.M. (ed.). : Folklore and Folk Life: An Introduction.
Dundes, A. (ed.). : The Study of Folklore.
Leach, Maria (ed.). : The Standard Dictionary of Folklore, Mythology and Legend
Handoo, J. : Folklore: An Introduction.
Handoo, J.: Theoretical Essays in Folklore.
Datta, B. et al. (ed): A Handbook of Folklore Materials of North-East India.
Sarma, N. C.: Lokasanskriti.

Subject: Folklore
Semester: Second
Course Name: Folk Literature
Credits 4
Marks: 100 (80+20)

Unit-1: Meaning, Definition and forms of folk Literature.
Unit 2: Fields of Folk Literature: Myths, Legends, Folk Tales, Folk songs Epics, Proverbs, Riddles, Tongue Twisters, Speech Acts – Verbal Art in Performances (Theatre, Dance Drama, Medicinal Chants,
Unit-3: Introduction and identification of the narrative genres of Assamese Oral Literature- (i) Myth (ii) Legend (iii) Tale (IV). Ballads
Unit-4: Introduction and identification of the Non-Narrative genre of Assamese Oral Literature. (i) Folksongs, (ii) Proverbs and (iii) Riddles.
Unit-5: Introduction to some selected items of Oral literature:
(i) Songs associated with the festival of the Bodos (ii) Jhumur songs of the tea garden labourers of Assam. (iii) Lalilang songs of Dimoria. (iv) Bogejari Songs of the Rabhas. (v) Songs associated with the Ali- ai –Ligang festival of the Karbis.

Books Recommended

Bhattacharyya, P.C. : *Asomor Janajati*
Das, B.M: People of Assam.
Goswami, P.: Folk Literature of Assam:
Asomiya Janasahitya
Bara Mahar Tera Geet
Bohag Bihu of Assam and Bihu Songs
Gogoi, L.: *Asomiya Loka Sahityar Ruprekha*
Sarma, H.K. : *Kamrupi Lokageet Sangrah*
Datta, B. *et al.* : *Goalpariya Lokageet Sangrah*
: Siphung-Gungang
: Folksongs of the Misings
: A Handbook of Folklore Material of North-East India.
Pegu, G. : *Mising Loka Sahitya*
Tamuli, J.C. : Asomiya Lokageet Sangrah
Kagyung, Bhrigumuni: *Mising Sanskritir Alekhya*
Narzi Bhaben : *Boro-Kachari Jana Sahitya*
Brahma, M.: Folksongs of the Bodos
Rabha, R.: Rabha Lokageet
Rabha, R. : *Rabha Janajati*
Terang, R. : *Karbi Loka Sahitya*
Boro, A.K. : Folk Literature of the Bodos
Duara, D.: *Uttar-Kachar Pahar Anchalar Janasahitya*
Malik, Sayed Abdul: Asomiya Zikir Aru Jari
Barua, P.C.: Assamese Proverbs
Brava Prasanna Chandra: Patantarmala.
Dutta, D.: Sathar, Phakara, Yojana
Datta, B. et al (eds.): Asomiya Biswakosh Vol. V.
Bhattacharyee, A: Barak Upatakyar Baranashi
Kalita, J.C (eds): Lalilang: Eti Samikshya.

Subject: Folklore
Semester: Third
Course Name: Material Culture and Folk Customs
Credits 4
Marks: 100 (80+20)

Unit 1: The Concept of Material Culture
Unit 2: House types and House Decoration, Folk Toys and Folk Paintings, and Folk attire and Ornaments with special reference to Assam
Unit 3: The Concept of social folk customs
Unit 4: Ceremonies connected with agriculture with special reference to Assamese, Bodo, Rabha, Mising, Karbi and Dimasa communities.
Unit 5: The Concept of Folk religion. Folk religions of Assam and the Northeast, folk deities of Assam. Rituals of Hudumdeo Puja, Mare Puja, Bas Puja

Books Recommended

Dorson, R.M. : Folklore and Folk life: An Introduction
M.J. Herscovits : Cultural Anthropology
Barua, B.K. : Asomar Loka-Sanskriti
Bhattacharya, P.C. : Asamor Janajati
Datta, B. : A Handbook of Folklore Material of North-East India.
Sarma, N.C. : *Asomor Samskritik Itihas*
Sarma, N.C.: Asomiya Lokasanskritir Chamu Abhas.
Narzi, B.: Boro-Kacharir Samaj Aru Samskriti
Bhattacharya, P.C. : Asomor Loka Utsav
Kagyung, Bhrigumuni: Mising Sanskritir Alekhya
Teron Longkam : Karbi Janajati
Hagjer, Nirupama : Dimasa
Bordoloi, B.N. : The Dimasa Kacharis
Goswami, P. (ed.) : Bohag Bihur Bare Baraniya Rup.
Bohag Bihu of Assam and Bihu Songs
Rajkhowa, B. : Assamese Popular Superstitions and Assamese Demonology.
Barua, A.C. : Loka Devata Siva

Subject: Folklore
Semester: Fourth
Course Name: **Folk Performing Art**
Credits 4
Marks: 100 (80+20)

Unit-1: Definition, characteristics and classification of different forms of folk performing Arts

Unit-2 : Folk Songs: definitions and characteristics. Folk songs of Assam

Unit-3 : Folk Dance: definitions and characteristics. Folk dances of Assam

Unit-4 : Folk Theatre: definitions and characteristics. Folk theatres of Assam: Ojapali, Dhuliya and Khuliya Bhaona, Kushan Gaan, Bhari Gaan, Putola Naach

Books Recommended

Dorson, R.M. (ed.). : Folklore and Folk Life: An Introduction.
Barua, B.K. : Asomar Loka-Sanskriti
Goswami, P.: Bohag Bihu of Assam and Bihu Songs
Sarma, H.K. : *Kamrupi Lokageet Sangrah*
Datta, B. *et al*. : *Goalpariya Lokageet Sangrah*
: Siphung-Gungang
: Folksongs of the Misings
: A Handbook of Folklore Material of North-East India.
Tamuli, J.C. : Asomiya Lokageet Sangrah
Kagyung, Bhrigumuni: *Mising Sanskritir Alekhya*
Brahma, M.: Folksongs of the Bodos
Rabha, R.: Rabha Lokageet
Malik, Sayed Abdul: Asomiya Zikir Aru Jari
Datta, B. et al (eds.): Asomiya Biswakosh Vol. V.
Bhattacharyee, A: Barak Upatakyar Baranashi
Kalita, J.C (eds): Lalilang: Eti Samikshya.
Sarma, N. C.: Lokasanskriti.

Subject: Folklore
Semester: Fourth
Course Name: Folklore and Traditional Knowledge System
Credits 4
Marks: 100 (80+20)

Unit 1: Traditional Knowledge: Definition, nature and scope. Characteristics andclassifications. Traditional knowledge in everyday life and occupation

Unit 2: Traditional knowledge related to food, agriculture, house patterns, dress and ornaments, folk medicine and healing practices, conservation of environment and sustainable livelihood. Folk science and technology

Unit 3: Relevance of traditional knowledge in the contemporary world. Traditional knowledge in the world of modernization, urbanization and globalization. Social Relevance of traditional knowledge in contemporary Society

Unit 4: Protection and preservation of traditional knowledge

Books Recommended:

Ramanujan, A.K.: *The Collected Essays*. OUP: Delhi. 1999.

Muthukumaraswamy, M.D. and Kaushal, Molly (eds).: Folklore, Public Sphere and Civil Society. National Folklore Support Center: Chennai. 2004.

Jha, Amit: Traditional Knowledge System in India Atlantic Publishers 2009

Wright, Evana: Protecting Traditional Knowledge: Lessons from Global Case Studies, Edward Elgar Publishing, Australia, 2020

Mohanta, Basanta Kumar and Singh, Vipin Kumar: Traditional Knowledge System and Technology in India, Raj Publications, 2012

Subject: Folklore
Semester: Fourth
Course Name: Tribal Studies
Credits 4
Marks: 100 (80+20)

Unit-1: Introduction to tribes of India

i) Types of tribes and their classification
ii) Origin myths
iii) Distribution

Unit-2: Characteristic Features of tribes – oral literature, material culture, social folk customs and performing arts.

Unit-3: Tribes and the forest – culture and ecology

Unit-4: Tribes of Assam and North-East India – a broad overview

Unit-5: Ethnicity and Identity Movements with special reference to Assam.

Books recommended

Hasnain, Nadeem	: Tribal India
Vidyarthi, L.P. & Rai, B.K.	: The Tribal Culture of India
Taid, Tabu.	: Scheduled Tribes of Assam
Prasad, Maheshwari.(ed)	: Tribes: Their Environment and Culture
Datta, B. Et.al (eds)	: Handbook of Folklore Material of North-East India
Basumatary, Rituraj	: Ethnic Movements in North East India
Chhetri, Harka Bahadur	: Adivasis and the Culture of Assam

Subject: Folklore
Semester: Fourth
Course Name: Folklore in the Contemporary World
Credits 4
Marks: 100 (80+20)

Unit-1: Introduction to Urban Folklore – Urban Legends and Myths.
Unit-2: Folklore in the digital world – Electronic Media, New Media and Social Media.
Unit-3: Folklore and its commodification with special reference to Assam
Unit-4: Folklore and cinema – short films, feature films and documentary films.
Unit-5: Folklore and Advertisement Campaigns.

Books recommended

Handoo, J. : Folklore: An Introduction
Horowitz, Anthony : Myths and Legends
Delfanti, Alessandro &amp;
Arvidsson, Adam : Introduction to Digital Media
Blank, Trevor J.
Et.al (eds) : Folklore and Social Media
M, Medhi. Et.al (eds) : Urbanisation and Folklore: Emerging Issues and Perspectives
Sherman, Sharon R.Et.al (eds) : Folklore/Cinema - Popular Film as Vernacular Culture
Spitzer, Nick.Et.al (eds) : Public Folklore

Subject: Folklore
Semester: Fifth
Course Name: Folklore and Fieldwork
Credits 4
Marks: 100 (80+20)

Unit-1: Field work: Importance of Fieldwork in Folklore. Purpose of Fieldwork in Folklore Studies

Unit 2: Field work and empirical tradition in Folklore. Selection Criteria of the field study areas and informants, preparation and organization of fieldwork. Use of Tools and Modern Devices

Unit 3: Methods of Field Data Collection- Concept and types of data. observation-participant and non-participant;interview; Use of schedules and questionnaires; Case study and Life history method.

Unit-4: Post-fieldwork phase and preparation of fieldwork report. Documentation of Data, Classifications, Compilation and Analysis of Primary (Field) Data

Unit-5: Methods of fieldwork report writing.

Books recommended

Dorson R.M.: Folklore and Folk Life: An Introduction.Goldstein, K. : A Guide for Field Worker's In Folklore.
Bora, M.: Gabeshanar Tatva Parisay
Saikia, N.: Gabeshana Paddhati Parisay
Pelto and Pelto: Anthropological Research

Subject: Folklore
Semester: Fifth
Course Name: Project Work
Credits 4
Marks: 100 (80+20)

Students have to undertake a field work in tribal or non-tribal villages preferably in N.E. India on topics suggested by the department. A Project Report on the work duly forwarded by the concerned Supervisors is to be submitted at the time of examination. Marks will be allotted by an external evaluator on the report and viva-voce.

Subject: Folklore
Semester: Fifth
Course Name: Introduction to Cultural Studies
Credits 4
Marks: 100 (80+20)

Unit 1: Introduction to Cultural Studies:. The contextual importance and alliance of Cultural Studies with Folklore.
Unit 2: Approaches to the study of culture: an overview. Cultural Studies as a discipline.
Unit 3: Meaning, Characteristics and Types of culture; 'High' and 'Low' culture, popular culture, folk culture, Culture and civilization
Unit 4: Culture for Social Change

Books Recommended

Dorson R.M.: Folklore and Folk life: An Introduction.
Datta, B. et.al. (eds.) : Asomiya Kiswa Kosh.
Dundes, A.: The Study of Folklore.
: Interpreting Folklore.
Handoo, J.: Folklore: An Introduction.
Theoretical Essays in Folklore
Claus, P and Korom, F.: Folkloristics and Indian Folklore.
Sarma, N.C.: Loka Samskriti
Goswami, Indira and Pattanaik, Prakash (eds). Indian Folklore. B. R. Publications: Delhi. 2001.
Hutnyk, John. 'Culture', in Theory, Culture and Society 23(2-3): 351- 358. http://tcs.sagepub.com
Jenks, Chris. Culture. Routledge: London.1993.
Tylor, E B. The Origins of Primitive Culture. Gordon Press: New York. 1871.
Williams, Raymond. Culture and Society 1780-1950. Penguin: Harmondsworth. 1958.
Williams, Raymond. Keywords:AVocabulary of Culture and Society. 2ndedition. Fontana: London. 1983.
Williams, Raymond. The Long Revolution. Chatto and Windus: London. 1961.

Subject: Folklore
Semester: Fifth
Course Name: **Archives and Museums**
Credits 4
Marks: 100 (80+20)

Unit 1: Concept, definition, nature, and classifications of Museum.
Unit 2: Functions of Museum: Collections of Objects, Preservation and Conservation,Display, and Dissemination
Unit 3: Definition of archives; Characteristic, role and functions of archives: Acquisition, appraisal, documentation and preservation; Using archives
Unit 4: Archival ethics; Copyrights: legal and ethical issues
Unit 5: Case study of Assam State Museum orKalakshetra (one case study only)

Books Recommended:

A Guide to the National Museum. New Delhi: National Museum, 1997.
Agarwal, O.P. Essentials of Conservation and Museology. Delhi: Sundeep Prakashan, 2007.

Edson, G. and D. David. Handbook for Museums. London: Routledge, 1986.
Guha Thakurta, Tapati. Monuments, Objects, Histories: Institutions of Art in Colonial India. Delhi: Permanent Black, 2004.
Kathpalia,Y.P. Conservation and Restoration of Archive Materials. UNESCO, 1973
Ridener, J. From Foiders to Post Modernism: A Concise History of Archival Theory. LLC:Litwin Books, 2009.
Seeger,Anthony and Chaudhuri, Shubha (eds).Archives for the Furure: Global Perspectives on AudiovisualArchives in the 21 century.Archives and Research Centre for Ethnomusicology and Seagull Books: Calcutta. 2004.
IASA Training manual. IASA Bulletin No, 58/June 1991
Ghosh. Sailen. Archives in India. Firma K.L. Mukhopadhyay: Calcutta. 1963.
Lance. David. (ed). Sound Archives: A Guide to their Establishment and Development. International Association of Sound Archives. 1983.
Nancy, Mackay. Curating Oral Histories: From Interview toArchives. Left Coast Press Inc.: California. 2007.

Subject: Folklore
Semester: Sixth
Course Name: **Crafts and Artisans**
Credits 4
Marks: 100 (80+20)

Unit 1: Folk arts and crafts: An Introduction: Definitions, characteristics and classification. Motifs and designs of folk arts and crafts, artifact and artisan, artisan Society
Unit 2: Folk art Traditions of Assam: Origin, tradition, social relevance and present scenario, Folk paintings of Assam
Unit 3: Folk craft Traditions of Assam: Textile, traditional jewellery, terracotta; clay doll and pottery, brass and bell metal craft; cane and bamboo craft; wood-craft, woodcarving, weaving and basketry, mask making; jute and pith craft;
Unit 4: Traditional Architecture of Assam
Unit 5: Folk musical instruments of Assam

Books Recommended:

Chattopadhyay, K. India’s Craft Tradition. Delhi: Publication Division, 1980. Dhamija, J. and J. Jain.Hand Woven Fabrics of India. Middletown, NJ: Mapin, 1989.Dwivedi, V.P. Indian Ivories. Delhi: Agam Prakashan, 1976.

Jain, Jyotindra, ed. Other Masters: Five Contemporary Folk and Tribal Artists of India. New Delhi: South Asia Books, 1998.

Jaitley, J. The Crafts Traditions of India. New Delhi: Lustre Press, 1990. Jayakar, Pupul. The Earthen Drum. New Delhi: National Museum, 1980.

Stronge, S., ed. A Golden Treasury, Jewellery from the Indian Sub-continent. London:Victoria & Albert Museum, 1989.

Mahanta, Pradip Jyoti, and Birendranath Datta, . Traditional Performing Arts of North-East India. Guwahati: Assam Academy for Cultural Relations, 1990.

Datta, Birendranath,, A Study of the Folk Culture of Assam

Datta, Birendranath. Folk Paintings in Assam, North Eastern Archival Centre for Traditional Art and Folklore, Tezpur University, 1998(monograph).

Datta, Birendranath. Puppetry in Assam: Past and Present, North Eastern Archival Centre for Traditional Art and Folklore, Tezpur University, 1999(monograph).

Datta, B (ed) A Handbook of Folklore Material of Northeast India, ABILAC, 1994

Subject: Folklore
Semester: Sixth
Course Name: **Folklore and Tourism Management**
Credits 4
Marks: 100 (80+20)

Unit 1: Tourism: definition, meaning, nature and scope, approaches to study tourism,
Unit 2: Folklore and tourism, heritage tourism
Unit 3: Concept of tourism resource, attraction, product, market, industry and destination on the basis of folklore materials
Unit 4: Folklore Tourism Resources of Assam: Living folklore, fairs and festivals, folk performing art forms, handicraft and handloom, cuisines, textile and jewellery.
Unit 5: *Satra* institution of Assam: Significance of *Satras* of Assam as a cultural and religious tourist attraction.

Books Recommended

Cooper, C, Fletcher, J, Gilbert, D and Wanhill, S. (2002): Tourism: Principles and Practice, Addison Wesley Longman Publishing, New York, USA
Kamra & Chand (2002): Basics of Tourism, Theory Operation and Practice; Kanishka Publishers, New Delhi-02
Mishra, S.N; Sadual S, K (2008): Basics of Tourism Management, Excel Books, New Delhi – 28
Seth, P.N. Bhat, S. (1993): An Introduction to Travel and Tourism, Starling Publishers, New Delhi
Krishnan, K.K. (2001): Managing Tourist Destination: Development, Planning, marketing, Policies, Kanishka Publishers Distributors, New Delhi-110002
Bhagawati, A.K., Bora, A.K., Kar, B.K.,(1998): Geography of Assam, Rajesh Publishers, New Delhi 2.
Bhattachararya, P. (2004): Tourism in Assam, Trends and Potentialities, Bani Mandir, MMC Bhawan, Ghy-3 3.
Bora, Sheila and M.C. (2004): The story of Tourism: An enchanting journey through India's' North- East, USB Publishers Distributors Pvt. Ltd. New Delhi-02 4
Bordoloi, B.N. (1991): Tribes of Assam: Part – III, Tribal Research Institute, Assam, ghy
Datta, B.N., Mahanta, P.J. (ed) (1990): Traditional Performing Arts of North-East India, Assam academy for Culture Relations, Guwahati, Assam
Taher, M. (1977): Tribes of North-East India; A Diagnostic Survey in Spatial Pattern, North Eastern Geographer, Vol. 9, No. 1&2

Subject: Folklore
Semester: Sixth
Course Name: **Folklore of India**
Credits 4
Marks: 100 (80+20)

Unit 1: Major Folklore Genre of India
Unit 2: A brief introduction to Indian folk literature
Unit 3: Folk Music and Dance forms of India
Unit 3: Folk Theatrical Tradition in India:
Unit 5: Folk Festivals of India
Unit 6: Folk Arts and Crafts Forms in India

Books Recommended:

Anand, Mulk Raj, ed. *Classical and Folk Dances of India*. Bombay: Marg Publications, 1965. Print.
Awasthi Suresh, "Traditional Theatre Practices and Conventions" *Sangeet Natak Quarterly Journal.* July-September 1971. Print.
Benedict, Ruth. *Patterns of Culture*. Boston: Houghton Mifflin Co., 1961. Print.
Bharata. *The Natyasastra: A Treatise on Hindu Dramaturgy and Histrionics*. Manmohan Ghosh (Ed.). Calcutta: The Royal Asiatic Society of Bengal, 1950. Print.
Channa, S. *Understanding Society, Culture and Change*. New Delhi: Blaze Publishers. 1994. Print.
Dhanavel, P. *The Indian Imagination of Girish Karnad.* New Delhi: Prestige Books, 2000. Print.
Gautam, M. R. *The Musical Heritage of India*. Delhi: Abhinav Publications, 1980. Print.
Ghosh, Sampa, and Utpal Kumar Banerjee. *Indian Puppets*. New Delhi: Shakti Malik Publications. 2012. Print.
India Country Study Guide, Vol. 1, Strategic Information and Developments, International Business Publications, USA, Washington, DC, USA-India. 2012. Print.
Islam, Mazhrul. *Folklore: The Pulse of the People of India*, New Delhi: Concept, 1985. Print.
Propp, Vladimir. *Theory and History of Folklore*. trans. Ariadana Martin and Richard P. Martin. Minneapolis: University of Minnesota Press. 1984. Print.
Ranade, G. H. *Hindustani Music*. Delhi: S. Lal & Co. 1989. Print.
Vatsayana, Kapila. *Traditions of Folk Dance*. London: Faber & Faber, 1967. Print.

Subject: Folklore
Semester: Sixth
Course Name: Theories and Concepts of Folkloristics
Credits 4
Marks: 100 (80+20)

Unit 1: Early Philology and the Grimm Brothers. W. J. Thoms and the word 'Folklore'. Folklore and ideology

Unit 2: Different Academic Approaches
- Mythological School
- Diffusion/Migration Theory
- Anthropological Perspectives
- Historical-Georgraphical School
- Psychoanalytical School

Unit 3: Growth of Folklore Studies in India. The Missionary Period, Nationalist Period, Academic Period

Unit 4: Folklore Studies in Northeast India and Assam

Unit 5: Contemporary issues of Folklore: Folklore and Gender, Cultural Ecology, Metafolklore, Subaltern Studies, Post Colonialism, Post Modernism, Deconstruction

Books recommended:

Dorson, R.M. (ed.). : Folklore and Folk Life: An Introduction.
Dundes, A. (ed.). : The Study of Folklore.
Leach, Maria (ed.). : The Standard Dictionary of Folklore, Mythology and Legend
Handoo, J.: Theoretical Essays in Folklore.
Handoo, Jawaharlal. 1989. *Folklore: An Introduction*, Mysore: Central Institute of Indian Languages.
Dorson, R. M. (ed.) (1982). *Folklore and Folklife: An Introduction*, Chicago: University of Chicago Press.
Sahu, Nandini. *Folklore and the Alternative Modernities*, Authorsspress, New Delhi, 2012.

Syllabus for FYUG Programme under implementation of NEP 2020
B.A. programme in Gender and Women's Studies, Gauhati University

Semester	Course	Title of the course
I	1.	**Understanding Gender**
II	2.	**Gender Issues I**
III	3.	**Gender Issues II**
IV	4.	**Introduction to Gender and Women's Studies**
	5.	**Gender and Education(Elective 01)** **Women, Science and Technology(Elective 01)**
	6.	**Gender, Society and Culture (Elective 02)** **Public Policy and Gender (Elective 02)**
	7.	**Gender, Rights and Law (Elective 03)** **Women and Entrepreneurship (Elective 03)**
V	8.	**Feminist Theory-I**
	9.	**Gender, Work and Livelihood(Elective 01)** **Gender in North-East India (Elective 01)**
	10.	**Gender, Empowerment and Governance (Elective 02)** **Gender, Environment(Climate Change) and Sustainability(Elective 02)**
	11.	**Gender and Human Rights(Elective 03)** **Women and Finance(Elective 03)**
VI	12.	**Feminist Theory-II**
	13.	**Feminist Traditions in India(Elective 01)** **Popular Writing and Gender(Elective 01)**
	14.	**Introduction to the Atlas of the Women of the World (Elective 02)** **Gender and Development(Elective 02)**
	15.	**Quantitative and Qualitative Research**

Four-year Undergraduate Programme
Subject: Gender and Women's Studies
Semester: **First**
Course Name: **UNDERSTANDING GENDER**
Existing Base Syllabus: None/NA
Course Level: 100-199

Unit no.	Unit content	No. of classes	Marks
Unit 1:	Key Concepts • Sex and gender - Gender roles and gendered division of labour - Private vs public divide and gender inequality - Gender Stereotypes- Sexuality- Heteronormativity – Patriarchy, Biological Determinism- Social Constructionism	15	25
Unit 2:	Social Construction of Gender • Femininities and Masculinities – Definition, attributes and images- Essentialism in the Construction of Femininity - Challenging Cultural Notions of Femininity –Politics of masculinity and power.	15	25
Unit 3:	Beyond the gender binary • Body as a Site and Articulation of Power Relations • Resisting embodiment of gender-Gender Fluidity	15	25
Unit 4:	Social Dynamics of Gender: Intersectionality • Race, Ethnicity and Tribe • Caste, Class and Religion	15	25

Reading list:

- Bhasin, K (1993) *What Is Patriarchy?* New Delhi: *Kali for Women.*
- Bhasin, K (2000) *Understanding Gender.* New Delhi: *Kali for Women.*
- Bhasin, K (2004) *Exploring Masculinities*. New Delhi: *Kali for Women.*
- *Bhowmick, N (2022). Lies our Mothers told Us. New Delhi: Rupa.*
- Chakravarti, U. (2003) *Gendering Caste through Feminist Lens*. Delhi: Stree.
- Gayle, R. (2012) *Questioning Gender.* Los Angeles: Sage
- Harrington, C. (2021). 'What is 'Toxic" Masculinity and Why Does it Matter'. *Men and Masculinities,* 24 (2): 345-352.
- Holmes, M. (2007) *What is Gender: A Sociological Approach*. London: Sage Publications.
- Hooks, b. (1984). *Understanding Patriarchy.* Available at https://imaginenoborders.org/pdf/zines/UnderstandingPatriarchy.pdf
- Lorber, J. (1993). 'Believing is Seeing: Biology as Ideology'. *Gender & Society*, *7*(4), 568–581.
- Lorde, A (1979) 'The master's Tools Will Never Dismantle the Master's House'. In Cherríe Moraga and Gloria Anzaldúa *(Eds.) This Bridge Called My Back: Writings by Radical Women of Color*, Watertown: Persephone Press, 94-101.
- Meadow, T. (2010). ' A Rose is a Rose: On Producing Legal Gender Classifications'. *Gender & Society*, *24*(6), 814–837.
- Serano, J. (2007) *Whipping girl: A transsexual woman on sexism and the scapegoating of femininity*, Emeryville, CA: Seal Press.
- *Shah, C, Merchant, R., Mahajan, S. and Nevatia, S. (2015). No Outlaws in the Gender Galaxy. New Delhi: Zubaan.*
- Sterling, A.N. (2000) "Should There Be Only Two Sexes?" In *Sexing the Body*.
- Whelehan, I. &Pilicher, J (2004). *50 Key Concepts in Gender Studies*. New Delhi: Sage.

Graduate Attributes

1. Course Objective: Explain the Basic Concepts related to Gender
2. Learning outcome:
    - To critique the biological assumptions behind the understandings of the body and develop understanding regarding gender fluidity.

- To establish the use of gender as an analytical category

Theory Credit: 3
Practical Credit: 1
No. of Required Classes: 60
No. of Contact Classes: 45
No. of Non-Contact Classes: 15
Particulars of Course Designer

Dr. Poonam Kakoti Borah
Gauhati University
Contact No: 9954811497
Email: poonamkborah@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Gender and Women's Studies
Semester: Second
Course Name: **GENDER ISSUES I**
Existing Base Syllabus: None/NA
Course Level: 100-199

Unit no.	Unit content	No. of classes	Marks
Unit 1:	**Language:** • Understanding and identification of the use of Gender Insensitive Language: words, phrases, sentences, proverbs, folklore. • Sexist content in School Textbooks and Media	15	25
Unit 2:	**Work:**Concepts and Issues, • Gender Division of Labour, Horizontal -Segregation, Vertical-Segregation, Women in Formal and Informal Sectors, Female Labour Force Participation, • Invisibility of Women's Work (Unpaid House Work/Care Work), Gender pay-gap, Sexual Harassment at Workplace. • Feminisation of Labour, Glass ceiling, Leaking pipe, Women the last colony	15	25
Unit 3:	**Violence:**Concepts and Types • Intimate Partner Violence, Domestic Violence, Sexual Assault, Marital Rape, Acid Attacks, Child Sexual Abuse, Child Marriage, Correctional Surgeries • Female Genital Mutilation and Circumcision, Honour Killings, Dowry, Trafficking of women, Sexual Harassment at Workplace, Violence against Sex workers, Cyber-Crime • State Sponsored Violence: Forced Sterilisation, Custodial Sexual Violence, Conflict Induced Sexual Assault and Rape	15	25
Unit 4:	**Introduction to the Constitutional and Legal Provisions: (An overview)** • Gender Sensitivity and the Constitution of India, • Protection of Women from Domestic Violence Act, 2005, The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013, • PCPNDT, 1994 (Including Amendments of 2003), Immoral Traffic (Prevention)Act,1956, Criminal Law Amendment Act, 2013, Provisions relating to Women under IPC, POCSO 2012	15	25

Reading list:

John. M. E. (ed). (2008). Women's Studies in India: A Reader. Penguin India. New Delhi.

Language:

Gender analysis of school curriculum and text books by Mirza and Munawar, UNESCO https://unesdoc.unesco.org/ark:/48223/pf0000216890

Analysis of the Textbooks of Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Odisha, Maharashtra, Manipur and Rajasthan: An Overall Report by NCERT

https://ncert.nic.in/dgs/pdf/overallreportDGS_24_8_17.pdf

Gender, critical pedagogy, and textbooks: Understanding teachers' (lack of mediation of the hidden curriculum in the EFL classroom by Mai Trang Vu and Thi Thanh Thuy Pham, Language Teaching Research, Sage Journals

https://journals.sagepub.com/doi/epub/10.1177/13621688221136937

Dr. Mahabaleshwar Rao, Gender, School Education(2017), Vismaya Prakashana.

Dr. N. B. Kongavada et al., Gender School and Society(2018), VidyanidhiPrakashana.

Gordon, P.R.T. *Some Assamese Proverbs*. Shillong: Assam Secretariat Press, 1896

Barua, P.C. *Assamese Proverbs.* Guwahati: Assam Publication Board, 1962.

Mieder, W. *Proverbs: A Handbook*. Westport: Greenwood Press, 2004.

Work:

Banerjee,Nirmala,*ANoteonWomenasworkers*inBanerjee,SenandDhawan,(Eds.),MappingtheField, StreePublications,Kolkata, 2011.

GhoshJayati,NeverDoneandPoorlyPaid:Women'sWorkinGlobalisingIndia,WomenUnlimited, New Delhi, 2009

Unni, Jeemol, "Women's Work: Measurement, Nature and the Informal Sector", inBanerjee, Sen and Dhawan (Eds.), Mapping the Field, Stree Publications, Kolkata,2011.

'EmbeddingCareandUnpaidWorkinMacroEconomicModelling:AStructuralist Approach, byE Braunstein,Staveren,Tavani

MariaMies,SocialOriginsofSexualDivisionoflabourinPatriarchyandAccumulation on a World Scale, Women in an International Division of Labour, ZedBooks,London and NY,1998.

MazumderVinaandSharmaKumud,SexualDivisionoflabourandtheSubordination of Women: A Reappraisal from India, In Irene Tinker (Ed.) PersistentInequalities: Women and the World Development, Oxford University Press, Oxford,1990.

Swaminathan Padmini, Outside the Realm of Protective Labour Legislation: Saga ofUnpaid Labour in India, Economic and Political Weekly, October 31, Vol. XLIV, No,44, 2009.

Violence:

Violence against Women. New Delhi: Kali for Women.

Paradigms and Violence Against Women. London: Zed books. Omvedt, Gail1995

Kannabiran,KalpanaandMenon,Ritu,*FromMathuratoManorama:ResistingViolenceAgainstWomen in India,*Women Unlimited, Delhi,2007.

Agnes, Flavia, "Protecting Women Against Violence? Review of a Decade of Legislation,1980-89",*Economic andPolitical Weekly*,27 (17),1992, pp. 19-21, 24-33.

Agnes,Flavia,*LawandGenderInequality:ThePoliticsofWomen'sRightsinIndia,*OxfordUniversityPress,NewDelhi, 1999.

Agnes,Flavia,*FeministJurisprudence:ContemporaryConcerns*,Majlis2003.

Crime Atrocities and Violence Against Women and Related Laws of Justice. New Delhi: Anmol Publications Pvt. Limited Thomas, Joseph (2001).

Gangoli, Geetanjali, Indian Feminisms: Law, Patriarchies and Violence in India, Ashgate, Aldershot-Hampshire, 2007.

Duncan McDuie-Ra, *Violence Against Women in the Militarized Indian Frontier: Beyond"IndianCulture"intheExperiencesofEthnicMinorityWomen,* ViolenceAgainstWomen 18(3) 322– 345

Moser,CarolineO.N.,Clark,FionaC.,(eds.),*Victims,PerpetratorsorActors*?:*Gender,ArmedConflict and Political Violence*,Zubaan, NewDelhi, 2001.

Oldenburg, Veena Talwar, *Dowry Murder: The Imperial Origins of a Cultural Crime*,OxfordUniversityPress,NewYork, 2003.

Law:

TheConstitution of India and frameworks of gender justice: Fundamental Rights (Articles 14, 15, 16, 21, 23); Directive Principles of State Policy (Articles 42, 46, 47), Universal Adult Franchise (Article 325 and 326); The Panchayats and Municipalities [Articles 243(D) and 243 (T)] B.

The Provisions of the Indian Penal Code: Rape, Molestation and Sexual Exploitation; Trafficking and Kidnapping; Dowry; Offences related to Marriage

Graduate Attributes
Course Objectives: To identify and explain to the students with the emerging gender issues

To instill gender sensitivity amongst students

To provide an introduction to the Constitution of India and the existing legal provisions to curbVAW

Learning outcomes: Students will be able to develop a world view with the gender lens

Students will be aware of their lived realities and will be motivated to work for change to achieve Gender Equality

Theory Credit: 3
Practical Credit: 1
No. of Required Classes: 60
No. of Contact Classes: 45
No. of Non-Contact Classes: 15
Particulars of Course Designer:
Prof. Alpana Borgohain
Gauhati University
Contact No: 9365353522 Email: alpanaborgohain@gauhati.ac.in
Dr. Ira Das
Pragjyotish College
Contact No: 9435347132 Email:iramirza15@gmail.com

Four-year Undergraduate Programme
Subject: Gender and Women's Studies
Semester: Third

Course Name: **GENDER ISSUES II**
Existing Base Syllabus: None/NA
Course Level: 200-299

Unit no.	Unit content	No. of classes	Marks
Unit 1:	**Health:** • Socio-cultural determinants of Physical and Mental Health • Basic Concepts: Maternal and Child Health, Sexual and Reproductive health, • Issues of declining Child Sex Ratio, • Occupational and Mental health, • Health, Hygiene and Sanitation, • Gender and Life-style diseases	15	25
Unit 2:	**Education:** • Gender Inequality and Gender Equity in Education, • Content Analysis of Textbooks, Curricular choices and Infrastructure, Attitudes and Prejudices of Teachers, • Factors leading to dropouts	15	25
Unit 3:	**Politics:**Concepts of Politics and Power • Issues of Participation and Representation and Voice in formal politics, governance and policy- making • Gender, Social Movement Politics and Women's Agency • Issues of Sexism and Violence in politics • Political Glass- Ceiling and Reservation Policy	15	25
Unit 4:	**Media:** Concept and types • Media as an agent of socialisation, Economic Empowerment and change, Alternative Media and Empowerment, • Stereotypes in media, • Portrayal of gender identities in media, Women as consumers and producers of Media	15	25

Reading list:

John. M. E. (ed). (2008). Women's Studies in India: A Reader. Penguin India. New Delhi.

Health:

Bajpai,Smita,*HearHealingHeritage:LocalBeliefandPracticesConcerningtheHealthofWomenandChildren.*Ahmedabad:Centrefor Education,TrainingandNutrition Awareness.1996.

Krishna Soman, 2011, ‘Women’s Health and Rights to Health in Independent India: An Overview’ inNirmala Banerjee, Samita Sen and Nandita Dhawan (eds.) Mapping the Field: Gender Relations inContemporaryIndia,Kolkata:Stree.

ImranaQadeer,‘HealthPlanninginIndia:SomeLessonsfromthePast’,SocialScientist,Vol.36,No.5/6(May-Jun., 2008), Pp. 51-75

Imrana QadeerAndDunuRoy, ‘Work, Wealth andHealth:SociologyOfWorkers'HealthInIndia’, SocialScientist,Vol. 17, No. 5/6(May -Jun., 1989),Pp. 45-92

SaheliWomen’sResourceCentre,Reproductive RightsintheIndianContext:AnIntroduction

Qadeer,Imrana,“ReproductiveHealth:APublicHealth Perspective”,*EconomicandPolitical Weekly*,Vol.XXXIIINo.41,1998.

NSSO Reports

National Family Health Survey Reports

Education:

Nussbaum, Martha 2012. ‘Women’s Education: A Global Challenge’, in Jacqueline Goodman (Ed.) Global Perspectives on Gender and Work: Readings and Interpretations, Delhi: Rawat Publishers. pp. 508-517.

R. Kamat,. ‘Women’s Education and Social Change in India’ Social Scientist, Vol. 5, No. 1 (Aug., 1976), pp. 3-27.

Manabi Mazumdar. 2012. ‘From Access To Attainment: Girls’ Schooling In Contemporary India’ in Nirmala Banerjee (Eds.) Mapping The Field: Gender Relations In Contemporary India, Vol I, Kolkata: Stree.

Subramanian, Jayasree. 2007. ‘Perceiving and Producing Merit: Gender and Doing Science in India’, Indian Journal of Gender Studies 14. pp. 259-284

ParomitaChakravati, 2012, “The Ideology of Literature: A Gendered Study of Bengali Language School Text-Books in West Bengal”, in Kavita Punjabi And Paromita Chakravarti (Ed.) Women Contesting Culture: Changing Frames Of Gender Politics In India, Kolkata: Stree

Nandini Manjrekar, Gender And Education In India A Reader, Aakar Books

Politics:

Kaushik Susheela, Indian Association Of Women’s Studies, Women's participation in politics, 1993

Kishwar Madhu, Women and Politics Beyond Quotas, EPW, 1996

Rai Praveen, Issues in General Elections 2009, EPW, 2009

Rai Praveen, Electoral Participation of Women in India: Key Determinants and Barriers, EPW, 2011

Menon Nivedita, (Ed.), 2006, Themes in Politics: Gender and Politics in India, New Delhi: Oxford University Press.

Praveen Rai, Women’s Participation in Electoral Politics in India: Silent Feminisation, South Asia Research, 2017

Ray Raka, Fields of Protest: Women’s Movement in India: 08 (Social Movements, Protest and Contestations) 1999

MedhiKunjaandDuttaAnuradha,“ConstraintsofWomeninPoliticalParticipation:ACaseStudyofAssam

”,inRenuDevi,(Ed.),*WomenofAssam*,OmsonsPublications,New Delhi, 1994.

Mahanta Aparna, “Women’s Movement in Assam and North-East India: An Assessment”, in Mahendra Narain Karna, Social Movements in North-East India, Indus Publishing Company, New Delhi, 1998.

Media:

Women And Media in the Context of Globalisation: Research And Advocacy Project Report prepared by Women’s Studies Research Centre, Gauhati University, Assam, India and Nodal Centre Institute of Development Studies, Kolkata, April 2006

https://businessfightspoverty.org/how-gender-responsive-media-can-help-womens-economic-empowerment-and-business/

Alternative media

https://egyankosh.ac.in/bitstream/123456789/57216/3/Unit-17.pdf

https://www.legalserviceindia.com/legal/article-6896-social-media-and-women-empowerment-a-brand-new-facet.html

https://www.sciencedirect.com/science/article/pii/B0080430767043114

Graduate Attributes
Course Objectives: To explain the basic concepts and emerging gender issues

To inform the students on the available data and trends on the issues

To communicate and facilitate students to the socio-cultural determinants of the issues

Learning outcomes: Students will be able to develop a world view with the gender lens

Students will be aware of their lived realities and will be motivated to work for change to achieve Gender Equality

Theory Credit: 3
Practical Credit: 1
No. of Required Classes: 60
No. of Contact Classes: 45
No. of Non-Contact Classes: 15
Particulars of Course Designer
Name: Prof. Alpana Borgohain
Gauhati University
Contact No: 9365353522
Email: alpanaborgohain@gauhati.ac.in

Name: Dr.Sunita Agarwalla
Dispur College
Contact No: 9864057865
Email: sunitadc@yahoo.com

Name: Kunjalata Brahma Bathari
LCB College
Contact No: 9435306734
Email: kunjalata194@gmail.com

Name: Dr.Sabrina Iqbal
Pragjyotish College
Contact No: 9864511433
Email: Iqbal.sabrina@gmail.com

Four-year Undergraduate Programme
Subject: Gender and Women's Studies
Semester: **FourthSemester**
Course Name: **INTRODUCTION TO GENDER AND WOMEN'S STUDIES**
Existing Base Syllabus: None/NA
Course Level: 200-299

Unit no.	Unit content	No. of classes	Marks
Unit 1:	**The Global Feminist Movement: Past and Present** • Enlightenment and Liberalization: Early feminist thought and struggle – Mary Wollstonecraft, JS Mill;Suffrage Movement in the West – Seneca Falls Convention • Feminist movement after the Second World War: Struggles of Women Workers; Consciousness raising groups • Intersectionality: Black Women's Movement; Struggles women of color, LGBTIQ community, Indigenous Women, Minorities • Women's Movement in the 21st Century: Internet Activism, #MeToo Movement, Gender Based Violence, Queer Feminism.	15	25
Unit 2:	**The Indian Feminist Movement: Past and Present** • 'Women's Question' in Pre-Colonial India: The Reform Movement and 'New Women'; Women in the Nationalist Movement • Women's Struggle in Independent India: The Towards Equality Report; the anti- price rise movement: SEWA; Towards Equality Report • The Contemporary Feminist Movement: Campaign Against Dowry, Rape, Sati; Chippko Movement; Community Identities; Dalit Feminism • Women's Movement in North-East India: Feminist Nationalism in Assam, AFSPA, *Meira Paib*i, etc.	15	25
Unit 3:	**Introduction to Gender and Women's Studies** • Meaning and definitions of Gender and Women's Studies. • Nature and objectives of Gender and Women's Studies Origin and History of Gender and Women's Studies • Gender and Women's Studies as an Academic Discipline	15	25
Unit 4:	**Women's Studies In India** • Case Study of Research Centre for Women's Studies, SNDT	15	25

	University • Case Study of Centre for Women's Development Studies, New Delhi		

Reading list:

- Anne Cranny-Francis, Wendy Waring, Pam Stavropolous, Joan Kirby (2003). Gender Studies: Terms and Debates. Palgrave Macmillan
- Forbes, Geraldine. (1998). Women in Modern India. Cambridge University Press
- Kumar, Radha. (1993). History of Doing. New Delhi : Zubaan
- Towards Equality Report
- Begum A.A. (2012). Rethinking justice for sexual crimes—Realities in North-eastern states of India. In Katjasungkana N., &Eiwringa S.E. (Eds), The future of Asian feminism: Confronting Fundamentalism, Conflicts and Neo-Liberalism (pp. 266–283). Newcastle upon Tyne, UK: Cambridge Scholar Publishing. (ISBN 1443834505)
- Mary E. John (2008), Women's Studies In India, A Reader, Penguin Books
- Bonnie G. Smith (2015), Women's Studies The Basics, Routledge Special Indian Edition, London and New York
- Devaki Jain & Pam Rajput (2003), Narratives from the Women's Studies Family Recreating Knowledge, Sage, New Delhi

Extended Reading List:

https://feminisminindia.com/2017/07/26/evolution-womens-studies-india/

Graduate Attributes

Course Objectives: The objective of the course is to familiarize students the emergence of the 'Women's Question' in the national and international perspective. The course provides students with an overview on the multitude of journeys undertaken by the Women's Movement across the globe and to the Indian experience of the Women's movement and it emergence as an academic discipline. In the context of India, the trajectory is traced from the pre-colonial emergence of the gender and women's question in the nationalist discourse to post-independence struggles and contemporary movements. In the international context, this course provides an introduction to the history of feminism and the waves of feminist struggles.

Learning outcomes:

- To understand the trajectory and the history of the women's movement in the India and the West.
- To comprehend the cross cultural differences and similarities of women's uprisings at different points of history, time and region.
- To understand the meaning and the history of gender and women's studies
- To familiarise about the emergence of Women Study Research Centers in India

Theory Credit: 3
Practical Credit: 1
No. of Required Classes: 60
No. of Contact Classes: 45
No. of Non-Contact Classes: 15
Particulars of Course Designer:

Prof. Polly Vauquline
pollyvauquline@gauhati.ac.in
9435144275

Four-year Undergraduate Programme
Subject: Gender and Women's Studies
Semester: **Fourth Semester (Elective 01)**
Course Name: **GENDER AND EDUCATION**
Existing Base Syllabus: None/NA
Course Level: 200-299

Unit no.	Unit content	No. of classes	Marks
Unit 1:	**Gender and Education** Role of education in gendering of individuals - Gender bias (in enrolment, textbooks, curriculum, classroom interaction, pedagogy) – issues of access, retention and dropouts, wastage and stagnation of girls- digital education and gender concerns- recent issues in education with regard to gender in North-East India.	15	25
Unit 2:	**Education for empowerment of women** Approaches to Women's Education - Education for achieving quality of life, equality of opportunities, and equity- Right to Education - Educational intervention for liberation of girls from learned helplessness and dependence- Historical perspective of Women's Education in India and Assam.	15	25
Unit 3:	**Programmes and Policies for Women's Education** Education and International Developments: International Development Aid and Goals Recent trends in Women's Education-Committees, Commissions and Policies in India for advancement of education with special reference to girls' education.	15	25
Unit 4:	**Education as an agent for Social Change** Role of education in changing attitudes- Types of Education: formal, informal and non-formal- Adult and continuing education, Distance education for women, Functional literacy and vocational education of women- Role of media Mass in education –Role of Civil Society in education- Feminist pedagogy, Teacher Training and Gender Equality	15	25

Reading list:

Manjrekar, N (2020) *Gender and Education in India: A Reader.* New Delhi: Aakar Publishers.
Skelton, C., Francis, B., and Smulyan, L. (2006) *The Sage Handbook of Gender and Education*, London: Sage Publication.
Kumar, K (2009) *What is Worth Teaching? New Delhi:* Orient Blackswan, New Delhi.
Chanana, K (2001) *Interrogating Women's Education: Bounded Visions*, Expanding Horizons,2001.
Ramachandran. V (2004) *Gender and Social Equity in Primary Education: Hierarchies of Access,* New Delhi: Sage Publication.
Ramachandran, P & Ramkumar, V. (2005) *Education in India*, New Delhi: National Book Trust.
Ferfolja, T and Ullman, Jacquueline (2022) *Gender n Sexuality Diversity in a Culture of Limitation: Student and Teacher Experiences in Schools,* New York: Routledge.
Paik, S (2014) Dalit Women's Education in India. New York: Routledge.
Awasthi, D. (2016) *Girl Education in India: Still Miles to Cover*. Vols. 1, 2 and 3. New Delhi: Gyan Books.

Graduate Attributes

Course Objective: To understand on the role of education as an instrument for women's empowerment.

Learning outcomes:

- It helps the student to develop awareness about the various issues in Women's Education.
- It helps the students to identify the ways and means by which education can act as a tool for social change.
- It helps the students to understand the government and non-government policies and programmes related to Women's Education.

a. Theory Credit: 3
b. Practical Credit: 1
c. No. of Required Classes: 60
d. No. of Contact Classes: 45
e. No. of Non-Contact Classes: 15

Particulars of Course Designers
Name: Dr. Poonam Kakoti Borah, Gauhati University and Dr. Sunita Agrawal, Dispur College
Contact No: 9954811497 and 9864057865
Email: poonamkborah@gauhati.ac.in, sunitadc@yahoo.com.

Four-year Undergraduate Programme
Subject: Gender and Women's Studies
Semester: **Fourth Semester (Elective 01)**
Course Name: **Women, Science and Technology**
Existing Base Syllabus: None/NA
Course Level: 200-299

Unit no.	Unit content	No. of classes	Marks
Unit 1:	**Introduction:** Connotations of Science, Science and Scientific Temper, Science as a branch of study, Technology, Assumptions about Science and Science Careers, Women, Science and Sexism	15	25
Unit 2:	**Women in STEM Education (International and National):** Presentation of data; Gender Gap; Drop-out rates; Reasons/Constraints; Glass-ceiling, Government led measures, Strategies for improvement	15	25
Unit 3:	**Women, Science and Leadership Issues:** Presentation of data, challenges, double bind, sticky floor, leaky pipes	15	25
Unit 4:	**Role Models: Life stories ofWomen Scientists in the Global and National levels** **10 women scientists of the world:** Ada Lovelace, Marie Curie, Chien-Shiung Wu, Katherine Johnson, Dorothy Hodgkin, Rosalind Franklin, Vera Rubin, Gladys West, Flossie Wong Staal, Jennifer Doudna, **10 women scientists of India:**AnandibaiGopalraoJoshi, Bibha Chowdhuri, Janaki Ammal,Kamala Sohonie, Asima Chatterjee, Rajeshwari Chatterjee, Kalpana Chawla, Dr. Indira Hinduja, Dr. Aditi Pant, Dr. Jayanti Chutia Women's Movement and its impact on Women role models in science	15	25

Reading list:

AISHE Reports

Godbole, Rohini and Ramaswamy, Ram (ed.), Lilavati's Daughters-The Women Scientists of India, 2008

Ramaswamy, Ram and Godbole, Rohini (ed.), The Girl's Guide to a life in Science, Zubaan, 2015

Gurumurthy,*GenderandICTs*,BridgeCuttingEdgePark:InstituteofDevelopmentStudies, 2004

Keller,Fox,Everlyn, *ReflectionsonGenderandScience*,YaleUniversityPress,1985

Harding,SandraG.(ed.),*FeministStandpointTheoryReader*,NewYork:Routledge,2004

*JournalofWomen'sStudies,SpecialissueonWomenandHealth,Vol.*1(2),Universityof Allahabad,September, 2007.

Longino,HelenE.*"Science,Objectivity,andFeministValues."*FeministStudies14:561-74,1988.

Papa,ReginaandShanmugaSundram,Yashodha(eds.),*WomenandEmergingTechnology, British Council Division,* Chennai: British Deputy High Commission,1996

Potter,Elizabeth,*FeminismandPhilosophyofScience:AnIntroduction,*NewYork:Routledge, 2006

Sagar, Rajiv, *Women and Professional Development in India,* New Delhi: CyberTech Publication, 2010
Schiebinger, Londa, *Has Feminism Changed Science?* Cambridge, MA: Harvard University Press, 1999
Singha Roy, Debal K. *Women, New Technology and Development*, Cambridge University Press, 1995

Graduate Attributes

Course Objectives: To explain the basic concepts and relate it to sexism in science

To inform the students on the available data and trends on the gender gap in STEM

To communicate and facilitate students to understand the socio-cultural determinants of the issues

Learning outcomes: Students will be able to develop a world view in STEM with the gender lens

Students will be aware of the constraints that women undergo while pursuingSTEM careers and will be motivated to work for change to achieve Gender Equality

Theory Credit: 3
Practical Credit: 1
No. of Required Classes: 60
No. of Contact Classes: 45
No. of Non-Contact Classes: 15
Particulars of Course Designer
Name: Prof. Alpana Borgohain
Gauhati University
Contact No: 9365353522
Email: alpanaborgohain@gauhati.ac.in

Semester: **Fourth Semester (Elective 02)**
Course Name: Gender, Society and Culture
Existing Base Syllabus: None/NA
Course Level: 200-299

Unit no.	Unit content	No. of classes	Marks
Unit 1:	**Understanding Gender in Societies:** • Concepts of Society, Culture, Sex and Gender • Social construction of Gender and Cultural construction of Gender • Understanding Femininities and Masculinities • Gendered Socialisation and Social Conditioning: Internalizing gender differences and the normalization of discrimination • Concepts: Gender division of labour, Gender Roles, Gender Discrimination, Gender Stereotypes, Gender-based Violence	15	25
Unit 2:	**Gendered Understanding of Family:** • Family: patriarchal, patrilineal, patrilocal; matriarchal, matrilineal, matrilocal; inheritance and authority • Is the family patriarchal? (Family as a site of power and politics); Gender discrimination in the family; Cultural subordination of women; infidelity; impotency • Changing notions of the family: Single mother headed family, live-in relationships, Same-sex couple family • Oppression in the name of culture: Why women eat last and least? Dress and Women; Honour and Women; Self- Silencing of women,Invisibilities of domestic work, Role of Family as perpetrator of gender-based violence (Foeticide, Infanticide, Dowry, Bride-burning, Incestual rape etc.)	15	25
Unit 3:	**Gendering other Important Social Institutions** • Religion: Gender blindness in creation, Religion, and gender oppression: Gendered Notions of Purity and Pollution; Temple and Mosque entry; Absence of Women as priests; Hierarchy of Gods and Goddesses; Personal laws and women • Caste: Endogamy and Exogamy: Honour Killings and Khap panchayats; Inter-caste marriages • Tribe: Gender relations in Tribal societies; Customary laws and gender (Matrilineal communities of Northeast India and Kerela) • Marriage: Monogamy, Polygamy, Polyandry, Divorce and Custody of children, *Parayadhan ; Kanyadan; Karva Chauth* , Debate on diverse marriage practices and need for Uniform Civil Code	15	25
Unit 4:	• **Gendering the Female Body:** • Female body as a site of gender-based oppression • Abortion: body and decision making	15	25

	• Missing girls: Preference for sons over daughters • Life-cycle rituals: norms and regulations; purity and pollution (birth, menarche, death, widowhood) • Movie Screening and Review (Any 2): Lajja; Astitva ; NH 37 (honour killing); Piku (Sexual choices); Bhawander(Caste politics); Keep Sweet, Pray and Obey (Religion and Gender); Nanu AvanallaAvalu(I am not he …. She): Kannada movie depicting trans experience		

Reading list:

Bhasin, K. (2000). Understanding Gender. India: Kali for women.

Oakley, A. (2016) *Sex Gender and Society* (8^{th} edition), Ashgate Publishing (1972)

Andersen, M. L. (2019). Thinking about Women: Sociological Perspectives on Sex and Gender. United States: Pearson.

Waldrop, A., Nielson K.B. (eds.) (2014). Women, Gender and Everyday Social Transformation in India. United Kingdom: Anthem Press.

Lindsey, L. L. (2015). Gender Roles: A Sociological Perspective. United Kingdom: Pearson.

Mayreder, R. (2009). Gender and Culture. United States: Ariadne Press.

Chowdhry, P. (2009). Contentious Marriages, Eloping Couples: Gender, Caste, and Patriarchy in Northern India. India: Oxford University Press.

Irudayam A., Jayshree S.J., Mangubhai P., Lee J.G. (2012). Dalit Women Speak Out:. Caste, Class and Gender Violence in India.(n.p.): Zubaan

Pereira, M. (2017). Gender Implications of Tribal Customary Law: The Case of North-East. India. India: Rawat Publications

Dwyer, Rachel (2006). Filming the Gods: Religion and Indian Cinema. Oxon: Routledge. Print.

Jain, Jasbir (2004). 'Ek Tha Raja, Ek Thi Rani: Patriarchy, Religion and Gender in Religious Kathas." India International Centre Quarterly, Vol. 31, No. 1, pp. 94-103. http://www.jstor.org/stable/23005915 (accessed March 13, 2013 23:38).

Hussain, I. (2018). Purdah and Polygamy: Life in the Indian Muslim Household. India: Sahitya Akademi.

Taylor, S. R. (2021). The Body Is Not an Apology, Second Edition: The Power of Radical Self-Love. United States: Berrett-Koehler Publishers.

Caldwell, C., Leighton, L.B. (eds.) (2018). Oppression and the Body: Roots, Resistance, and Resolutions. United States: North Atlantic Books.

Leslie J., McGee, M. (eds.). (2000). Invented Identities: The Interplay of Gender, Religion and Politics in India. India: Oxford University Press.

Graduate Attributes

Course Objectives: To explain the basic concepts, structures, institutions and processes in societies that socialises and constructs gender identitiesthat are unequal.

Learning outcomes: Students will be able to develop an awareness about the ways in which structures, institutions and social processesfunction to construct our identities and bodies.

Studentswill be motivated to work for change to achieve Gender Equality

Theory Credit: 3
Practical Credit: 1
No. of Required Classes: 60
No. of Contact Classes: 45
No. of Non-Contact Classes: 15
Particulars of Course Designer
Name: Dr. Sabrina Iqbal Sircar; Dr Sunita Agarwalla;Prof. Alpana Borgohain
Institution: Pragjyotish College; Dispur College; Gauhati University
Contact No: 9864511433; 9864057865; 9365353522

Email:
Iqbal.sabrina@gmail.comsunitadc@yahoo.comalpanaborgohain@gauhati.ac.in

Semester: **Fourth Semester (Elective 02)**
Course Name: **PUBLIC POLICY AND GENDER**
Existing Base Syllabus: None/NA
Course Level: 100-199

Unit no.	Unit content	No. of classes	Marks
Unit 1:	**Introducing Public Policy** Nature-Origin and Development-Approaches to Public Policy-Public Policy Making as a Process: Problem Identification, Agenda, Formulation, Adoption, Implementation and Evaluation.	15	25
Unit 2:	**Gendered Exclusions** Work-Health-Education-Politics- Gender and welfare- Issues of Intersectionality: Caste, Disability and Sexuality.	15	25
Unit 3:	**Gender in Public Policy** The concept of "women's interests"- Gender Mainstreaming-WPR Approach- Gender Based Analysis ("Plus") - Liberty and equity as goals of public policy	15	25
Unit 4:	**Gender and Public Policy in India** SDG Goal 5-Government policies for gender equality-Government Initiatives for gender equality – Major schemes for gender equality-Initiatives for transgender persons	15	25

Reading list:

- Lindblom, Charles E and Edward J. Woodhouse. 1993. *The Policy-Making Process*. 3rd ed. Englewood Cliffs, N.J.: Prentice-Hall.
- Birkland, Thomas A. *An Introduction to the Policy Process: Theories, Concepts, and Models of Public Policy Making* . Armonk, NY: M.E. Sharpe, 2001.
- Hawkesworth, Mary. 1994. "Policy Studies Within a Feminist Frame." *Policy Sciences* 27:97-118.
- Gelb, Joyce and Marian Palley. 1996. *Women and Public Policies: Reassessing Gender Politics* . University Press of Virginia.
- Lovenduski, Joni and Norris, Pippa, eds. 1993. *Gender and Party Politics*. London: Sage.
- Marshall, Catherine. 2005. "Dismantling and Reconstructing Policy Analysis." *Feminist Critical Policy Analysis I: A Perspective from Primary and Secondary Schooling*. Catherine Marshall, ed. London: The Falmer Press. pp. 1-40.
- Bacchi, Carol. 2012. "Introducing the 'What's the Problem Represented to Be?' Approach." *Engaging with Carol Bacchi: Strategic Interventions and Exchanges*. Angelique Bletsas and Chris Beasley, eds. Adelaide, AU: University of Adelaide Press. pp. 21-24.
- Fraser, Nancy and Linda Gordon. 1994. 'A Genealogy of Dependence: Tracing a Keyword of the U.S. welfare State', *Signs. pp.* 309-36

Graduate Attributes
Course Objective:
To improve students' capacity for critical policy analysis through an understanding of gender, race, class, and other markers of identity in the policymaking process (both historically and contemporaneously)
Learning outcome:
Better understand inequities based on gender and sex, their sources, and attempts to reduce them through political and legal means.
Think critically about the extent to which men and women have different political interests, have been affected differently by past and present public policies, would benefit from different types of policy in the future.

Theory Credit: 3
f. Practical Credit: 1
g. No. of Required Classes: 60
h. No. of Contact Classes: 45
i. No. of Non-Contact Classes: 15

j. Particulars of Course Designer (Name, Institution, email id)

Name: Dr. Poonam Kakoti Borah, Gauhati University
Contact No: 9954811497
Email: poonamkborah@gauhati.ac.in

Semester: **Fourth Semester (Elective 03)**
Course Name: Gender, Rights and Law
Existing Base Syllabus: None/NA
Course Level: 200-299

Unit no.	Unit content	No. of classes	Marks
Unit 1:	**Concepts:** Rights, Law, Gender Discrimination, Equality: Formal and Substantive, Gender Equality, Feminist Perspectives of Justice	15	25
Unit 2:	**Constitution of India and Women's Rights:** Constituent Assembly and it's Women Members; Preamble to the Constitution of India The Constitution of India and framework of gender justice: Fundamental Rights (Articles 14, 15, 16, 21, 23); Directive Principles of State Policy [Articles 39(a), 39(d), 39(e),42, 46, 47], Fundamental Duties 51-A (e), Universal Adult Franchise (Article 325 and 326); The Panchayats and Municipalities [Articles 243D (3), 243 D (4), 243 T (3) and 243 T (4)]	15	25
Unit 3:	**Legislations pertaining to Women's Rights in India:** The Immoral Traffic (Prevention) Act,1956 The Maternity Benefit Act 1961 (Amended in 2017) The Dowry Prohibition Act 1961 The Pre-conception and Pre-natal Diagnostics Techniques (Prohibition of Sex Selection) Act, 1994 (Including Amendments of 2003) The Protection of Women from Domestic Violence Act, 2005 The Prohibition of Child Marriage Act, 2006 The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013 The Medical Termination of Pregnancy Act, 1971 (including Amendments of 2022) The Protection of Children from Sexual Offences Act, 2012 Criminal Law Amendment Act, 2013 Provisions of the Indian Penal Code, 1860: Rape, Molestation; Trafficking; Kidnapping and Abduction; Dowry; Dowry Death, Acid Attack, Voyeurism, Stalking, Sexual Harassment, Offences related to Marriage	15	25
Unit 4:	**Rights of Persons with Disabilities and Legal Perspective on Rights of Non-Binaries:** The Rights of Persons with Disabilities Act 2016 Section 377 and Landmark Judgments in India [Naz Foundation vs Government of NCT Delhi 2009; NALSA Judgement 2014 (National Legal Services Authority vs Union of India); Justice (Retd) K S Puttaswamy vs Union of India 2017; Navtej Singh Johar vs Union of India 2018; Arun Kumar vs Inspector General of Registration, Tamil Nadu 2019 Transgender Persons (Protection of Rights) Act, 2019 Screening of ten-part television series 'Samvidhaan' based on the making of the Indian Constitution directed by Shyam Benegal; Women Architects of Indian Republic' by Centre for Women's Development Studies	15	25

Reading list:

- Talukdar, Papia Sengupta (2008) 'Rights' in Rajeev Bhargava and Ashok Acharya (Eds.) Political Theory: An Introduction, New Delhi: Pearson Longman, pp. 89-104.
- Menon, Krishna (2008) 'Justice' in Rajeev Bhargava and Ashok Acharya (Eds.) Political Theory: An Introduction, New Delhi: Pearson Longman, pp. 74-86.

- Heywood, Andrew (1994) ‘Equality, Social Justice and Welfare’ in Political Theory: An Introduction, New York: Palgrave Macmillan, pp. 284-315
- Heywood, Andrew (1994) ‘Law, Order and Justice’ in Political Theory: An Introduction, New York: Palgrave Macmillan, pp. 152-183.
- Childs, Mary (2001), ‘Law and Feminism’ in Elizabeth L. MacNabbetal. (Eds.) Transforming the Disciplines: A Women’s Studies Primer, Binghamton: The Haworth Press, pp. 217-224.
- Smart, Carol (1989), ‘The Quest for a Feminist Jurisprudence’ in Feminism and the Power of Law, London: Routledge, pp. 66-89.
- Kapur, Ratna and BrindaCossman, (1996) ‘Feminist Legal Revisions: Women, Law and Social Change’ in Subversive Sites: Feminist Engagements With Law in India, Sage Publications, pp. 19-86.
- Gandhi, Nandita and Nandita Shah, (1992) ‘Legal Campaigns’ in The Issues at Stake: Theory and Practice in the Contemporary Women’s Movement in India, New Delhi: Kali for Women, pp. 213-272.
- Kapur, Ratna and BrindaCossman, (1996) ‘Constitutional Challenges and Contesting Discourses: Equality and Family’ in Subversive Sites: Feminist Engagements With Law in India, Sage Publications, pp. 173- 231
- Sathe, S.P. (1993) ‘Sexism: Constitutional and Judicial Process’ in Towards Gender Justice, RCWS, SNDT Univ- Gender Series, pp. 31-55.
- Singh, Kirti (2004) ‘Violence Against Women and the Indian Law’ in SavitriGoonesekere (Ed.) Violence, Law and Women’s Rights in South Asia, New Delhi: Sage Publications, pp. 77-147.
- Coomeraswamy, Radhika (2005) ‘Identity Within: Cultural Relativism, Minoritty Rights and the Empowerment of Women’ in Indira Jaising (ed), Men’s Laws Women’s Lives: A Constitutional Perspective on Religion, Common Law and Culture in South Asia, New Delhi: Kali for Women, pp. 23-55
- Anjani Kant, LAW RELATING TO WOMEN & CHILDREN, 3rd Edition, Central Law Publication, 2012
- K. D. Gaur , TEXT BOOK ON INDIAN PENAL CODE , Universal Law Publishing Co Ltd, 4th Edition (Reprint), New Delhi, 2014.
- Mamta Rao, LAW RELATING TO WOMEN AND CHILDREN, 3rd ed., Eastern Book Company, Lucknow, 2012.
- M. P. Jain, INDIAN CONSTITUTIONAL LAW , 7th ed (Reprint), Lexis Nexis, Gurgaon, 2014.
- S. C. Tripathi and Vibha Arora, LAW RELATING TO WOMEN AND CHILDREN, 6th ed., 2015.
- S. Anand, JUSTICE FOR WOMEN: CONCERN AND EXPRESSIONS, 3rd ed, Universal law Publication, New Delhi, 2002
- V. N. Shukla CONSTITUTIONAL LAW OF INDIA, 12th ed , Eastern Book Company, Lucknow, 2013

Course Objectives: To explain the basic concepts and to generate awareness about the rights of Women under the Constitution of India.

to generate awareness about the major legislations dealing with rights of Women, PWDs and Non-Binaries in the family and in the society with feminist perspectives.

Learning Outcomes:

Students will be aware of the rights of Women under the Constitution of India.
The students will be able to analyse the major legislations dealing with rights of Women, PWDs and Non-Binaries in the family and in the society with feminist perspectives.

Theory Credit: 3
k. Practical Credit: 1
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id)

Name: Prof. Alpana Borgohain,Gauhati University
Contact No: 9365353522
Email: alpanaborgohain@gauhati.ac.in

Name: Dr. Kasturi Gakul, NLUJAA, Guwahati

Contact No: 9706457352
Email: kasturigakul@nluassam.ac.in

Semester: **Fourth Semester (Elective 03)**
Course Name:**Women and Entrepreneurship**
Existing Base Syllabus: None/NA
Course Level: 200-299

Unit no.	Unit content	No. of classes	Marks
Unit 1:	**Introduction:** Meaning, elements, determinants and importance of entrepreneurship and creative behaviour; analyse the role of women in entrepreneurship and the challenges they face; Women entrepreneurs' impact on society and the economy; opportunities for women in entrepreneurship.	15	25
Unit 2:	**Mobilisation of Resources:** Mobilising resources for start-ups; Contract management- vendors, suppliers, bankers, customers; access to financing for women entrepreneurs.	15	25
Unit 3:	**Technology and Women Entrepreneurship:** Overview of technology; opportunities and challenges of using technology in entrepreneurship; examples of successful women entrepreneurs who leveraged technology	15	25
Unit 4:	**Alternative Models of Entrepreneurship:** Social Entrepreneurship:Concept,Characteristics and Role Models; Feminist Entrepreneurship: Concept, Characteristics and Role Models	15	25

Reading list:

- Bijoy Rana Deb, Fundamentals of Entrepreneurship, Kalyani Publishers
- Robert Hisrich, Michael Peters, Dean Shepherd, Entrepreneurship, McGraw-Hill Education
- Vasant Desai. Dynamics of Entrepreneurial Development and Management. Mumbai, Himalaya Publishing House.
- David H. Holt, Entrepreneurship: New Venture Creation. Prentice-Hall of India, New Delhi.. Nagendra P. Singh, Emerging Trends in Entrepreneurship Development. New Delhi: ASEED.
- SS Khanka, Entrepreneurial Development, S. Chand &Co,Delhi.
- K Ramachandran, Entrepreneurship Development, McGraw-HillEducation
- Dr.Neetu Kumari And Jhanvi Khanna ; Women Entrepreneurship : Issues And Perspectives;Blue Rose Publishers
- Mridula Velagapudi ; Women Entrepreneurship : Role of Women Entrepreneurship Towards more Inclusive Economic Growth
- Ajanta Borgohain Rajkonwar; Small and Medium Enterprises in Assam, DVS Publishers
- Jeemol Unni, Vanita Yadav, Ravikiran Naik, Swati Dutta ; Women Entrepreneurship in Indian Mid Class; Orient BlackSwanPvt. LTD.

Graduate Attributes

Course Objectives: The purpose of this course is to orient the learner towards:

- the role of women in entrepreneurship, including the challenges and opportunities they face.
- mobilisation of resources and to explore the ways in which women entrepreneurs can leverage technology to grow their business.

- analyze successful female entrepreneurs and their stories.
- alternative models of Entrepreneurship

Learning outcomes:

- Students will be able to develop a conceptual understanding and awareness aboutentrepreneurship.
- Students will learn the procedure for setting up entrepreneurship.
  - Theory Credit: 3
  - Practical Credit: 1
  - No. of Required Classes: 60
  - No. of Contact Classes: 45
  - No. of Non-Contact Classes: 15
  - Particulars of Course Designer
  - Name: Dr.KaberiBezbarua; Prof. Alpana Borgohain
  - Institution: GauhatiCommerce College; Gauhati University
  - Contact No: 9864032233; 9365353522
  - Email:
  - Bezbaruakaberi19@gmail.com alpanaborgohain@gauhati.ac.in

Semester: **Fifth Semester**
Subject: Gender and Women's Studies
Course Name: **Feminist Theory I**
Existing Base Syllabus: None/NA
Course Level: 300-399

Unit no.	Unit content	No. of classes	Marks
Unit 1:	**Meaning and Definitions of Feminism.** Growth of Feminism in USA, Europe, Third world counties and India.	15	25
Unit 2:	**Liberal Feminism of the First Wave** Origin, Concepts and Thoughts - Individual Rights, Equality-Rationality- Women's Civil and Political Rights, Enfranchisement - Legal reforms - Criticisms of Liberal Feminism.	15	25
Unit 3:	**Marxist Feminism of the First Wave** Origin, Concepts and thoughts- Historical Materialism - Class and class struggle – Capitalism – Alienation - Engels on origin of Patriarchy and private property- the Socialization of Domestic Labor- Wages for Household Work –Invisibility of Women's work – Comparable worth – Challenges before Marxist Feminism	15	25
Unit 4:	**Second Wave and Radical Feminism** Origin- Concepts and Thoughts- Construction of Gender-Patriarchy -Reproduction –- Biological revolution- reproductive technology – Androgyny- Motherhood- Sisterhood- Sexuality – Violence against women's body: Gender based violence and Pornography - Criticisms of Radical Feminism.	15	25

Reading list:

- Bhasin, K and Said, N (1986) *Feminism and its Relevance in South Asia*. New Delhi: Kali for Women.
- hooks, b (2000). *Feminism for Everybody*, Pluto Press.
- hooks, b (2000). *Feminist theory – From Margin to Center*, Pluto Press, UK..
- Oakley, A. and Mitchell, J (1986). *What is Feminism?* UK:Basil Blackwell.
- Tong, R. (2009). 'Feminist Thought: A More Comprehensive Introduction', Philadelphia: Westview Press.
- Oakley, A. and Mitchell, J (1986). *What is Feminism?* UK:Basil Blackwell.
- Spender, D (1983). *Feminist Theories: Three centuries of Women's Intellectual Traditions.* London: The Women's Press.
- Whelehan, I (1995). Mo*dern Feminist Thought: From The Second Wave To 'Post Feminism'*, Edinburg: Edinburg University Press

Graduate Attributes:
Course Objective:
To understand social reality from a Feminist Perspective
Learning outcomes:
To enable students to understand different dimensions of women's subordination and oppression.
To understand the different strategies to achieve gender equality, the importance of women's solidarity, and the movement to eradicate women's subordination and oppression.

p. Theory Credit: 3
q. Practical Credit: 1
r. No. of Required Classes: 60
s. No. of Contact Classes: 45
t. No. of Non-Contact Classes: 15
u. Particulars of Course Designer (Name, Institution, email id)
Name: Dr. Poonam Kakoti Borah, Gauhati University

Contact No: 9954811497
Email: poonamkborah@gauhati.ac.in

Semester: **Fifth Semester (Elective 01)**
Subject: Gender and Women's Studies
Course Name:**Gender, Work and Livelihood**
Existing Base Syllabus: None/NA
Course Level: 300-399

Unit no.	Unit content	No. of classes	Marks
Unit 1:	Concept of work; Productive and Unproductive work; Use value and Market value Gender division of labour: burden of unpaid, undervalued, unprotected and invisibility of Reproductive work, House-work and Care-work Dynamics of inequalities: gender roles and expectations at home and in the labour market Horizontal -Segregation, Vertical-Segregation; Gender Discrimination at Work; Gender-pay Gap; Sexual Harassment at Workplace; Transgender and Work	15	25
Unit 2:	**Globalisation and Contemporary Demands:** Affective and Emotional Labour; Body, Sexuality and Work; Surrogacy and Reproductive Labour; International demand for Domestic and Care Work; Technology and Women; Digital Divide; Gig Economy and work; AI and the future of work **Globalisation and its impact on Women's Work:** Feminisation of Labour; Feminisation of Poverty; Women the last colony; Women in organised and unorganised sector; Glass Ceiling; Leaking Pipes; Work from Home and Women	15	25
Unit 3:	**Gender and Livelihood** Meaning and understandings of: Livelihood, Livelihood assets, Livelihood context, Livelihood strategies, Livelihood Vulnerability, Livelihood Interdependence Women and Livelihood Situations in India Women and Rural Livelihood, Feminization of Agriculture Transgender: Issues and challenges of livelihoods Women Reclaiming Sustainable Livelihoods	15	25

Unit 4:	**Government Policies and Programmes:**
	For Protection of Women Workers: Maternity Benefit Act, 1961; Maternity Prohibition of Sexual Harassment of Women at Workplace Act, 2013; Minimum Wages Act 1948;
	The National Perspective Plan for Women 1988-2000;
	The Shramshakti Report 1988; The National Policy for Empowerment of Women 2001; Working Women's Hostels;
	The Transgender Persons (Protection of Rights) Act 2019
	SMILE (Support for Marginalised Individuals for Livelihood and Enterprise), February, 2022
		15	25

Reading list:

Report on "*Women and Men in India 2022*" launched by Ministry of Statistics and Programme Implementation (MOSPI), Govt. of India. https://www.mospi.gov.in/publication/women-men-india-2022

Aarti Kelshikar. 2023. *How Women Work: Fitting In and Standing Out in Asia*. Harper Collins India. February 25.

Jieyu Liu, Junko Yamashita. 2021. *Routledge Handbook of East Asian Gender Studies*. Dec 13.

GiandomenicaBecchio. 2021. *A History of Feminist and Gender Economics*. June 30.

Maithreyi Krishnaraj.2008. *Women's Work in Indian Census: Beginnings of Change. Women's Studies in India: A Reader*, ed. by Mary E. John, Penguin.

Bina Agarwal, Jane Humphries, and Ingrid Robeyns, eds. *Capabilities, Freedom and Equality: Amartya Sen's Work from a Gender Perspective*. Oxford India Press, 2006

S. Kaur. *Women and Poverty*. Jaipur: Book Enclave, 2008

MaithreyiKrishnaraj, ed. *Gender, Food Security and Rural Livelihoods*. Stree, Kolkata, 2007.

Ester Boserup. 1970. *Woman's Role in Economic Development*. George Allen and Unwin. London.

Lourdes Beneria and Gita Sen. 1981. *Accumulation, Reproduction and Women's Role in Economic Development: Boserup Revisited*". Signs, Vol.7, 279-98.

Angela Burton ed. *Hit or Miss:Women's Rights and the Millennium Development Goals*. ActionAid, UK, 2015

Vibhuti Patel and Nandita Mondal ed. *Gendered Inequalities in Paid and Unpaid Work of Women in India*, Singapore: Springer.

Uma Kothari. 2005. *A Radical History of Development Studies: Individuals, Institutions and Ideologies*, Zed Books.

Kaila H.L.2005. Women, Work and the Family, Rawat Publications, Jaipur

Objective:

This Course is designed with the aim of imparting knowledge about gender issues with specific focus on work and livelihood.

Learning Outcomes: After completion of this course, students will be able to:

- learn gender and women's issues on work and livelihood
- analyze women's issues in the field of work and livelihood from gender perspectives
- examine inter-linkages between social processes, globalisation and work with a gender lens
- critically reflect on the policies and programmes of the Government of India
  - Theory Credit: 3
  - Practical Credit: 1
  - No. of Required Classes: 60
  - No. of Contact Classes: 45
  - No. of Non-Contact Classes: 15
  - Particulars of Course Designer
  - Name: Prof. Alpana Borgohain, Prof. Polly Vauquline, Dr. Ira Das
  - Institution:Gauhati University,Gauhati University, Pragjyotish College
  - Contact No:9365353522 9435144275 9435347132
  - Email:

alpanaborgohain@gauhati.ac.in, pollyvauquline@gauhati.ac.in, iramirza15@gmail.com

Semester: **Fifth Semester (Elective 01)**
Subject: Gender and Women's Studies
Course Name: **Gender in Northeast India**
Existing Base Syllabus: None/NA
Course Level: 300-399

Unit no.	Unit content	No. of classes	Marks
Unit 1:	**Origin and Evolution of Northeast India:** Colonial context, Postcolonial developments, Geography and Geo-political significance Societies: Tribal and Non-Tribal; Matrilineal and Patrilineal; Gender at the Intersections of Caste, Class, Ethnicity, Religion, Sexuality; Customary Laws and Women's Rights	15	25
Unit 2:	**Gender Relations in NEI (Contemporary times):** Education: Accessibility, Enrolment, Drop-out, Retention and Gender Gap; Recent issues in education with regard to gender in North-East India Health: IMR, MMR, Stunting, Wasting, Anaemia Economy: Ownership of Resources; Agriculture and Women; Women and Textile/Handloom Industry; Livestock farming and Women; Women in Tea Plantations Politics: Representation and Participation of Women in Formal Politics as Voters, Contestants and Leaders; Participation in Informal Politics	15	25
Unit 3:	**Women's Agency for Change and Development in NEI:** Women in India's Independence Movement: ChandraprabhaSaikianiand *AxomMahilaXomiti, Rani Gaidinliu, Nupi Lan, Kanaklata Baruah (Martyr)* Women's Social Movements in NEI: *Meira Paibi; Mizo Women's Movement under MHIP(Mizo HmeichheInsihkhawm Pawl)* Entrepreneurship and Empowerment of Women in NEI: *Lakheemi Baruah (Kanaklata Mahila Urban Cooperative Bank for Women); Saneki Weaves (NEN); Hasina Kharbhih (INGON)* Women and Social Activism (Fight against social evils): The Assam Witch-hunting (Prohibition, Prevention and Protection) Act, 2015; NEN, Mission *Birubala and WASE (Arunachal Pradesh)* Role of Women in Conflict and Peace: AFSPA, W*omen combatants in militant outfits,* Women as peacemakers: *Matri-Mancha, Naga Mothers Association,*	15	25

	Indira Goswami, Irom Sharmila, Tangkhul Shanao Long		
Unit 4:	**Transgender / Queer Activism in NEI:** Transgender Identity Assertion and Policy Advocacy; Queer Pride Walks in Northeast India; Organisations working for Gender Justice in NEI: Xukia; Xomonoy, Xobdo, NEthing, Anaajori; Drishtee Collective; Akam Foundation; NupiManbi(Association of Manipur); Policy initiatives for Gender Justice in NEI	15	25

Reading list:

- Sarma Dipti, "The Women of the Brahmaputra Valley in the Freedom Struggle (1921- 47)", in Dr. (Ms) S.L. Baruah (Ed.), 1992, Status of Women in Assam With Special Reference to Non-Tribal Societies, New Delhi: Omsons Publications.
- Sarma Dipti, Women of Assam: Their Contribution to India's Freedom Struggle, A Synoptic Note in Commemorative Volume, Golden Jubilee Handique Girls' College, 1939-1989, Guwahati, 1989,
- Brauah Preeti, Edited in Guptajit Pathak, 2008, Assamese Women in Indian Independence Movement: With a Special Emphasis on Kanaklata Barua, New Delhi: Mittal Publications.
- Sharma Dipti, 1995, Mukti-JujotLuitporia Nari, Guwahati: Students' Stores.
- Sharma Dipti, 1993, Assamese Women in the Freedom Struggle, Calcutta: PunthiPustak.
- Dr. (Ms) S.L. Baruah (Ed.), 1992, Status of Women in Assam With Special Reference to Non-Tribal Societies, New Delhi: Omsons Publications.
- Renu Devi, (Ed.), Women of Assam, Omsons Publications: New Delhi, 1994.
- Misra Tilottama, 2007, Gunabhiram Baruah Ramnabami-Natak: The Story of Ram and Nabami (translated and with an Introduction by Misra), New Delhi: Oxford University Press.
- Das Omeo Kumar, 1983, Jeevan Smriti, Guwahati: Asom Prakashan Parishad.
- Devi Nalinibala, 1994, Eri Aha Dinbur, Guwahati: Lawyers' Book Stall.
- Goswami MamoniRoisom, 2007, UpanyasSamagrah, Guwahati: Student Stores Publishers.
- Sharma Manorama, 1990, Social and Economic Change in Assam: Middle Class Hegemony, New Delhi: Ajanta Publications.
- Sharma Manorama, "Gender History and the Necessity of a Multidisciplinary Approach", Proceedings of North East India History Association, Dibrugarh, 2008.
- Sharma Manorama, "Locating the Women in History: The Need for an Imaginative and Sensitive Methodology", Proceedings of North East India History Association, Goalpara, 2007.
- Sharma Manorama, "Gender History in North-East India in the Post 1947' Proceedings of North East India History Association, Shillong, 2008.
- Sharma Manorama, "Gender and History: Necessity of a Methodology for Gender Neutral Reconstruction", Proceedings of North East India History Association, Shillong, 2000.
- Sharma Manorama, Women in Ahom Economy: Some Textx Re-Examined" Proceedings of North East India History Association, Shillong, 2002.
- Sharma Manorama, "Enriching Historical Research: Literature as a Source of History", Proceedings of North East India History Association, Shillong, 2006.
- Guha Anima, BipannaPrajati, Manjula: Guwahati, 2015.
- Mahanta Aparna, 2008, Journey of Assamese Women 1836-1937, Assam Publication Board: Guwahati
- Sharma Manorama (ed.), Rethinking Gender History: Essays on Northeast India and Beyond, DVS Publisher, 2017
- Kalita, Biraj, et. al. Sex, sahibs and bodies: women workers in the Tea- plantations of colonial Assam, August 2022Labor History 63(4):1-16 DOI:10.1080/0023656X.2022.2099535

- Dr. Rahman Rukchana, Gender History in Youth Movements and Democratic Politics in Assam: A Study of Women's Voices in Assam Movement (1979-85), ND Publisher, 2021
- Dr. Samhita Baruah, Queer Feminist Peep into Public Arts of North East India, Sage
  Begum A.A. (2012). Rethinking justice for sexual crimes—Realities in North-eastern states of India. in Katjasungkana N., &Eiwringa S.E. (Eds),

The future of Asian feminism: Confronting Fundamentalism, Conflicts and Neo-Liberalism (pp. 266–283). Newcastle upon Tyne, UK: Cambridge Scholar Publishing. (ISBN 1443834505)

Graduate Attributes:

Course Objective:

- To develop the understanding of Gender Identities and Gender relations in Northeast India.

Learning outcomes:

- Students will be aware of the:
- contextual specificities of the region and it's influence in forming gender identities and gender relations
- Women's Agency and Activism in the socio-economic and political aspects of the region
- Queer Activism in the Region

v. Theory Credit: 3
w. Practical Credit: 1
x. No. of Required Classes: 60
y. No. of Contact Classes: 45
z. No. of Non-Contact Classes: 15
aa. Particulars of Course Designer (Name, Institution, email id)

Name: Prof. Alpana Borgohain, Dr.Chitrangkita Gayan, Kunjalata Brahma Bathari
Institution:Gauhati University, Rupohi College,LCB College
Contact No: 9365353522 9910417089 9435306734
Email: alpanaborgohain@gauhati.ac.inchitra.gayan2@gmail.com
kunjalata194@gmail.com

Four-year Undergraduate Programme
Subject: Gender and omen's Studies
Semester: Fifth (Elective 02)
Course Name: **GENDER, EMPOWERMENT AND GOVERNANCE**
Existing Base Syllabus: None/NA
Course Level: 300-399

Unit no.	Unit content	No. of classes	Marks
Unit 1:	**Understanding Governance** The Concept of Governance: Intellectual and Political History- Agents of Governance: Government, Civil Society and Markets - The Ideological Dimension of the Governance Agenda	15	25
Unit 2:	**Gender and Governance** Engendering the State: Women in Politics of South Asia and India-Gender Quotas- Engendering the Civil Society: Women's Civil Society Mobilization in India-Engendering the Market: The mainstream-informal market distinction, Corporate Social Responsibility	15	25
Unit 3:	**Development, Empowerment and Governance** Development- Empowerment: Meaning and approaches-Women in Development- Women and Development-Gender and Development- Practical Gender Needs and Strategic Gender Needs -Women's Agency- Self-help Groups and women's empowerment.	15	25
Unit 4:	**Gender concerns in Policy and Planning** Gender and the Planning Process- History of planning and development in India-Gender Budgeting-Gender Audits-Gender Mainstreaming in India-National Commission for Women	15	25

Reading list:

- Nussbaum, M. 2003. (ed.) *Essays on Gender and Governance*, Human Development Resource Centre, UNDP,
- Mishra Panda, S (2008) (ed.) *Engendering Governance Institutions: State, Market and Civil Society*, New Delhi: Sage.
- Moser, C. (1993) *Gender Planning and Development*, Routledge, London.
- Rai, S (2003) (Ed.) *Mainstreaming Gender, Democratizing the State? Institutional Mechanisms for the Advancement of Women*, Manchester: Manchester University Press, pp. 223-242
- Bevin, M (2009) *Key Concepts of Governance*, London: Sage.
- Remenyi, J (2004) 'What is Development?' in Damien Kingsbury et al., (Eds.) *Key Issues in Development*. New York Palgrave Macmilan. , pp. 22-44.
- Miller, C and Razavi, S (1995) From WID to GAD: Conceptual shifts in the Women and Development discourse, UNRISD Occasional Paper, No. 1, United Nations Research Institute for Social Development (UNRISD), Geneva. 25
- Tinker, I. (ed.) Persistent Inequalities, Oxford University Press, Oxford, 1990.
- Kuruvilla, M & George, I. (2020) (eds.) *Handbook of Research on New Dimensions of Gender Mainstreaming and Women Empowerment,* (Eds,), IGI Global, USA.

Graduate Attributes
Course Objective:

- To develop the ability to evaluate the effectiveness of various gender empowerment programmes and policies.

Learning outcomes:

- To describe the concept of governance and the debates on governance and women's participation
- To trace women's participation in the governance process, with a special focus on India

bb. Theory Credit: 3
cc. Practical Credit: 1
dd. No. of Required Classes: 60
ee. No. of Contact Classes: 45
ff. No. of Non-Contact Classes: 15
gg. Particulars of Course Designer (Name, Institution, email id)

Name: Dr. Poonam Kakoti Borah, Gauhati University
Contact No: 9954811497
Email: poonamkborah@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Gender and Women's Studies
Semester: **Fifth (Elective 02)**
Course Name: **GENDER, ENVIRONMENT (CLIMATE CHANGE) AND SUSTAINABILITY**
Existing Base Syllabus: None/NA
Course Level: 300-399

Unit no.	Unit content	No. of classes	Marks
Unit 1:	**Gender and Environment Relationship** • Physical Environment vs Human Created Environment • Key issues and concepts of gender and environment relationship • Gender Inequality in resource access and management • Ecology and Ecosystem, Feminist Political Ecology	15	25
Unit 2:	**Gender and Sustainability** • Sustainability: Meaning and importance, • Understanding concepts of sustainability from economic, social and environmental perspectives • Relation of Gender with sustainability and UN Sustainable Development Goals • Sustainable Development Concepts; measurement; perspectives from Indian experience	15	25
Unit 3:	**Gender and Climate Change** • Climate change: Meaning, Climate Change Crisis, Paris Agreement 2015, Climate Change Performance Index (CCPI) • Gender and climate change: Relations, Impacts, Vulnerability, Adoption and Mitigation • Importance of Gender Responsive Approaches to Climate Change	15	25
Unit 4:	**Case Studies and Poster Presentation** • Nepal Earthquake 2015- Gender analysis of adaption and mitigation • Poster Presentation on gender and sustainable development (a visual display of figures, tables, and text designed to communicate the topic or issue assigned)	15	25

Reading list:

1. Robert Solow, (1992) “An Almost Practical Step toward Sustainability,” Resources for the Future 40th anniversary lecture,. 5.

2. Kenneth Arrow et al. (2004), “Are We Consuming Too Much?” Journal of Economic Perspectives, 18(3): 147-172.

3. Meinzen-Dick, Kovarik, Quisumbing. “Gender and Sustainabilty: A Matter of Balance” from the CGIAR Blog. https://wle.cgiar.org/thrive/2015/10/15/gender-and-sustainability-matterbalance

4. Hackett S.C. (2006). “Introduction to the Concept of Sustainability”, In Hackett (2006), Environmental and Natural Resources Economics : Theory, Policy, and the Sustainable Society, 3rd ed., Armonk, N.Y. : M.E. Sharpe, chap. 12, pp. 323-338.

5. Brundtland. (1987). Our Common Future, Chapter 2: Towards Sustainable Development. UN Documents. Available at: http://www.un-documents.net/ocf-02.htm

6. Political Ecology - an overview
   https://www.sciencedirect.com/topics/earth-and-planetary-sciences/political-ecology

7. https://ccpi.org/

8. Paris Climate Agreement 2015 - Paris Agreement Summary

   https://unfccc.int/process-and-meetings/the-paris-agreement?gclid=CjwKCAjwitShBhA6EiwAq3RqA_i5cVBkUuIadO4oKKfVwYd6c65_-8GgqojSG9F0gRPngNwznqo0ahoC-CwQAvD_BwE

9. Lorena Aguilar, Margaux Granat, and Cate Owren (2007). Roots for the Future: The Landscape and Way Forward on Gender and Climate Change, Report prepared byInternational Union for Conservation of Nature (IUCN) Global Gender Office (GGO) and Global Gender and Climate Alliance (GGCA) https://portals.iucn.org/library/sites/library/files/documents/2015-039.pdf

Graduate Attributes:
Objective:

This Course is designed with the aim of imparting knowledge about gender issues with specific focus on environment and sustainability.

Learning Outcomes:

By the end of the semester, students should be able to demonstrate the following:

- A critical perspective on key concepts of gender, environment and sustainability and the inter-relations amongst them.
- Insights on critical debates and the initiatives undertaken to address the issues of gender, climate change and resource management
- Do gender analysis of adversities created by nature phenomena
- To critically analysis the relations of gender and environment and draw their own perceptions
- Have competence to discuss gender, environment and the issues involved from global to local level.

- Theory Credit: 3
- Practical Credit: 1
- No. of Required Classes: 60
- No. of Contact Classes: 45
- No. of Non-Contact Classes: 15
- Particulars of Course Designer
- Name: Prof. Polly Vauquline

- Institution:Gauhati University,
- Contact No: 9435144275
- Email:
  pollyvauquline@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Gender and Women's Studies
Semester: **Fifth (Elective 03)**
Course Name: **Gender and Human Rights**
Existing Base Syllabus: None/NA
Course Level: 300-399

Unit no.	Unit content	No. of classes	Marks
Unit 1:	**Human Rights: An Introduction:** Concept of Human Rights; Three Generations of Human Rights: Civil and Political Rights; Economic, Social and Cultural Rights; Collective Rights; Evolution of the concept of Human Rights from Magna Carta to the Universal Declaration of Human Rights (Magna Carta; The French Declaration of the Rights of Man and the Citizen; The Universal Declaration of Human Rights)	15	25
Unit 2:	**UN and Women's Human Rights:** Universal Declaration of Human Rights (1948), International Covenant on Economic, Social and Cultural Rights (1966), International Covenant on Civil and Political Rights (1966) Convention on the Elimination of All Forms of Discrimination against Women, 1979; The Convention on the Rights of the Child, 1979; The Declaration on the Elimination of Violence against Women, 1993; CAT (Convention against Torture and other cruel, inhuman or degrading Treatment or Punishment) 1988 UN Institutional Mechanisms for Women's Rights: The United Nations Commission on the Status of Women 1946; UN Women 2010	15	25

Unit 3:	**The UN Conferences and the Global Movement for Women's Human Rights:**
	The 4 World Conferences on Women: Mexico City 1975; Copenhagen 1980; Nairobi 1985; Beijing 1995;
	Vienna Conference on Human Rights, 1993; Vienna Declaration and Programme of Action (VDPA): Part I, para 18; Part I, para 19;
	The Optional Protocol to the Convention on the Elimination of All Forms of Discrimination against Women, 1999; The United Nations Millennium Declaration (Goal 3), 2000; The Security Council Resolution 1325, 2000; 2030 Agenda for Sustainable Development (Goal 5)
		15	25

Unit 4:	**The International Legal Principles and the Human Rights of Non-Binaries (LGBTQI+):** UN Sexual and Reproductive Health and Rights Yogyakarta Principles, 2006; Yogyakarta Principles plus 10, 2017	15	25

	UN Independent Expert on protection against Violence and Discrimination based on sexual orientation and gender identity (IE SOGI), 2016 Campaign for UN Free & Equal: a global campaign to promote equal rights for LGBTI people **Screening of Movies and Review (Any 02):** Fireflies; Me Hihra, Me Lakshmi; Between the lines; Philadelphia; Margherita with a Straw; White Milk		

Reading list:

- Chen, Martha Alter (1995) ‘Engendering World Conferences: The International Women's Movement and the United Nations’ Third World Quarterly, Vol. 16, No. 3, Sep., , pp. 477-493
- Stamatopoulou, Elissavet (1995) ‘Women’s Rights and the United Nations’ in Julie Peters and Andrea Wolper (Eds.) Women’s Rights, Human Rights: International Feminist Perspectives, New York: Routledge, pp. 36- 50.
- Charlesworth, Hilary (1995) ‘Human Rights as Men’s Rights’ in Julie Peters and Andrea Wolper (Eds.) Women’s Rights, Human Rights: International Feminist Perspectives, New York: Routledge, pp. 103

Graduate Attributes:

Objectives:

- To generate awareness about Human Rights of Women and the Queer and the International Human Rights Legal Framework

Learning Outcomes:

- Students will get a basic understanding of Human Rights and it’s evolution
- They will be aware about the International Laws pertaining to Women and Non-Binaries
- Theory Credit: 3
- Practical Credit: 1
- No. of Required Classes: 60
- No. of Contact Classes: 45
- No. of Non-Contact Classes: 15
- Particulars of Course Designer
- Name: Prof. Alpana Borgohain, Kunjalata Brahma Bathari, Dr. Sabrina Iqbal Sircar
- Institution:Gauhati University, LCB College, Pragjyotish College
- Contact No: 9365353522 9435306734 9864511433
- Email:

alpanaborgohain@gauhati.ac.inkunjalata194@gmail.com Iqbal.sabrina@gmail.com

Name: Dr. Kasturi Gakul, NLUJAA, Guwahati
Contact No: 9706457352
Email: kasturigakul@nluassam.ac.in

Four-year Undergraduate Programme
Subject: Gender and Women’s Studies
Semester: **Fifth (Elective 03)**
Course Name: **Women and Finance**
Existing Base Syllabus: None/NA
Course Level: 300-399

Unit no.	Unit content	No. of classes	Marks
Unit 1:	• **Introduction** • Finance- Meaning, features, functions, types and sources; • Financial System- meaning and components	15	25
Unit 2:	• **Banking** • Bank- Meaning, features and different types of bank • Bank Account – Meaning, Types, Features and Advantages • Non- Banking Financial Institutions- their meaning and purpose	15	25
Unit 3:	• **Negotiable Instruments** • Meaning and features of Negotiable Instrument, Types of negotiable instruments	15	25
Unit 4:	• **Resources for Women and Finance** • Tools and resources for improving financial literacy and financial planning, Microfinance • Support networks and organisations for women in finance • Legal and Regulatory Frameworks for Women’s Financial Rights	15	25

Reading list:

- D.M. Mithani and E. Gordon, Banking and Financial System, Himalaya Publishing House.
- D. Muraleadharn, Modern Banking, Prentice Hall of India, New Delhi.
- Indian Institute of Banking and Finance, Principles of Banking, Macmillan.
- K. C. Sekhar and L.Sekhar, Banking Theory and Finance, Vikas Publishing House.
- P.N. Varshney, Banking Law & Practice, Sultan Chand & Sons
- S.N. Maheswari & S.K. Maheswari, Banking Law & Practice, Kalyani Publishers
- S. Natarajan and R. Parameswaram, Indian Banking, Sultan Chand & Sons.
- Bharati Pathak, Pearson Education The Indian Financial System
- P N Varshney and D K Mittal, Indian Financial System, Sultan Chand & Sons.
- Micro Finance: Perspectives and Operations, IIBF, Macmillan, 2009.
- Micro Finance-Redefining the Future, V. Somnath, Excel Books.
- Debabrata Sarma, Uttam Barua; Banking

Graduate Attributes:

Objectives: This course examines the unique challenges women face in managing their finances and building wealth.

Learning Outcomes: By the end of the course, students will be able to-

- To develop an understanding of finance, its functioning, its various tools and challenges
- Identify the unique financial needs and goals of women at different life stages
- Develop a financial plan that reflects their personal values, goals and risk tolerance.
- Develop strategies for managing debt, building credit and improving their financial health
- Identify the legal and regulatory frameworks, that protect women's financial rights and interest

Theory Credit: 3
Practical Credit: 1
No. of Required Classes: 60
No. of Contact Classes: 45
No. of Non-Contact Classes: 15
Particulars of Course Designer
Name: Dr Kaberi Bezbarua
Institution: GauhatiCommerce College

Contact No: 9864032233 Email: bezbaruakaberi19@gmail.com

Four-year Undergraduate Programme
Subject: Gender and Women's Studies
Semester: Sixth
Course Name: Feminist Theory II
Existing Base Syllabus: None/NA
Course Level: 300-399

Unit no.	Unit content	No. of classes	Marks
Unit 1:	**Psychoanalytic Feminism** Feminist criticisms of Freud, Oedipus Complex, Dual Parenting	15	25
Unit 2:	**Socialist Feminism** Origin - Concepts and Thoughts - Class and Gender, Dual-Systems Theory- Unified System Theory. Criticism of Socialist Feminism.	15	25
Unit 3:	**Intersectionality and Feminism** Post-Modern Feminism- Black Feminism- Third World Feminism– Eco-feminism– Masculinities	15	25
Unit 4:	**Queer Feminism** Sexual orientation and Gender Identity- Growth of Queer movements in USA and India- The challenge of queering feminism- Queer Studies.	15	25

Reading list:

- Bakshi, K and Dasgupta, R (2019). *Queer Studies: Texts, Contexts and Praxis.* New Delhi: Orient Blackswan.
- Heywood, L. (2011). *The Women's Movement Today: An Encyclopedia of Third-wave Feminism,* Greenwood Press.
- hooks, b (2000). *Feminism for Everybody*, Pluto Press.
- hooks, b (2000). *Feminist theory – From Margin to Center*, Pluto Press, UK..
- Oakley, A. and Mitchell, J (1986). *What is Feminism?* UK:Basil Blackwell.
- Tong, R. (2009). 'Feminist Thought: A More Comprehensive Introduction', Philadelphia: Westview Press.
- Whelehan, I (1995). Mo*dern Feminist Thought: From the Second Wave To 'Post Feminism'*, Edinburg: Edinburg University Press.
- Glover, D and Kaplan, C (*2009)Genders*, New York: Routledge.
- Butler, J (1999), *Gender Trouble: Feminism and the Subversion of Identity, New York:* Routledge.
- Richardson, D. McLaughlin, J and E. Casey, M (2006) *Intersections Between Feminist and Queer Theory*, Basingstok: Palgrave Macmillan.

Graduate Attributes:

Course Objective:

- To understand social reality from a Feminist Perspective

Learning outcomes:

- It helps students to understand the relevant theories and contemporary developments in feminism
- It helps to understand different ideological affiliations within feminist movements

Theory Credit: 3
Practical Credit: 1
No. of Required Classes: 60
No. of Contact Classes: 45
No. of Non-Contact Classes: 15
Particulars of Course Designer (Name, Institution, email id)

Name: Dr. Poonam Kakoti Borah, Gauhati University
Contact No: 9954811497
Email: poonamkborah@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Gender and Women's Studies
Semester: **Sixth (Elective 01)**
Course Name: **FEMINIST TRADITIONS IN INDIA**
Existing Base Syllabus: None/NA
Course Level: 300-399

Unit no.	Unit content	No. of classes	Marks
Unit 1:	**Making of Indian Feminism** A room of one's own and a tradition of their own- Savitribai Phule-Pandita Ramabai - Tarabai Shinde- RokeyaSakhawat Hossain- Rasasundari Debi-ChandraprovaSaikiani	15	25
Unit 2:	**Nation and the Construction of 'Woman'** Colonised identities and lives- Bodies as sites of violence- Sanctions and Surveillance-The Age of Consent Controversy- Prohibition of Sati-Nationalism and the New Patriarchy	15	25
Unit 3:	**Land, Caste and Gender in India.** Dalit women's Activism-Women's Labour in India- Women and ecological movements-Gender and violence	15	25
Unit 4:	**"Other" feminisms** Resisting militarism- Imposed and chosen sexualities- Heteronormativity- Subverting masculinities.	15	25

Reading list:

- Ambedkar, B. R. 1979. *Dr. Babasaheb Ambedkar: Writings and Speeches* (BAWS, V. Moon, ed., 22 vols. Bombay: The Education Department, Government of Maharashtra
- Bhatt, E. 2005. *We Are Poor but So Many: The Story of Self-Employed Women in India*. New Delhi: Oxford University Press.
- Bose, M. 2000. *Faces of the Feminine in Ancient, Medieval, and Modern India.* New York: OUP
- Boserup, E. 1970. *Woman's role in economic development*. New York: St. Martin's Press.
- Chaudhuri, M, ed. 2004. *Feminism in India*. New Delhi: Women Unlimited.
- Gangoli, G. 2007. Indian feminisms: Law, patriarchies and violence in India. United Kingdom: Ashgate
- Kumar, R. 1993. *The History of Doing*. New Delhi: Kali for Women.
- Kumkum S and Sudesh V, eds. 1989. *Recasting Women: Essays in Colonial History*. New Delhi: Kali for Women.
- Rege, S. 2013. *Writing Caste/Writing Gender: Narrating Dalit Women's Testimonios*. India: Zubaan.
- Subramaniam, M. 2006. *The Power of Women's Organizing: Gender, Caste, and Class in India.* Lanham: Lexington Books
- Tharu, S, and K. Lalita, eds. 1991. *Women Writing in India: 600 B.C. to the Present*. New Delhi: Oxford University Press

Graduate Attributes

Course Objective:

To explore the complex debates of contemporary feminisms in the country.

Learning outcomes:

- to understand the importance of colonial interventions in shaping the gender identities in India.
- to understand the complex intersectional relationships of class, caste, land and gender in India

Theory Credit: 3
Practical Credit: 1
No. of Required Classes: 60
No. of Contact Classes: 45
No. of Non-Contact Classes: 15
Particulars of Course Designer (Name, Institution, email id)

Name: Dr. Poonam Kakoti Borah, Gauhati University
Contact No: 9954811497
Email: poonamkborah@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Gender and Women's Studies
Semester: **Sixth (Elective 01)**
Course Name:**Gender in Popular Writings**
Existing Base Syllabus: None/NA
Course Level: 300-399

Unit no.	Unit content	No. of classes	Marks
Unit 1:	**Gender in Popular Writings** - Concepts of popular high literature and popular mass literature; - Distinguish between popular high literature and popular mass literature; - trace the rise of popular writings; Identify and locate popular writings in terms of their gendered contents; - Some most relevant popular texts as specific readings for this section: Enola Holmes Mystries by Nancy Springer Bridget Jones's Diary by Helen Fielding The Hunger Games by Suzzane Collings.	15	25
Unit 2:	**Voices of Women from India** - Women's Writings Colonial India: Stree Purusha Tulana by Tarabai Shinde, Sultana's Dream by Begum RokheyaShakhawat Hussain and High Caste Hindu Women by Pandita Ramabai - Women's Writings from Post Colonial India :Parishmita Singh, The Hotel at the End of World, Kari, Amruta Patel, Mahasweta Devi's Breast Stories, Pinjar by Amrita Pritam	15	25
Unit 3:	**Gender in Popular Culture Writings in Assamese:**BurhiAairXaadhu by LakhminathBezbaruahAbhijatri by Nirupama Borgohain Antarip by Dr BhandenranathSaikia Gender in folk songs, folk tales and proverbs in Assamese	15	25
Unit 4:	**Life Writings:** Sarojini Naidu's Letters to her daughter; Indira Goswami's AdhalilkhaDostabej;Nalinibala Devi's Eri Aha Dinbur; Minoti Borthakur's Mur Axukhr Ek Bosor; Virginia Woolf's A Room of One's Own	15	25

Reading list:

Janice Radway, *Reading The Romance, Women, Patriarchy and Popular Literature,* The University of North Carolina Press, 1984

Pamela Thomas, *Asian American Women's Popular Literature : Feminizing Genres and Neo-liberal Belonging,* Temple, Up, 2014

Maja Bajaccarter, Norma Jones and Bob Batchelor. (eds), *Heroines of Comic Books and Literature, Portrayals in Popular Culture,* Rowman and Littlefield, 2014

Walter Benjamin, *The Work of Art in the Age of Mechanical Reproduction*

Theodore Adorno and Max Horkheimer, *The Culture Industry, Enlightenment as Mass Deception*

Susie J Tharu and K Lalitha, *Women Writings in India, 600 BC to the Present* ,The Feminist Press, Newyork, 1991

Nandana Dutta, *Communities of Women in Assam: Being, Doing and Thinking Together,* Routledge, 2016

Graduate Attributes:

Course Objective:
To read and understand the popular literaturewith feminist perspectives

Learning outcomes:
Will make learners think critically about popular literature *vis a vis*canonical

Will help the students to identify the connections, formulas, themes and styles of popular genres

Will sensitize learners to the ways in which popular fiction reflects and engages with the questions of identity, gender , race, etc.

Theory Credit: 3
Practical Credit: 1
No. of Required Classes: 60
No. of Contact Classes: 45
No. of Non-Contact Classes: 15

Particulars of Course Designer:

Name: Dr Shikha Kashyap
Institution: North Gauhati College
Designation: Associate Professor, Department of English, Guwahati-781031
Contact No: 8474060251
Email: kashyapdibru@gmail.com

Name: Dr Chitrangkita Gayan
Institution: Rupahi College, Rupahi, Nagaon, Assam, Pin: 782125
Designation: Assistant Professor,
Department: History
Contact Number: 9910417089
Email: chitra.gayan2@gmail.com

Four-year Undergraduate Programme
Subject: Gender and Women's Studies
Semester: **Sixth (Elective 02)**
Course Name: **Introduction to the Atlas of the Women of the World**

Existing Base Syllabus: None/NA
Course Level: 300-399

Unit no.	Unit content	No. of classes	Marks
Unit 1:	**MAP AND MAP READING** Map: Meaning, Definitions and Importance Basic understandings of types of maps; Physical Maps, Topographic Maps, Political Maps, Weather Maps, Economic and Resource Maps and Population Maps. Important Elements of Maps; Title, Direction, Legend, Boundary, Distance (Scale), Labels, Grids and Index, Citation, Symbols showing physical, economic, political, social and cultural attributes in maps.	15	25
Unit 2:	**GLOBAL MAPPING OF FAMILY** Households: The Shrinking Households, Women and Poverty, Lone-parent households with children and One-person households Marriage and Divorce: Average age of first marriage, Divorces and Polygamy in Africa Lesbian Rights: Lesbians, gays and the law, Same-sex partnership recognition and Global views on homosexuality	15	25
Unit 3:	**GLOBAL DISPARITIES** 3.1: Water: Sanitation shortfall, Water Supplies, Average water use and The journey to water 3.2: Education: School; Primary school enrolment and secondary schooling, Higher Education; University, Tertiary Education and Women teaching in tertiary level. 3.3: Poverty: Women and men at risk of poverty, Population living in deprivation and Countries in extreme poverty	15	25
Unit 4:	**PRACTICAL WORKS ON MAPS** 4.1: Identification and demarcation of political boundaries: Districts of Assam; States and UTs of India; Countries of Asia, Europe, Africa, North America, South America and Oceania. 4.2: Interpretation of gender related data (sex ratio, education, health, work participation, crime against women, etc.) using point, line, polygon, shade (choropleth) methods and graphical representations.	15	25

Reading list:

Joni Seager (2018), The Penguin Atlas of Women in the World, 5th Edition, Penguin Books

Saraswati Raju, Peter J. Atkins, Naresh Kumar and Janet G. Townsend, (1999). Atlas of Men and Women in India, Kali for Women

Map Reading Skills-beginner's guide https://getoutside.ordnancesurvey.co.uk/site/uploads/files/map-reading.pdf

Keith Gillard, (1990) Basic Map Reading, Longman

Oxford Student Atlas for India, Fourth Edition, 2022

Graduate Attributes:

Objective:

This Course is designed with the aim of imparting knowledge about gender issues by locating them in the Atlas of the world.

Learning Outcomes: Will acquire the skills of identifying the elements of map and understand the fundamentals of reading a map.

Will acquire the skills of identifying the social elements of the map and related them with the gendered space.

Will demonstrate the capability to develop critical spatial analyses and acquire the skill to associate the socio- cultural and economic attributes in the creation of gendered space.

Will develop critical understandings of gender issues across the countries of the world

- Theory Credit: 3
- Practical Credit: 1
- No. of Required Classes: 60
- No. of Contact Classes: 45
- No. of Non-Contact Classes: 15
- Particulars of Course Designer
- Name: Prof. Polly Vauquline
- Institution:Gauhati University,
- Contact No: 9435144275
- Email:
  pollyvauquline@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Gender and Women's Studies
Semester**: Sixth (Elective 02)**
Course Name: **Gender and Development**
Existing Base Syllabus: None/NA
Course Level: 300-399

Unit no.	Unit content	No. of classes	Marks
Unit 1:	• Concept of Development, Agencies of Development, Critique of Development • Approaches to Women's Development: Women in Development (WID), Women and Development (WAD) and Gender and Development (GAD)	15	25
Unit 2:	• Gender needs – practical needs and strategic needs • UNDP and Human Development; HDI; UNDP and Gender Development; Gender Related Development Index; Gender Development Index (GDI), Gender Inequality Index (GII), Gender Empowerment Measure, Global Gender Gap Index (GGGI); MDGs and SDGs and Gender Equality	15	25
Unit 3:	• Sustainable Development Approach 1987: Meaning, Salient Features; Brundtland Commission Report: *Our Common Future* • Emergence of Alternative Participatory Approaches of 1990s: Bangladesh Grameen Bank; Self Employed Women's Association (SEWA). • Women's Development Approaches in India's Five- Year Plans: Reports on Gender and Development • Impact of Structural Adjustment Policies on Women and the Marginalised Gender • Gender Mainstreaming, Gender Auditing, Gender Responsive Budgeting	15	25
Unit 4:	• Various Approaches to Women's Empowerment: Integrated Development Approach; Economic Development of Women Approach; Consciousness Raising and Organising Approach; Transformative Change Approach	15	25

Reading list:

Report on "Women and Men in India 2022" launched by Ministry of Statistics and Programme Implementation (MOSPI), Govt. of India. https://www.mospi.gov.in/publication/women-men-india-2022

Aarti Kelshikar. 2023. How Women Work: Fitting In and Standing Out in Asia. Harper Collins India. February 25.

Jieyu Liu, Junko Yamashita. 2021. Routledge Handbook of East Asian Gender Studies. Dec 13.

GiandomenicaBecchio. 2021.A History of Feminist and Gender Economics. June 30.

IAWS. 1995. Feminist Approaches to Economic Theories A Report, IAWS, New Delhi.
PromillaKapur (ed), Empowering Indian Women, Publication Division, Government of India, New Delhi, 2000.
Kaila H.L.2005. Women, Work and the Family, Rawat Publications, Jaipur.
Malcom Harper. 1998. Profit for the Poor – Cases in Microfinance, Oxford and IBH Publishing House, New Delhi.
Sheela Varghese. 2003. Employment of Women in the unorganized manufacturing sector, University Book House Private Limited, Jaipur.
Balakrishnan A.2005. Rural Landless women Labourers – Problems and Prospects, Kalpaz Publications, New Delhi.

Preet Rustagi. 2004. Significance of Gender-Related Development Indicators: An Analysis of Indian States. Indian Journal of Gender Studies. Vol 11(3).

Martha Nussbaum.2000. Women and Human Development. Cambridge University Press.

Jane L. Parpart, M. Patricia Connelly, and V. EudineBarriteau, eds. Theoretical Perspectives on Gender and Development, International Development Research Centre, Ottawa, 2000

Mary. E. John. 1996. Gender and Development in India, 1970s – 1990s: Some Reflections on the Constitutive Roles of Contexts. Economic and Political Weekly. 31 (47), 3071 – 3077.

Graduate Attributes:

Objectives: This course is curated to enable students to imbibe concepts and approaches to women's development. The course analyses how the gender dynamics of power and inequality play out in the social institutions of households, markets, states and within societies. This course is correlated with discussions on the role of feminist research, advocacy and activism in shaping development policy and practice.

Learning Outcomes:

After completion of this course, students will be able to

- learn the evolution of the concept of gender in development theory.
- understand the institutional dynamics of power in relation to gender inequality.
- critically assess development policies and practices.
- analyse how feminist advocacy and activism seek to influence and transform development practices.

- Theory Credit: 3
- Practical Credit: 1
- No. of Required Classes: 60
- No. of Contact Classes: 45
- No. of Non-Contact Classes: 15
-
- Particulars of Course Designer
- Name: Prof. Polly Vauquline
- Institution:Gauhati University,
- Contact No: 9435144275
- Email: alpanaborgohain@gauhati.ac.in iramirza15@gmail.com

Four-year Undergraduate Programme
Subject: Gender and Women's Studies
Semester: Sixth
Course Name: **INTRODUCTION TO RESEARCH METHODOLOGY**

Existing Base Syllabus: None/NA
Course Level: 300-399

Unit no.	Unit content	No. of classes	Marks
Unit 1:	**Understanding Research** Research: Definition, Characteristics and Objectives Types of Research: Descriptive vs. Analytical Research, Applied vs. Fundamental Research, Quantitative vs. Qualitative Research, Conceptual vs. Empirical Research	15	25
Unit 2:	**Research Process** Steps in planning a research study: Basic Understanding of; Formulating a Research Problem, Conceptualising a Research Design, Constructing instrument/s for data collection, Selecting a Sample and Writing a Research Proposal, Research Ethics Steps in conducting a research: Basic Understanding of; Data Collection, Processing of Data and Writing a Research Report.	15	25
Unit 3:	**Research Methods** Quantitative research Method: Meaning, Advantages and Drawbacks Qualitative research method: Meaning, Advantages and Drawbacks Mixed Method and Triangulation: Meaning, Advantages and Drawbacks, Feminist Research: Meaning and Feminist Approaches to Research as a Process	15	25
Unit 4:	**Exercises on Research Tools** Exercises on open-ended questions Exercises on closed-ended questions Exercises on asking personal and sensitive questions Collecting data using secondary source	15	25

Reading list:

- Ranjit Kumar (2016). Research Methodology A Step By Step Guide for Beginners, 2nd Edition, Pearson Education, Australia.
- Charles Teddlie & Abbas Tashallori (2009). Foundations of Mixed Methods Research Integrating Quantitative and Qualitative Approaches in the Social and Behavioral Sciences, Sage Publication.
- Sharlene Nagy Hesse Biber& Michelle L Yaiser (2004) Feminist Perspectives on Social Research, Oxford University Press.
- Paul S Maxim (1999). Quantitative Research Methods in the Social Sciences by, Oxford University Press.

- National Committee for Ethics in Social Science Research in Health (NCESSRH) Ethical Guidelines for Social Science Research in Health
- Lee Ann Fenge, Lisa Oakley, Bethan Taylor, and Sean Beer (2019). The Impact of Sensitive Research on the Researcher: Preparedness and Positionality, International Journal of Qualitative Methods Volume 18: 1–8, SAGE Publication.

Graduate Attributes:

Objectives:

This course is offered for students of 6th Semester of Undergraduate Program of Gender and Women's Studies. The students are introduced to the basic understandings of research, types of research and research methods in this course. The course introduces the basic methods associated with conducting scholarly search. Towards the end of the course the students learn to frame basic research tools.

Learning Outcomes:

Upon completion of this course each student will be able to:

- Demonstrate knowledge about research
- Perform research process by using the steps involved.
- Explain, compare and construct qualitative, quantitative and mixed research paradigms
- Prepare questionnaire and interview schedule

- Theory Credit: 3
- Practical Credit: 1
- No. of Required Classes: 60
- No. of Contact Classes: 45
- No. of Non-Contact Classes: 15
- Particulars of Course Designer
- Name: Prof. Polly Vauquline
- Institution:Gauhati University,
- Contact No: 9435144275
- Email: pollyvauquline@gauhati.ac.in

DEPARTMENT OF HINDI, GAUHATI UNIVERSITY

NEP-2020 FYUGP SYLLABUS

हिन्दी विभाग,गौहाटी विश्वविद्यालय

राष्ट्रीय शिक्षा नीति-2020 चार वर्षीय स्नातक कार्यक्रम का पाठ्यक्रम

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प्रथम

स ड: HIN-AEC-1

स म: हिन्दी काव्य-धारा (रीतिकाल तक)

स- क: 50

स वल: 100-199

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1	**1**	**(क)**आदिकालीन, भक्तिकालीन और रीतिकालीन हिन्दी काव्यधारा का सामान्य परिचय **(ख)** *हिन्दी काव्य सुधा* – पाब्लिकेशन डिपार्टमेंट,गौ.वि. **पू** **क** **प** - **षण: 40** -	**15**	**25** **(20+5)**
2	**1**	*हिन्दी काव्य सुधा* – पाब्लिकेशन डिपार्टमेंट,गौ.वि. **षण: 10** - -	**15**	**25** **(20+5)**

र ट य: *इकाई 1(क) से केवल अतिलघु एवं लघु- उत्तरीय प्रश्न पूछे जाएंगे ।*

सदभरथ

1. *हिन्दी साहित्य का सरल इतिहास* –राजनाथ शर्मा,विनोद पुस्तक मन्दिर, आगरा ।

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4. *विद्यापति*– डॉ° आनन्द प्रकाश दीक्षित (संपा°),साहित्य प्रकाशन मन्दिर, ग्वालियर ।

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8. *गोस्वामी तुलसीदास* – आचार्य रामचन्द्र शुक्ल, प्रकाशन संस्थान, नयी दिल्ली ।

9. *बिहारी का नया मूल्यांकन* – डॉ° बच्चन सिंह, लोकभारती प्रकाशन, इलाहाबाद ।

10. *भूषण-विमर्श* -- भगीरथ प्रसाद दीक्षित, अवध पब्लिशिंग हाउस, लखनऊ ।

11. *घनानन्द : काव्य और आलोचना*– डॉ° किशोरीलाल, साहित्य भवन प्राइवेट लिमिटेड, इलाहाबाद ।

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ष्प्रउपलब्धि : *हिन्दी काव्य-धारा से संबंधित प्रस्तुत योग्यतावर्धक पाठ्यक्रम को इस रूप में तैयार किया गया है,जिससे कि विद्यार्थियों को हिन्दी काव्य-धारा के प्रारम्भिक तीन कालखंडों की सामान्य जानकारी प्राप्त हो । इसके अलावा चयनित रचनाओं के पठन-पाठन के जरिए काव्य-रस के अतिरिक्त हिन्दी भाषा के साहित्यिक स्वरूपों से भी वे परिचित हों और इन बातों से उनलोगों की व्यावहारिक योग्यता में भी अपेक्षित वृद्धि घटित हो सके ।*

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नाम : डॉ॰ अच्युत शर्मा
संस्थान : गौहाटी विश्वविद्यालय
ईमेल :*sarmaachyut291058@gmail.com*

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इनर वरण

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स ड: द्वितीय HIN-AEC-2

स म: हिन्दी काव्य-धारा (आधुनिककाल) स-क: 50

स वल 100-199

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1	**1**	**(क)** आधुनिक हिन्दी काव्य-धारा का संक्षिप्त परिचय **(ख)** *हिन्दी काव्य सुधा* – पाब्लिकेशन डिपार्टमेंट,गौ.वि. - - -	**15**	**25** **(20+5)**
2	**1**	*हिन्दी काव्य सुधा* – पाब्लिकेशन डिपार्टमेंट,गौ.वि. - - -	**15**	**25** **(20+5)**

र ट ष़*इकाई 1(**क**) से केवल अतिलघु एवं लघु- उत्तरीय प्रश्न पूछे जाएंगे ।*

सद भ र थ़

1. *हिन्दी साहित्य का सरल इतिहास* –राजनाथ शर्मा, विनोद पुस्तक मन्दिर, आगरा ।

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4. *हिन्दी साहित्य का इतिहास* -- डॉ° नगेन्द्र (संपा.),नेशनल पब्लिशिंग हाउस, नयी दिल्ली ।

5. *आधुनिकहिन्दीकविता*–डॉ°विश्वनाथ प्रसाद तिवारी, राजकमल प्रकाशन,नयी दिल्ली ।

6. *भारतेन्दुः एक नयी दृष्टि* – लहरी राम मीणा, स्वराज प्रकाशन,नयी दिल्ली ।
7. *मैथिलीशरण गुप्त के काव्य की अंतर्कथाओं के स्रोत* -- शशि अग्रवाल, हिन्दी साहित्य सम्मेलन, प्रयाग ।

8. *माखनलाल चतुर्वेदी : काव्य एवं दर्शन*– डॉ° दिनेश चन्द्र वर्मा, विद्या प्रकाशन, कानपुर ।

9. *जयशंकर प्रसाद* – आचार्य नन्ददुलारे वाजपेयी, लोकभारती प्रकाशन, इलाहाबाद ।

10. *महादेवी का नया मूल्यांकन* – डॉ° गणपतिचन्द्र गुप्त, लोकभारती प्रकाशन,इलाहाबाद ।

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12. *प्रसाद- निराला- अज्ञेय*– डॉ° रामस्वरूप चतुर्वेदी, लोकभारती प्रकाशन, इलाहाबाद ।

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13. *धर्मवीर भारती की काव्य- साधना*– डॉ° मंजूषा श्रीवास्तव, मिलिन्द प्रकाशन,हैदराबाद ।

14. *सर्वेश्वर : सौन्दर्य और प्रेम*– डॉ॰ रामशंकर त्रिपाठी, विनय प्रकाशन, कानपुर ।

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षप्रउपलब्धि : *हिन्दी काव्य- धारा से संबंधित प्रस्तुत योग्यतावर्धक पाठ्यक्रम को इस रूप में तैयार किया गया है, जिससे कि विद्यार्थियों को आधुनिक हिन्दी काव्य- धारा की सामान्य जानकारी प्राप्त हो। इसके अलावा चयनित रचनाओं के पठन- पाठन के जरिए काव्य- रस के अतिरिक्त आधुनिक युगबोध से भी वे परिचित हों और इन बातों से उनलोगों की व्यावहारिक योग्यता में भी अपेक्षित वृद्धि घटित हो सके ।*

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नाम:पूजा शर्मा
संस्थान:गौहाटी विश्वविद्यालय
ईमेल :***poojasarmahindi@gauhati.ac.in***

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1	**1**	**(क)कहानी :** परिभाषा, तत्व, प्रकार; **क** हिन्दी कहानी साहित्य का सामान्य परिचय **(** **ख** **)** **प** **षण़40** -	**15**	**25** **(20+5)**
2	**1**	**षण़10** - - -	**15**	**25** **(20+5)**

र ट ध़ *इकाई* ***1(क)*** *से केवल अतिलघु एवं लघु- उत्तरीय प्रश्न पूछे जाएंगे ।*

सद भ र थ़

1. *हिन्दी साहित्य का इतिहास* -- डॉ° नगेन्द्र **(**संपा.**),**नेशनल पब्लिशिंग हाउस, नयी दिल्ली ।

2. *हिन्दी साहित्य का दूसरा इतिहास* – डॉ° बच्चन सिंह, राधाकृष्ण प्रकाशन, नयी दिल्ली ।

3. *काव्यशास्त्र* – डॉ° भगीरथ मिश्र, विश्वविद्यालय प्रकाशन,वाराणसी ।

5. [illegible] शिवकुमार मिश्र, लोकभारती प्रकाशन, इलाहाबाद ।

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7. *यशपाल का कहानी-संसार : एक अंतरंग परिचय* – सी.एम. योहन्नान, लोकभारती प्रकाशन, इलाहाबाद ।

8. *कहानीकार अज्ञेय : सन्दर्भ और प्रकृति* – डॉ° चन्द्रभानु सोनवणे, विद्या प्रकाशन, कानपुर ।

9. *रेणु का कथा साहित्य* – डॉ° सुरेश चन्द्र महरोत्रा, विद्या प्रकाशन,कानपुर ।

10. *रांगेय राघव के कथा-साहित्य में जनवादी जीवन-मूल्य* – डॉ° सत्यनारायण सिंह,पुस्तक पथ।

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उपलब्धि : *हिन्दी कहानी साहित्य से संबंधित प्रस्तुत योग्यतावर्धक पाठ्यक्रम को इस रूप में तैयार किया गया है, ताकि विद्यार्थियों को शताधिक वर्षों के समृद्ध हिन्दी कहानी साहित्य की चुनी हुई रचनाओं के पठन-पाठन के जरिए कथा-रस, जीवनानुभव एवं सरल हिन्दी गद्य का सम्यक् परिचय प्राप्त हो और इन बातों से उनलोगों की व्यावहारिक योग्यता में भी अपेक्षित विकास संघटित हो सके।*

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नाम: प्रो° दिलीप कुमार मेधि

संस्थान:गौहाटी विश्वविद्यालय

ईमेल :***dkmedhi1@gauhati.ac.in***

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1	**1**	**(क)उपन्यास:** परिभाषा, तत्व, प्रकार; हिन्दी उपन्यास साहित्य का सामान्य परिचय **(ख)अपने-अपने अजनबी:** अज्ञेय,भारतीय ज्ञानपीठ प्रकाशन,नई दिल्ली **क** **प**	**15**	**25 (20+5)**
2	**1**	**धरती धन न अपना :** जगदीश चन्द्र,राजकमल प्रकाशन, नई दिल्ली **षण:40** **त**	**15**	**25 (20+5)**

र टय: *इकाई 1(क) से केवल अतिलघु एवं लघु- उत्तरीय प्रश्न पूछे जाएंगे ।*

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सदभ र थ

1. *हिन्दी साहित्य का इतिहास* -- डॉ° नगेन्द्र (संपा.),नेशनल पब्लिशिंग हाउस, नयी दिल्ली ।
2. *हिन्दी साहित्य का दूसरा इतिहास* – डॉ° बच्चन सिंह, राधाकृष्ण प्रकाशन, नयी दिल्ली ।
3. *काव्यशास्त्र* – डॉ° भगीरथ मिश्र, विश्वविद्यालय प्रकाशन,वाराणसी ।
4. *हिन्दीउपन्यास: एकअंतर्यात्रा* -- डॉ° रामदरश मिश्र,राजकमल प्रकाशन,नयी दिल्ली ।
5. *अज्ञेय का कथा- साहित्य* -- डॉ° ओम प्रभाकर, नेशनल पब्लिशिंग हाउस, नयी दिल्ली ।
6. *अज्ञेय : विचार का स्वराज* -- कृष्णदत्त पालीवाल, प्रतिभा प्रतिष्ठान, सुभाष मार्ग, नयी दिल्ली ।
7. *जगदीश चन्द्र : एक यथार्थनिष्ठ उपन्यासकार* – डॉ° नवरूणा भट्टाचार्य,आनन्द प्रकाशन, ।
8. *जगदीशचन्द्र: एक रचनात्मक यात्रा*– तरसेम गुजराल एवं विनोद शाही (संपा°),

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षप्पउपलब्धि : *हिन्दी उपन्यास साहित्य से संबंधित प्रस्तुत योग्यतावर्धक पाठ्यक्रम को इस रूप में तैयार किया गया है, ताकि विद्यार्थियों को शताधिक वर्षों के समृद्ध हिन्दी उपन्यास साहित्य के प्रतिनिधिमूलक दो उपन्यासों के पठन- पाठन के जरिए कथा- रस, जीवनानुभव एवं सरल हिन्दी गद्य की सम्यक् परिचय प्राप्त हो और इन बातों से उनलोगों की व्यावहारिक योग्यता में भी अपेक्षित विकास संघटित हो सके।*

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  नाम : डॉ° रीतामणि वैश्य

  संस्थान : गौहाटी विश्वविद्यालय

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FOUR-YEAR UNDER GRADUATE COURSE (FYUGP) 2023
GAUHATI UNIVERSITY

HISTORY SYLLABUS

Department of History
Gauhati University
Guwahati-781014
Assam

SYLLABUS IN HISTORY FOR THE FOUR-YEAR UNDER GRADUATE COURSE (FYUGP) 2023 UNDER GAUHATI UNIVERSITY

The CCS (UG) in History of Gauhati University has drafted and recommended the syllabuses in History for the first three years of the Four Years Under Graduate Course in History in its meetings held on 15.03.2023 and 03.05.2023. The syllabus was approved the Academic Council in its meeting held on

This syllabus will be implemented from the academic session 2023-2024 under Gauhati University as per the Regulations approved for the purpose.

The courses will help the students to meet several important parts of the overall programme learning outcomes to be achieved by students on completion of the programme of study leading to the award of an undergraduate Certificate, Diploma or Degree.

Some of the Programme Learning Outcomes are

(i) Knowledge and understanding

Upon completion of the programme, the graduates would be able to demonstrate the acquisition of: knowledge of facts, concepts, principles, theories, and processes that the subject History is embedded in. The graduates will have an understanding of both World, Indian and regional histories and also the political, social and economic forces that shaped the histories. Overall, the programme will help the students develop broad multidisciplinary learning contexts especially in the field of humanities and social sciences.

(ii) Generic learning outcomes

The students completing the programme will be able to think Critically will be to apply analytic thought to history in particular and humanities and social sciences in general, including the analysis and evaluation of policies and practices, as well as evidence, arguments, claims, beliefs and the reliability and relevance of evidence.

The Graduates will be able to identify relevant assumptions or implications; and formulate coherent arguments; identify logical flaws in the arguments of others, analyse and synthesise data/information related to issues and arguments of history from a variety of sources and draw valid conclusions and support them with evidence and logic.

Graduates with history as is being offered under FYUGP of Gauhati University will acquire knowledge of the values and beliefs of multiple cultures and a global perspective to honour diversity. The graduates will be able to identify the migration of people and their settlements in Bharat and link them with cultural diversity. Graduates will be capable to effectively engage in a multicultural group/society and interact respectfully with diverse group.

(iii) Course Learning Outcomes : The course learning outcomes are stated as Course Outcomes in each of the courses.

COURSE LIST OF B.A. (Major and Minor) PROGRAMME IN ISTORY UNDER

FYUGP - GAUHATI UNIVERSITY

(2023)

Semester	Course Name	Credit	Course level
First	History of India (Up to 1206 CE)	4	100-199
Second	History of India (1206-1757 CE)	4	100-199
Third	History of India (c. 1757 to 1947 CE)	4	100-199
Fourth	History of Assam (upto 1826 CE)	4	200-299
	Social Formation and Cultural Patterns of the Ancient and Medieval World	4	300-399
	History: Concepts and Ideas	4	300-399
	Social and Economic History of India (Up to 1206 CE)	4	300-399
Fifth	Rise of the Modern West	4	200-299
	History of Europe (1648-1870 CE)	4	300-399
	History of East Asia : China and Japan (1839-1949)	4	300-399
	Social and Economic History of India (1206-1757 CE)	4	300-399
Sixth	History of Assam (1826-1947 CE)	4	200-299
	Social and Economic History of Assam (Upto 1947 CE)	4	200-299
	History of Europe (1870-1945 CE)	4	300-399
	Social and Economic History of India (1757-1947 CE)	4	300-399

FYGUP 2023
First Semester (History 1/1)

Course Name: **History of India (Up to 1206 CE)**

Credit : 4
Course level: 100-199

Course Outcome: Upon completion of this course, a student will be able to:

- explain the emergence of state system in North India as well as development of imperial state structure and state formation in South India in the early period.
- They will be able to relate the changes and transformations in polity of early India and the linkages developed through contacts with the outside world.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Sources for reconstructing Ancient Indian History: archaeological; literary
[b] Harappan Civilization: origin, extent, characteristics; first urbanization; decline.
[c] Vedic Culture-Early and Later Vedic periods: Tribal Polity, economic developments; social stratification; religion and philosophy;

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Second Urbanization; Rise of territorial states: *Mahajanapadas*
[b] Religious movements in North India: Jainism; Buddhism
[c] The Mauryas: Administrative system, Society and Economy; Asoka's Dhamma; Decline.
[d] Greek Invasion and its Impact.

Unit:III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Political developments in Post–Mauryan period with special reference to Sungas, Kushanas, Kharavelas, Satavahanas.
[b] Sangam Age: Literature, Society and Culture.

Unit:IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The Gupta Empire: administrative system, economy, society, art and architecture, cultural developments.
[b] Post-Gupta Period: Land Grant Economy and Early Feudalism.
[c] Harshavardhana; Samanta system

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Emergence of Rajputs in North India
[b] Political developments in South India with special reference to Cholas, Rashtrakutas, Chalukyas of Badami.
[c] Arabs; Ghaznavids and Ghorids.

Readings :

Altekar. A.S. 1966. *State and Government in Ancient India.* Delhi: Motilal Banarasidass.

Chakravarti. Ranabir. 2013. *Exploring Early India up to c. AD 1300*. Second Edition. Delhi: Macmillan

Champakalakshmi, R. 1996. *Trade, Ideology and Urbanization: South India, 300 CE to 1300 AD*. Delhi: Oxford University Press.

Chattopadhyaya, B.D. 1994. *The Making of Early Medieval India*. New Delhi: Oxford University Press.

Jha, D.N. 2012. *Ancient India in Historical Outline.* Delhi: Manohar Publishers. Reprint.

Kangle. R.P (ed. and tr.). 1960-65. *Kautilya's Arthasastra*. Bombay: University of Bombay

Kulke, Hermann(ed). 1994. *The State in India, AD 1000-1700*. New Delhi: Oxford University Press

Ratnagar. Shereen. 1991. *Enquiries into the Political Organization of Harappan Society*. Pune: Ravish Publishers.

Roy, Kumkum. 1994. *Emergence of Monarchy in North India*. New Delhi: Oxford University Press

Sahu, Bhairabi Prasad. 2012. 'Recent Perspectives of the State and Debates in Early Indian History'. *Indian Historical Review* 39(2)145-162.

Sharma, R.S. 1983. *Aspects of Political Ideas and Institutions in Ancient India*. New Delhi: Macmillan

Sharma. R.S. 2006. *India's Ancient Past*. New Delhi: Oxford University Press.

Sharma, R.S.1983.*Material Culture and Social Formations in Ancient India.* New Delhi: Macmillan.

Singh, Upinder. 2009. *A History of Ancient and Early Medieval India: From the Stone Age to the 12th century*. Delhi: Pearson India.

Thapar. Romila.1984. *From Lineage to State.* New Delhi: Oxford University Press.

Thapar. Romila. 2003. *The Penguin History of Early India: From origins to AD 1300.*Haryana: Penguin Random House India.

Thapar, Romila. 1978. *Ashoka and the Decline of the Mauryas.* Delhi: Oxford University Press.

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FYUGP 2023

Second Semester : (History 1/1)

Course Name : **History of India (1206-1757 CE)**

Credit : 4
Course level: 100-199

Outcomes: Upon completion of this course, students will be able to :

- Explain the political transition that took place under the Sultanate and the Mughals and how it changed the geo-political structure between 1206-1757.
- Identify the regional kingdoms and analyse their administration and polity.
- Explain the formation of different pre-modern states apart from the Sultanate and the Mughals during this period along with their administrative system, political ideologies, legitimation, and the institution of kingship.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Conceptualising ‘medieval’ Indian history; Sources
[b] Persian *tarikh* tradition
[c] Foreigners’ accounts, vernacular literature.
[d] Regional history writing: *bakkhars, buranjis, khyats*

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Foundation, Consolidation and Expansion of the Sultanate: Iltutmish, Razia Sultan, Balban, Alauddin Khilji, Muhammad Bin Tughluq, Firoz Shah Tughluq, Sayyids
[b] Theories of Kingship, Nobility, *khalifa* and *ulemas*
[c] Administration and policies under the Sultanate, *Iqta* system

Unit:III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Lodis and Battle of Panipat, Babur’s victory and consequences
[b] Rajput’s origin and polity: Mewar, Marwar and Amer
[c] Sher Shah Suri and his administration
[d] Vijayanagar and Bahmani Sultanate: Krishna Deva Raya; Administration, Battle of Talikota, Mahmud Gawan, disintegration of Bahmani- Bijapur, Ahmednagar, Bera, Golconda and Bidar.
[e] Gajapatis of Orissa, Gujarat, and Malwa Sultanate, Jaunpur, Bengal, Kashmir Sultanate

Unit:IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Mughal emperors: Akbar, Jahangir, Shahjahan, Aurangzeb

[b] Mughals and Central Asia contacts; Mughals-Rajput relations: matrimonial and political

[c] Nobility, Mansabdars-Jagirdars, administration

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Khalsa tradition and challenges to the Mughals

[b] Marathas under Shivaji, Peshwa administration

[c] Later Mughals and Bahadur Shah Jafar

[d] The 18th century: Decline of Mughals state, theories and interpretation, Power contestation: Awadh, Bengal and Hyderabad

Readings

Kulke, Hermann. (1995). *The Early and the Imperial Kingdom: A Processual Model of Integrative State Formation in Early Medieval India* in Kulke, H (ed), “The State in India, 1000-1700”, ed., New Delhi: Oxford University Press. 1997.

H. Kulke and B. P. Sahu, (2018). *History of Precolonial India: Issues and Debates*, Delhi: Oxford University Press, Part II

Kumar, Sunil. (2007). *The Emergence of the Delhi Sultanate*, *1192-1286*. Ranikhet: Permanent Black.

Tod, James. (1920). *Annals and Antiquities of Rajasthan*, William Crooke (Ed.). London: Oxford University Press, 3 volumes.

Mukhia, Harbans (1976). *Historians and Historiography during the Reign of Akbar*. Vikas: Publishing House

Mukhia, Harbans (2004). *The Mughals of India*, Oxford, United Kingdom: Wiley India, Blackwell Publishing

Tripathi, R P. (1959). *Some Aspects of Muslim Administration.* Allahabad: The Indian Press

Alam, M and S Subrahmanyam (eds.) (1998). *The Mughal State, 1526-1750*, Delhi: OUP

Chandra, Satish. (Ed.) (2005). *Religion, State and Society in Medieval India: Collected Works of Nurul Hasan*, Delhi: Oxford University Press

Bhargava, Meena (ed.) Exploring Medieval India. Sixteenth to Eighteenth Century, Vol. II, New Delhi: Orient BlackSwan

Bhargava, Meena (Ed.) (2014). The decline of the Mughal Empire, Delhi: OUP

Alavi, Seema (Ed.) (2000). The Eighteenth Century in India (New Delhi: Oxford University Press

Marshall, P.J (Ed.) (2003). The Eighteenth Century in Indian History: Evolution or Revolution? Oxford University Press

Rizvi, S.A.A (1987). The Wonder That Was India. Vol.II. India. Picador

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Third Semester (History 1/1)

Course Name : **History of India (c. 1757 to 1947 CE)**

Credit : 4
Course level 100-199

Course Outcome: Upon completion of this course, students will be able to:

- Explain the major factors that led to the establishment and consolidation of British rule in India.
- Identify the events, personalities and the process that led to development of resistance against British colonial rule and the eventual growth of Indian nationalist movement, that ultimately led to the end of the British rule in the country.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Political condition in post-Mughal period and rise of regional powers.
[b] European trading companies in India : Portuguese, Dutch, English and French
[c]The Battle of Plassey and the Battle of Buxar - the establishment of the British rule in India.
[d] Robert Clive and Dual Administration in Bengal.

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Expansion and Consolidation of the British rule under Warren Hastings and Lord Cornwallis.
[b] British relations with the Marathas and Mysore.
[c] Lord Wellesley and the Policy of Subsidiary Alliance
[d] Lord Hastings and the relations with the Indian States.

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The Growth and expansion of Sikh power under Ranjit Singh; British occupation of Punjab
[b] Lord Dalhousie and his policy of expansion- the Doctrine of Lapse
[c] Wars against Afghanistan and Burma (British Frontier Policy)
[d] Colonial State and policies of governance : army, police, law.

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The Revolt of 1857- its causes and consequences, the Government of India Act of 1858.
[b] The growth of national awakening in India and the establishment of the Indian National Congress.
[c] Lord Curzon and the Partition of Bengal; the Swadeshi Movement in India, Muslim League; growth of Revolutionary Terrorism.

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Gandhi in Indian politics - the Khilafat and the Non-Cooperation Movement, the Civil Disobedience Movement.
[b] The growth of the Left, Muslim League and Communal politics in India.
[c] The Quit India Movement – The INA and Partition of India.

Readings:

Bandyopadhya, Sekhar*: From Plassey to Partition: A History of Modern India*, Orient Longman Ltd. Hyderabad, 2004.
Chandra, B, Mukherjee, M *et al* : *India's Struggle for Independence*, Penguin Books, New Delhi, 2003.
Chandra, B., : *History of Modern India*¸ Orient BlackSwan, 2010
Grover B.L and Grover, S., *A New Look at Modern Indian History*, S. Chand & Company, New Delhi, 2004.
Banerjee-Dube, Ishita, *History of Modern India,* Cambridge University Press, New Delhi, 2014
Sarkar, Sumit : *Modern India*, Macmillan, New Delhi, 1983.
Gopal, S :*The British Policy in India, 1858-1905*, McMillan, New Delhi, 1992.
Grewal, J. S :*The Sikhs of the Punjab*, Cambridge University Press, New Delhi, 1999.
Gordon, Stuart :*The Marathas*, Cambridge University Press, New Delhi, 1999.

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Fourth Semester FYUGP (HISTORY 1/4)

Course Name : **History of Assam (upto 1826 CE)**

Credit : 4
Course level: 100-199

Course Outcome: After completion of this course a student will be able to :

- Explain in general outline the history of Assam from the earliest times to the advent of the British.
- Identify major events and personalities in the political history of Assam from the earliest times to the occupation of Assam by the English East India Company

Unit: I	Contact Classes : 6	Non-contact classes : 2	Marks : 15

[a] A survey of the sources: indigenous literature; accounts of foreign travellers (Chinese, Arabian, Persian, French); archaeological sources.
[b] Land and people: Migration routes and settlement pattern.

Unit: II	Contact Classes : 9	Non-contact classes : 2	Marks : 20

[a] The kingdom of Pragjyotisha-Kamarupa; Politico-cultural centres in the valleys of Doiyang-Dhansiri, Kapili-Jamuna and at Bhaitbari.
[b] Political dynasties: Varmana; Salastambha; Pala
[c] Administration: Central and Provincial; Judicial; Revenue

Unit: III	Contact Classes : 10	Non-contact classes : 4	Marks : 25

[a] Political condition of Assam in the Post-Pala period.
[b] Disintegration of the Kingdom of Kamarupa (Vaidyadeva, Tingyadeva, Vallavadeva)
[c] Turko-Afghan invasions
[d] Kamata, Chutiya, Kachari, and the Koch kingdoms; the Bara Bhuyans

Unit: IV	Contact Classes : 12	Non-contact classes : 4	Marks : 25

[a] Foundation of the Ahom kingdom by Siukapha
[b] Expansion and consolidation of the Ahom kingdom : Suhungmung, Pratap Singha, Gadadhar Singha, Rudra Singha, Rajeswar Singha.
[c] Ahom-Mughal conflict: the Treaty of 1639, Mirjumla's invasion, Battle of Saraighat (1671) and Battle of Itakhuli
[d] Ahom system of administration: Central administration, the *Paik* system and *Posa* system

Unit: V	Contact Classes : 8	Non-contact classes : 3	Marks : 15

[a] Decline and fall of the Ahom Kingdom: the Moamariya Rebellion;
[b] Burmese Invasions.
[c] Ahom policy towards the Hill tribes.
[d] The English East India Company in Assam Politics;

[e] Treaty of Yandaboo and Assam

Readings:

Barpujari, H. K. 1992 : *The Comprehensive History of Assam Vol. I, II and III,* Publication Board Assam.
Baruah, K. L. 2019: *Early History of Kamrupa,* Bhabani Books, Guwahati,.
Baruah, S.L. 1985: *A Comprehensive History of Assam*, Munshiram Monoharlal, New Delhi,
Devi, Lakshmi 1968 : *Assam Buranji* (Assamese), LBS Publishers, Guwahati
Dutta, A.K. 1991:*Maniram Dewan and the Contemporary Assamese Society*, Jorhat.
Gait, E. A. 1906 **:** *A History of Assam*
Gogoi, Padmeswar 2016 (Reprint) : *The Tai and the Tai Kingdoms,* Gauhati University Press.
Guha, A. 1991:*Medieval and Early Colonial Assam*, Bhabani Books,.
Nath, D. 1987: *Asom Buranji* (Assamese) Bidya Bhawan.
Neog, M. 1965: *Sankardeva and His Times*, Gauhati University Press, First Print

Fourth Semester FYUGP (HISTORY 2/4)

Course name : Social Formation and Cultural Patterns of the Ancient and Medieval World

Credit : 4
Course level : 200-299

Course Outcome: After completion of this course a student will be able to :

- Describe some of the most significant events and societies of pre-modern world.
- Explain political events relating to the ancient Greece city states and Rome.
- Analyse the complexities of historical forces in West Asia and the rise of Islam.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Civilization : The Nile Valley, Mesopotamia, China
[b] The Maya Civilization, the Incas, the Aztecs
[c] Polity, Economy and Social life and activities.

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Ancient Greece and Roman Empire
[b] Evolution of the 'polis' and changing political formations in ancient Greece: Athens and Sparta
[c] Slavery in the Ancient Greek and Roman world
[d] Greek Culture-Science and Philosophy, religion, art, and architecture

Unit:III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The Late Roman World, The Arabs
[b] Religion in the Late Roman Empire, Judaism and Christianity
[c] Spread of Christianity, Development of the Catholic Church

[d] Pre-Islamic society, Tribal background and the Rise of Islam, Foundation of the Islamic state, Caliphate and Crusades

Unit:IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Feudalism : its features and debates
[b] Feudal society and the Church
[c] Transitions in the feudal economy from 11th – 14th centuries

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Growth of trade and towns and their impact
[b] Oceanic trade with the East
[c] Emergence of Europe as a centre of World trade, Medieval Cities,
[d] Trading communities- Jews, Arabs, Italians, Flanders, English, German and Dutch

Readings :

Anderson, P. (1988). *Passages from Antiquity to Feudalism*. London and New York: Verso

Finley, M.I. (1963/1991). *The Ancient Greeks*, London: Penguin (1991 reprint)

Green, P. (1973). *A Concise History of Ancient Greece to the close of Classical era*, London: Thames and Hudson ltd.

Hopkins, K. (1978). *Conquerors and Slaves*. Cambridge: Cambridge University Press

Joshel, S. R. (2010). *Slavery in the Roman World*, Cambridge: Cambridge University Press

Bloch, M. (1961). *Feudal Society* Vol. I, Chicago: University of Chicago Press

Brunt, P.A. (1971). *Social Conflicts in the Roman Republic.* London: Chatty and Windus

Donner, F.M. ed. (2016). *The Expansion of the Early Islamic State*, London and New York: Routledge

Duby, G. (1978). *The Early Growth of the European Economy: Warriors and Peasants from the Seventh to the Twelfth century*. Cornell: Cornell University Press

Hodgson, M.G.S. (1974). *The Venture of Islam, Volume 1: The Classical Age of Islam*, Chicago: University of Chicago Press

Perry Anderson, *Passages from Antiquity to Feudalism*.

Marc Bloch, *Feudal Society*, 2 Vols.

Bloch, M. (1966). “The Rise of Dependent Cultivation and Seigniorial Institutions.” in M.M. Postan (Ed.), *The Cambridge Economic History of Europe*, Volume 1. Cambridge: Cambridge University Press.

Cambridge History of Islam, 2 Vols.

Georges Duby, *The Early Growth of the European Economy*.

Finley, M.I. (1983). *Politics in the Ancient World*. Cambridge: Cambridge University Press

Kumar, R. (2018). *Ancient and Medieval World: From Evolution of Humans to the Crisis of Feudalism*, New Delhi: Sage

Le Goff, J. (1992) *Medieval Civilisation*, 400-1500, (translated by Julia Barrow), Oxford UK & Cambridge USA: Blackwell

Hodgson, Marshall G.S (1974). *The Venture of Islam, Conscience and History in a World Civilisation.* 3 Vols. Chicago and London

Lapidus, Ira M(1988). *History of Islamic Societies*. Cambridge

Frederick Mote (1990). *Imperial China:* 900-1800 .Cambridge.Mass.Harvard University Press

Butterfield, H.J (1958). *The Origins of Modern Science: 1300-1800*. New York.

Chaunu, Pierre (1979). *European Expansion in the later Middle Ages*. General Editor Richard Vaughan, Vol. 10. North-Holland Publishing Company. Amsterdam

Pirenne, Henry (1937). *Economic and Social History of Medieval Europe*.New York. Craft Production

Fourth Semester FYUGP (History 3/4)

Course Name: **History: Concepts and Ideas**

Credit : 4
Course level : 300-399

Course Outcome: After completion of this course a student will be able to:

- Explain the concepts and scope of History.
- Compare and contrast History with other disciplines.
- Analyse the traditions of historical writing.
- Evaluate critical issues relating to the subject of History.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

History : Nature and Scope

i) What is History? Definition and Scope
ii) The Subject Matter of History: A Brief Survey of Changing Perspectives
iii) Types of Historical Evidence: Archival, Archeological, Literary and Oral.

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Categorization of History:

i) Economic
ii) Social
iii) Political
iv) Literary
v) Intellectual
vi) Diplomatic
vii) Universal
viii) Legal

Unit:III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

History and other Disciplines

i) Archaeology
ii) Geography
iii) Sociology
iv) Economics
v) Political Science

vi) Philosophy
vii) Literature

Unit:IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Traditions of Historical writing

i) Greco- Roman Traditions
ii) Chinese Tradition
iii) Traditions in Early India
iv) Traditions in Medieval India
v) History writing in Modern India

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Issues in Historical understanding

i) Writing History: Objectivity and Interpretation;
ii) Bias in History
iii)Periodization of Indian History: James Mill's periodization and the Nationalist critique

Readings:

Ali, B. Sheikh, 2022. (Reprint) *History: Its Theory and Methods*, Laxmi Publication
Sreedharan E., 2004. *A Textbook of Historiography* Orient BlackSwan
Carr, E.H., 2018. *What is History?* Penguin Paperbacks
Marwick, A, 1989. *The Nature of History,* Palgrave Macmillan
Cannadine, David, 2004. *What is History Now?* Palgrave Macmillan
Thapar, R, 2014. *The Past as Present,* Aleph Book Company
Thapar, R., Mukhia, Chandra, Bipan. 1969. *Communalism and the Writing of Indian History,* People's Publishing House.

4th Semester FYUGP (HISTORY 4/4)

Course Name: **Social and Economic History of India (Up to 1206 CE)**

Credit : 4
Course level : 300-399

Course Outcome: After completion of this course a student will be able to:

- Explain in general outline the economic history of Early India.
- Analyse the phases of development of economy from pastoral to Settled Agriculture.
- Identify major factors that influenced society and religions.
- Appreciate art and architecture of Ancient India

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Pre-History to Proto-History

(i) Hunting-Gathering Societies – Paleolithic
(ii) Advent of Food Production – Neolithic-Chalcolithic Cultures
(iii) First Urbanisation- Harappan Culture - Agriculture, Craft, Trade, Society, Religion and Art

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Transition from Rural to Urban

(i) Transition from Mixed Pastoral Economy to Settled Agriculture (1500-500 BCE)
(ii) Second Urbanisation in the Ganga Valley – Agriculture, Craft, Trade, Guilds and Labour
(iii) State Controlled Economy of the Mauryas
(iv) Post-Mauryan Economy – Trade Routes, Coinage, Urban Centres ; External Trade Networks – Indo-Roman, Indo-China

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Society and Religion

(i) Emergence of Social Stratification – *Varna-jati*, *Varnashrama dharma*, Untouchability, Gender Relations
(ii) Emergence and Spread of Jainism, Buddhism and other Religious Sects
(iii) Puranic Religion
(iv) Emergence and Development of Bhakti

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Towards Early Medieval India (300-1200 CE)

(I) Land Grants, Changing Production Relations, Graded Land Rights and Peasantry, Debates on Indian Feudalism
(II) Patterns of Trade, Currency and Urban Settlements
(III) Land Grant Economy in South India – Brahmadeyas and Agraharas, Temple Economy (Cholas)

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Literature and Art

(i) Literature – Survey of Sanskrit, Pali, Prakrit and Tamil
(ii) Art and Architecture – Mauryan, Post- Mauryan, Gupta, Post- Gupta; Evolution of Regional Styles

Readings :

B.D. Chattopadhyaya, 1994. *The Making of Early Medieval India*, OUP, New Delhi.
B & F. Raymond Allchin, 1982. *The Rise of Civilization in India and Pakistan*, CUP.
B.P. Sahu (ed.), 1997. *Land System and Rural Society in Early India*, Manohar, New Delhi.
B. Stein, 1980. *Peasant State and Society in Medieval South India*, OUP, New Delhi.
D.D. Kosambi, 2016 *An Introduction to the Study of Indian History*, Sage Publications India Pvt. Ltd, New Delhi, (First Published 1956)
D.K. Chakrabarti, 2003, *India: An Archaeological History: From Paleolithic Beginnings to Early Historic Foundations*, OUP, New Delhi,
D.P. Agarwal, 1982. *The Archeology of India*, Curzon Press, London.

G.L. Possehl, 2003. *The Indus Civilization: A Contemporary Perspective*, Vistaar Publications, New Delhi,

R. Chakravarti (ed.), 2005. *Trade in Early India,* OUP, New Delhi.

R. Champakalakshmi, 1996. *Trade, Ideology and Urbanization: South India, 300 BC- AD 1300*, OUP, New Delhi.

R. Gurukkal, 2012. *Social Formations of Early South India*, OUP, New Delhi.

R.S. Sharma, 2004. *India's Ancient Past*, OUP, New Delhi.

R.S. Sharma, 2007. *Material Culture and Social Formations in Ancient India*, Macmillan, (2nd Edn.)

R.S. Sharma, 2005 (3rd revised Edn.) *Indian Feudalism*, *(circa, 300 - 1200 A.D)*, Macmillan, (First Published 1965)

R.S. Sharma, 1987. *Urban Decay in India, (c.300 – c.1000)*, Munshiram Manohar Lal, Delhi.

R.S. Sharma, 2003. *Early Medieval Indian Society: A Study in Feudalisation*, Orient BlackSwan, New Delhi.

R. Thapar, 2002. *The Penguin History of Early India: From the Origins to AD 1300*, Penguin, New Delhi.

S. Huntington, 2014. *The Art of Ancient India: Buddhist, Hindu and Jain*, Motilal Banarsidass, Delhi, (First Published, New York, 1985)

S.K. Maity, 1957. *Economic Life of North India in the Gupta Period (c. 300-500 A.D)*, The World Press, Calcutta.

S.K. Maity, 1970. *Early Indian Coins and Currency System*, Munshiram Manoharlal, Delhi.

U, Chakravarti, 1987. *The Social Dimensions of Early Buddhism*, OUP, New Delhi,

U. Singh, 2008. *A History of Ancient and Early Medieval India*, Pearson, New Delhi.

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Fifth Semester FYUGP (HISTORY 1/4)

Course Name : **Rise of the Modern West**

Credit : 4
Course level : 200-299

Course Outcome: On completion of this course, the students will be able to

- Explain the major trends and developments in the Western world between the 14th to the 16th century CE.
- Analyse the significant historical shifts and events and the resultant effects on the civilizations of Europe in the period.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Transition from feudalism (to capitalism):

[a]concepts of feudalism; regional variations
[b]The Crisis of Feudalism
[c]The transition debate: Maurice Dobb and Paul Sweezy; Marc Bloch, Georges Duby; the Brenner Debate

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Geographical explorations and early colonial expansion:

[a] Factors and motives behind voyages and explorations
[b] the conquests of the Americas:
[c] beginning of the era of colonization;
[d] mining and plantation; the African slaves.

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Renaissance:

[a]Origins of Renaissance
[b]Humanism in Renaissance
[c] Italian influence on Art, Architecture, Culture, Education and Polity; Northern Humanism

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Reformation in the 16th century: Origin and impact

[a] Martin Luther, John Calvin, Zwingli
[b]The Radical Reformation: Anabaptists, Huguenots
[c] English Reformation and the state
[d] Counter Revolution

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Economic developments of the sixteenth century:

[a] Development of science: Renaissance to the 17th century.
[b] Shift of economic balance from the Mediterranean to the Atlantic;

[c] Agricultural revolution, Enclosure movement;
[d] Commercial Revolution; Influx of American silver and the Price Revolution.
[e] Concepts of Mercantilism and Imperialism: Mercantilism in the 17th and 18th centuries.

Readings:

Fisher, H.A.L., 1938. *A History of Europe,* Eyre and Spottiswoode, London

Sinha, Arvind, 2010. *Europe in Transition from Feudalism to Industrialization*, Manohar Books, Delhi.

Hayes, C J H, 1982 (Third Indian Reprint) *Modern Europe Upto 1870*, Surjeet Publications, Delhi.

Phukan, Meenaxi, 2012. *Rise of the Modern West: Social and Economic History of Early Modern Europe,* Trinity Press Pvt. Ltd

Aston, T.S. and Philpin, C. H. E. (eds.) 1976, *The Brenner Debate: Agrarian Class Structure andEconomic Development in Pre-Industrial Europe,* Cambridge University Press.

H. Butterfield, 1949 (1997 edition). *The Origins of Modern Science* Free Press.

Cipolla, Carlo M., 1976. *Fontana Economic History of Europe*, Vols. II and III. Barnes and Noble.

Cipolla, Carlo M., 1993 (3rd edition) *Before the Industrial Revolution, European Society and Economy.* 1000 -1700

Dobb, Maurice, 1947. *Studies in the Development of Capitalism.*

Hale, J. R., 2000, *Renaissance Europe.* Wiley Blackwell

Hall, A. Rupert, 1963. *From Galileo to Newton*. Dover Publications Inc.

Hill, Christopher, 2001. *A Century of Revolutions 1603-1714* Routledge

Hilton, Rodney, 1950 *Transition from Feudalism to Capitalism*, Verso Books

Lee, Stephen J., 1984 *Aspects of European History, 1494 - 1789*. Routledge

Parker, G., 2001. *Europe in Crisis. 1598- 1648.* Wiley Blackwell

Vries, Jan de, 1976. *Economy of Europe in an Age of Crisis 1600 - 1750.*Cambridge University Press.

Bath, Slicher van, 1963. *The Agrarian History of Western Europe. AD.500 - 1850.* Cambridge University Press

Elton, G. R., 1956. *Reformation Europe, 1517 -1556,* Harper Touchbooks

Gilmore, Myron P. 1962, *The World of Humanism. 1453 -1517.* Harper Touchbooks

Kriedte, Peter, 1983. *Peasants, Landlords and Merchant Capitalists,* Cambridge University Press.

Mathias, Peter, 1969. *The First Industrial Nation: The Economic History of Britain 1700–1914,* Routledge

Miskimin, Harry A., 1975. *The Economy of Later Renaissance Europe: 1300-1460*, Cambridge University Press.

Nauert, Charles G., 1995. *Humanism and the Culture of the Renaissance Europe,* Cambridge University Press.

Rice, Eugene F., and Grafton, Antony, 1994. *The Foundations of Early Modern Europe 1460-1559.* W.W. Norton and Company

Fifth Semester FYUGP (HISTORY 2/4)

Course Name: **History of Europe (1648-1870 CE)**

Credit : 4
Course level 300-399

Course Outcome: After the completion of this course the students will be able to

- Evaluate the historical evolution and political developments that occurred in Europe in the period between 1648 to 1870.
- Analyse the evolution of social classes, nation states, evolution of capitalism and nationalist sentiment in Europe.
- Relate to the variety of causes that dragged the world into devastating wars in the intervening period.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] End of Thirty Years' War
[b] Treaty of Westphalia and the new state system
[c] France under Henry IV, Richelieu and Mazarin
[d] Era of Louis XIV
[e] Bourbon succession to Spain

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The Germanies in the Seventeenth and Eighteenth centuries
[b] Russia: Careers of Peter the Great and Catherine the Great; Warm Water Policy
[c] Conflict between Hohenzollern Prussia and Habsburg Austria
[d] British expansion: successes against Spain and foundation of Overseas Empire
[e] The British and American Revolutions : Causes and consequences

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The French Revolution : Crisis of *ancien regime*
[b] Causes :Intellectual currents and emerging Social classes.
[c] Phases of the French Revolution 1789 - 99.
[d] Napoleonic consolidation - reform and empire.

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Congress of Vienna: Forces of conservatism & restoration of old hierarchies.
[b] Revolutionary and Radical movements, 1830 - 1848.
[c] Process of capitalist development in industry and agriculture: case Studies of Britain,France, the German States and Russia.
[d] Evolution and Differentiation of social classes: Bourgeoisie, Proletariat, land owning classes and peasantry.

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The Eastern Question : The Crimean War

[b] Era of Second Napoleonic Empire : Napoleon III : Foreign Policy
[c] Unification of Italy
[d] Unification of Germany

Readings:

Hayes, C.J.H.,1953. *Modern Europe to 1870*
Lipson, E., 1960. : *Europe in the Nineteenth and Twentieth Century*
Hobsbawm, E.J. 1962: *The Age of Revolution 1789-1848.*
Baldwin, M.W. & : *History of Europe* (Relevant Chapters)
Thompson, D.: *Europe since Napoleon*
Fisher, H .A.L.: *History of Europe*, Book III
Cameron, Euan (ed.) : *Early Modern Europe An Oxford History,* New Delhi, 2004
Phukan, Meenaxi, 2000. : *Rise of the Modern West: Social and Economic History of Early Modern Europe*

Fifth Semester FYUGP (HISTORY 3/4)

Course Name: **History of East Asia : China and Japan (1839-1949)**

Credit : 4
Course level 300-399

Course Outcome: After completion of the course, a student will be able to

- Explain the gradual opening of China and the increasing influence of European powers therein.
- Analyse the reaction to Western imperialism up to the establishment of the Communist Republic in modern China.
- Describe Japan's transition from feudalism to modernity, internal reconstruction, changes in socio-economic and political structures up to the rise of militarism.

PART I: CHINA

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Opening Up of China

i) Opium Wars (1839 -1860), Unequal Treaties
ii) Increasing Western Economic Interests; Open Door Policy

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Emergence of Nationalism

i) Popular Movements: Taiping, Self-Strengthening Movement, Boxer Rebellion
ii) Nationalism in China: Revolution of 1911, Sun Yat Sen and Three Peoples Principles
iii) Emergence of the Republic and Yuan Shi Kai, Warlordism (1916-1925)
iv) New Intellectual Ideas and May Fourth Movement

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Communism in China

i) Political crisis in the 1920's
ii) Problem of early industrialisation
iii) Kuomintang and The First United Front
iv) Communist Party under Mao Tse-tung, Second United Front, Long March, The Chinese Revolution (1949), Establishment of the Peoples' Republic of China.

PART II: JAPAN

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

End of Isolation to Meiji Restoration

A. Pre- Restoration Period
  i) Tokugawa Shogunate
  ii) Japan and the West- Perry Mission, Harris Treaty
B. Meiji Restoration (1867-68)
  i) Meiji Constitution; Rise of Political Parties
  ii) Processes and nature of modernization: Abolition of feudalism, Industrialisation, Zaibatsu, military changes.

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Emergence of Japan as an Imperial Power

i) Sino- Japanese War, 1894-95
ii) Russo-Japanese War, 1904-05
iii*)* Washington Conference
iv) Manchurian Crisis: Rise of Militarism

Readings:

Beasley. W.G. 1963. *The Modern History of Japan*. London: Weidenfeld and Nicolson.

Clyde P. H. and B. F. Beers. 1972. *The Far East.* New Delhi: Prentice Hall of India.

Chow Tse-tung. 1962. *The May Fourth Movement: Intellectual Revolution in Modern China*. Cambridge: Harvard University Press.

Chesneaux. Jean et al. 1976. *China, From Opium Wars to the 1911 Revolution*. New York: Pantheon Books

Chesneaux. Jean et al. 1977. *China, From 1911 Revolution to Liberation*. New York: Pantheon Books

Fairbank, John K. *et al.,*1989. *East Asia: Tradition and Transformation.* Revised Edition. Cambridge, Massachusetts: Harvard University Press.

Hsu, Immanuel. 1970. *The Rise of Modern China.* New York: Oxford University Press.

Purcell, Victor. 1963. *The Boxer Uprising: A Background Study.* UK: Cambridge University Press.

Schurmann F. and Schell O. (eds). 1967. *Readings in China: The Eighteenth and Nineteenth Centuries.* New York: Penguin.

Vinacke, H.M. 1978. *A History of the Far East in Modern Times*. Delhi: Kalyani Publication.

Wright, Mary C. 1969. *China in Revolution: The First Phase, 1900 -1913.* New Haven, Connecticut: Yale University Press.

Fifth Semester FYUGP (HISTORY 4/4)

Course Name : **Social and Economic History of India (1206-1757 CE)**

Credit : 4
Course level : 300-399

Course Outcome: After completing the course, the students will be able to :

- Describe the changes in the society of medieval India including the rise of nobility and the Bhakti and Sufi movements.
- Analyse how the economy of Medieval India developed under the Sultanate and the Mughal rule.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Society (13th-mid 16th century CE)

(a) Emergence of a new nobility; Changes in rural society
(b) Development of regional identities: art, architecture and literature
(c) Bhakti movements and monotheistic traditions in South and North India; Women Bhaktas; Nathpanthis; Kabir, Nanak and the Sant tradition: *Saguna* and *Nirguna*
(d) Ulema: Emergence and role
(e) Sufi *silsilas*: Chishti and Suhrawardi; doctrines and practices; social roles; literature

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Economy (13th to mid-16th century CE)

(a) *Iqta* and Iqtadari; revenue systems; revenue-free grants
(b) Agricultural production; technology
(c) Growth of urban centres Monetization; market regulations
(d) Trade and commerce: Overland trade; Indian Ocean trade

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Society (mid-16th to 18th century CE)

(a) Incorporation of Rajputs and other indigenous groups in Mughal nobility
(b) Pressure from the *ulema*; Sufi mystical and intellectual interventions
(c) Land rights and revenue system; Zamindars and peasants; rural tensions

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Economy (mid-16th to 18th century CE)

(a) Crafts and technologies; Monetary system

(b) Markets; transportation; urban centres
(c) Indian Ocean trade network
(d) Extension of agriculture; agricultural production; crop patterns
(e) Trade routes and patterns of internal commerce; overseas trade; rise of Surat

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Issues and Debates

(a) Rural society: proliferation of castes; growth of artisanal groups
(b) Women in Medieval India : Role in polity; Position in Society
(c) 18th century debate: economic interpretations

Readings:

Alavi Seema (ed), 2008. *The Eighteenth Century in Indian History,* Oxford University Press
Chandra, Satish 2019 : *Medieval India from Sultanat to the Mughals*, Vols. I, II, Har Anand Publication
Majumdar, R.C. (ed) :*The History and Culture of the Indian People*, Vols. VI
Chitnis, K.N. 1990 : *Socio- Economic History of Medieval India,* Atlantic Publishers and Distributors.
Habib, Irfan 2013 (Third Edition): *Agrarian System of Mughal India 1556-1707*, Oxford University Press.
Habib, Irfan 2011.: *Economic History of Medieval India,* Pearson.
Habib, M & Nizami : *Comprehensive History of India*, Vol. V
Mehta, J.L. : *Advanced Study in History of Medieval India*, Vol. I & II
Nizami, K.A. :*Studies in Medieval Indian History and Culture*
Rashid, A :*Society and Culture in Medieval India*
Marshall, P.J. (ed), 2005. *The Eighteenth Century in Indian History,* Oxford University Press
Rizvi, S.A.A., 2005 :*The Wonder that was India*, Part-II : *A History of Sufism in India*, Picador

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Sixth Semester FYUGP (HISTORY 1/4)

Course Name: History of Assam (1826-1947 CE)

Credit : 4
Course level 200-299

Course Outcome: Upon completion of this course, students will be able to

- Describe the annexation of Assam by the imperialist British forces.
- Explain the expansion and consolidation of the British colonial rule in Northeast India.
- Analyse the development of nationalism in Assam and its role in India's freedom struggle.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Political condition in Assam on the eve of the British rule.
[b] Establishment and Consolidation of the British rule
[c] David Scott – Annexation of Lower Assam, Administrative Reorganisation and Revenue Measures of Scott
[d] ; Robertson – Administrative and Revenue measures; Jenkins' Administrative Measures

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a]Ahom Monarchy in Upper Assam (1833-38)
[b] Annexation of Cachar
[c] Early phase of Revolts and Resistance to British rule- Gomdhar Konwar, Piyali Phukan, U. Tirut Singh,
[d] The Khamti and the Singpho rebellion
[e] The 1857 Revolt in Assam and its aftermath.

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Establishment of Chief Commissionership in Assam.
[b] Land Revenue Measures and Peasant Uprisings in 19th century Assam
[c] Growth of national consciousness – Assam Association, Sarbajanik Sabhas, Raiyat Sabhas.
[d] Government of India Act, 1919 – Dyarchy on Trial in Assam.

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Non Co-operation Movement and Swarajist Politics in Assam
[b]The Civil Disobedience Movement
[c] Trade Union and Allied Movements
[d]Tribal League and Politics in Assam

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Quit India Movement in Assam.
[b] Cabinet Mission Plan and the Grouping Controversy
[c] The Sylhet Referendum.
[d] Migration, Line System and its Impact on Politics in Assam

Readings:

Barpujari, H. K : (ed) 1992. *The Comprehensive History of Assam, Vols. IV & V*. Publication Board Assam
Baruah, Swarnalata 1985 : *A Comprehensive History of Assam*, Munshiram Monoharlal Publishers Pvt. Ltd., New Delhi.
Goswami, Priyam 2012: *From Yandabo to Partition*, Orient Black Swan,.
Barpujari, H. K., Bhuyan, S.K., et. al. (eds.) 1999 (Second Edition). *Political History of Assam, Vol. I.*, Publication Board Assam
Barpujari, H. K. 1980: *Assam in the Days of the Company,* Spectrum, Guwahati.
Bhuyan, A.C and De, S. (eds) 1999 (Second Edition). *Political History of Assam, Vols. II & III.* Publication Board Assam.
Bhuyan, A.C : (ed) 2000 *Nationalist Upsurge in Assam*, Publication Board, Assam.
Dutta, Anuradha 1991: *Assam in the Freedom Movement*, Darbari Prakashan, Calcutta.
Bora.S. 1996 :*Student Revolution in Assam*, Mittal Publications, Delhi
Chakravarti, B. C 1964 : *British Relations with the Hill Tribes of Assam*, Firma KLM, Calcutta
Guha, Amalendu :*Planters Raj to Swaraj, Freedom Struggle and Electoral Politics in Assam.*
Lahiri, R.M 1954 : *Annexation of Assam (1824-1854),* General Printers and Publishers, Calcutta.

Sixth Semester FYUGP (HISTORY 2/4)

Course Name : **Social and Economic History of Assam (Upto 1947 CE)**

Credit : 4
Course level : 200-299

Course Outcome: Upon completion of this course, students will be able to

- Analyse the socio-economic history of Assam including among others the development of caste system, religious beliefs, agriculture and land system.
- Explain the development trade and commerce, various agricultural regulations, plantation economy, development of modern industries, transport system, education, the emergence of middle class, development of literature and press, and growth of public associations.
- Appreciate the diversity of Assam.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Society and Economy in Early Assam

[a] Proto-historic period: Myths and Legends
[b] Society: Varnashrama dharma, social classes
[c] Economy: land grants, expansion of agriculture, revenue and trade relations
[d] Religious beliefs and practices : Saivism, Vaishnavism, Saktism, animism.

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Society in Medieval Assam

[a] Social Organisation– Caste-Class Relationship, Nobility, *Paiks*, Slaves and Servants
[b] Neo-Vaishnavite Movement in Assam – Impact on Society
[c] Development of *Satra* Institutions; four *Sanghatis*

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Economy in Medieval Assam

[a] Agriculture and Land System – Classification and Ownership of Land
[b] Land Revenue and other Taxes
[c] Trade and Trade routes
[d] Economic Relations between the Hills and Plains : *Posa* system, khats.

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Economy in Colonial Assam

[a] Agriculture Regulations and revenue system
[b] Plantation Economy of the Tea Industry
[c] Development of Modern Industries-Coal and Oil.
[d] Development of Transport System

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

Society in Colonial Assam

[a] Growth of Modern Education and the role of Christian Missionaries.
[b] Language Controversy in 19th century Assam
[c] Emergence of Middle Class
[d] Literary and Cultural Development: *Jonaki Yug, Ramdhenu Yug*.
[e] Development of Press and Growth of Public Associations – The Assam Sahitya Sabha.

Readings:

Barpujari, H.K.: (ed) 1992 : *The Comprehensive History of Assam*, Vol. I, III, IV & V, Publication Board, Assam.
Barua B.K. 1951: *A Cultural History of Assam,* K K Barooah, Nowgong, Assam
Baruah, S.L. 1985 : *A Comprehensive History of Assam*, Munshiram Monoharlal Publishers Pvt. Ltd., New Delhi,1985
Gogoi Nath, Jahnabi 2002: *Agrarian System of Medieval Assam*, Concept, New Delhi.
Guha, Amalendu 2022 (Reprint) :*Planters Raj to Swaraj: Freedom Struggle and Electoral Politics in Assam 1826-1947,* Tulika Books, Delhi.
Choudhury, P.C. 1959 :*History of Civilization of the People of Assam to the Twelfth Century A.D.,* DHAS, Guwahati.
Gait, E.A. 1906 : *A History of Assam*.
Guha, Amalendu 1990 :*Medieval and Early Colonial Assam,* K.P Bagchi& Co., Calcutta.
Medhi, S. B 1978 :*Transport System and Economic Development in Assam*, Publication Board, Assam.
Mahanta, P.K., 1921 (Fourth edition) *Asomiya Madhyabritya Srenir Itihas,* Purbanchal Prakash, Guwahati
Nath, D. (ed) 2011:*Religion and Society in North East India*, DVS, Guwahati.
Saikia, Rajen 2002 :*Social and Economic History of Assam (1853- 1921),*Manohar Books.
Sarma, S.N. 2001 (Reprint) : *A Socio Economic and Cultural History of Medieval Assam 1200-1800 A.D.*, Guwahati, Bina Library, Guwahati
Sharma, Monorama 1990 : *Social and Economic Change in Assam: Middle Class Hegemony,* Ajanta Publications.

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Sixth Semester FYUGP (HISTORY 3/4)

Course Name : History of Europe (1870-1945 CE)

Credit : 4
Course level 300-399

Course Outcome: After completing the course, the students will be able to :

- Explain the major political developments in Europe from 1870 to 1939.
- Describe how the rise of two unified nations of Germany and Italy gave rise of intense imperialist contest the world over.
- Analyse the causes and consequences of World War I and the developments leading to World War II.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The Treaty of Frankfurt (1871) : Impact on Germany and Italy
[b] *Kulturkamph* : Conflict between the Church and State
[c] Foreign policy of Germany under Bismarck

[c] The Paris Commune
[c] Imperialism in Africa

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The Eastern Question: Role of Imperialist powers
[b] Russo-Turkish War and the Berlin Congress
[c] Rise of nationalism and the Balkan Wars.
[d] Triple Alliance
[e] Triple Entente

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] The First World War: Causes and consequences
[b] The Paris Peace Conference and the Peace Settlements
[b] League of The Nations – Origin and activities
[c] The Bolshevik Revolution (1917) – Rise of the USSR

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Rise of Nazism – Germany under Hitler
[b] Rise of Fascism - Italy under Benito Mussolini
[c] The Spanish Civil War
[d] Policy of appeasement

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] European involvement in East Asia
[b] Anglo-Japanese Treaty (1902)
[c] Russo-Japanese War (1904-05)
[d]The Second World War: Causes and Course

Readings:

Hayes, C J H : 1953. *Contemporary Europe Since 1870.* Macmillan Company, New York.
Hazen, C.D. 1919, *History of Europe, 1870-1919,* London G Bells & Co.
Carr, E.H., 1961, *International Relations Between the Two World Wars 1919-1939*, Palgrave Macmillan
Thompson D 1923 : *Europe since Napoleon,* Longmans, London
Lipson E 1960 : *Europe in 19th and 20th Centuries,* A. & C. Black, London,
Vernadsky, H., 1961 : *A History of Russia,* Yale University Press
Fisher, H.A.L 1916 (first published) : *A History of Europe,* Edward Arnold Publishers Ltd., London
Fay, Sidney Bradshaw, 1930. *The Origins of World War Vol. I,* The Macmillan Company, New York

Sixth Semester FYUGP (HISTORY 4/4)

Course Name : **Social and Economic History of India (1757-1947 CE)**

Credit : 4
Course level : 300-399

Course Outcome: After completing the course, the students will be able to :

- Describe how the imperial British rule economically exploited India and caused drain of wealth.
- Analyse how the colonial encounter effected social change in India.
- Appreciate the socio-cultural diversity of India.

Unit: I	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Indian Economy at the advent of British rule

[b] Early Phase of Colonial Economy: Mercantilism, British overseas trade

[c] Decline of Traditional Industries : De-industrialization

Unit: II	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Agrarian Settlements: Permanent settlement; Ryotwari settlement; Mahalwari settlement.

[b] Commercialization of agriculture and Rural indebtedness

[c] Famines.

Unit: III	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Trade and fiscal policy,

[b] Development of Railways and Indian Economy

[c] Emergence of Indian Industries and capitalist enterprise.

[d] Banking and Currency.

Unit: IV	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a]Social consequence of the transformation of Indian agriculture : rise of new social classes zamindars, tenants, kisans; emergence of middle class.

[b] Impact of modern education; Emergence of new intelligentsia and its composition.

[c]The advent of printing and its implications

Unit: V	Contact Classes : 9	Non-contact classes : 3	Marks : 20

[a] Socio-Religious Reform Movements: Reform and Revival: Brahmo Samaj, Prarthna Samaj, and Ramakrishna and Vivekananda, Arya Samaj, Wahabi, Deoband, Aligarh and Singh Sabha Movements.

[b] Changing caste equations.

[c] Women: Changing position and attitudes.

[d] Women’s issues: property rights, reform legislation, political participation.

Readings:

Chandra, B 1990: *The Rise and Growth of Economic Nationalism in India*, Peoples Publication House, New Delhi.

Bandyopadhyay, Sekhar, 2004*: From Plassey to Partition: A History of Modern India*, Orient Longman Ltd. Hyderabad.

Banerjee Dube, Ishita, 2014 :*History of Modern India,* Cambridge University Press, New Delhi.

Sarkar, Sumit, 1983: *Modern India*, Macmillan, New Delhi.

Desai, A. R., 1990 : *Social Background of Indian Nationalism*, Popular Publication, New Delhi,.

Gopal, S., 1992 :*The British Policy in India, 1858-1905*, McMillan, New Delhi.

Jones, K.W., 1999:*Socio-Religious Reform Movements in British India*, Cambridge University Press, New Delhi.

Kumar, Ravinder, 1983. *Essays in the Social History of Modern India,* Oxford University Press, New Delhi.

Roy, Tirthankar, *The Economic History of India,* Oxford University Press, New Delhi, 2006.

Kumar, Dharma (Ed.) 2010The Cambridge Economic History of India, Vol. II, 1757-2003, Orient Blackswan, Delhi.

Bhattacharya, Sabyasachi (ed.), 2015. *Essays in Modern Indian Economic History,* Primus Books, New Delhi.

Dutt, R.P., 1940. *India To-day*, Victor Gollancz Ltd. London

Forbes, Geraldine, 1999., *Women in Modern India,* Cambridge University Press, New Delhi.

Kaushal, G., 1979. *Economic History of India 1757-1966,* Kalyani Publishers, New Delhi,

Bayly, Susan, 1999. *The New Cambridge History of India IV-3 Caste, Society and Politics in India from the Eighteenth Century in the Modern Age,* Cambridge University Press, New Delhi.

Vishwanathan, Gauri, 1998. *Masks of Conquest, Literary Studies and British Rule in India*, Oxford University Press.

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Department of Library and Information Science
Gauhati University
Gopinath Bordoloi Nagar, Guwahati-781014, Assam, India

Revised Syllabus as per New Education Policy - 2020
(To be effective from August, 2023)

This syllabus was approved at the Committee of Courses and Studies (CCS) Meeting in Library and Information Science (LIS), Faculty of Arts, held on 28th April, 2023 and approved in Academic Council, GU vide its Resolution No. AC-01/2023/10 dated 13-5-2023.

1. About B.A./B.Sc./M.A./MSc. in Library and Information Science Program: The development of society largely depends on information access, processing, organisation, dissemination and the different types of information services accessible to the citizens. The twenty-first century is the age of information and knowledge and a constantly growing number of institutes / organisations that are based on information and knowledge are emerging. The B.A./B.Sc./M.A./MSc. in Library and Information Science program will produce required human resources for information and knowledge-based organisation.

While studying a Library and Information Science program, based on selection of the minor course (pass course), it can be called a B.A. or B.Sc. degree or M.A. or M.Sc. in Library and Information Science.

2. Objectives

a) To make students competent with basic information skills, both traditional and modern, to run a library;
b) To fulfil the basic level to an advanced level of imparting knowledge under one umbrella;
c) To prepare students to take leadership positions in the emerging libraries and information centres;
d) To incorporate the related disciplines into the curricula for facilitating interdisciplinary study and research;
e) To prepare students to take up self-employment in the information field;
f) To ensure mobility, to equalise the standard of programme structure and syllabi at par with others; and
g) To prepare the student as efficient, progressive, human professionals with initiative, drive and integrity.

3. Admission Criteria: Any person after passing Class XII (Class 10+2) or having an equivalent level of any board or institute recognized by this university will be eligible for admission. For every academic session, students shall be admitted to the programme through an open admission test or by any other suitable mode as they may be notified by appropriate authority from time to time.

4. Implementation of the New Syllabus: The CCS resolved to start the 3-years / 4-years B.A./B.Sc. and 5-years M.A./M.Sc. in Library and Information Science from the year 2023-24. However, at the Master's degree level, it will be started only after the bachelor degree students under the new syllabus graduate. Till that moment of time, the existing syllabus of M.L.I.Sc. / M.Lib.I.Sc. will continue at the Master's degree level. The CCS further resolved that 5-year integrated M.A./M.Sc in Library and Information will commence from the next academic session.

5. Multiple Entry-Exit Option: There will be lateral entry provisions, but at any moment of time, the total intake will never exceed the total intake capacity of the programme.

6. Program Outline: In the following, Course No. column, the first digit indicates the semester, the second and third indicate the course serial number and the fourth digit indicates the credit of the course. One credit is equivalent to 30 study hours inclusive of all learning activities.

7. Program Specific Outcomes (PSOs): After completion of B.A./B.Sc./M.A./M.Sc. in Library and Information Science from Gauhati University, the learning outcomes would be:

1. Ability to effectively and efficiently discover, assess, and apply information for academic and personal goals.
2. Understanding existing and evolving information landscape, as well as the role of libraries and information professionals in enabling information access.
3. Comprehend history, ideas, concepts, and practises of LIS.
4. Organise and facilitate access to information in all forms, including printed and digital
5. Gain hands-on experience with a number of LIS-related technology tools and platforms, such as library systems, databases, metadata, and digital preservation.
6. Ability to communicate and work successfully with a wide range of stakeholders, including colleagues, patrons, and community members.
7. Comprehend and adhere to the LIS field's ethical norms and values, which include intellectual freedom, privacy, and secrecy.
8. Ability to critically analyse and evaluate research in the field of library and information science, as well as perform independent research projects.
9. Ability to lead and manage libraries and other information organisations at different levels.
10. Ability to design inclusive and culturally sensitive services and programmes and comprehend the significance of diversity, equality, and inclusion in LIS.
11. Ability and motivation to engage in continuous learning and professional growth throughout their LIS careers.

Entry	Semester	Course No.	Course Name	Theory/ Practice	Type	Nature	Marks Distribution			Credit			Exit
							Exam	Internal	Total	Lecture	Practice	Total	
10+2	I	1014	Foundations of Library and Information Science	Theory	Major/Minor	CC	80	20	100	4	0	4	**1 Year Certificate in Library and Information Science** Credit: 8
	II	2024	Library Systems	Theory	Major/Minor	CC	80	20	100	4	0	4	
Certificate	III	3034	Information Sources and Services	Theory	Major/Minor	CC/OC	80	20	100	3	1	4	**2 Years Diploma in Library and Information Science** Credit: 28
	IV	4044	Knowledge Organisation: Classification	Theory	Major/Minor	CC	80	20	100	4	0	4	
		4054	Knowledge Organisation Practice: CC and DDC(Basic)	Practice	Major	CC	80	20	100	0	4	4	
		4064	Knowledge Organisation: Cataloguing	Theory	Major	CC	80	20	100	4	0	4	
		4074	Knowledge Organisation: Cataloguing	Practice	Major	CC	80	20	100	0	4	4	
Diploma	V	5084	Fundamentals of Information Communication Technology	Theory	Major/Minor	CC/OC	80	20	100	3	1	4	**3 Years B.A./B.Sc. in Library and Information Science** Credit: 60
		5094	Knowledge Organisation Practice: DDC(Advanced) & UDC	Practice	Major	CC	80	20	100	0	4	4	
		5104	Information Communication and Information System	Theory	Major	CC	80	20	100	3	1	4	
		5114	Books and Printing Technology	Theory	Major	CC	80	20	100	4	0	4	
	VI	6124	Management of Library and Information Centres	Theory	Major/Minor	CC	80	20	100	4	0	4	
		6134	Library Automation and Networking	Theory	Major	CC	80	20	100	4	0	4	
		6144	Library Automation Practice	Practice	Major	CC	80	20	100	0	4	4	
		6154	Field Project	Practice	Major	CC	80	20	100	1	3	4	
Basic Degree	VII	7164	Preservation and Conservation	Theory	Major	CC/OC	80	20	100	3	1	4	**4 Years B.A./B.Sc. in Library and Information Science with Honours** Credit: 92
		7174	Website Design and Development	Practice	Major	CC/OC	80	20	100	1	3	4	
		7184	Information Storage and Retrieval	Theory	Major	CC	80	20	100	3	1	4	
		7194	Library Marketing	Theory	Major	CC	80	20	100	4	0	4	
	VIII	8204	Research Methodology	Theory	Major	CC/OC	80	20	100	4	0	4	
		8214	Content Management System	Practice	Major	CC/OC	80	20	100	1	3	4	
		8224	Intellectual Property Rights	Theory	Major	CC/OC	80	20	100	4	0	4	
		8234	Bibliographic Database: Project	Practice	Major	CC	80	20	100	0	4	4	
Honours Degree	IX	9244	Digital Library	Theory	Major	CC	80	20	100	4	0	4	**1/2/5 Year(s) M.A./M.Sc. in Library and Information Science** Credit: 124
		9254	Digital Library	Practice	Major	CC	80	20	100	0	4	4	
		9264	User Study and Information Literacy	Theory	Major	CC	80	20	100	4	0	4	
		9274	Learning Management System	Practice	Major	CC/OC	80	20	100	1	3	4	
	X	9284	Knowledge Management	Theory	Major	CC/OC	80	20	100	4	0	4	
		9294	Apprenticeship	Practice	Major	CC	80	20	100	0	4	4	
		9304	Research Evaluation Metrics	Theory	Major	CC	80	20	100	4	0	4	
		9314	Dissertation	Practice	Major	CC	80	20	100	0	4	4	

5 Years M.A. / M.Sc. in Library and Information Science Programme of Gauhati University

Four Year Under Graduate Programme

Library and Information Science

Semester 1

LIS-1014: Foundations of Library and Information Science

Course Level: 100-199

Graduate Attributes: The graduate attributes are reflected under course objectives and learning outcomes as follows:

Course Objectives	Learning Outcomes
• To make the learners aware of the Library and Information Science subject and its relation and contribution to society.	• Get acquainted with the library and information science subject and its different dimensions; • Make use of the five laws as a set of logical principles to initiate any new activity in library, documentation, information work and services; • Describe the role played by different organisations in the development of libraries; • Grasp the role of ILA, IASLIC, ALA and other library associations in the promotion of libraries; and • Get acquainted with the information and library related rules, regulations and acts.

Detailed Syllabus

Unit no	Unit Content	No of class	Marks
1	**Library and Information Science:** Library and Information Science (LIS) as a subject, LIS as a profession, Professional skills and competencies, professional ethics, and academic status of a librarian; library as a social institution, linkage of LIS with other subjects, LIS education in India, Career prospect in LIS, Librarians' Day and National Library Week, World Book Day, S. R. Ranganathan and Melville Dewey.	**14**	**20**
2	**Laws of Library Science:** Five laws of library science, implication of five laws in Library and Information Centres; Cannon and postulates.	**10**	**20**
3	**Library and its Promoters:** UNESCO, National Knowledge Commission, India and National Mission on Libraries, India, Library and Information Policy, Commissions and Committees in relation to LIS.	**10**	**20**
4.	**Library Associations:** Library associations at international, national, state and regional levels; State level association: ALA, ACLA, SAGPS, BLA; National Level association: ILA, IASLIC, IATLIS; International level association: ALA, ARL, CILIP, SLA, IFLA, FID, ASLIB, LAUK.	**14**	**20**
5	**Library Related Regulations:** The Press and Registration of Books Act, 1867; the Delivery of Books 'and Newspapers' (Public Libraries) Act, 1954 and 1956; Information Technology Act, 2000, Right to Information Act, 2005.	**12**	**20**

No. of Required Classes: 60
No. of Contact Classes: 40
No. of Non-Contact Classes: 20
Theory Credit: 4
Practical Credit: 0
Particulars of Course Designer

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Reading List:

Dhiman, Anil Kumar & Rani, Yashoda (2005). Learn Library and Society: Learning Library Science Series. New Delhi: Ess Ess Publications.

Government of India (1867). The Press and Registration of Books Act, 1867. Retrieved from https://www.indiacode.nic.in/handle/123456789/2272

Government of India (1956). The Delivery of Books and Newspapers (Public Libraries) Act, 1956. Retrieved from https://www.indiaculture.nic.in/delivery-books-and-newspapers

Ranganathan, ShiyaliRamamrita (2006). The Five Laws of Library Science. New Delhi: Ess Ess Publications.

Jain, M. K. (Ed.). (2001). Library and information services in India: States and union territories: On the eve of new millennium. Shipra. https://www.goodreads.com/book/show/1949366.Library_And_Information_Services_In_India

Jain, M. K., Kalia, D. R., &Mangha, P. B. (2000). 50 Years: Library and Information Services in India. Shipra Publications.

Khanna, J. K., & K. Vasihisht. (1985). Knowledge Evolution Structure & Research Methodology. Ess Ess Publications.

Mangla, P. B., & Mandal, S. (2006). The national library, India: An intellectual resource (NACONAL 2006). The National Library, Kolkata. http://archive.org/details/dli.ministry.29646

Rubin, R. (2004). Foundations of Library and Information Science. Neal-Schuman Publishers.

Barman, Badan (2022). A Comprehensive Book on Library and Information Science. LIS Links.

Pal, B., & Hazarika, N. (2022). Textbook on Skill enhancement course in Library and Information Science. EBH Publishers.

Semester 2
LIS-2024: Library Systems
Course Level: 100-199
Graduate Attributes: The graduate attributes are reflected under course objectives and learning outcomes as follows:

Course Objectives	Learning Outcomes
• To make the learners aware of the different types of libraries and their functions and activities in fulfilling the users' needs and approach.	• Explain the different types of libraries and their functions; • Explain the different aspects of the academic library system; • Recognize different types of public libraries and their functions; • Visualise the role of national libraries; and • Comprehend the need and purpose of library legislation for public library services.

Detailed Syllabus

Unit no	Unit Content	No of class	Marks
1	**Basics of Library:** Definition, Types and functions; Historical Development of libraries; Public library movement in India and Assam; Inclusive libraries	**10**	**20**
2	**Academic Library System:** Concept, functions, authority, collection, personnel, finance, services; Role of UGC, NAAC, AICTE, INFLIBNET and other bodies in promoting libraries in universities, colleges, schools and other academic institutions in India; School library system: KVS and NVS; Selected academic libraries in India.	**13**	**20**
3	**Public Library System:** Concept, functions, authority, collection, personnel, finance, services; Selected public libraries in India; Community Information System; Library Legislation: Need, purpose; functions and advantages; Library Acts in India; RRRLF, IFLA, UNESCO Public Library Manifesto.	**13**	**20**
4.	**Special Library System:** Concept, functions, authority, collection, personnel, finance, services; Health library, agricultural library, engineering and technological library, law library, corporate library, personal library, archives, museum and oriental libraries; Library services for differently abled persons, children, women and aged people; Role of DST; Selected special libraries in India.	**13**	**20**
5	**National Library:** Concept, functions, authority, collection, personnel, finance, services; Selected national library of the	**11**	**20**

	World: Library of Congress, British Library; National library of India; Depository Libraries.		

No. of Required Classes: 60
No. of Contact Classes: 40
No. of Non-Contact Classes: 20
Theory Credit: 4
Practical Credit: 0
Particulars of Course Designer

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Dr. Badan Barman	badanbarman@gauhati.ac.in	Department of library and Information Science
Dr. Niraj Barua	nirajbarua@gauhati.ac.in	Department of library and Information Science

Reading List:

Abdullahi, I. (2009). Global Library and Information Science: A Textbook for Students and Educators. With Contributions from Africa, Asia, Australia, New Zealand, Europe, Latin America and the Carribean, the Middle East, and North America. Walter de Gruyter.

Appleton, L. (2021). Positioning the Academic Library within the University: Structures and Challenges. Routledge.

Ashworth, W. (1979). Special Librarianship. C. Bingley.

Barua, B. P. (1992). National Policy on Library and Information Systems and Services for India: Perspectives and Projections. Popular Prakashan.

Battles, M. (2004). Library: An Unquiet History. W. W. Norton.

Bhatt, R. K. (1995). History and Development of Libraries in India. Mittal Publications.

Bolin, M. K. (2017). The 21st Century Academic Library: Global Patterns of Organization and Discourse. Chandos Publishing.

Burnett, R. (2017). Reflecting on the Future of Academic and Public Libraries. Scitus Academics LLC.

Devarajan, G. (1990). Public Library System in India. Ess Ess Publications.

Dhiman, A. K. (2008). A Handbook of Special Libraries and Librarianship. Ess Ess Publications.

Dowler, L. (1997). Gateways to Knowledge: The Role of Academic Libraries in Teaching, Learning, and Research. MIT Press.

Eden, B. L. (2015a). Leading the 21st-Century Academic Library: Successful Strategies for Envisioning and Realizing Preferred Futures. Rowman & Littlefield.

Eden, B. L. (2015b). Enhancing Teaching and Learning in the 21st-Century Academic Library: Successful Innovations That Make a Difference. Rowman & Littlefield.

Evans, G. E., & Greenwell, S. (2018). Academic Librarianship. American Library Association.

Evans, W., & Baker, D. (2011). Libraries and Society: Role, Responsibility and Future in an Age of Change. Elsevier.

Forbes, C., &Keeran, P. (2020). Academic Library Services for Graduate Students: Supporting Future Academics and Professionals. ABC-CLIO.

Gill, P. (2013). The Public Library Service: IFLA/UNESCO Guidelines for Development. Walter de Gruyter.

Hada, Kapil Singh & Bajpai, R. P. (2014). Integrated Indian Public Library System. Gurgaon: Partridge Publishing.

Jordan, P. (2017). The Academic Library and Its Users. Routledge.

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Kumar, K. (1997). Library Organization. Vikas Publishing House.

M, Y., Joseph. (2015). Special Library Administration, Standardization and Technological Integration. IGI Global.

Murray, S. A. P. (2009). The Library: An Illustrated History. Skyhorse.

Neely, T., & Lee-Smeltzer, K.-H. (2013). Diversity Now: People, Collections, and Services in Academic Libraries. Routledge.

Oakleaf, M. J. (2010). The Value of Academic Libraries: A Comprehensive Research Review and Report. Assoc of Cllge&amp; RsrchLibr.

Patel, J., & Kumar, K. (2001). Libraries and Librarianship in India. Greenwood Publishing Group.

Pateman, J., & Pateman, J. (2019). Managing Cultural Change in Public Libraries: Marx, Maslow and Management. Routledge.

Raval, Ajaykumar (2013). Handbook of Public Library System. New Delhi: Discovery Publishing House.

Sahai, S. (1990). Academic Library System. Allied Publishers.

Sahai, S. N. (1990). Academic Library System. New Delhi: Allied Publishers Limited.

Semertzaki, E. (2011). Special Libraries as Knowledge Management Centres. Elsevier.

Simons, M. (2017). Academic Library Metamorphosis and Regeneration. Rowman & Littlefield.

Singh, S. P. & Kumar, Krishan (2005). Special Libraries in the Electronic Environment. Delhi: Bookwell.

Sridhar, M. S. (1992). Problems of Collection Development in Special Libraries. Concept Publishing Company.

Thakur, D. S. (2006). Scientific and Technical Libraries. Ess Ess Publications.

Trehan, G. L. (1985). College Library Management: Academic Library System, Services, and Use. Sterling Publishers.

Usherwood, B. (2007). Equity and Excellence in the Public Library: Why Ignorance is Not Our Heritage. Ashgate Publishing, Ltd.

Venkatappaiah, V. (1994). Model Library Legislation: Model Public Library Act and Rules Made Therein for the Constituent States and Union Territories. Concept Publishing Company.

Walter, S., & Williams, K. (2010). The Expert Library: Staffing, Sustaining, and Advancing the Academic Library in the 21st Century. Assoc of Cllge&amp; RsrchLibr.

Semester 3

LIS-3034: Information Sources and Services

Course Level: 100-199

Graduate Attributes: The graduate attributes are reflected under course objectives and learning outcomes as follows:

Course Objectives	Learning Outcomes
• To make the learners aware of the different sources of data and information and make acquaintance with the different services provided by libraries and knowledge resource centres.	• Describe the structure of different kinds of documentary sources useful and accessible to a variety of users; • Describe the need, use and functions of bibliographies; • Grasp the process involved in providing reference and information services; • Comprehend the sources for different types of information; • Enumerate different types of abstracting & indexing periodicals with examples; and • State the process involved in rendering biographical information services. • Evaluate the different types of information sources

Detailed Syllabus

Unit no	Unit Content	No of class	Marks
1	**Basics of Reference and Information Sources:** Nature of information, characteristics, types and formats, Non-documentary sources of information, Documentary sources of information: Primary, Secondary and Tertiary, reference sources of information, Evaluation of Reference Sources; International Article Number, International Standard Book Number (ISBN), International Standard Serial Number (ISSN), Digital Object Identifier (DOI).	**14**	**20**
2	**Types of Reference and Information Sources:** Dictionary, Thesaurus, Encyclopaedia, Biographical, Geographical and Statistical sources of information; Abstracting and Indexing, Citation Index and Bibliographical Sources; Bibliographic Control.	**10**	**20**
3	**Electronic Information Sources:**Definition, features, types and origin; Pricing model of E-resources, acquisition and access mechanism and devices used for accessing; Evaluation of web resources;Different databases of E-resources; Federated search and discovery services, remote access, Library Portal; Open Access, Open Educational Resources, Creative Commons Licenses and Govt. initiatives in e-resources.	**14**	**20**
4.	**Reference Service:** Concept, types, functions, Reference enquiry, Reader's profile, Fact finding, Referral service, Alerting Services: CAS and SDI services, interlibrary loan, Document Delivery	**11**	**20**

	Service; Documentation Service, Library Public Relation and Extension Activities, Preparation of subject bibliographies.		
5	**Digital Reference Services**: Concept, Definition, Characteristics, Importance, and Types – Asynchronous and Synchronous; Web 2.0 and 3.0 services - Social Networking Services, Social tagging, Social Bookmarking, RSS Feeds, Web-Scale Discovery Services; Mobile-based library service, OPAC, Machine translation, Library website, library apps, augmented reality, Ask a Librarian.	**11**	**20**

No. of Required Classes: 60
No. of Contact Classes (Theory): 30
No. of Contact Classes (Practical): 20
No. of Non-Contact Classes: 10
Theory Credit: 3
Practical Credit: 1

Particulars of Course Designer

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Reading List:

Alewine, M. C., & Canada, M. (2017). *Introduction to Information Literacy for Students*. John Wiley & Sons.

Arch, X., & Gilman, I. (2020). *Academic Library Services for First-Generation Students*. ABC-CLIO.

Bopp, R. E., & Smith, L. C. (Eds.). (2011). *Reference and information services: An introduction* (4th ed). Libraries Unlimited.

Bomhold, C. (2022). *Serving the Underserved: Strategies for Inclusive Community Engagement*. Neal-Schuman Publishers, Incorporated.

Bunch, A. (1982). Community information services: the origin, scope and development. London: Clive Bingley

Cassell, K. A. (2017). *Managing Reference Today: New Models and Best Practices*. Rowman & Littlefield.

Cassell, K. A., & Hiremath, U. (2006). *Reference and Information Services in the 21st Century: An Introduction*. Facet.

Chakrabarti, A. K. (1983). Reference Service. Hyderabad: APPLA.

Chakrabarti, M. L. (1987). Bibliography: Theory and Practice. 3rd Ed. Kolkata: World Press.

Coffman, S. (2003). *Going Live: Starting and Running a Virtual Reference Service*. American Library Association.

Connor, E. (2006). *An Introduction to Reference Services in Academic Libraries*. Routledge.

Davidson, Donald. (1980). Reference service. London: Clive Bingley

Dollah, W. A. K. W. (2012). *Digital reference services in academic libraries*. The University of Malaya Press.

Durrance, J. C., & Fisher, K. E. (2002). Online community information: Creating a nexus at your library. Chicago, Ill: American Library Association.

Ekene, O., Nkem. (2019). *Managing and Adapting Library Information Services for Future Users*. IGI Global.

Ellis, L. A. (2016). *Teaching Reference Today: New Directions, Novel Approaches*. Rowman & Littlefield.

Farmer (Eds.), L. (2007). *The Human Side of Reference and Information Services in Academic Libraries. Adding Value in the Digital World* (1st ed.). Chandos Publishing.

Farmer, L. S. J. (2014). *Introduction to Reference and Information Services in Today's School Library*. Rowman & Littlefield.

Foskett, D. J. (1967). *Information Service in Libraries*. Archon Books.

Grogan, D. (1992). *Practical Reference Work* (2nd edition). Clive Bingley.

Group, L. A. I. S. (1999). *Guidelines for Reference and Information Services in Public Libraries*. Library Association Pub.

Guha, B. (1983). Documentation and information: services, techniques and systems. Calcutta: World Pr. Private Ltd

Harper, M. (2011). *Reference Sources and Services for Youth* (1st edition). Neal-Schuman Publishers Inc.

Hirsh, S. (2015). *Information Services Today: An Introduction*. Rowman & Littlefield.

Katz, B., & Kinder, R. (2019). *The Publishing and Review of Reference Sources*. Routledge.

Katz, L. S. (2013). *Doing the Work of Reference: Practical Tips for Excelling as a Reference Librarian*. Routledge.

Katz, L. S. (2014). *Reference Services and Media*. Routledge.

Katz, W. A. (2003). *Digital Reference Services*. Haworth Information Press.

Kern, M. K. (2009). *Virtual reference best practices: Tailoring services to your library*. American Library Association.

Kimmel, S., &Heise, J. (2003). *Virtual Reference Services: Issues and Trends*. CRC Press.

Krishan Kumar (1999). Reference Service. 4th ed. New Delhi: Vikas.

Lankes, R. D. (2006). *The Virtual Reference Desk: Creating a Reference Future*. Facet.

Maddigan, B. C., &Bloos, S. C. (2013). *Community Library Programs That Work: Building Youth and Family Literacy*. ABC-CLIO.

Mukherjee, A.K. (1984). Reference works and its tools. Calcutta: World Press.

Mukhopadhyay, P. (2011). Digital community information system: a framework for India. Germany: LAP Lambert Academic Publishing.

Novotny, E. (2013). *Assessing Reference and User Services in a Digital Age*. Routledge.

Pitts, J. E., Bonella, L., Coleman, J. M., &Wathen, A. (2019). *Library Services for Online Patrons: A Manual for Facilitating Access, Learning, and Engagement*. ABC-CLIO.

Ranganathan, S. R. (2006). *Reference Service*. Ess Ess Publications.

Sharma, C. K. (2006). *Reference Service and Sources*. Atlantic Publishers & Dist.

Singh, G. (2013). *Information sources, services and systems*. Phi Learning Pvt. Ltd.

Sue, P. (2011). *E-Reference Context and Discoverability in Libraries: Issues and Concepts: Issues and Concepts*. IGI Global.

Weisman, H. M. (1972). Information systems, services, and centers. New York: Becker

Whitlatch, J. B., & Searing, S. E. (2014). *Guide to Reference: Essential General Reference and Library Science Sources*. American Library Association.

Semester 4

LIS-4044: Knowledge Organisation: Classification

Course Level: 200-299

Graduate Attributes: The graduate attributes are reflected under course objectives and learning outcomes as follows:

Course Objectives:	Learning Outcomes
• To familiarise students with the fundamentals of library classification, including its history and types of classification systems and how they are used to arrange information sources.	• Identify and describe the need, purpose and function of library classification; • Adapt existing normative principles of library service to knowledge resources; • Describe the structure, identify the main classes in a library classification; • Able to use notational devices in library classification; and • Exemplify the application of facet analysis and sequencing of facets in Colon Classification.

Detailed Syllabus

Unit no	Unit Content	No of class	Marks
1	**Subjects:**Universe of knowledge: structure and attributes; modes of formation of subjects.	**10**	**20**
2	**Library Classification:** Meaning, need and purpose; kinds of Library classification schemes: Faceted and Enumerative. Common (ACI and PCI) and Special Isolates and auxiliaries. Facets and Facet Analysis, Speciators and their kinds, Phase Relations: levels and kinds/nature.	**14**	**20**
3	**Principles in Library Classification:**Normative principles: Laws, Canons, Principles, Postulates; Three Planes of works; Notation: Definition, structures, quality and function.Notational techniques in different classification schemes.	**14**	**20**
4.	**Mapping of Subjects in Major Classification Schemes:** Brief study of major classification schemes and the representation of the universe of subjects as mapped in DDC, UDC, LC, CC.	**12**	**20**
5	**Trends of Library Classification:** Taxonomy, Folksonomy, Automated classification, Web Dewey, Classify	**10**	**20**

No. of Required Classes: 60
No. of Contact Classes (Theory): 00
No. of Contact Classes (Practical):60
No. of Non-Contact Classes: 00
Theory Credit: 0
Practical Credit: 4
Particulars of Course Designer

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Reading List:

Batley, S. (2014). *Classification in Theory and Practice*. Chandos Publishing.

Broughton, V. (2004). *Essential Classification*. Facet Publishing.

Broughton, V. (2022). *Facet Analysis*. American Library Association.

Comaromi, J. P., &Satija, M. P. (1989). *Dewey Decimal Classification: History and Current Status*. Sterling Publishers.

Fletcher, W. I. (2017). *Library Classification*. Trieste Publishing Pty Limited.

Gilchrist, A., &Vernau, J. (2012). *Facets of Knowledge Organization: Proceedings of the ISKO UK Second Biennial Conference, 4th - 5th July, 2011, London*. Emerald Group Publishing.

Hunter, E. J. (2017). *Classification Made Simple*. Routledge.

Krishan Kumar (2000). Theory of Classification. New Delhi: Vikas.

Kumbhar, R. (2011). *Library Classification Trends in the 21st Century*. Elsevier.

Marcella, Rita and Newton, Robert (1997). A new manual of classification. Mumbai: Jaico.

Mitchell, J. S., &Vizine-Goetz, D. (2013). *Moving Beyond the Presentation Layer: Content and Context in the Dewey Decimal Classification (DDC) System*. Routledge.

Palmer, B. I., & Wells, A. J. (2021). *The Fundamentals of Library Classification*. Routledge.

Ranganathan, S. R. (1951). *Philosophy of Library Classification*. E. Munksgaard.

Ranganathan, S. R. (2006). *Classification and Communication*. Ess Ess Publications.

Ranganathan, S.R. (1989). Elements of Library classification. 2nd ed. Bombay: UBS.

Ranganathan, S.R. (1989). Prolegomena to library classification. 3rd ed. Bombay: Asia.

Rowley, Jennifer and Ferrow, John (2000). Organizing Knowledge: An Introduction to Knowledge managing information. London: Gower.

Satija, M. P. (2013). *The Theory and Practice of the Dewey Decimal Classification System*. Elsevier.

Satija, M. P. (2021). *Dewey Decimal Classification: Edition 19 (1979) to WebDewey (2018)*. Ess Ess Publications.

Sayers, W. C. B. (1958). *An Introduction to Library Classification, Theoretical, Historical, and Practical: With Readings, Exercises, and Examination Papers*. Grafton.

Semester 4

LIS-4054: Knowledge Organisation Practice: CC and DDC (Basic)

Course Level: 200-299

Graduate Attributes: The graduate attributes are reflected under course objectives and learning outcomes as follows:

Course Objectives	Learning Outcomes
• To teach students practical classification skills utilising two important classification tolls like CC and DDC, as well as how to apply the principles of CC and UDC to manage and preserve library collections in an organised and effective manner.	• .Exemplify the application of facet analysis and sequencing of facets in Colon Classification; • Construct class numbers according to Colon Classification; • Identify the different types of common isolates and their use in DDC; and • Classify a document as per Dewey Decimal Classification system.

Detailed Syllabus

Unit no	Unit Content	No of class	Marks
1	**Basic and Compound Subjects:** Classification of Documents representing basic, compound and complex subjects according to CC.	**15**	**25**
2	**Complex Subjects:** Classification of Documents representing complex subjects according to CC.	**15**	**25**
3	**Use of Schedule:** Classification of Documents representing basic subjects according to DDC.	**15**	**25**
4.	**Compound Subject:** Classification of Documents representing compound subjects according to DDC.	**15**	**25**

No. of Required Classes: 60
No. of Contact Classes (Theory): 00
No. of Contact Classes (Practical):60
No. of Non-Contact Classes: 00
Theory Credit: 0
Practical Credit: 4
Particulars of Course Designer

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Dr. Niraj Barua	nirajbarua@gauhati.ac.in	Department of library and Information Science

Reading List:

Ranganathan, S.R. (1964). Colon Classification, 6th rev. ed. Bombay: Asia.

Ranganathan, S.R. (1989). Colon Classification, 7th ed. 6th rev. and ed. by M.A. Gopinath. Bangalore: Sharda Ranganathan Endowment for Library Science.

Dewey, Melville (1971). Dewey Decimal Classification and Relative Index. 22nd ed. 4V. New York: Forest Press.

Raju, A.A.N. (1995). Dewey Decimal Classification (DDC 20): Theory and practice: a practical self-instructional manual. Madras: T. R. Pub.

Satija, M.P and Comaroni, M.P (1998). Exercises in the 21st Edition of DDC. Revised and Enlarged. New Delhi: Sterling.

Semester 4
LIS-4064: Knowledge Organisation: Cataloguing
Course Level: 200-299
Graduate Attributes: The graduate attributes are reflected under course objectives and learning outcomes as follows:

Course Objectives	Learning Outcomes
• Understanding the purpose and importance of cataloguing in libraries, the role of cataloguing in facilitating access to information resources, and the principles of cataloguing codes such as AACR2R (Anglo-American Cataloguing Rules, 2nd edition) and CCC (Classified Catalogue Code) by investigating current issues and trends in cataloguing.	• Define and describe a library catalogue; • Distinguish different approaches of readers for documents; and • Explain the cataloguing process. • Catalogue a reading material.

Detailed Syllabus

Unit no	Unit Content	No of class	Marks
1	**Library Catalogues:** Needs, structures and types; Physical forms of catalogues including book, sheaf, card and machine readable including OPACs, Web-OPACs. Centralize, Cooperative and Union catalogues.	**12**	**20**
2	**Types of Entries:** Personal Authors, Corporate Authors, Pseudonyms, Anonymous work, Uniform titles, Non-Print Materials.	**14**	**20**
3	**Cataloguing Code:** Canons and Principles, AACR2R, CCC, RDA, FRBR, Bibframe.	**12**	**20**
4.	**Subject Headings:** SLSH, LCSH, Chain procedure.	**10**	**20**
5	**Trends in Library Catalogue:** Retrospective Conversion. Bibliographic standards: ISBD; Data exchange formats. Metadata standards and schemes. MARC, UNIMARC, CCF, MARC-21, ISO 2709, Z39.50, Z39.71, etc.	**12**	**20**

No. of Required Classes: 60
No. of Contact Classes (Theory): 40
No. of Contact Classes (Practical):00
No. of Non-Contact Classes: 20
Theory Credit: 4
Practical Credit: 0
Particulars of Course Designer

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Dr. Niraj Barua	nirajbarua@gauhati.ac.in	Department of library and Information Science

Reading List:

Dhiman, Anil Kumar & Rani, Yashoda (2005). Learn Library Cataloguing: Learning Library Science Series. New Delhi: Ess Ess Publications.

Chan, Lois M. (1994). Cataloguing and classification: An Introduction. New York: McGraw Hill.3. Girija Kumar and Krishan Kumar (1988) Theory of Cataloguing. 5th Ed. New Delhi: Vikas.

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Ranganathan, S.R. (1964). Classified Catalogue Code: with additional rules for dictionary catalogue. Bombay: Asia.

Aswal, R. S. (2005). *AACR2R with MARC21: Cataloging Practice for 21st Century*. Ess Ess Publications.

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Carter, R. C. (2018). *Managing Cataloging and the Organization of Information: Philosophies, Practices and Challenges at the Onset of the 21st Century*. Routledge.

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Cole, J. E., & Jones, W. (2002). *E-serials Cataloging: Access to Continuing and Integrating Resources Via the Catalog and the Web*. Psychology Press.

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Ferguson, B. (1998). *MARC/AACR2/authority Control Tagging: Blitz Cataloging Workbook*. Libraries Unlimited.

Hart, A. (2014). *RDA Made Simple: A Practical Guide to the New Cataloging Rules*. ABC-CLIO.

Joachim, M. D. (2003). *Historical Aspects of Cataloging and Classification*. Psychology Press.

Lubas, R. L. (2011). *Practical Strategies for Cataloging Departments*. ABC-CLIO.

McLeish, S. (2020). *Resource Discovery for the Twenty-first Century Library: Case Studies and Perspectives on the Role of IT in User Engagement and Empowerment*. Facet Publishing.

Raju, J., & Raju, R. (2006). *Descriptive and Subject Cataloguing: A Workbook*. Elsevier.

Sanchez, E. (2011). *Conversations with Catalogers in the 21st Century*. ABC-CLIO.

Studwell, W. E. (1990). *Library of Congress Subject Headings: Philosophy, Practice, and Prospects*. Psychology Press.

Welsh, A., & Batley, S. (2012). *Practical Cataloguing: AACR, RDA and MARC 21*. Facet Publishing.

Semester 4
LIS-4074: Knowledge Organisation: Cataloguing
Course Level: 200-299

Graduate Attributes: The graduate attributes are reflected under course objectives and learning outcomes as follows:

Course Objectives	Learning Outcomes
• To get expertise in the actual cataloguing of various library resources, including books, journals, audiovisuals, and electronic resources.	• Catalogue a book; • Catalogue non-book material; and • Find out a subject heading;

Detailed Syllabus

Unit no	Unit Content	No of class	Marks
1	**Preparation of Main Entries for Personal Authors:**Main entries for personal author(s), shared responsibility, mixed responsibility.	**12**	**20**
2	**Preparation of Main Entries for Corporate Authors:** Main entries preparation for editorial publications, periodicals and other serial publications, multivolume, pseudonyms, corporate bodies and non-book materials according to AACR- 2R.	**14**	**20**
3	**Assigning Subject Headings:**Finding out subject heading using SLSH or LCSH.	**12**	**20**
4.	**Data Entry in SOUL and Koha:** Data entries in SOUL and Koha software for preparation of OPAC.	**12**	**20**
5	**RDA Toolkit:** Practice in RDA Toolkit by using the trial access.	**10**	**20**

No. of Required Classes: 60
No. of Contact Classes (Theory): 00
No. of Contact Classes (Practical):60
No. of Non-Contact Classes: 00
Theory Credit: 0
Practical Credit: 4
Particulars of Course Designer

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Reading List:

Kumar, Krishan & Garg, B.S. (2005). Advanced Cataloguing Practice: Based on Anglo-American Cataloguing Rules. New Delhi: Har-Anand Publications Pvt. Ltd.

Kochar, R.S. (1998). Principles and practices of cataloguing. Delhi: Rajat pub.

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Wyner, Bondan S. (1985). Introduction to cataloguing and classification.7th ed. Littleton: Libraries Unlimited.

Semester: 5
LIS-5084: Fundamentals of Information Communication Technology
Course Level: 300-399
Graduate Attributes: The graduate attributes are reflected under course objectives and learning outcomes as follows:

Course Objectives	Learning Outcomes
• To make the learners aware of the fundamentals of computer and information communication technology.	• Explain the computer system and its components and uses; • Visualise the importance of ICT to provide different kinds of library and information services; • Explain the different types of networks and its topologies; • Able to work in Windows and Linux environments; and • Able to work in an MS Office.

Detailed Syllabus

Unit no	Unit Content	No of class	Marks
1	**Computer Basics:** Hardware and software; Generations of computer; Classification of computers; Computer Organization (Input, Output and Peripheral devices; History, Computer architecture); Computer storage (RAM, ROM, Virtual memory) and Character Representation (ASCII, ISCII, Unicode).	**12**	**20**
2	**Computer Software:** System Software (working with Operating System Windows and Linux); Application Software (working with Word processor MS Office, LibreOffice and LaTeX).	**12**	**20**
3	**ICT:** Communication Technology: Fundamentals and applications; Networks and Networking: Tools and Architecture; Data Transmission Techniques, Transmission Modes, Bandwidths; Internet and Intranet application; Transmission media- Switching system, Bandwidth, Multiplex, Protocol; Wireless communication; Fax, Email, Teleconferencing/ Videoconferencing, Videotext, Voicemail.	**12**	**20**
4.	**Internet:** Basics of Internet. Internet Protocols and Standards (HTTP, SHTTP, FTP, SMTP, TCP/IP, URI, URL). Internet applications: Web browser, web directory and subject gateways, search engine, Email, Chat, RSS, blog, discussion forum and group, web conferencing, wiki, social network. Cloud computing, data warehouse and data mining. Virtual Reality, Augmented Technologies.	**12**	**20**
5	**Networking and Internet Safety:** Networking: Types (LAN, MAN, WAN), Topologies (Bus, Ring, Star, Tree, Mesh, Hybrid) and VPN.Data Security, network security, firewalls, cryptographic techniques, anti-virus software, anti-spyware, intrusion detection system.	**12**	**20**

No. of Required Classes: 60
No. of Contact Classes (Theory): 30

No. of Contact Classes (Practical): 20
No. of Non-Contact Classes: 10
Theory Credit: 3
Practical Credit: 1
Particulars of Course Designer

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Reading List:

Martin, Michael J (2000). Understanding the network: a practical guide to internetworking. Indianapolis: New Riders.

Norton, Peter (2000). Peter Norton's Introduction to Computers. New Delhi: McGraw-Hill

Rajaraman, V and Adabala, N. (2014). Fundamentals of Computers, 6th Ed. Delhi: PHI Learning Pvt Ltd.

Tannenbaum, Andrew (2013). Computer Networks. New Delhi, Prentice Hall

Semester 5

LIS-5094: Knowledge Organisation Practice: DDC (Advanced) and UDC

Course Level: 300-399

Graduate Attributes: The graduate attributes are reflected under course objectives and learning outcomes as follows:

Course Objectives	Learning Outcomes
• Developing an in-depth understanding of the advanced features of DDC and UDC to work with complex and specialized collections, such as scientific and technical materials, and digital resources.	• Identify the different types of common and special isolates and their use in DDC and UDC; • Classify documents according to Dewey Decimal classification's advanced features. • Classify documents according to Universal Decimal Classification Abridged Edition;

Detailed Syllabus

Unit no	Unit Content	No of class	Marks
1	**Use of Subdivision and Auxiliaries:** Classification of Documents requiring use of Tables.	**15**	**25**
2	**Compound Subject:** Classification of Documents representing compound and complex subjects according to DDC.	**15**	**25**
3	**Documents Representing one or more subjects in UDC:** Classification of Documents representing basic and compound subjects according to UDC.	**15**	**25**
4.	**Documents Representing Subject and Auxiliaries in UDC:** Classification of Documents representing subjects and auxiliaries according to UDC.	**15**	**25**

No. of Required Classes: 60
No. of Contact Classes (Theory): 00
No. of Contact Classes (Practical):60
No. of Non-Contact Classes: 00
Theory Credit: 0
Practical Credit: 4
Particulars of Course Designer

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Reading List:

Dewey, Melville (1971). Dewey Decimal Classification and Relative Index. 22nd ed. 4V. New York: Forest Press.

Raju, A.A.N. (1995). Dewey Decimal Classification (DDC 20): Theory and practice: a practical self instructional manual. Madras: T. R. Pub.

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International Federation for Documentation (1977). Universal Decimal Classification. London: British Standards Institution.

Raju, A. A. N. (2007). Universal Decimal Classification (IME-1993): Theory and Practice: A Self Instructional Manual. New Delhi: Ess Ess Publications.

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Semester 5
LIS-5104: Information Communication and Information System
Course Level: 300-399

Graduate Attributes: The graduate attributes are reflected under course objectives and learning outcomes as follows:

Course Objectives:	Learning Outcomes
• To understand the importance and role of information in society, the nature of information communication, information system and information providers and their impact on libraries.	• Distinguish between seemingly synonymous words, such as information, data, knowledge, facts, and wisdom; • Describe the importance of information in society • Ability to design, implement, and manage information systems in libraries.

Detailed Syllabus

Unit no	Unit Content	No of class	Marks
1	**Data, Information, and Knowledge**: Concept, Definition, characteristics; Information Life Cycle; Information explosion;	**10**	**20**
2	**Information Society**: Role of Information in society its origin, knowledge Society and role of Information institutions, Information policies with special reference to India, Politics of Information – Universal Data flow, Free flow of information, NWICO, WSIS, Information poverty, and digital divide.	**12**	**20**
3	**Information communication –** Concept, Definition, Theory, Models, Channels, and Barriers; Scientific Communication: formal and informal channels communication, Invisible colleges.	**12**	**20**
4.	**Information System:** Concept, definition and components. Information system at National, Regional and International levels; Information system at sectoral level. CSIR, NIScPR, NASSDOC, DESIDOC, SENDOC, ASTINFO, SAARC, APINESS, AGRIS, MEDLARS.	**13**	**20**
5	**Information Intermediaries:** Concept, Definition and Functions. Information Brokers, Information Aggregators, Online Vendors, Technological gatekeepers, Information Consultants, Some important information intermediaries: DIALOG, BLDSC, Clarivate, ProQuest, Elsevier; National Knowledge Network.	**13**	**20**

No. of Required Classes: 60
No. of Contact Classes (Theory): 30
No. of Contact Classes (Practical): 20
No. of Non-Contact Classes: 10
Theory Credit: 3
Practical Credit: 1

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Reading List:

Abell, Angela, &Oxbrow, Nigel (2001). Competing with knowledge: The information professionals in the knowledge management age. London: Facet Publishing.

Atherton, Pauline (1977). Handbook for information systems and service. Paris: UNESCO.

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Singh, G. (2013). Information sources, services and systems. Phi Learning Pvt. Ltd.

Takaingenhamo, C., Collence. (2019). Cooperation and Collaboration Initiatives for Libraries and Related Institutions. IGI Global.

Taylor, Arlene G. (2004). The organization of information. Connecticut: Libraries

Tredinnick, Luke. (2006). Digital information contexts: Theoretical approaches to understanding digital information. Oxford: Chandos Publishing.

Vickery, B.(1987). Information systems. London: Butterworths.

Semester 5

LIS-5114: Books and Printing Technology

Course Level: 300-399

Graduate Attributes: The graduate attributes are reflected under course objectives and learning outcomes as follows:

Course Objectives	Learning Outcomes
• To comprehend the importance and role of books, its parts and knowledge about writing materials, scripts, printing technology from ancient to modern age.	• Identify the parts of a book and their importance; • Evaluate about the quality of printing and binding • Comprehend the role of classic books on human civilization

Detailed Syllabus

Unit no	Unit Content	No of class	Marks
1	**Early writing material:**Early writing materials of India and world: Perishable and non-perishable; Scribes and his implements; Organization of early writing materials in ancient and medieval India and world; Paper: origin, types, and properties.	**12**	**20**
2	**Writing Scripts:** The mnemonic, pictorial, ideographic and phonetic; Egyptian writing: hieroglyphic, hieratic and demotic; cuneiform writing; birth of alphabet: Greek and Roman and their offshoots; History of writing in India: Indus Valley script; Brahmi and Kharosthi; Modern Indian language scripts: origin and growth.	**12**	**20**
3	**Invention of Printing:** History; Wood block printing: advantages, disadvantages; Need of movable type printing; Type metal; Typography: parts of a type, type size, measurement; typefaces: Roman, Gothic, Italic; Ligatures and punctuation marks; Composition by hand; page and its necessary accessories; Imposition in folio, octavo etc.; proof correction: conventional proof correction symbols, ISI proof correction symbols; Mechanical composition: linotype, monotype, stereotype, electrotype; Printing press: hand press, platen press, cylinder press, perfecting press, rotary press.	**12**	**20**
4.	**Binding and structure of books:** Evolution of the form of Book; Binding: need, materials, techniques, parts; Mending and repairing, recasing and recovery, re-inforcing and rebacking; Machine binding vs Hand binding; Folding and sewing; Covering materials; Evaluation of binding; Paper-back binding; Parts of a book: title page, edition, impression, reprint, variant.	**12**	**20**
5	**Classic Books:** Concept, Study of some classic books that had revolutionary impact on human civilization- Indian Classics:Vedas, Upanishads, Puranas, Ramayana, Mahabharata, Bhagavad Gita, Susrata Samhita, Charaka Samhita; Yoga Sutra of Patanjali, Panchatantra, Arthashastra, Western Classics: Illyad,	**12**	**20**

	Odyssy, Philosophiæ Naturalis Principia Mathematica, On the Origin of Species;		

No. of Required Classes: 60
No. of Contact Classes (Theory): 40
No. of Contact Classes (Practical): 00
No. of Non-Contact Classes: 20
Theory Credit: 4
Practical Credit: 0
Particulars of Course Designer

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Reading List:

Chakraborti, M. L. (1971). Bibliography in theory and practice. World Press.

Eliot, S., & Rose, J. (2011). A Companion to the History of the Book. John Wiley & Sons.

Jain, M. K. (Ed.). (2001). Library and information services in India: States and union territories: On the eve of new millennium. Shipra. https://www.goodreads.com/book/show/1949366.Library_And_Information_Services_In_India

Jain, M. K., Kalia, D. R., &Mangha, P. B. (2000). 50 Years: Library and Information Services in India. Shipra Publications.

Johns, A. (2009). The Nature of the Book: Print and Knowledge in the Making. University of Chicago Press.

Khanna, J. K., & K. Vasihisht. (1985). Knowledge Evolution Structure & Research Methodology. Ess Ess Publications.

Mangla, P. B., & Mandal, S. (2006). The national library, India: An intellectual resource (NACONAL 2006). The National Library, Kolkata. http://archive.org/details/dli.ministry.29646

McMurtrie, D. C. (2012). The Book—The Story of Printing & Bookmaking. Read Books Design.

Rubin, R. (2004). Foundations of Library and Information Science. Neal-Schuman Publishers.

Thomas, I. (1874). The History of Printing in America: With a Biography of Printers. Burt Franklin.

Semester: 6
LIS-6124: Management of Library and Information Centres
Course Level: 300-399
Graduate Attributes: The graduate attributes are reflected under course objectives and learning outcomes as follows:

Course Objectives	Learning Outcomes
• To provide students with a broad understanding of the principles and practices of library and information science management and equip them with the skills necessary to effectively manage libraries and information centres.	• Explain different theories of management; • Define and comprehend the components of human resources management; • Formulate the budget proposal keeping in view both budgeting aspects and functions of a library; • Identify and describe the functions of different sections of the libraries; and • Appreciate the purpose and function of different kinds of library statistics.

Detailed Syllabus

Unit no	Unit Content	No of class	Marks
1	**Management:** Concepts, definition, scope; Management styles and approaches; Management schools of thought; Functions and principles of scientific management. Decision Making.	**10**	**20**
2	**Human Resource Development:** Staff formula, professional and semi professional levels; Job description; Job evaluation; Job Enrichment; Job Satisfaction; Motivation theories and their application; Group dynamics; In service training; Discipline and grievances work culture in libraries and role of Librarian; Performance appraisal, Annual Confidential Report.	**13**	**20**
3	**Financial Management:** Resource mobilization; Budgeting: techniques and methods, budgetary control; Cost effectiveness and cost benefit analysis; Outsourcing: problems and prospects.	**10**	**20**
4.	**Library Management:** Different sections of LICs and their functions: Processing, Circulation, Serial control, Maintenance, Stock verification, weeding out of books; Collection development: principles and theories, Selection tools; Good Office Committee; Online bookshops vs traditional bookshops, IFLA - Guidelines for a Collection Development Policy. Evaluation of library collection, Library statistics: purpose and types; Reporting; Physical file management in libraries. Library committee and library rules	**14**	**20**
5	**Library Quality Control:** Library building and library furniture and fittings: Existing standard on building and furniture, types. Green Library. Planning of library building, Library Disaster Management, Library Security, Sustainable Library. Total Quality Management (TQM): definition, concept, elements, quality audit, Six Sigma, LibQual; LIS related standards; Standard- ISO-9001.	**13**	**20**

No. of Required Classes: 60

No. of Contact Classes (Theory): 40
No. of Contact Classes (Practical): 00
No. of Non-Contact Classes: 20
Theory Credit: 4
Practical Credit: 0
Particulars of Course Designer

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Reading List:

Kumar, Krishan (1987). Library Administration and Management. New Delhi: South Asia Books.

Kumar, Krishan (2007). Library Management in Electronic Environment. New Delhi: Har-Anand Publications Pvt. Ltd.

Mittal, R. L. (2007). Library Administration: Theory and Practice. New Delhi: Ess Esss Publications.

Ranganathan, S. R. (2006). Library Administration. New Delhi: Ess Ess Publications.

Redfern, B. (1995). Studies in library management. London: Clive Bingley.

Semester 6

LIS-6134: Library Automation and Networking

Course Level: 300-399

Graduate Attributes: The graduate attributes are reflected under course objectives and learning outcomes as follows:

Course Objectives	Learning Outcomes
• To provide students with a comprehensive understanding of library automation and networking, and the skills necessary to effectively manage and maintain library automation systems and utilize the benefits of resource sharing library networks and consortia.	• Describe the concept of system, system analysis and design; • Use Flow Chart, DFD, SWOT PERT/CPM as and when needed. • Explain the need and purpose of automation; • Grasp the different modules of ILMS and its uses; • Explain different library networks and consortia;

Detailed Syllabus

Unit no	Unit Content	No of class	Marks
1	**System Analysis:** System concepts and information system; System development life cycle; Role of system analyst; Planning and conduction a system study. Planning and investigations; Information gathering; Structured analysis tools; Operations research: Flow chart, Gantt chart, Data Flow Diagram (DFD); Strength, Weakness, Opportunities, Threat (SWOT), Programme Evaluation and Review Techniques/ Critical Path Methods (PERT/CPM).	**10**	**20**
2	**Systems Study:** Concept, Components analysis, evaluation and design, Library as a System, Subsystems of a Library; Integrated Library Management System (ILMS); Different library software packages used in Indian libraries and their different modules: NewGenLib, Libsys, E-Granthalaya, SOUL, Koha.	**13**	**20**
3	**Library Automation:** Need and advantages; Planning and implementation of library automation; Steps in Library automation; Selection of hardware and software, Areas of Library Automation. Standard for library automation. Barcode, QR Code, RFID, Biometric, Smartcard.	**10**	**20**
4.	**Resource Sharing:** Library Cooperation and resource sharing, Library Network: OCLC, JANET, ERNET, INFLIBNET, DELNET.	**14**	**20**
5	**E- Resource Consortia:** Concept, Indian Initiatives, ICOLC, E-ShodhSindhu: UGC-Infonet, INDEST, N-LIST, NKRC; CeRA, DelCON, Forsa, IIM Libraries Consortium.	**13**	**20**

No. of Required Classes: 60
No. of Contact Classes (Theory): 40
No. of Contact Classes (Practical): 00
No. of Non-Contact Classes: 20
Theory Credit: 4

Practical Credit: 0

Particulars of Course Designer

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Reading List:

Devarajan, G. (1999). Information technology for libraries. New Delhi: Ess Ess.

Lahkar, Narendra & Singh, Sanjay Kumar (Eds.) (2014). North East India Library Network: Challenges and Opportunities. Guwahati: Department of Library and Information Science, Gauhati University.

Ahmad, Shamim (2008). Computer in Library Management. New Delhi: A.P.H. Publishing Corporation.

Haravu, I.J. (2004). Library Automation: Design, Principles and Practice. Delhi: Allied Publishers Pvt Ltd

Singh, Sanjay Kumar (2014). Impact of ICT on management of library operations. New Delhi: Avon Publications.

Semester 6

LIS-6144: Library Automation Practice

Course Level: 300-399

Graduate Attributes: The graduate attributes are reflected under course objectives and learning outcomes as follows:

Course Objectives	Learning Outcomes
• To equip the students with deep practical knowledge of using Integrated Library Management Systems (ILMS) including system administration, database management, and troubleshooting.	• Install SOUL and Koha Software; • Customize Koha software to meet the local need; • Make an entry in the SOUL and Koha software. • Work effectively in Koha and SOUL software.

Detailed Syllabus

Unit no	Unit Content	No of class	Marks
1	**SOUL:** Installation, Working on all available modules. Database Creation and Use.	30	50
2	**Koha:** Installation, customization, database creation and use.	30	50

No. of Required Classes: 60
No. of Contact Classes (Theory): 00
No. of Contact Classes (Practical):60
No. of Non-Contact Classes: 00
Theory Credit: 0
Practical Credit: 4
Particulars of Course Designer

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Reading List:

LibLime (2016). Koha - Open Source ILS - Integrated Library System. Retrieved from: http://www.koha.org

INFLIBNET (2014). SOUL. Rerieved from https://www.inflibnet.ac.in/soul/

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Semester 6

LIS-6154: Field Project

Course Level: 300-399

Graduate Attributes: The graduate attributes are reflected under course objectives and learning outcomes as follows:

Course Objectives	Learning Outcomes
• To provide students the chance to explore various types library and learn about the various roles and responsibilities of library staff, as well as valuable hands-on experience and insights into the library profession, library services and organization.	• Develop the writing and presentation skill to present an observation; and • Grasp the recent developments in Library and Information Centres

Detailed Syllabus:

Students are required to visit a minimum of six libraries (maximum two from each category amongst public library, academic library, special library, archives, oriental libraries and departmental libraries of major Indian Universities.

The field project will be organized by the concerned institution and it will be carried out in a place outside the state, preferably in a metropolitan city. At the time of the visit, the learners need to observe library workings, collections, facilities, and services.

After visiting the libraries, the students need to submit a handwritten report on the libraries that includes a title page, certificate from guide, self-declaration, preface, acknowledgement, details of the journey, critical observation of each library and comparative study of the library visited. A viva voce will be conducted to evaluate the overall enlightening experiences towards understanding of the technical concepts taught in the classroom.

No. of Required Classes: 60
No. of Contact Classes (Theory): 20
No. of Contact Classes (Practical):40
No. of Non-Contact Classes: 00
Theory Credit: 1
Practical Credit: 3
Particulars of Course Designer

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Reading List:

Bailey, Stephen (2003). Academic Writing: A Practical Guide for Students. UK: Psychology Press.

Luey, Beth (1987). A Handbook for Academic Authors. New York: Cambridge University Press.

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COURSE	COURSE NAME		CREDITS
Course-1	**Manipuri Orthography**		**4**
	Unit I	Manipuri Alphabet	
	Unit II	Vowels, Secondary symbols of Vowels	
	Unit III	Consonants, Conjuncts, Clusters, Manipuri Numerals (Cardinals & Ordinals)	
	Unit IV	Manipuri Writing System	

Learning Outcomes:

- *To achieve greater knowledge and understanding about Manipuri alphabet, Vowels and Consonants.*
- *To enable the learner to read and write the language, identify the two and three letter conjuncts, clusters etc. of the language.*
- *To gain the knowledge and understanding of the Manipuri numeral system, both the Cardinal and Ordinal numerals.*
- *To achieve the knowledge of Manipuri writing system and its application with perfection.*

***References**:*

1. Manipuri To English Dictionary by Soibam Imoba
2. Manipuri Grammar by Ch. Yashawanta Singh

Name of the Contributor: Dr. Sorokhaibam Saratchandra Singh Contact No. 9085164491
Name of the Moderator: Dr. Salam Brojen Singh Contact No. 8761800701

COURSE	COURSE NAME		CREDITS
Course-2	**History of Manipuri Language & Literature**		**4**
	Unit I	Periodization and classification of Manipuri Literature	
	Unit II	Ancient Manipuri Literature	
	Unit III	Medieval Manipuri Literature	
	Unit IV	Modern Manipuri Literature	

Learning Outcomes:

- *To achieve the greater knowledge and understanding about the Manipuri Literature and its development.*
- *To gain the knowledge of the Manipuri culture and society from the Ancient and Medieval Manipuri literatures.*
- *To enable to gain the knowledge about the different aspects of Manipuri Language.*
- *To enlighten the learner about the literary forms, styles etc.*
- *To gain a tentative picture of the writing styles used by different authors in the modern literary texts.*
- *To understand the current trends prevalent in the modern Manipuri literature.*

References:

1. Shastri, Kalachand. :1982,*Ashamba Manipuri SahityagiItihas*. O.K.Store, Imphal.
2. Singh, Ch. Manihar. : 2003, *A History of Manipuri Literature*, SahityaAkademi, New Delhi.
3. Nabachandra, Polem. :2006, *Ariba Manipuri SahityagiSaklon*, Writers' Forum, Imphal.
4. Singh, MoirangthemRajen. : 2007, *Ariba Manipuri SahityagiMasak*, MoirangShathibi Publications, Kakching, Manipur.
5. Singh, L. Ashok Kumar. : 2016, *Ariba Manipuri Sahityagi (Seirol) Paring*, G.M. Publications, Keishamthong, Imphal.
6. MoirangthemBiramangol. : 2011, *Ariba Manipuri SahityadaNungshiNungwon-giMashak*, CIIL,

Mysore-570006.

7. Singh, LongjamAnand. : 2014, *MeeteiLolgiPuwari*, Shiroi Publications, Thoubal, Manipur.

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Name of the Moderator: Dr. Salam Brojen Singh Contact No. 8761800701

FYUGP-MANIPURI-SYLLABI-GU, 2023

COURSE	COURSE NAME			CREDITS
Course-3	**Manipuri Grammar&Literature**			**4**
	Unit I	Root & Affixes, Diphthong, Amplification, Word meaning & Correction of sentence		
	Unit II	Essay		
		i.	Kalidasa – A. Minaketan Singh	
		ii.	Meitei NingthounaPhambalTongba – N. Khelchandra Singh	
	Unit III	Poetry		
		i.	Pi Thadoi – Kh. Chaoba Singh	
		ii.	Kamalda – A. Minaketan Singh	
		iii.	KeidanoPanthou–Kh. Gourakishwar Singh	
		iv.	Awaba – E. Nilakanta	
	Unit IV	Prose		
		i.	KalpanaSwayambar – G.C. Tongbra	
		ii.	Kang Ningthou– G.C. Tongbra	

Learning Outcomes:

- *To achieve the knowledge to assess Manipuri grammatical information and application.*
- *To gain the knowledge of the Manipuri culture and society reflected in the selected pieces of the course.*
- *To enable to gain the knowledge about the different aspects of Manipuri Language and its usage.*
- *To enlighten the learner about the grammatical terms like, root and affixes.*
- *To gain a broad picture of the writing styles used by different authors in the literary texts and compare with the writings reflected in the modern literature.*

References:

1. Singh, I.R.Babu, ed. :1991,*Manipuri Wareng*, The Cultural Forum Manipur, Imphal.
2. Singh, ThokchomYogendra, :1988, *Manipuri Sheireng*, Manipuri SahityaParishad, Imphal.

ed.

3. Thoudam, P.C. :1991, *Remedial Manipuri Grammar*, Aman Enterprise, Imphal.
4. Singh, Ch. Yashawanta. :2000, *Manipuri Grammar*, Rajesh Publications, New Delhi.
5. W., Tomchou. :1998, *A Study of Meitei Phonology*,The Students' Store, Imphal.
6. Singh, N. Nilamani. ed. :2009, *Akhannaba Manipuri Wareng*, SahityaAkademi, New Delhi.

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COURSE	COURSE NAME		CREDITS
Course-4	**Religious Festivals, Education & Biographical Literature**		**4**
	Unit I	MeraHouChongba, RathaYatra&GanNgai	
	Unit II	Lai Haraoba	
	Unit III	The Advent of Western Education in Manipur	
	Unit IV	Aspect of Biographical Literature	

Learning Outcomes:

- *To enable to achieve the knowledge about the advent of Hinduism in Manipur and its impact on Manipuri Culture and Society.*
- *To enlighten about the religious festivals celebrated by the different communities.*
- *To provide the knowledge and understanding about the coming of western education in Manipur and its consequences in the Manipuri society.*
- *To enable to gain the critical knowledge about the biographical literature and understand and appreciate the contributions made by the literary figures.*

References:

1. Sastri, Kalachand. :1982, *Ashamba Manipuri SahityagiItihas*. O.K.Store, Imphal.
2. Singh, Ch. Manihar. :2003, *A History of Manipuri Literature*, SahityaAkademi, New Delhi.
3. Nabachandra, Polem. :2006, *Ariba Manipuri SahityagiSaklon*, Writers' Forum, Imphal.
4. Singh, MoirangthemRajen. :2007, *Ariba Manipuri SahityagiMasak*, MoirangShathibi Publications, Kakching, Manipur.
5. Singh, L. Ashok Kumar. :2016, *Ariba Manipuri Sahityagi (Seirol) Paring*, G.M. Publications, Keishamthong, Imphal.
6. MoirangthemBiramangol. :2011, *Ariba Manipuri SahityadaNungshiNungwon-giMashak*, CIIL, Mysore-570006.
7. Singh, ThokchomIbohanbi. :2017, *ManipuridaPunshiWarigiSahitya*, Rinda Publications, Imphal.

8. Singh, ThokchomMangoljao. :1967, *ManipurdaNongchuplomgiShiksha Vol. 1*., BhagyabatiKaryalaya, Churchand Printing Works, Imphal.

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COURSE	COURSE NAME		CREDITS
Course-5	**Manipuri Poetry**		**4**
	Unit I	*Ancient* i. HijanHirao- N. Khelchandra ii. Yakeiba - N. Khelchandra	
	Unit II	*Medieval* i. Shree RambuNagapashnaPullabadaSugreebanaTengthaba ii. Lanka KandageeMatangAma iii. AshwamedhaYeigyageeShagolBalmikiMunigee Banda LabanaFabageeMatang PareekshitSapayagyageematangama	
	Unit III	*Romanticism* i. LamgiChekla Amada- Kh. Chaoba Singh ii. Nonggumlakkhoda - A. Minaketan Singh iii. Ereipak- A. Darendrajit Singh HuinaoMachaYengba- H. Anganghal Singh	
	Unit IV	*Modernism* i. Manipur - E. Nilakanta Singh ii. Mamang Leikai ThambalSatle- L. Samarendra Singh iii. EiLaimingLoude - Shree Biren JagoiJagoi- Y. Ibomcha Singh	

Learning Outcomes:

- *To achieve the greater knowledge and understanding about Manipuri Poetry.*
- *To enable the identification of the literary techniques and creative uses of language and to achieve elaborate understanding about Manipuri Poetry.*
- *To develop the capacity to appreciate the literary usage of Manipuri and use the same creatively and imaginatively.*
- *To develop the capacity of critical analysis on the different writing and expression styles of the author.*

***References**:*

1. Singh, ChongthamManihar and PolemNabachandra ed. :2000,*KanchiSheireng* Manipur University, Imphal.

2. Singh, ThokchomYogendra, ed. :1991, *ManipuriSheireng*, Manipuri SahityaParishad, Imphal.

3. Singh, MoirangthemRajen. :2007, *Ariba Manipuri SahityagiMasak*,MoirangShathibi Publications, Kakching, Imphal.

4. Devi, KoijamSantibala. :2013, *Manipuri Sheirengda Nationalism AmasungAteiWarengKhara*, The Cultural Forum Manipur, Imphal.

5. Long-Zomba, Sharata Chandra. :2021, *ShriBirengeeSheireng&LeelaMachaNeinaba*, Ahanbi Publications, Manipur.

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COURSE	COURSE NAME			CREDITS
Course-6	**Manipuri Prose**			**4**
	Unit I	i.	Numit Kappa - Moirangthem. Chandra Singh	
		ii.	Androgee Mei - AshangbamMinaketan Singh	
	Unit II	i.	Manipuri SahityadaMahakavya- ElangbamNilakanta	
		ii.	ManipurgiChingmeeKummeishing - Gangmumei Kamei	
	Unit III	i.	Manipuri SahityadaLamkoiWaree - ThokchomIbohanbi Singh	
		ii.	CacharChatngeida- Kh. Prakash	
	Unit IV	i.	MeidingnguGaribniwazHaktakta Manipuri SanskritigeeYawol- Raj Kumar Sanahal Singh	

Learning Outcomes:

- *To achieve the greater knowledge and understanding about Manipuri Prose.*
- *To enable to gain the knowledge about different cultural aspects prevalent in early times and different types of literary sources and subjects as well.*
- *To enlighten the learner about the importance of Manipuri epics in the course of Manipuri literature.*
- *To gain the knowledge about the evolution of Sanskrit during the ancient times.*
- *To achieve greater knowledge about the ancient literary pieces.*

References:

1. Singh, N. Nilamani. ed. :2009,*Akhannaba Manipuri Wareng*, SahityaAkademi, New Delhi.
2. Singh, N. Khelchandra. :1967,*Ariba Manipuri SahityageeItihas*, Divine Book Mart, Imphal.
3. Devi, HuidromSubasini. :2010, *Manipuri SahityadaLamkoiWaree*, MaibamGhono Meitei, Imphal.
4. Singh, I.R. Babu. :1986,*ApunbaWareng*, Public Book Store, Imphal.
5. Singh, ElangbamDinamani. :1983, *Manipuri Wareng*, The Cultural Forum Manipur, Imphal.

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Name of the Moderator: Dr.SorokhaibamSaratchandra Singh Contact No. 9085164491

FYUGP-MANIPURI-SYLLABI-GU, 2023

COURSE	COURSE NAME			CREDITS
Course-7	**Manipuri Short Story**			**4**
	Unit I	i.	Enthokpa– R.K. Shitaljit Singh	
		ii.	TatkhrabaPunshiLeipul– NilbirShastri	
	Unit II	i.	MamangthongLollabadiManingthongdaLakudna– E. Sonamani Singh	
		ii.	WanomShareng– Kh. Prakash Singh	
	Unit III	i.	ThajagiAyingbaMaithong– E. Rajnikanta Singh	
		ii.	SarkargiChakori– HijamGuno Singh	
	Unit IV	i.	LupagiMinok– N. Kunjamohan Singh	
		ii.	Yeknaba –ElangbamDinamani	

Learning Outcomes:

- *To achieve the greater knowledge and understanding about Manipuri Short Stories.*
- *To enable to gain the knowledge about different writing styles and usage of literary terms in Manipuri fictions.*
- *To enlighten the learner about the place occupied by the short stories in the course of Manipuri literature.*
- *To gain a tentative picture of the writing styles used by different authors to correct some unwanted social practices prevalent in the present society.*
- *To achieve the capacity for critical analysis and assessment of Manipuri fiction.*

References:

1. Sharma, A.K. :1996,*CanchiWarimacha*, Manipur University, Imphal.
2. Singh,ElangbamDinamani. :1983,*Manipuri Wareng*, The Cultural Forum Manipur, Imphal.
3. Singh, I.R. Babu. : 1986, *ApunbaWareng*, Public Book Store, Imphal.

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COURSE	COURSE NAME		CREDITS
Course-8	**Manipuri Folk Literature**		**4**
	Unit I	Folklore and Folk Literature: Concept and background of Folk study	
	Unit II	Folk Narratives: Myth, Legend & Folk tales	
	Unit III	Folk Poetry: Folk song, Ballad & Folk epic	
	Unit IV	Folk speech: Proverbs, Riddles, variations and functions.	

Learning Outcomes:

- *To enhance the knowledge and understanding about the Manipuri folk literature, its concept and background of folk study.*
- *To gain the knowledge of the Manipuri culture and society from the oral literatures and other folk literatures as well.*
- *To enable to analyse and assess Manipuri folk literature and the different aspects of Manipuri language.*
- *To enlighten the learner about the importance and place occupied by the Manipuri folk literature in the course of the development of the language..*
- *To gain a greater and in-depth knowledge about the Folk speech, i.e. the proverbs, riddles, etc.*
- *To understand the morals of the folk tales and its application.*

References:

1. Singh, O. Ibochaoba. :1993,*Folklore Bigyan Part-1*, Institute ofManipuri Folklore, Imphal.
2. Singh, I.R.Babu. :2011, *Manipuri PhunggaWari*,SahityaAkademi, New Delhi.
3. Sing, M. Kirti. :1993, *Folk Culture of Manipur*, Manas Publications, New Delhi.
4. Dorson, Richard, M. :1982,*Folklore and Folklife*, An Introduction. University of Chicago Press, Chicago.
5. Singh, Birendra Kumar, ed. :1993. *Manipuri KhunungEsheiKhomjinba*,SahityaAkademi, New Delhi.
6. Devi, MoirangthemNirmala. :2019, *Jiribamgi Manipuri (Meitei) PaorouAmasungPaokhong Neinaba*, Ahanbi Publications, Imphal.
7. Soram, Sanatombi. :2014, *Manipuri Phunggawari*, Cultural Research Centre Manipur, KhaNaorem Leikai, Imphal.

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COURSE	COURSE NAME			CREDITS
Course-9	**Literary Criticism and Literary Forms**			**4**
	Unit I	Eastern (BharatiyaKavyaSampradaya)		
		i.	Rasa	
		ii.	Alangkar	
		iii.	Dhwani	
	Unit II	Western		
		i.	William Wordsworth	
		ii.	S.T. Coleridge	
		iii.	T.S. Eliot	
	Unit III	Literary Forms: Novel, Drama & Film		
	Unit IV	Literary Forms:Kavya, KhandaKavya&Mahakavya		

Learning Outcomes:

- *To enhance and inculcate the literary analysis besides the literary genre elevates the abilities of the learners' in the field of literary criticism.*
- *To inculcate the importance of critical analysis of the literary texts of the Western poets, i.e. William Wordsworth, S.T. Coleridge, T.S. Eliot.*
- *To gain the in-depth knowledge about the literary forms, i.e. Novel, Drama & Film.*
- *To enable the learners to analyse and assess with the knowledge gained during the course and become a successful critics in future too.*
- *To gain the knowledge about Kavya, KhandaKavya and Mahakavya.*

References:

1. Biprachand, ed. :1997,*SahityaNeinarol*, SahityaSevaSamiti, Kakching, Manipur.
2. Sharma, SanglakpamIbomcha. :1997,*AshambaBharatiyaSahityaAmasungSahityaShastra*, SanglakpamOngbiIbemhal Devi, Imphal.
3. Long Zomba, Sharata Chandra. :2010,*CriticismgiMityengda*, Rinda Publications, Imphal.
4. L., Shruti Kumar. :2017, *WarengNachom*, NOHAKHOL, Imphal.

5. Meitei, M. Mani. :2020, *Criticism, Theory Amasung Theoretical Practice*, Cultural Research Centre Manipur, KhaNaorem Leikai, Imphal.

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COURSE	COURSE NAME		CREDITS
Course-10	**Biographical Literature: KhwairakpamChaoba Singh**		**4**
	Unit I	Life and works of KhwairakpamChaoba Singh	
	Unit II	KhwairakpamChaoba Singh as a Poet	
	Unit III	KhwairakpamChaoba Singh as an Essayist	
	Unit IV	KhwairakpamChaoba Singh as a Novelist with reference to Labanga-Lata	

Learning Outcomes:

- *To understand and know in-depth about the place occupied by KhwairakpamChaoba Singh in the field of Manipuri literature and gain an elaborate knowledge about his life and contributions.*
- *To gain and enhance the knowledge of the Manipuri culture and society from the perspective of the writings of KhwairakpamChaoba Singh.*
- *To enable to analyse and assess the literary piece Labanga-Lata written by KhwairakpamChaoba Singh.*
- *To understand and appreciate KhwairakpamChaoba for his immense contributions in Manipuri literature.*

References:

1. Elangbam,Dinamani. :1971,*KhwairakpamChaoba*, The Manipur Geeta Press, Singjamei,Imphal.
2. Singh, SorokhaibamSaratchandra. :2014,*KaviChaoba,*Rinda Publications, Imphal.
3. Devi, K. Madhuri. :1995,*ChaobaAmasungMahakkiWarengSahitya*,Lamyanba Press,Imphal.
4. Singh, ThokchomPrafullo, ed. :1996,*KaviKhwairakpamChaobaAmasungMahakkiSahitya,*Mukhi Printing Centre, Singjamei, Imphal.

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COURSE	COURSE NAME		CREDITS
Course-11	**Manipuri Culture and Ancient Land System**		**4**
	Unit I	Ancient Land System of Manipur	
	Unit II	Manipuri Marriage System	
	Unit III	Social system of Manipuri behavioural pattern (birth and death)	
	Unit IV	Formation of Manipuri community with special reference to clans	

Learning Outcomes:

- *To enable to gain knowledge about the land system of Manipur prevalent in ancient period.*
- *To gain the in-depth knowledge about the social system of Manipuri behavioural pattern, the importance and necessity.*
- *To enable the learners to elaborate knowledge about the formation of Manipuri community on the basis of different clans of the community.*
- *Provide the critical knowledge, importance and core value of the Manipuri marriage system. This will help the learner to become a culturally aware individual and compare with the other marriage systems practiced by the other communities.*

References:

1. Sharma, B. Kulachandra. :1998, *MeiteigiLuhongbaAmasungLounaLeinabagiWayelWakhul,*Tambra Publication, Imphal.
2. Goswami, Sunita. :2017,*Manipuri Marriage System ofHojai*,Rinda Publications, Imphal.
3. Kabui, Gangmumei. :2003,*History of Manipur Vol. I,* National Publishing House, New Delhi.
4. Singh, M.Kirti. :1998,*Religion and Culture of Manipur*,Manas Publications, Delhi.
5. Singha, MutumAsharani. :2015, *Manipuri SanskritigiMasak*, Nevedita Publications, Guwahati.
6. Birchandra, N. : 2016, *YekShalaigeeHouraklonPuwarigeeMityengda*, G.M. Publications, Imphal.
7. Manipuri SahityaParishad, Imphal. : 1970, *Glimpses of Manipuri Language, Literature and Culture*, Manipuri SahityaParishad, Imphal.
8. Singh, YengkhomIbotombi. : 2004, *Meitei (Meetei) giLuhongbagiHourakphamChatnarol,*EmaSanahanbi Printing Press, Dingku Road, Imphal.

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COURSE	COURSE NAME			CREDITS
Course-12	**Manipuri Short Play and Children Literature**			**4**
	Unit I	TrithaYatra– A. Samarendra Singh		
	Unit II	Tamna Lai – Kanhailal Singh		
	Unit III	Bus Stop – A. Tomchou		
	Unit IV	Children Literature		
		i.	Tal Taret– KoijamSantibala	

***Learning Outcomes**:*

- *To achieve the greater knowledge and understanding about Manipuri short plays and children literature.*
- *To enable to gain the knowledge about different writing styles and usage of literary terms in Manipuri short plays and children's literature.*
- *To enlighten the learner about the place occupied by the short stories in the course of Manipuri literature.*
- *To gain morals from the literary texts whereby the author is providing a social or individual message which will be highly beneficial to the readers to become a responsible citizen in future.*
- *To achieve the capacity for critical analysis and assessment of Manipuri short plays.*

References:

1. Koijam, Santibala. :*Tal Taret*, The New Life Publisher, Imphal.
2. Singh, L. Damodar, H. GouradasSingh, Th. Yogendra Singh, ed. :1986, *Manipuri Lila Macha*, Public Book Store, Imphal.

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COURSE	COURSE NAME		CREDITS
Course-13	**Manipuri Indigenous Games& Festivals**		**4**
	Unit I	Shagol Kangjei (Polo), Hiyang & Kang	
	Unit II	Jagoi Rasa	
	Unit III	Cheiraoba &Ningol Chakkouba	
	Unit IV	Sangai Festival & Yaoshang	

Learning Outcomes:

- *To achieve the in-depth knowledge and understanding about Manipuri indigenous and traditional games, i.e. Shagol Kangjei, Hiyang and Kang, etc., and its importance and relation with the Manipuri culture.*
- *To enable to gain the knowledge about the critically acclaimed and famous Manipuri dance.*
- *To enlighten the learner about the traditional and cultural festivals, i.e. Cheiraoba, Ningol Chakkouba and Yaoshang and its importance in the Manipuri Community.*
- *To enable to gain the critical knowledge about the religious festival, i.e. Lai Haraoba and its importance for the Manipuri community.*

References:

1. Devi, LaimayumSubhadra. :2011,*ShastriyaNrityagiMityengda Jagoi Rasa*, Ashangba Publication, Imphal.
2. Singh, Wangkheimayum Budha. :1992, *Meiteishinggi Mahoushadagi Shagonnaduna Leijarklaba Mashannashing*, Wangkheimayum Publications, Imphal.
3. Singh, Moirangthem Rajendra. :2001, *Manipurda Lai Haraoba Amasung Kakching Haraoba*, Moirang Shathibi Publications, Kakching, Imphal.
4. Devi, Ng. Ekashini. :2006, *Meitei Amaibi*, Joy Shankar Publications, Imphal.

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FYUGP-MANIPURI-SYLLABI-GU, 2023

COURSE	COURSE NAME		CREDITS
Course-14	**Manipuri Film & Translation Works**		**4**
	Unit I	Status of Manipuri Film	
	Unit II	Manipuri documentary and short films	
	Unit III	Problem of translation, cultural specific words, idioms and phrases	
	Unit IV	Drama: AbhijananShakuntalam – translated by Brajabihari Sharma	

Learning Outcomes:

- *To enable to achieve the knowledge about the trend of Manipuri Film and its current status in the Manipuri Society.*
- *To enlighten about the aspect of translation and problems facing when the task is taken-up. The learners will be able to know and understand about the cultural specific words prevalent in the language.*
- *To provide the knowledge and understanding about the grammatical aspects of the language, i.e. idioms and phrases.*
- *To enable to gain the critical knowledge about the dramatic literature by assessing the selected piece for the Course.*

References:

1. Devi, YambemTombi. :2015,*Film AmasungFilmgi Art*,Yambem Publications, Imphal.
2. Devi, YambemTombi. :2011, *Cinema, Cinema Amasung Cinema*,Ashangba Communication, Imphal.
3. Devi, YambemTombi. :2018, *FilmgiKhongchatPunshigiMathel*,Yambem Publications, Imphal.
4. Sharma, Brajabihari. :*AbhijananShakuntalam*(translation).
5. Kongbam, Meghachandra. :2021, *Manipuri Cinema*, NingthoukhongjamRanjana Devi, WangkheiNingthemPukhriMapal, Imphal.

Name of the Contributor: Dr. Salam Brojen Singh Contact No. 8761800701
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COURSE	COURSE NAME		CREDITS
Course-15	**Manipuri Folk Beliefs**		**4**
	Unit I	Folk beliefs at home	
	Unit II	Folk beliefs in festivals	
	Unit III	Folk beliefs in customs and traditions	
	Unit IV	Folk beliefs in rituals	

Learning Outcomes:

- *To enhance the knowledge and understanding about the Manipuri folk beliefs practiced at home, festivals, ritual functions and beliefs prevalent in Manipuri customs and traditions.*
- *To gain the knowledge of the Manipuri culture and society from the folk literatures and other oral folk literatures as well.*
- *To enable to analyse and assess Manipuri folk beliefs and the underlying core meaning for the same and apply accordingly.*
- *To enlighten the learner about the culture and tradition of the community and provide an in-depth knowledge and understanding about the rituals associated in the lives of the community.*

***References**:*

1. ChongthamchaNgamba. :1989, *MallemLeishemlolAriba Part-1*, ThingbaijamchaTuleshwar, KhwaiNagamapalPaonam Leikai, Imphal.
2. Devi, AdhikarimayumRadhamanbi. :2018, *Manipuri Dance and Culture: An Anthology,* Akansha Publishing House.
3. Singh, LaishramBirendra Kumar. :2014, *Manipuri LokSahitya (Meitei)*, SahityaAkademi, Delhi.
4. Devi, Jamini. :2010, *Cultural History of Manipur SijaLaioibi AndThe Maharas*, A Mittal Publications.
5. Sarangthem,Bormani. :2003, *MoirangShaiwon*, Published by self, ChingaMakhaChanamPukhriMapal, Imphal.
6. Soram, Sanatombi. :2014, *Manipuri Phunggawari*, Cultural Research Centre, Manipur, KhaNaorem Leikai, Imphal.

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Four Year Undergraduate Programme (FYUGP)

NEP, 2020

Subject: Mass Communication and Journalism (MCJ)

Department of Communication & Journalism
GAUHATI UNVERSITY
Guwahati-781014, Assam

COURSE STRUCTURE

SEMESTER	PAPER	Total Credit
I	Introduction to Media and Communication	4
II	Basics of Journalism	4 (3+1)
III	Basics of Reporting and Editing	4 (3+1)
IV	Introduction to Public Relations	4 (3+1)
	Introduction to Advertising	4 (3+1)
	Indian Society, Polity and Media Laws (C)	4
	Understanding Digital Media	4 (3+1)
V	Basics of Radio Journalism	4 (3+1)
	TV Journalism: An Introduction	4 (3+1)
	Communication for Development (C)	4 (3+1)
	Introduction to Cinema Studies	4 (3+1)
VI	Mass Media in NE India (C)	4
	ICT and Media Management	4
	Specialised Communication	4
	Convergent Media and Content Development	4

ABOUT THE COURSE

The fundamental goal of this programme are to plan for an all-round development of the media and communication students that would comprise imbibing correct media education principles, inculcating modern media perspective, understanding professional ethics, skill development in various fields of media and determining the pathway for media growth. Keeping all this in mind the syllabus here has been designed accordingly also leaving room for further modifications in order to adapt to changing dynamics of the media world.

This compilation consists of 15 (fifteen) papers till sixth semester. Graduate Aptitudes (learning outcomes) are in accordance with the NEP guideline.

OBJECTIVES

The course is designed to:

- Introduce various aspects of mass communication.
- Acquaint and train on different use of media strategies.
- Develop the skills of the students on handling of different mass communication tools.

LEARNING OUTCOMES

After completion of this programme, the students will be able to:

- Discuss the various theoretical and practical aspects of mass communication.
- Enumerate the existing and emerging trends of mass communication and journalism
- Explain the methods of appropriate use of mass communication tools in context with the environment
- Inherit the ethical values related to the mass media.
- Develop their skills on online journalism, broadcast journalism, advertising and public relations, film studies and community communications
- Encourage media entrepreneurship

1. Four-year Undergraduate Programme
2. **Semester: First**
3. Subject Name: *Mass Communication and Journalism* (MCJ)
4. Course Name: Introduction to Media and Communication
5. Existing Base Syllabus: CBCS
6. Course Level: 100-199
7. Prerequisite: Does not arise
8. Theory Credit: 4
9. Practical Credit: Nil
10. Number of Required Classes: **60**

    Contact Class: **40**

    Non-Contact Classes: **20**
11. Total marks: End Semester Examination will be 3 Hours duration with 80 marks;

    Internal Assessment is 20 Marks

COURSE OBJECTIVES

The course is designed to:
- Introduce basic aspects of communication.
- Correlate the theoretical aspects of communication.
- Introduce students to the target audience and recent development in communication field.

LEARNING OUTCOMES

Disciplinary and Interdisciplinary areas:
- Comprehensive knowledge and basic aspects of communication, Develop a comprehensive perspective on the evolution, gradual changes and delivery and reception of communication,
- Enables students to identify and correlate the systematic development of communication models and theories

Generic Learning:
- Decode the morphology of communication

Critical Thinking:
- Apply analytical thought during the reception of information
- Interpret growth, development and changing trends of communication in the Contemporary world.
- Identify audience segmentation

Creativity:
- Think about communication messages in an analytical pattern
- Adopt innovative communication tools for connectivity
- View a communication problem from multiple perspectives

Communication Skills:

- Develop listening ability
- Express thoughts and ideas strategically
- Construct logical arguments using language suitable for audience

Analytical reasoning:

- Exercise, restrain in accepting extreme views
- Identify authentic information

Research Related Skills:

- Develop skills to identify sociological perspectives on communication
- Articulate communication methods for effective implementation

Coordinating and collaborating with others:

- Work effectively in group communication
- Coordination and communication of policy making

Leadership:

- Develop horizontal and vertical organisational communication skills
- Develop management skills through identification of audience reception

Digital and Technological Skills:

- Understand the epistemology of digital and technological growth

Multicultural competence and inclusive spirit:

- Capability to understand diversity of communication
- Appreciate inclusivity of communication pattern

Value inculcation:

- Develop neutrality in understanding information
- Instil integrity and identify ethical information, dissemination norms

Environmental Awareness and Action:

- Develop sensitivity towards environmental information

Community Engagement:

- Develop group communication skills and participate in community communication strategies

Empathy

- Ability to appreciate differences, individualism and social inequalities and develop communication strategies to mitigate the same

COURSE OUTLINE

Unit No.	Unit Content	No. of Classes (60)	Marks (80)
Unit - I	Concept of Communication; Human Communication and development; Evolution of human communication, Types of Communication (Verbal, non-verbal, Formal-informal, Mediated,-Non-mediated); Forms of Communication (Intrapersonal, Interpersonal, Group, Public and Mass Communication) Elements of Communication; Mass Communication- types, advantages and its Process,	15 (10+5*)	20

	Barriers of Communication, Functions of Communication, Audience : Concept and Type		
Unit II	Need of Theories, Basics of communication Theories: Authoritarian, Libertarian, Social-Responsibility, Hypodermic Needle Theory, Usage and Gratification Theory; Gate Keeping Theory; Cultural Effects	15 (10+5*)	20
Unit III	Need of Models, Models of Communication - SMR, SMCR, Shannon and Weaver, Schramm, Gate-keeping, Newcomb, Indian Communication Models	15(10+5*)	20
Unit IV	Mass media; Characteristics and Types of Mass Media, Media in Everyday Life, Traditional and Alternative Media, Community Media, Cinema, New media, Role of Media in democracy	15 (10+5*)	20

Suggested Readings:

1. McQuail, D. (2010). McQuail’s Mass Communication Theory. New Delhi: Sage Publications.
2. Stevenson, N. (1997). Understanding media culture: Social theory and mass communication.
3. Singhal, A. & Rogers, E M. (2001). India’s Communication Revolution: From Bullock Carts to Cyber Marts. New Delhi: Sage Publications.
4. DeFleur, M.L. and S. Ball-Rokeach., Theories of Communication. Longman, New York.
5. McQuail, Denis and Windhl. Communication Models for the Study of Mass Communication. Longman, London.
6. Werner, Severin J. and Tankard W. James., Communication Theories. Origin, Methods, Uses. Longman, London.
7. Kincaid, D. Lawrence, Communication Theory–Eastern and Western Perspectives, Academic Press Inc., San Diego, 1987.
8. Kumar. J. Keval, 'Mass Communication in India, Jaico Publishing house, Bombay, (New Ed.)
9. Rogers M. Everett, A History of Communication Study, New York, Free Press, 1997.
10. Littlejohn, W. Stephen. Theories of Human Communication, 3rd ed., Belmont, California, 1989.
11. Barlow, David M and Mills B. Reading Media Theory: Thinkers, Approaches, Contexts. Pearson: Longman, London

E-RESOURCES

- Communication Theory: http://communicationtheory.org
- Mass Communication Theory: https://masscommtheory.com/

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Semester II

1. Four-year Undergraduate Programme
2. Subject Name: Mass Communication and Journalism
3. **Semester: Second**
4. Course Name: **Basics of Journalism**
5. Existing Base Syllabus: CBCS
6. Course Level: 100-199
7. Theory Credit**: 3**
8. Practical Credit**: 1**
9. The number of Required Classes: **75** (45+30)

   Contact Class: 55

   Non-Contact Classes*: 20
10. Total marks: End Semester Examination will be 3 Hours duration with 80 marks; Internal Assessment is 20 Marks

OBJECTIVES

The course is designed to:

- Introduce various aspects of Journalism.
- Introduce various types of News.
- Introduce students about the basics of other related knowledge of journalism with special emphasis on print media.

LEARNING OUTCOMES

Disciplinary and Interdisciplinary areas:

Learn to coordinate between different mediums for news generation

Generic Learning

Critical Thinking:

- Develop the ability to identify the news source and credible reporting

Creativity:

- Innovate methods to acquire news and presentation

Communication Skills:

- Develop clarity in news writing

Analytical reasoning:

- Exercise, restrain in reporting extreme views

Research Related Skills:

- Develop skills to initiate background study

Coordinating and collaborating with others:

- Conduct effective coordination with sources and working professionals in a news room

Digital and Technological Skills:

- Adopt new technologies for collection and documentation of facts

Value inculcation:

- Accept diversity and provide reporting on marginalized groups and individual voices

Community Engagement:

- Inculcate participatory communication spirit for better information gathering

Empathy

- Create an environment of inclusivity and collective participation

COURSE OUTLINE:

Unit No.	Unit Content	No. of Classes (75)	Marks 80
Unit - I	Understanding News; News: meaning, definition, nature; Hard news, soft news, basic components of a news story; Attribution, embargo, dateline, credit line, by-line. News Values, News Source, types of source, Language of news	15 (10+5*)	20
Unit - II	Understanding the structure and construction of news; 5Ws and 1 H, News Sense, Types of news, News Leads/intros, Structure of the News Story–Inverted Pyramid style Organising a news story; Principles of news selection; Use of internet, Different mediums-a comparison; Basic differences between the print, electronic and online journalism	15 (8+7*)	25
Unit - III	History of Journalism, Journalism in different parts of the Globe-Authoritarian to Libertarian, Famous Journalists of the world and their contribution, Photo journalism, yellow journalism; Penny press, Data Journalism Tabloid press; Citizen journalism; News Agency Journalism, Role of Media in a Democracy; Responsibility to Society; Contemporary debates and issues relating to media, Ethics in journalism	15(7+8*)	25
Unit – IV (Practical)	Understanding the types of news and its various aspects learned in Unit and II, Analysing content generation of newspapers, Collect and compiling various types of newspapers, Learning and designing newspaper layout (both print and online copy can be used), News blogging, weekly reporting events, Try to bring out own lab journal (print/e- version) by compiling news	30	10

Internship

Students have to go compulsory internship for four to six week to get their final diploma / degree as per GU-FYUGP rules.

References

1. Journalism- N Jayapalan (Atlantic)
2. Journalism and mass communication- Amit Desai
3. Ethics and journalism-Karen Sanders (sage)
4. Radio and TV journalism- JR Hackmoulder, PP Singh, FAD Jonge (Anmol books)
5. Broadcast news producing- Brad Schultz (sage)
6. E-Resources • Centre for Investigative Journalism in India: http://cij.co.in/index.php • Daily Writing Tips: http://www.dailywritingtips.com/the-art-of-writing-news/

Particulars of Course Designer :

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1. Four-year Undergraduate Programme
2. Subject Name: Mass Communication and Journalism
3. **Semester: Third**
4. Course Name: **Basics of Reporting and Editing**
5. Existing Base Syllabus : CBCS
6. Course Level: 200-299
7. Theory Credit**: 3**
8. Practical Credit**: 1**
9. Number of Required Classes: **75** (45+30)

   Contact Class: 55

   Non-Contact Classes*: 20

10. **Total marks**: End Semester Examination will be 3 Hours duration with 80 marks;

    Internal Assessment is 20 Marks

COURSE OBJECTIVES

The course is designed to:

- Introduce the basics of reporting and editing for media.
- Discuss the duties and responsibilities of the reporter

LEARNING OUTCOMES

Generic Learning

Critical Thinking:
- Interpret between News and Views,
- Identify Credible Sources

Creativity:
- Enable designing of news structure

Communication Skills:
- Express ideas, facts and thoughts strategically
- Build up Analytical Reasoning

Research-Related Skills:
- Develop research capacity for news collection , reporting and interpretation

Coordinating and collaborating with others:
- Build a rapport with news sources

Digital and Technological Skills:
- Apply digital skills in data collection

Value inculcation:
- Accept diversity and refrain from biased opinions

Community Engagement:
- Coordinate with community for news gathering

Empathy

- Develop the ability to refrain from unethical news presentation

COURSE OUTLINE

Unit No.	Unit Content	No. of Classes (75)	Marks 80
Unit - I	Basics of Reporting Sources of News, Reporter- role, functions and qualities; news agency reporting. Covering Speeches, Meetings and Press Conferences, Beat reporting- crime, courts, city reporting, local reporting, health, education, sports, environment (Green Reporting); entertainment and culture etc. Newsroom setup, Organizational setup of a newspaper, Editorial department.	15 (8+7*)	25
Unit - II	Definition and Importance of Lead: types of lead; body of the story; Interviewing: setting up the interview, conducting the interview; Articles, Features- types of features and human interest stories, difference between articles and features.	15 (7+8*)	20
Unit - III	Introduction to editing: Principles of editing, Headlines; importance, types and functions of headlines; typography and style, language; style sheet, importance of pictures and news picture, Role of sub-editor, copy-editor, News editor and Editor, Editor- Roles, functions and qualities, Chief of bureau, correspondents. Editorial page Opinion pieces, Op-Ed pages, Supplements- Role of Supplement, columns/columnists	15(10+5*)	25
Unit – IV Practical	News gathering, Conducting Interviews, News Photography (Mobile/ Camera), Writing News, Caption Writing, Letters to the Editor, Writing Article, Headlines Writings	30	10

Reference

1. Journalism- N Jayapalan (Atlantic)
2. Journalism and Mass Communication- Amit Desai(reference press)
3. Writing for Journalists (Media Skills)- Wynford Hicks; Routledge; 3rd edition (2016), India
4. Tim Harrower (2012) Inside Reporting: a Practical Guide to Craft of Reporting ; McGraw Hill; 3rd edition
5. Vivek. S (2008) Editing For Print and Electronic Media ; Cyber Tech Publications, New Delhi; ISBN 978-81-7884-351-3

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Semester IV

Course No	Course Name
Paper IV	**Introduction to Public Relations**
Paper V	**Introduction to Advertising**
Paper VI	**Indian Society, Polity and Media Laws (C)**
Paper VII	**Understanding Digital Media**

1. Four-year Undergraduate Programme
2. Subject Name : Mass Communication and Journalism
3. **Semester : Fourth**
4. Course Name : Introduction to Public Relations (Elective)
5. Existing Base Syllabus : CBCS
6. Course Level : 200-299
7. Theory Credit**: 3**
8. Practical Credit**: 1**
9. A number of Required Classes: **75** (45+30)

   Contact Class: 55

   Non-Contact Classes*: 20
10. Total marks: End Semester Examination will be 3 Hours duration with 80 marks;

    Internal Assessment is 20 Marks

COURSE OBJECTIVES

1. To introduce the elements of public relations
2. To enhance the understanding on different types and circumstance associated with public relations
3. To felicitate PR industry and academic interactions

LEARNING OUTCOMES

Disciplinary and Interdisciplinary areas

- Inculcating self-employment skills

Generic Learning

Critical Thinking**:**

- Analysis and Evaluation of crisis situation
- Identify and develop strategies

Creativity:

- Develop innovative and imaginative message matrix

Communication Skills:

- Express ideas and thoughts strategically for image development and repairing
- Maintain mutual understanding among internal and external public

Analytical reasoning

- Identify logical flaws in the existing strategies
- Design and plan messages for effective Public Relations

Coordinating and collaborating with others:

- Work effectively in groups
- Inculcate leadership skills for organizational structure
- Collaborate with stakeholders for event management

Leadership

- Develop horizontal, vertical and diagonal organisational communication skills

Digital and Technological Skills:

  - Inculcate skills to understand use of ICT in the field of Public Relations
  - Understanding new media dynamics

Community Engagement:

  - Build communication strategies for undertaking various activities related to Corporate Social Responsibility

Empathy

  - To identify and understand situation of community, organization or individuals for PR

COURSE OUTLINE

Unit No.	Unit Content	No. of Classes (75)	Marks 80
Unit - I	Public Relations-Definitions, Concepts and practices, Introduction to Public Relations, History, growth and development of PR Role and Functions of PR-Principles and Tools, Basic understandings of PR in govt. and Private Sectors	15 (8+7*)	25
Unit - II	PR-Publics –internal and external Campaigns, advertising, publicity, propaganda Vs PR, Spin doctoring, lobbying Role of PR in Crisis management, Apex bodies in PR- IPRA code - PRSI, PSPF and their codes.	15 (10+5*)	25
Unit - III	Media Relations: Introduction, importance and sources of media information CSR, Media Relations	15 (7+8*)	15
Unit – IV (Practical) Writing for PR	Press Release Writing, conducting press conference, designing brochures and Promotional Video	30	15

References:

- Antony, Young (2010). Brand Media Strategy. Plagrave Macmillan
- Craige, Carroll (2011). Corporate Reputation and the New Media. Taylor and Francis
- Corporate Communication – Principles and Practice (2010). New Delhi: OUP
- Duhe, C. Sandra (2007). New Media and Public Relations. Peter Leng
- Fernandez, Joseph (2004). Corporate Communications: A 21st Century Primer. New Delhi: Response Books
- K.M, Srivastava (2007). Public Relations in the Digital Era. Varanasi: Pilgrims Publishing

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1. Four-year Undergraduate Programme
2. Subject Name : Mass Communication and Journalism
3. **Semester : Fourth**
4. Course Name : Introduction to Advertising (Elective)
5. Existing Base Syllabus : CBCS
6. Course Level : 200-299
7. Theory Credit**: 3**
8. Practical Credit**: 1**
9. Number of Required Classes: **75** (45+30)
   Contact Class: 57
   Non-Contact Classes*: 18
10. Total marks: End Semester Examination will be 3 Hours duration with 80 marks;
    Internal Assessment is 20 Marks

COURSE OBJECTIVES

1. To discuss the trends of advertising
2. To introduce the creative elements of ad-making
3. To analyse the different concepts of branding in modern times

LEARNING OUTCOMES

Disciplinary and Interdisciplinary areas

- Acquaint with the different aspects of advertising
- Familiarize with the tools and terms associated with ad making
- Enhance skills required in effective promotion of products

Generic Learning

Critical Thinking:

- Enable to understand ecology of advertising and marketing

Creativity

- Build capacity for innovating advertising designs

Communication Skills:

- Create ability to communicate maximum in minimum words

Analytical reasoning

- Understand the dynamics of revenue and advertising

Coordinating and collaborating with others:

- Coordinating with different brands and Ad agencies

Digital and Technological Skills:

- Develop updated message designing through different applications

Value Inculcation

- Develop audience sensitive messages

Environmental Awareness and Action

- Create room for generating environmental awareness through innovative campaigns

Empathy

- Understand diversified needs of people and sensitively designing a brand

COURSE OUTLINES

Unit No.	Unit Content	No. of Classes (75)	Marks 80
Unit - I	Introduction to Advertising- meaning and history of Advertising, Importance and Functions, Advertising as a tool of communication, Components of advertising, Qualities of good advertising, Advertising Models-AIDA model, DAGMAR Model, Maslow's Hierarchy Model, Communication theories applied to advertising Advertising and new trends, Economic, Cultural, Psychological and Social aspects of advertising, Ethical & Regulatory Aspects of Advertising-Apex Bodies in Advertising-AAAI, ASCI and their codes.	15 (10+5*)	20
Unit - II	Advertising through Print, electronic and online media, Types of Media for advertising, Advertising Objectives, Segmentation, Positioning and Targeting Media selection, Planning, Scheduling, Marketing Strategy and Research and Branding, Advertising Department vs. Agency-Structure, and Functions, Advertising Budget, Campaign Planning, Creation and Production	15 (10+5*)	20
Unit -III	Online advertising, SEO, digital application in advertising, branding, Theories of branding. Famous ad gurus and their creation. Challenges of advertising in a revenue driven world	15 (7+8*)	20
Unit –IV	Students will create a print ad, Develop a copy for any product, Make an Audio-Visual advertisement, Create an online advertising campaigns	30	20

References

- Applegate, Edd. (2005). Strategic Copywriting: How to Create Effective Advertising. Rowman & Littlefield
- Bumba, Lincoln &Sissors, Z. Jack. (1996). Advertising Media Planning (3rd Ed). NTC Business Books.
- Griffiths, Andrews. (2004). 101Ways to Advertise Your Business – Building Successful Business with Smart Advertising. NSW: Allen & Unwin
- Kotler, Philip. (2000). Marketing management. Prentice Hall of India

- Sharma, Sangeeta & Singh, Raghuvir. (2006). Advertising: Planning and Implementation. Phi Learning
- Sharma, Chetan, Herzog, Joe &Melfi, Victor. (2008). Mobile advertising: Supercharge Your Brand In The Exploding Wireless Market. John Wiley & Sons.
- M.Wells (2007); Advertising: principles and Practices: Pearson Education, India

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1. Four-year Undergraduate Programme
2. Subject Name : Mass Communication and Journalism

3. **Semester : Fourth**
4. Course Name : Indian Society, Polity and Media Laws (Compulsory)
5. Existing Base Syllabus : CBCS
6. Course Level : 200-299
7. Theory Credit**: 4**
8. Practical Credit**: Nil**
9. Number of Required Classes: **60**

Contact Class: 40

Non-Contact Classes*: 20

10. Total marks: End Semester Examination will be 3 Hours duration with 80 marks;

Internal Assessment is 20 Marks

COURSE OBJECTIVES

The course is designed to:

- Introduce various aspects of Indian society.
- Acquaint on the Constitution of India.
- Introduce the students about the Indian government and politics

COURSE OUTCOMES

Disciplinary and Interdisciplinary areas

- Develop comprehensive knowledge on the basic aspects of India as a nation, Indian society;
- Decipher the understanding of India in ages with basic understanding of responsible media.

Generic Learning

Critical Thinking**:**

- Apply critical thinking on social norms and ethical guidelines during dissemination of information through mass media;
- Interpret information with consideration of heritage and social norms;
- Identify Self regulations and responsibilities of media

Communication Skills:

- Develop reading ability
- Express thoughts and ideas with in-depth background knowledge
- Construct discourse using self-regulation for audience for good taste

Analytical reasoning

- Enables students to identify and correlate the various stages of nation building, Indian social structure and values.
- This paper will also give a brief idea about the ethical guidelines for journalism and mass communication with introductory Acts and Laws related to media.

Research Related Skills:

- Develop skills to identify sociological perspectives on information
- Data Collection and data interpretation with objectives

Multicultural competence and inclusive spirit:

- Capability to understand diversity of Indian historical background
- Appreciate inclusivity of Indian social fabric

Value Inculcation

- Develop neutrality in understanding India
- Instil integrity and identify ethical information, dissemination norms

COURSE OUTLINE

Unit No.	Unit Content	No. of Classes (60)	Marks 80
Unit - I	Formation of India as nation, Vedic age, Gupta age, medieval and Modern age, British India, freedom struggle, post independent development. Indian society: Indian Social Structure, Caste, Religion, Language etc.; North East India: History, Geography, Culture and Politics	12 (7+5*)	15
Unit - II	Constitution of India : Historical Background, Constituent Assembly of India; Philosophical foundations of the Indian Constitution; Preamble, Fundamental Rights and Duties, Directive Principles of State Policy	15 (10+5*)	20
Unit -III	Union Government: Structures and Functions, President, Prime Minister, Cabinet, Parliament, Parliamentary privileges; Supreme Court of India, State Government: Structure and Functions, Governor, Chief Minister, State Legislature, Judicial System in States; Indian Political System : Political Parties, Linguistic, Regionalism, Communalism, Insurgency, Terrorism, Caste, Corruption and Criminalization of Politics.	15 (10+5*)	20
Unit –IV	Ethics in Media : Privacy, Right to Reply, Communal Writing, Yellow Journalism, Press Council of India guidelines, ethical issues in social media; Laws and Acts : RTI Act, 2005, Cyber Laws, TRAI, Indian Penal Code (IPC) provisions in sedition, crime against women and children, obscenity, Official Secrets Act; Defamation, Contempt of Court, BFI, Film censorship, BCCC etc.	18 (13+5*)	25

References

- Basu, Durga Das, Introduction to the Constitution of India -New Delhi: Wadhwa and Company Law Publishers, 2002
- Pylee, M.V., Constitutional Amendments in India -Delhi : Universal Law, 2003.
- Neelamalar, M. (2015). Media Laws and Ethics. PHI.
- Pathak, P. Juhi. (2014). Introduction to Media Laws and Ethnics. Shipra Publications
- Vidyasagar, I.S. (2006). Constitution of India. ABD Publisher

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1. Four-year Undergraduate Programme
2. Subject Name : Mass Communication and Journalism
3. **Semester : Fourth**
4. Course Name : Understanding Digital Media (Elective)
5. Existing Base Syllabus : CBCS
6. Course Level : 300-399
7. Theory Credit**: 3**
8. Practical Credit**: 1**
9. Number of Required Classes: **75** (45+30)

   Contact Class: 55

   Non-Contact Classes*: 20

10. Total marks: End Semester Examination will be 3 Hours duration with 80 marks;

    Internal Assessment is 20 Marks

COURSE OBJECTIVES

The course is designed to:

- Introduce various aspects of digital media.
- Highlight the emerging concepts and challenges of digital social media.
- Introduce students about significance and usage of social media.

LEARNING OUTCOMES

Disciplinary and Interdisciplinary areas

- Derive the concepts of digital and social media.
- Utilise digital social media tools for different developmental and promotional activities
- Comprehend the functionalities and challenges of social media

Generic Learning

Critical Thinking:

Understands the functionalities of web media and applicability in current times

Creativity

- Innovate ways to engage in digital and web technology
- Create Expertise in using digital technology for mass communication

Communication Skills:

- Assist in easy use of digital technology in effective digital communication

Research Related Skills

- Adopt digital technology in conducting web-based research

Coordinating and collaborating with others

- Facilitate convergence with worldwide technology

Empathy

- Create sensitization on existence of misinformation through on line and mis use of digital media

COURSE OUTLINE

Unit No.	Unit Content	No. of Classes (75)	Marks 80
Unit - I	**Key Concepts and Theory** Defining new media, terminologies and their meanings – Digital media, new media, online media et al.; Information society and new media, Technological Determinism, Computer mediated-Communication (CMC), Networked Society.	15 (8+7*)	20
Unit - II	**Understanding Virtual Cultures and Digital Journalism** Internet and its Beginnings, Remediation and New Media technologies, Online Communities, User Generated Content and Web 2.0, Networked Journalism, Alternative Journalism; Social Media in Context, Activism and New Media	15 (10+5*)	20
Unit -III	**Digitization of Journalism** Authorship and what it means in a digital age, Piracy, Copyright, Copyleft and Open Source, Digital archives, New Media and Ethics	15 (7+8*)	20
Unit –IV	**Overview of Web Writing (Practical)** Linear and Non-linear writing, Contextualized Journalism, Writing Techniques, Linking, Multimedia, Storytelling structures, Brief history of Blogging, Creating and Promoting a Blog, Digital marketing, Social media content curation, Introduction to DTP software like Page maker, Quark express, Photoshop	30	20

Internship

Students have to go compulsory internship for four to six week to get their final diploma / degree as per GU-FYUGP rules.

References:

- Handbook of New Media: Social Shaping and Consequences of ICTs, edited by:Leah A. Lievrouw & Sonia Livingstone, SAGE Publications, Ltd
- Understanding New Media, Eugenia Siapera - Dublin City University (DCU), 2017
- Social Media Marketing Mastery 2020: 2 Books in 1 - How to Become a Top Instagram and Facebook Influencer with Personal Branding Strategies, Gary Loomer

- Social Media Success for Every Brand: The Five Story Brand Pillars That Turn Posts Into Profits, Claire Diaz-Ortiz and Donald Miller
- Social Media Power : The underground playbook for growing your Business on Social Media Paperback – 29 December 2020
- The Social Media Effect Paperback – Import, 29 May 2017, Shaun Rodgers
- Basics Of Social Media & Digital Journalism : A Binary Revolution Paperback – 30 October 2022, Ritika Bora (Author), Vikrant Yadav (Author)

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Semester V

Course No	Course Name
Paper VIII	Basics of Radio Journalism
Paper IX	TV Journalism: An Introduction
Paper X	Communication for Development
Paper XI	Introduction to Cinema Studies

1. Four-year Undergraduate Programme

2. Subject Name : Mass Communication and Journalism
3. **Semester : Fifth**
4. Course Name : *Basics of Radio Journalism (Elective)*
5. Existing Base Syllabus : CBCS
6. Course Level : 300-399
7.Theory Credit**: 3**

8.Practical Credit**: 1**

9. Number of Required Classes: **75** (45+30)

Contact Class: 55

Non-Contact Classes*: 20

Total marks: End Semester Examination will be 3 Hours duration with 80 marks; Internal Assessment is 20 Marks

COURSE OBJECTIVES

1. To introduce the elements of radio journalism
2. To discuss various dimensions of radio production
3. To give idea on studio know-how

LEARNING OUTCOMES

Disciplinary and Interdisciplinary areas

- Enhance the student's knowledge of the functioning of radio
- Get an idea on the technical know-how of radio production

Generic Learning

Critical Thinking:

- Apply analytical thought for radio programme designing, scripting and anchoring
- Identify audience patterns for messages development

Creativity

- Adopt innovative ideas for message design and connectivity at different situations
- Identify the proper format for message delivery
- understanding of electronic media content creation

Communication Skills:

- Develop the art of radio programme presentation
- Connect audience through script writing as required by a programme and type of audience

Research Related Skills

- Capacity to record, edit and package a program or news for broadcasting
- Capacity to develop an appropriate message

Digital and Technological Skills

- Understand the digital and technological growth in radio programme production and broadcasting

Value inculcation

- Develop neutrality in understanding information
- Instill integrity and identify ethical information, dissemination norms

Community Engagement

- Develop group communication skill
- Understand participatory communication in content generation

Empathy

- Should be able to appreciate differences, individualism and social inequalities
- Should encourage ethical values in programe production

Course Outline

Unit No.	Unit Content	No. of Classes (75)	Marks 80
Unit - I	Growth and Development of Radio, Various Committees associated with the Journey of Radio in India, Characteristics of Radio as a Mass Medium, Concept of Public Service Broadcasting, Knowledge about Electromagnetic Spectrum, AM, FM, Community Radio, Internet Radio, HAM Radio, Web Radio, Radio Vision, World Space Radio etc. Radio as a tool of Communication for Development,	15 (7+8*)	20
Unit - II	Understanding various Radio programmes, Radio Formats (Feature, Documentary, Talk Show, live talk shows, Interviews, jingles, advertisements etc.) Radio News: different bulletins and news-based programmes, radio news reporting, editing, radio news reading, Voice Training and Art of Presentation, Understanding Studio: Studio Management, Programme and Newsroom functioning	15 (10+5*)	25
Unit - III	Phases of Production: Pre-production, Production and Postproduction; Difference between studio production and Field production, Basic understanding of script writing for radio, Anchoring Sound in Radio production -Concepts of sound-scape, sound culture, Types of sound-Sync, Non-Sync, Natural sound, Ambience Sound, Sound recording and editing techniques (Online sound editing software, Newsroom Software) Types of Microphones Do's and Don'ts of Radio production	15 (8+7*)	25
Unit – IV Practical	Students will listen to radio programmes, audio books, podcast and develop scripts for various audio programmes Will try to understand the differences in writing for Radio, Television and Newspaper, Recording and Editing radio news capsules, Perform content analysis of radio programmes and news Practise voice culture and anchoring	30	10

References:

- Broadcast Journalism; Gaur, D.K; New Delhi, Omega Publication
- Radio Production; Mcheish, Robert; Oxford, Focal Press
- Broadcasting Journalism; Dash, A; Discovery Publications, New Delhi
- Keith, Michael C & Krause, Joseph M. (1989) — "The Radio Station" published by Focal Press, Boston, London
- Writing for Television, Radio and New Media" by Robert L Hilliard
- This is All India Radio: A Handbook of Radio Broadcasting in India; by U L Barua, Publications Division, Ministry of Information and Broadcasting, Government of India, 1983

Particulars of Course Designer:

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1. Four-year Undergraduate Programme
2. Subject Name : Mass Communication and Journalism
3. Semester : Fifth
4. Course Name : *TV Journalism: An Introduction (Elective)*
5. Existing Base Syllabus : CBCS
6. Course Level : 300-399
7. Theory Credit**: 3**
8. Practical Credit**: 1**
9. Number of Required Classes: **75** (45+30)

Contact Class: 58

Non-Contact Classes*: 17

10.Total marks: End Semester Examination will be 3 Hours duration with 80 marks;

Internal Assessment is 20 Marks

COURSE OBJECTIVES

The course is designed to:

- Introduce various aspects of television journalism.
- Train students on television production and presentation
- Illustrate studio know how of news production in television

LEARNING OUTCOMES

Disciplinary and Interdisciplinary areas:

- Students will understand TV journalism and follow changing trends; they will be able to appreciate visual literacy principles

Critical Thinking:

- Interpreted and identify image manipulation, misinformation and disinformation, fake news

Creativity:

- Students will be able to conceptualise TV news and programs; they will acquire practical skills to search & report for stories and present these in appropriate video format

Communication Skills:

- Establish connection with viewers from field through camera
- Present TV offerings to viewers appropriately
- Developing command over language and overall presentation

Analytical reasoning:

- Students will be introduced and enabled to TV production process and various formats of news and programs broadcasting

Research Related Skills:

- Develop Back ground research on subject matters, issues, TV medium , audience and associated processes

Digital and Technological Skills:

- Develop knowledge of digital equipments for TV production and broadcasting;
- Hands-on Skill on Practical aspects of mobile journalism

Value inculcation:

- Understand the Dos and Don’ts of TV production
- Appreciation of Ethical Principles of TV Journalism

Community Engagement:

- Motivate community for participation through positive message delivery and creating awareness on negatives issues

Empathy

- Ability to appreciate social and cultural diversity
- Combat social inequalities and deprivation though appropriate video messaging

COURSE OUTLINE

Unit No.	**Unit Content**	**No. of Classes (75)**	**Marks 80**
Unit - I	Introduction to TV journalism; C&IT convergence; Direct satellite news gathering (DSNG); Internet & digital media; Mobile journalism (MoJo) Designing the message for TV, mainstream & alternative media Production principles, stages (pre-production, production, post-production), types (news, feature programmes, reality shows), 24x7 news & Breaking news; Television Newsroom structure	15 (8+7*)	20
Unit - II	Image: Photographic composition principles, pictorial design, scene elements Camera: Positioning, movement, angle & shots Lighting: Concepts & objectives, light types, outdoor & studio lighting Sound: Audio element in audio-visual media, soundtrack, soundscape, ambience, sound mixing for visual media Voice: Microphone, recording, voiceovers for news & features	15 (10+5*)	25
Unit - III	Reporting: Qualities, skills, duties & responsibilities, background research, piece-to-camera (PTC) Producing, packaging & promoting news bulletins, debates, interviews, opinions, walk-the-talk; Positioning of promos & ads	(10+5*)	25
	Script writing in different formats for TV	30	10

Unit – IV Practical	news/features Shooting video shorts Giving piece-to-camera, Anchoring: General awareness & news sense, voice culture, studio autocue & teleprompter reading, body language & posture Writing for TV, scripting elements, Basics of Video-editing		

References

- Hasan, Seema. 2019. Mass Communication: Principles and Concepts. CBS. New Delhi (Edn. 2)
- Visual Intelligence: Perception, Image and Manipulation in Visual Communication: Barry, A.M.: State University of New York Press.
- Broadcast Journalism; Gaur, D.K; New Delhi, Omega Publication
- Video Production; BelavadiVasuki; Oxford University Press
- Video Streaming & Editing; Aptech Ltd.; Mumbai, Aptech Ltd

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1. Four-year Undergraduate Programme

2. Subject Name : *Mass Communication and Journalism (MCJ)*
3. Semester : Fifth
4. Course Name : Communication for Development (Compulsory)
5. Existing Base Syllabus : CBCS
6. Course Level : 300-399
7. Theory Credit**: 3**
8. Practical Credit**: 1**
9. Number of Required Classes: **75** (45+30)

Contact Class: 55

Non-Contact Classes*: 20

10.Total marks: End Semester Examination will be 3 Hours duration with 80 marks;

Internal Assessment is 20 Marks

COURSE OBJECTIVES

The course is designed to:

- Introduce the innovative approaches to C4D concepts, processes and practices
- To cater the growing demand for communication experts to work on development sector
- To upgrade human resource with specialised knowledge and skills on communication for social and behaviour change.

LEARNING OUTCOMES

Disciplinary and Interdisciplinary areas

- Develop skills in carrying out research, content design, implementation, monitoring & evaluation of C4D interventions
- Decipher the significance of the knowledge base of theories around development, behaviour change, social transformation and; human rights principles.
- Get exposure to techniques for designing and developing effective C4D strategies, interventions for social transformation

Generic Learning

Critical Thinking:

- Identifying developmental areas

Creativity

- Initiate innovative processes for community mobilisation and production

Communication Skills:

- Create opportunities for group communication and group mobilisation

Analytical reasoning

- Develop skills in identifying communication barriers in a community

Research Related Skills

- Identify needs of communities for content development for Communication for Development

Coordinating and collaborating with others

- Understand to create linkage between government policies and communities

Digital and Technological Skills

- Understand the digital and technological growth in radio programme production and broadcasting

Value inculcation

- Identifying a common ground for mitigating strengths and weakness of communities

Community Engagement

- Develop group communication skills and participate in community communication strategies

Empathy

- Recognise community-associated problems and deal with them neutrally

COURSE OUTLINE

Unit No.	Unit Content	No. of Classes (75)	Marks 80
Unit - I	Development: Concept, paradigms, Development versus growth, Development Versus Modernism, Human development index Sustainable Development, Gender and development	15 (8+7*)	20
Unit - II	Development communication: Concept and approaches Paradigms of development: Dominant paradigm, dependency, alternative paradigm Participatory Development and Participatory Communication	15 (10+5*)	25
Unit - III	Role of media in development: Journalism and spot bias, Challenges of Developmental reporting Contributions of Stalwarts like Allan Chalkley, Paolo Freire, B. G. Varghese, P Sainath Critical appraisal of dev communication programmes and government schemes: Krishi Darshan, Jhabua, MNREGA etc. Community informatics Concept of Community, Community Media, Folk Theatre and Development communication	15 (7+8*)	25
Unit –IV	Students will come with communication strategy based on mid-media (Street play and puppetry) as well as produce radio and video programmes on any contemporary development issue Students will publish news/Articles/Features/Op-Eds/ Awareness campaign on any contemporary development issue Students can take help of nearby community radio station, All India Radio, Doordarshan and NGOs for practical engagement as well	30	10

References:

- Srinivas Melkote, & Steeves. (2001). Communication for Development in the Third World. New Delhi: Sage
- Bill Reader; J.A. Hatcher (Ed.) (2012) Foundations of Community Journalism: Sage ; ISBN 978-1-4129-7466-0(pbk)
- K.K. Mallik and V.Pavarala (Ed) (2022): Community Radio in South Asia Reclaiming the Airwaves; Routledge India; ISBN 9780367520588
- Dutta. A, Bharali. B & Goswami, A L. (2019) Decoding Communication for Development, ARMT South Asia Publications
- McPhail, T. L. (2009). Development communication: Reframing the role of media. UK: Wiley Blackwell
- Tabing Louie. (2002). How to do community radio, Unesco Publication, New Delhi
- Bhattacharjee,M (2021). Puppetry in Changing World, ARMT South Asia Publications

Particulars of Course Designer:

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1. Four-year Undergraduate Programme
2. Subject Name : *Mass Communication and Journalism (MCJ)*
3. Semester : Fifth
4. Course Name : Introduction to Cinema Studies
5. Existing Base Syllabus : CBCS
6. Course Level : 300-399
7. Theory Credit**: 3**
8. Practical Credit**: 1**
9. Number of Required Classes: **75** (45+30)

    Contact Class: 55

    Non-Contact Classes*: 20

10. Total marks: End Semester Examination will be 3 Hours duration with 80 marks;

    Internal Assessment is 20 Marks

COURSE OBJECTIVES

The course is designed to:

- Introduce various concepts associated with cinema.
- Educate and train students on how to read cinema.
- Introduce students about cinema from North East India
- Highlight on some of the important organisations related to a film industry

LEARNING OUTCOMES

Disciplinary and Interdisciplinary areas:

- Comprehensive knowledge on Cinema as a medium of communication
- Develop diverse perspectives on the evolution and gradual changes of cinema as a medium

Critical Thinking:

- Apply analytical thought on understanding the language of cinema
- Develop skills on how to analyze a cinema
- Interpret ideologies behind the film making

Creativity:

- Articulate own interpretation after watching movie through discussion, presentation and publication
- Adopt innovative communication tools for expressing
- Develop critical thinking through film screening

Communication Skills:

- Develop ability to study films
- Creatively express thoughts and ideas
- Construct logical arguments using language suitable for audience

Analytical reasoning:

- Identify and emancipate the historical, socio-political, cultural and economic backdrop in making a movie as well as in the story telling approach

Research Related Skills:

- Develop skills to identify and correlate sociological issues on stories and director's perspectives in cinema

Digital and Technological Skills:

- Understand the digital and technological involvement in the journey of cinema

Value inculcation:

- Develop neutrality in understanding the story and the society it represents
- Develop cine literacy

Empathy

- Inculcate ability to appreciate differences, individualism and social inequalities cinema can and do reflect

COURSE OUTLINE

Unit No.	Unit Content	No. of Classes (75)	Marks 80
Unit - I	Movies and Meaning: Images, Motion pictures, Cinema as mass media, Cinema and Communication. Growth and Development of film - National and International perspectives with an emphasis on Indian Cinema, Movements and various Film Genres Growth and Development of Regional Cinema in India with special reference to Assam and the North-East	15 (8+7*)	20
Unit - II	Language of Cinema Focus on visual Language: Shot, Scene, sequence, Mis-en-scene, Deep focus, Montage, idea about semiotics Role of Sound in Cinema- an introduction, Cine Society Movement in India and Assam- Growth and Development, Present Scenario Cine literacy	15 (10+5*)	25
Unit - III	Film Censorship, CBFC, Organizations related to the Business of Production, Presentation and Training in Filmmaking- (like NDFC, FTII, SRFTI, DBHRGFTI, Film Festival Directorate of India, Children's Film Society of India, National and State-level Awards for films, National Film Archives of India, Film Division) Basic understanding of film review	15 (7+8*)	25
Unit – IV	Watch and Study about film making techniques and scripts of critically acclaimed films Analysing filmmaking techniques and content of Films from North East India Students will have to publish a minimum of two write-ups related to cinema Students will have seminar presentations, group	30	10

	discussions and orientation programmes related to film studies as internal assessment They will also attend/organise film festivals and film-making workshops		

References:

- Monaco, James. (1981). How to Read a Film. Oxford University Press.
- Hill, John & Gibson, Pamela Church. (2000). Oxford Guide toFilm Studies. OxfordUniversity Press.
- Thoraval, Yves (2000)Cinemas of India, Macmillan India
- Ray, Satyajit (1976)Our Films Their Films, Orient Blackswan Pvt Ltd
- Saran, Renu (2012), History of Indian Cinema. Diamond Books
- Raghavendra, M K & Joseph V K (2021) Critics On Indian Cinema, Best Books
- Rajadhiksya, A & Willemen P (1999). Encyclopedia of Indian Cinema, Routledge;

- Sarma, A. (2013). *The Loan Ranger in a Forsaken Frontier: The Unsung Pioneer of Indian Cinema in the North-East*. Aank-Baak
- Parthajit Baruah (2021), Jyotiprasad, Joymoti, Indramalati and Beyond: History of Assamese Cinema, Krantikaal Prakashan

- Sarma, A. (2001), Axomiya Chalacchitrar san-pohar, Aank-Baak,

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Semester : VI

Course No	**Course Name**
Paper XII	**Mass Media in NE India (C)**
Paper XIII	**ICT and Media Management**
Paper XIV	**Specialised Communication**
Paper XV	**Convergent Media and Content Development**

1. Four-year Undergraduate Programme
2. Subject Name : *Mass Communication and Journalism (MCJ)*
3. Semester : Sixth
4. Course Name : Mass Media in NE India
5. Existing Base Syllabus : CBCS
6. Course Level : 300-399
7. Theory Credit**: 4**
8. Practical Credit**: NIL**
9. Number of Required Classes: **60**
   Contact Class: 40
   Non-Contact Classes*: 20
10. Total marks: End Semester Examination will be 3 Hours duration with 80 marks;
    Internal Assessment is 20 Marks

COURSE OBJECTIVES

The course is designed to:

- Trace the origin and development of media in North East India.
- Highlight different types of newspapers and magazines of North East India.
- Acquaint students about radio and television services in the region

LEARNING OUTCOME

Critical Thinking:
- Apply critical thinking on comparative study about national and regional media representation

Creativity:
- Learning to use media mix creatively to highlight local issues
- To explore the potential for content creation of undiscovered aspects of NEI

Communication Skills:
- Developing communication skills to overcome geographical isolation of NEI

Analytical reasoning:
- Identify community specific knowledge for communication

Research Related Skills:
- Develop Research skills to identify and highlight public issues for communication

Coordinating and collaborating with others:
- Work effectively in group communication
- Coordination and communication of policy making

Digital and Technological Skills:
- Understand the Digital and Technological Skills in modern media communication

Multicultural competence and inclusive spirit:
- Appreciation of ethnic diversity and work for harmony

Empathy

- Ability to appreciate differences, individualism and social inequalities and develop communication strategies to mitigate the same

COURSE OUTLINE

Unit No.	**Unit Content**	**No. of Classes (60)**	**Marks 80**
Unit - I	Origin and development of communication system in North East India; Folk and Traditional media in NE India; Development of modern mass media in North Eastern states of India; Efforts during British era; Role of Missionaries and other socio-literary organizations; Press during Pre Independence period in Assam; *Arunodoi, Assam Bonti, Jonaki, Banhi, Awahan etc.; growth and development of press from 1930 to 1980 in NE India*.	15 (10+5*)	20
Unit - II	Press in NE India since 1980 till present time; potential for future growth, recent trends, study of the NE states' projection and focus in the national / global media, Mass media in Assam : scope and limitations.	15 (10+5*)	20
Unit - III	Specialized newspapers and magazines – Sports, Science & Technology, Women, Children, Youth, Literature, Entertainment and News Magazines in Assam and other states of NE India; Radio Services in NE India (All India Radio (AIR) in NE India; AIR Guwahati, AIR Dibrugarh, AIR stations in other places in NE India; Private Radio channels in Assam; FM, AM, SW channels; Community)	15 (10+5*)	20
Unit – IV	Growth and development of Television in Assam, Doordarshan channels in NE India; Cable TV channels in NE India; Private Satellite Channels in Assam and NE India; Coverage and language in Television channels in NE India; Trends of Digital and Social Media, MOJO in NE India; Alternative media: presence and scope; Street play, Puppetry, Mobile Theatre, Comics journalism etc. in NE India.	15 (10+5*)	20

Reference

- Sunil Pawan Baruah : Press in Assam Origin and Development ; Powersift, Bhabani Books and Gifts, Guwahati, 2022, ISBN : 978-93-87494-47-3
- Arun Lochan Das : Ebar Ubhati Chao; Sishu Sashi Publication, Guwahati, 2001
- Apurba Sarma : Jyotiprasad as a Film Maker; Gauhati Cine Club, Guwahati, 2005
- Sanjay Kr. Hazarika (ed) : Chaturtha Stambha; N.L. Publications, Guwahati, 2011
- Chandra Prasad Saikia : Asamar Batari Kakat-Alocanir Dersa Bachariya Itihash; Celebration Committee of 150 Years of Newspapers in Assam, Guwahati, 1998

- Prasanna Kr. Phukan : Asomor Sambad Patrar Samikshyatmak Adhyayan; Madhu Prakashan, Dergaon, 1996
- Gitali Saikia, Sanjib Lochan Tamuli : Folk Theatre of Assam; Directorate of Information and Public Relations (DIPR), Assam, 2014
- Dr. Umesh Deka (Ed.) : A Glimpse of Language and Culture of North East India; Chandra Prakash, Guwahati, 2012, ISBN: 978-93-244-0269-1
- Zakirul Alam (Ed.) : Journalism & Media Industry of North East India; EBH Publisher, Guwahati, 2014, ISBN : 978-93-83252-31-2
- Aheibam k. Sing, SS Hanjabam and K.C. Devi (Ed.) : Media in Manipur (Vol-I); Akansha Publishing House, New Dekhi, 2020, ISBN : 978-81-8370-575-2
- K.C. Devi, SS Hanjabam and others (Ed.) : Media in Manipur (Vol-II), Akansha Publishing House, New Delhi, 2020, ISBN : 978-81-8370-576-9
- Anjan Sarma (Ed.) : 175 Years of Media in Assam and Beyond; PowerShift, Bhabani Books, Guwahati, 2022, ISBN: 978-93-87494-48-0
- Elizabeth W. Brown : the Whole World Kin; Powersift, Bhabani Books, Guwahati, 2022, ISBN : 978-93-93935-01-4
- G.P. Pandey : Press in the North East; Publication Division, Ministry of I&B, ISBN : 978-81-230-1840-9

Particulars of Course Designer:

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1. Four-year Undergraduate Programme
2. Subject Name : *Mass Communication and Journalism (MCJ)*
3. Semester : Sixth
4. Course Name : ICT and Media Management
5. Existing Base Syllabus : CBCS
6. Course Level : 300-399
7. Theory Credit**: 4**
8. Practical Credit**: Nil**
9. Number of Required Classes: **60**

   Contact Class: 40

   Non-Contact Classes*: 20

10. Total marks: End Semester Examination will be 3 Hours duration with 80 marks;

    Internal Assessment is 20 Marks

COURSE OBJECTIVES

- Introduce various concepts on IEC and ICT.
- Educate and train the students on ICT as a tool of education.
- Introduce students about the aspects of media management

LEARNING OUTCOME

Critical Thinking:

- Apply critical thinking on IEC, ICT and Media Management

Analytical reasoning:

- Identify authentic information through the use of ICT

Research Related Skills:

- Develop skills to identify information for IEC production

COURSE OUTLINE

Unit No.	Unit Content	No. of Classes (60)	Marks
Unit - I	Information, Education & Communication (IEC) : Concept and Meaning of IEC; Characteristics of IEC; IEC and media engagement; IEC and Electronic media; IEC and Print media; IEC and ICT; IEC production and Media planning; Concept of design and graphics for IEC. Various aspects of the educational media production: video production, audio production, audio- visual production, techniques of instructional media production;	15 (10+5*)	20
Unit - II	Concept and Meaning of IT and ICT, ICT in mass communication, current trends of ICT; ICT as a tool of education and research in the contemporary period, role of ICT as a change agent; e-learning portal; e-	15 (10+5*)	20

	books, e-journals; online databases such as DOAJ, Shodhganga, Jestor etc. ICT applications in Media : ICT and reporting, editing, designing and production; ICT and media convergence; OER		
Unit - III	Principles of Media Management; Significance and importance; Media as an industry: stages and development, investment in media industry; Circulation; price war and sales; Advertising and marketing; personal management; production; media as profession	15 (10+5*)	15
Unit – IV	Media ownership : characteristics and pattern; media ownership pattern in world, India; FDI in media industry; Media consumers : characteristics, behavior and significance; TRP and emerging trends; Revenue pattern for print, radio, television and digital media; Impact of new technologies in media; Media entrepreneurship : characteristics and scenario in India and Assam.	15 (10+5*)	25

References

- Kothari, Gulub. (1995). Newspaper Management in India, Intercultural Open University
- Chiranjeev, Avinash. (2000). Electronic Media Management, Authors Press.
- Peter, Pringle. K. et. al., (1989). Electronic Media Management, Focal Press.
- Gunarathne, Shelton A.. (2000). Handbook of Media in Asia, Sage.
- Kothari, Gulab. (1985). Newspaper Management in India, Intercultural Open University.

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1. Four-year Undergraduate Programme
2. Subject Name : *Mass Communication and Journalism (MCJ)*
3. Semester : **Sixth**
4. Course Name : Specialised Communication
5. Existing Base Syllabus : CBCS
6. Course Level : 300-399
7. Theory Credit**: 4**
8. Practical Credit**: Nil**
9. Number of Required Classes: **60**

    Contact Class: 40

    Non-Contact Classes*: 20

10. Total marks: End Semester Examination will be 3 Hours duration with 80 marks;

    Internal Assessment is 20 Marks

COURSE OBJECTIVES

The course is designed to:

- Introduce the students to various fields of communication
- Familiarise the students with various types of reporting.
- Enumerate the basics of writing for different fields of communication.

LEARNING OUTCOME

Disciplinary and Interdisciplinary areas:

- Develop skills on various types of specialised communication;
- Decipher the significance of science communication, corporate communication, cultural communication and sports journalism.

Generic Learning:

Critical Thinking:

- Apply analytical thought on identifying various types of communication
- Interpret growth, development and changing trends of specialized communication in contemporary world

Creativity:

- Adopt innovative communication tools for message designing in specialized communication
- Interpret issues from multiple perspectives

Communication Skills:

    - Develop listening ability for content generation
    - Express thoughts and ideas in different formats
    - Construct informative messages from marginalized section
    - Disseminate arguments with valid reasonings

Research Related Skills:

- Develop skills to identify sociological perspectives on various fields of communication

Coordinating and collaborating with others:

- Coordinate and collaborate with specific stakeholders for effective implementation of communication design/information

Digital and Technological Skills:

- Understand the use of digital and technological adaptation for message generation, dissemination and reception

Value inculcation:

- Develop neutrality in understanding information
- Instil integrity and identify ethical information, dissemination norms

Environmental Awareness and Action:

- Develop message for various environmental issues through writing and videos for taking actions

Empathy

- Ability to appreciate differences, individualism and social inequalities and generate content to mitigate the same

COURSE OUTLINE

Unit No.	**Unit Content**	**No. of Classes (60)**	**Marks 80**
Unit - I	**Political Communication** The Changing Role of Media in Democracy, Media Influencing, Politics and vice versa, Political Communication's effects on the public: Agenda Setting & Priming and Framing, News Coverage during elections, Political Marketing & PR, Emotions in Politics, covering parliamentary sessions, media manipulation, media lobbying, intolerance Trial by Media, media activism, International Relations and Media	15 (10+5*)	20
Unit - II	**Cultural and Sports Communication** Definition and Types of Cultural Communication, culture and sustainability, understanding various aspects of Indian Culture and their scope (Oral literature, material culture, performing arts etc.), Mass Culture and Popular culture. Current scenario of cultural reporting, cultural impact and imperialism. Cultural reporting. Need and significance of sports journalism, understanding sports diplomacy, introducing various types of sports in the world with special reference to North East India, various sports events, sports associations and federations, Sports features and photography	15 (10+5*)	20

Unit - III	**Science Communication** Basic understanding of science and technology communication, need and significance, historical background, Movement of Public Understanding of Science in the world, inculcating scientific temperament, science popularisation, Challenges of Science Communication, Role of media in creating scientific temper in society, Knowledge about scientific experiments in the country: SITE Experiment, Kheda Project, Chambal Project, Agricultural extension programmes etc Important tenants of science writing, science literature- fiction and non-fiction, science films, science through radio and television, science through traditional folk media, science reporting, writing and content generation, translation in science communication. Basics of Green Journalism	15 (10+5*)	20
Unit – IV	**Business Communication**: The Nature of Business Communication, Types of Business Communication, Business communication skills, Report writing, Writing Memos, Circulars, Notices and Applications. Developing Oral Business Communication Skills, Covering business promotion.	15 (10+5*)	20

References:

- Jethwaney, Jaishri (2010). Corporate Communication – Principles and Practice. Oxford University Press.
- Sachdeva, Iqbal S. (2009). Public Relations – Principles and Practices, OUP.
- Herman, S & Chomsky N. (1988, Reprint edition 2002), Manufacturing Consent: The Political Economy of the Mass Media, Pantheon Books Inc
- Samovar, L. A & Porter, R. E. (2000). Inter-cultural Communication-A Reader, Wadsworth
- Ravindran, R.K. (1999). Media and Society. Commonwealth
- Price, Stuart. (1998). Communication Studies, Longman
- Caldwell' (eds) Production Studies: Cultural Studies of Media Industries. New York: Rouledge.
- Dawking, Richard. Modern Science Writing; Oxford University Press
- Berger, RoloffSwoldsen. Handbook of Communication Science; Sage Publications
- Indian Science News Association , Communicating Science; Indian Science News Association, Kolkata

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1. Four-year Undergraduate Programme
2. Subject Name: *Mass Communication and Journalism (MCJ)*
3. Semester: Sixth
4. Course Name: Convergent Media and Content Development
5. Existing Base Syllabus: CBCS
6. Course Level: 300-399
7. Theory Credit**: 4**
8. Practical Credit**: Nil**
9. Number of Required Classes: **60**

    Contact Class: 40

    Non-Contact Classes*: 20

10. Total marks: End Semester Examination will be 3 Hours duration with 80 marks;

    Internal Assessment is 20 Marks

COURSE OBJECTIVES

The course is designed to:

- Introduce the students to media convergence
- Introduce characteristics and art of digital storytelling
- Introduce a basic understanding of digital media literacy

LEARNING OUTCOME

Disciplinary and Interdisciplinary areas:

- Derive the concepts of digital and social media.
- Utilise digital social media tools for different developmental and promotional activities
- Comprehend the functionalities and challenges of AI, social media and Content Development

Generic Learning:

Critical Thinking:

- Apply critical thinking to understand various meanings and uses of convergence media;
- Ability to identify and interpret misinformation, disinformation and fake news;

Communication Skills:

- Express thoughts and ideas strategically;

Creativity

- Adopt innovative content and technique to connect and influence

Analytical Reasonings

- Identify authentic information;

- Develop digital media literacy;
- Ability to understand Social Media Engagement and Polarization

Research Related Skills:

- Develop skills to identify accurate sources of information in digital media for content development

Digital and Technological Skills:

- Enhance Skill in convergent media (reporting, scripting, content and video editing, graphic designing, voice-over and presentation, uploading), Data Journalism, Searching online resources

Value inculcation:

- Develop neutrality in understanding information
- Instil integrity and identify ethical information, dissemination norms Empathy
- Ability to appreciate differences, individualism and social inequalities and generate content to mitigate the same

COURSE OUTLINE

Unit No.	Unit Content	No. of Classes (60)	Marks (80)
Unit - I	Understanding new media, Concept of Convergence, Process and effects of Convergence, Network and Cloud technology, Evolution of Communication technology 2G, 3G, 4G, 5G etc. Convergence in Cinema, Musical Videos, OTT platforms, Role and effects of Social Media	15 (10+5*)	15
Unit - II	Social Media engagement and polarization, Echo Chamber, Hate Speech and Trolling Media Convergence and Specialized Communication (Political, Sports, Cultural, Science and Technology, Business/ Corporate etc.)	15 (10+5*)	15
Unit - III	Characteristics of Digital storytelling, Digital Content Creation: Digital platforms and Social media networks, blog post, website copies, special posts, podcast, videos; Digital marketing strategy; Research and Planning, Measuring Performance Skilling in convergent media (reporting, scripting, content and video editing, graphic designing, voice over and presentation, uploading)	15 (10+5*)	25
Unit – IV	AI and Media (Introduction to artificial intelligence, machine learning, artificial Intelligence in journalism, automated journalism), Chatbots (ChatGPT, Google Bird AI, Bing AI chat etc.) Issues of Credibility, Privacy and Security, Surveillance society, Regulatory Challenges to Media Convergence, Misinformation, Disinformation and Fake News; Fact Checking Information Technology Act 2000	15 (10+5*)	25

References:

- Grant, A. & Meadows, J. (Eds.). (2012). *Communication technology update and fundamentals*, Boston, MA: Focal Press.
- Miller, V. (2011). Understand digital culture. Sage Publications.
- Nightingale V. & Dwyer T. (2007). New media worlds: challenges for convergence. Oxford.
- Jenkins, H., & Deuze, M. (2008). Convergence culture.
- Manovich, L. (2001). The language of new media. MIT press.
- Visvizi, A., & Lytras, M. D. (Eds.). (2019). Politics and technology in the post-truth era. Emerald Publishing Limited
- Reddick, R., & King, E. (2000). The online journalist. Wadsworth Publishing.
- Ray, T. (2006). Online Journalism: a basic text. Cambridge India.
- Gray, J., Chambers, L., & Bounegru, L. (2012). The data journalism handbook: how journalists can use data to improve the news. "O'Reilly Media, Inc."
- Batsell, J. (2015). Engaged journalism: Connecting with digitally empowered news audiences. Columbia University Press

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Particulars of Course Designer:

Prepared by: Dr. Bharati Bharali
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Internship

Students have to go compulsory internship for **four to six week** to get their final diploma / degree as per GU-FYUGP rules.

NATIONAL EDUCATION POLICY, 2020

Syllabus For

Four Year Undergraduate Programme
Subject: Persian

Department of Persian, Gauhati University
Email: persian@gauhati.ac.in

Cycle: 1.0 June, 2023

Core Papers

Paper-1: Introduction of Persian language & Basic Grammar

Paper-2: Persian language Learning

Paper-3: Introduction of Persian Prose and Poetry: Some Selection

Paper-4: Origin and Development of Persian Language

Paper-5: Literary History of Persian

Paper-6: Classical Persian Prose & Poetry

Paper-7: Applied Persian Grammar

Paper-8: Language development & Correspondence in Persian

Paper-9: Ethical Persian Literature

Paper-10: Persian Sufi Literature

Paper-11: Modern Persian Prose

Paper-12: Modern Persian Poetry

Paper-13: Indo-Persian Prose

Paper-14: Indo-Persian Poetry

Paper-15: History of Sufism

Course Name: **Introduction of Persian language & Basic Grammar**

Course Level: 100-199
Semester-1
Credit: 4
Contact Classes: 40, Non-Contact Classes: 20

Learning Outcome:

- Students will be able to learn the basic grammatical structure in modern Persian language.
- Student will be able to read and write on basic things about day to day life communication in the context of trade, tourism and culture.
- Students will evolve their linguistic competence in Persian and they can go for higher levels of learning Persian Language and literature.

Unit-I: **30 Marks**

a. Brief introduction of Persian Language
b. Alphabet
c. Oral Expression (Phonetics & Elocution)
d. Vocabulary building
e. Suffix and Prefix

Unit-II: **30 Marks**

a. Singular, Plural, Gender, Preposition, Negative & interrogative
b. Elementary Grammar: Masdar, Mozare, Different Zamane, Ism, Fae'l, Sifat etc.
c. Compositions, Numbers and vocabulary buildings

Unit III: **20 Marks**

a. Days and Months in Persian
b. Names of months, Seasons & weekdays.

Reading List:

a. Ahmed Saeed, Lessons in Modern Persian, Ministry of Defence, Monumental Publishers, 1988
b. Persian for Foreigners (An Elementary Course) by by Taqi Purnamdarian, 1995.
c. Namdariyan, Taqipur: Dars-e-Farsi, Published by Institute for Humanities & Cultural Studies, Tehran, Iran, 1378/1999
d. Kumar, Dr. Rajinder: Elementary Persian Grammar, Harjeet Publication, Delhi-110 034, 2009
e. Sufi Abdul Aziz: Essentials of Persian Translation, Indo-Iran Society, Lal Kuan, Delhi 110 006, 1999
f. Thackston, Wheeler: An Introduction to Persian, Bethesba, Ibex Publication, Maryland, U.S.A., 2009

Course Name**: Persian Language Learning**

Course Level: 100-199
Semester-2
Credit: 4

Contact Classes: 40, Non-Contact Classes: 20

Learning Outcome:

- Learners will be able to learn the Major grammatical structure in modern Persian language.
- Learners will be able to read and write on basic things about day to day life communication.
- Students will evolve their linguistic competence in Persian and they can go for higher levels of learning Persian Language and literature.
- Read and apprehend passages from simple but authentic texts from the Farsi *Dabistan*.

UNIT –I: **30 Marks**

a. Noun, prepositions, adverb, Ezafe, etc.
b. Adjectives, Degrees, Infinitives, Imperatives etc.
c. Tenses (Present, Past, Future)

UNIT – II: **20 Marks**

a. Pronoun (Personal & Possessive), Objectives
b. Present Participle, Voice (Active & Passive) etc.

UNIT-III: **30 Marks**

a. Reading & Writing Skill
b. Rah-e-Madarseh
c. Duwa
d. Chahar Fasl
e. Lakpusht wa Murghabi Ha
f. Rubah-o-Khurus

<u>Reading Lists:</u>

1. Taqipur Namdariyan: Dars-e-Farsi, Published by Institute for Humanities & Cultural Studies, Tehran, Iran,1999.
2. Saffarzadeh, Tahera: Fann-e-Tarjuma, Intesharat-e Amir Kabir, Tehran, Iran, 1996
3. Dr. Rajinder Kumar: Elementary Persian Grammar, Harjeet Publication, Delhi, 2009
4. Sufi Abdul Aziz: Essentials of Persian Translation, Indo-Iran Society, Lal Kuan, Delhi,1999.
5. Wheeler Thackston: An Introduction to Persian, Bethesba, Ibex Publication, Maryland, U.S.A., 2009
6. Mirsadeghi, Nazanin, Essentials of Persian Grammar: Concepts and Exercises, December 4, 2014

Course Name: **Introduction of Persian Prose and Poetry: Some Selection**

Course Level: 200-299
Semester-3
Credit: 4
Contact Classes: 40, Non-Contact Classes: 20
Learning Outcomes:

- This course will enable a learner to have a good understanding of stories from Indian and Iranian original text for knowing ancient Indo-Persian heritage.
- Through this course the students will be acquainted with moral teaching of Indian and Iranian cultural ethos.

The following Lessons: **40 Marks**

Unit-I: Prose: **بخش نثر**

1. Madarseh-e-Ma	مدرسہ ما
2. Lakpusht wa Khargush	لاک پشت و خرگوش
3. Gurg-o-Gao	گرگ و گاؤ
4. Nauroz	نوروز
5. Ba Hivanat Mehrban Basheem	با حیوانات مهربان باشیم
6. Firdausi	فردوسی
7. Dehqan-e-Fidakar	دهقان فداکار
8. Rubah-o-Khurus	روباه و خروس
9. Sa‘di Shirazi	سعدی شیرازی
10. Agar Jungle Nabashid	اگر جنگل نباشید
11. Umar Khayyam	عمر خیام
12. Sangpusht-o-Gavazn	سنگ پشت و گوزن

Unit-II: Poetry: **بخش نظم** **40 Marks**

The following Poems:

1. Benam-e-Khuda	بنام خدا (نظامی)
2. Kitab-e-Khub	کتاب خوب (عباس یمینی شریف)
3. Khane Aziz-i- Man	خانہ عزیز من
4. Mihan-e-Kheesh ra Kuneem Abad	میهن خویش را کنیم آباد
5. Rubah-o-Zagh	(روباه و زاغ) حبیب یغمائی
6. Subh	صبح (یحیی دولت آبادی)
7. Madar	مادر
8. Darakhtkari	درختکاری (عباس یمینی شریف)

Reading Lists:

1. Ahmad Saffar Maqaddam, Persian language: Book one to Four, Iran Culture House, 2001
2. Farsi Dabistan, Awal ta Panjum, Iran Culture House. 1383 AH
3. Taqipur Namdariyan: Dars-e-Farsi, Humanities & Cultural Studies, Tehran, Iran, 1378/1999.
4. Saffarzadeh, Tahera: Fann-e-Tarjuma, Intesharat-e Amir Kabir, Tehran, Iran, 1996
5. Dr. Zehra Khanlari‘Kiya’: Farsi Dastur, Idarah-e- Adabiyat, Jayyed Press, Delhi, 1996
6. Sufi Abdul Aziz: Essentials of Persian Translation, Indo-Iran Society, Lal Kuan, Delhi,1999.

Course Name: Origin and Development of Persian Language

Course Level: 200-299
Semester-4
Credit: 4
Contact Classes: 40, Non-Contact Classes: 20

Learning Outcome:

- Provide comparative knowledge of languages belonging to Indo-Iranian group.
- This paper will provide knowledge about the pre-Islamic languages of Persia along with the literature produces in those languages especially the Avestan and the Pehlavi literature.
- Generate evidence of comparative Philology to explain how Persian and Sanskrit were close to each other.

Unit 1: **20 Marks**

a. The Family of Indo-European Languages and their classification

Unit 2: **40 Marks**

- **a. Avesta**
  - i. Brief introduction
  - ii. writing style and script
  - iii. Parts of Avesta
- **b. Old Persian**
  - i. Brief introduction
  - ii. Writing style and script
  - iii. Inscriptions
- **c. Pehlavi**
  - i. Brief Introduction
  - ii. Huzwarish
  - iii. Literature
- **d. Dari**
  - i. Brief introduction
  - ii. Arab Invasion
- **e.** Resemblance between Persian and Sanskrit

Unit-3: **20 Marks**

1. Pre-Islamic religions
   - a. Zoroastrianism
   - b. Manism

Reading Lists:

1. Iran its culture by F.C. Davar
2. Historical Grammar of Ancient Persian Language by E.L.Jhonson
3. Selection from Avesta and old Persian by I.J.S. Taraporewale

Course Name**: Literary History of Persia**

Course Level: 200-299
Semester-4
Credit: 4

Contact Classes: 40, Non-Contact Classes: 20

Learning Outcome:

- This paper will be an introduction to historical and Socio-cultural changes during the rule of different dynasties so that the student become well aware about the various literary movements of this periods.
- Inculcate the basic knowledge and skills and expertise in Indo-Persian studies.

Unit-I: 40 Marks

a. Iranian dynasties: Samanid to Seljuq Period
b. Persian poets & writers
c. Persian Literature

Unit II: 40 Marks

a. Mugul Timurid to Pahlavi Period
b. Persian poets & writers
c. Persian Literature

Reading Lists:

1. Sharaf-e-Alam, Prof.; Patna University, Bihar: Iran: Ahad-e-Qadeem Ki Siyasi, Saqafatiwa Lisani Tarikh, Printology Ink, Kucha Chelan, Darya Gunj, Delhi-110 002, 1981

2. Ishrat, Dr. Amrit Lal: Iran SadyunkeAaine Mein, Idarah-e-Musannefeen, Hyderabad.

3. Shafaq, Rezazadeh: Tarikh-e-Adabiyat-e-Iran, Translated by Sayyed Mubariz uddin Rif‘at, Kutabkhana Khurshidia, Urdu Bazar, Lahore, 2014.

4. Ansari, Dr. Noorul Hasan: A History of Persian Language, Idarah-e-Adabiyat-e-Dehli, Delhi-110 006, Vol. I, 1982

5. Chopra, Ravindra Mohan: The Rise, Growth and Decline of Indo-Persian Literature, Iran Society, Calcutta, 2012.

Course Name**: Classical Persian Prose & Poetry**

Course Level: 200-299
Semester-4
Credit: 4
Contact Classes: 40, Non-Contact Classes: 20

Learning Outcome:

- Introduce the learners with the classical Persian literature with special reference to the well famed classical Persian prose writers.
- Introduce the melodious rhyming and heart touching classical Persian poetries comprises of Ghazals, Mathnavis, Rubayies etc to inculcate rich tradition of classical Persian poetry among the learners.
- Interpret the values and traditions reflected in Classical Persian literature for a better human society.

Unit-1: Prose **40 Marks**

a. **Kimiya-i-Sadat**
    i. *Paida Kardan-i-Sharayat* (پیدا کردن شرایت)

b. Tarikh-i-Tabari
    i. *Dastan-i-Tawallud-i-Behram* (داستان تولد بهرام)

b. **Marzban Nameh**
The following stories:
    i. *Dāstan-e-Aahu-o-Mush-o-Uqqab*
    ii. *Dāstan-e-Barzigar Ba Mar*

Unit-2: Poetry **20 Marks**
Unit-I:
a. **Rubayat (Omar Khyyam**)
    i. 1-8 quatrains

Unit:-II: **20 Marks**
a. **Ghazaliyat Sa'adi Shirazi:**
    i. Waqt-e-tarub- khush…
    ii. In tuitysar we bustani…
    iii. Aiki gufti hich muskil chum…

Reading Lists:

1. BA Pass Persian Selection, Calcutta University, 1998
2. Nasr-e-Kohan; Intersharat-e-Vizarat-e-Farhang-o-Hunar,Idareh Kull-e Nigarish, Tehran, Iran.
3. NizamiAruziSamarqandi: ChaharMaqaleh; edited Mohammad Qazvini, Tehran University Publication, Tehran, Iran, 1334/1955.
4. Siyasat Nama published by Intisharat-i-Zawar, Tehran edition 2037 A.H. (sun year).
5. Adabiyat-i-Kalasic-o-Jadid, Mazhar Asif, Bihar University, 2005
6. Rehmandoost, Mostafa: Bagh-e-Mehrbaniha, Madraseh Publication, Tehran, Iran, 1995

Course Name: **Applied Persian Grammar**

Course Level: 200-299
Semester-4
Credit: 4

Contact Classes: 40, Non-Contact Classes: 20

Learning Outcome:

- Introduce the learners with resources to understand advanced Persian grammar.
- Involve students to improve their creativity in applied Persian language and enhance their qualities of expression and elaboration in the day to day useable communications and dealings.

Unit-1: 40 Marks

a. Composition
b. Phrases and Idioms in Persian
c. Compound Verbs
d. Proverbs & Idioms

Unit-2: 40 Marks

a. Precise writing
b. Report writing
c. Essay & Letter Writing

Reading Lists:

1. دستور زبان فارسی نوشته زهرا خانلری
2. Persian Grammar by Wilber
3. A Grammar of Persian Language by W. Jones
4. Taqipur Namdariyan: Dars-e-Farsi, Published by Institute for Humanities & Cultural Studies, Tehran, Iran,1999.
5. Saffarzadeh, Tahera: Fann-e-Tarjuma, Intesharat-e Amir Kabir, Tehran, Iran
6. Dr. Rajinder Kumar: Elementary Persian Grammar, Harjeet Publication, Delhi-110 034,
7. Sufi Abdul Aziz: Essentials of Persian Translation, Indo-Iran Society, Lal Kuan, Delhi 110 006, 1999.
8. Wheeler Thackston: An Introduction to Persian, Bethesba, Ibex Publication, Maryland, U.S.A., 2009
9. Nazanin Mirsadeghi, Essentials of Persian Grammar: Concepts and Exercises, December 4, 2014

Course Name: **Language development & Correspondence in Persian**

Course Level: 300-399
Semester-5
Credit: 4

Contact Classes: 40, Non-Contact Classes: 20

Learning Outcome:

- Accustom the students with Persian language & make them fluent in spoken Persian
- Prepare the learners to read Persian text and historical sources
- Prepare an expert translator and efficient interpreter
- Make students viable for corporate sector jobs in this field

Unit-1: **30 Marks**

a. Persian Terminologies
b. Simple Sentence making
c. Development of communicative skill

Unit-2: Advance Translation from English to Persian & vice-versa **30 Marks**

i. Commercial Translation
ii. Political Translation
iii. Historical Translation

Unit-3: Spoken Persian **20 Marks**

Reading Lists:

1. Namdariyan, Taqipur: Dars-e-Farsi, Published by Institute for Humanities & Cultural Studies, Tehran, Iran, 1378/1999
2. Kumar, Dr. Rajinder: Elementary Persian Grammar, Harjeet Publication, Delhi-110 034, 2009
3. Sufi Abdul Aziz: Essentials of Persian Translation, Indo-Iran Society, Lal Kuan, Delhi 110 006, 1999
4. Thackston, Wheeler: An Introduction to Persian, Bethesba, Ibex Publication, Maryland, U.S.A., 2009
5. Ahmed Saeed, Lessons in Modern Persian, Ministry of Defence, Monumental Publishers, 1988

Couse Name: Ethical Persian Literature

Course Level: 300-399
Semester-5
Credit: 4

Contact Classes: 40, Non-Contact Classes: 20

Learning Outcome:

- Morality and ethics being the backbone of classical Persian poetry, in this paper it is tried to inculcate these two utmost necessary characteristics among the students.

Unit-I:	**20 Marks**

A brief History Ethical Literature

Unit II : Prose	**30 Marks**

a. Qabus Nameh

i. Bab-e-Nahum

b. Akhlaq-i- Muhsini

ii. Dar Shukur

ii. Dar Sabr

iii. Gulistan-i-Sa’adi (1-5 stories from Daftar 1)

Unit III: Poetry	**30 Marks**

a. Bustan
i. Darvish-e-Haqgu
ii. Jawan mard wa Sag-e-Tishneh

Reading Lists:

1. Nasr-e-Kohan; Intersharat-e-Vizarat-e-Farhang-o-Hunar, Idareh Kull-e Nigarish, Tehran, Iran.
2. Sa‘di Shirazi, Kulliyat-e-Sa‘di; Mohammad Ali Furooghi, Intesharat-e-Mu‘iniyan, Tehran, 1996.
3. Sa‘di Shirazi, Boostan-e-Sa‘di; Mohammad Ali Farughi, Tehran, 1937.
4. Manochehr Danish Pazooh: Safina-e-Marvareed, Intesharat-e-AllamaTabatabai, Tehran, Iran, 2004

Course Name: Persian Sufi Literature

Course Level: 300-399
Semester-5
Credit: 4

Contact Classes: 40, Non-Contact Classes: 20

Learning Outcome:

- Interpret the views of Sufi poets such as Rumi, Hafiz on humanism and universal brotherhood.
- Impart ethics to recognize different value systems and understand the moral dimensions of decision making.

Unit-I: Prose **40 Marks**

1. **Kashf-ul Mahjub** by Ali Huzwari
   حکایت ۱-۲
2. **Tazkirat-ul Awliya** by Farid uddin Attar
   حکایت ۱-۲

Unit-II: Poetry **40 Marks**

a. **Mathnavi** by Rumi
i. بشنو از نی چون حلایت می کند
ii. مرد بقال و طوطی

b. Hafiz Shirazi:
i. اگر آن ترک شیرازی بدست آرد
ii. زلف اشفتہ و خوی کرده

Reading Lists:

1. Nasr-e-Kohan; Intersharat-e-Vizarat-e-Farhang-o-Hunar, Idareh Kull-e Nigarish, Tehran, Iran.
2. Sa‘di Shirazi, Kulliyat-e-Sa‘di; Mohammad Ali Furooghi, Intesharat-e-Mu‘iniyan, Tehran, 1996.
3. Sa‘di Shirazi, Boostan-e-Sa‘di; Mohammad Ali Farughi, Tehran, 1937.
4. Manochehr Danish Pazooh: Safina-e-Marvareed, Intesharat-e-AllamaTabatabai, Tehran, Iran, 2004
5. Nasr-e-Kohan; Intersharat-e-Vizarat-e-Farhang-o-Hunar, Idareh Kull-e Nigarish, Tehran, Iran
6. Khan, Hakim Zaki Ahmad: Nisāb-e-Jadeed-e-Farsi, Jayyed Press, Ballimaran, Delhi-110 006

Course Name: **Modern Persian Prose Literature**

Course Level: 300-399
Semester-5
Credit: 4

Contact Classes: 40, Non-Contact Classes: 20

Learning Outcome:

- Develop an expertise in different form of prose like novel writing, drama writing, short story writing.
- Students learn to identify and understand socio-cultural and economic scenario of Iran reflected in Modern Persian Prose literature.
- Make the learner understand about constitutional and Islamic revolution of Iran and their impact on modern Persian prose literature.

Unit 1: **40 Marks**

An Outline History of Modern Persian Prose

Unit 2: **40 Marks**

a. KhanaePedari (Saeed Nafisi)

b. Yahya (Sadiq Chubak)

c. Pizishk-e-Chashm (Mohammad Hijazi)

d. Kabutar-o-Kulagh (Yusuf E‘tesamulmulk)

e. Zuban-i-Farsi Dar Hind (Ali Asghar Hikmat)

Reading Lists:

1. Khan, Dr. M.A. and Dr S.H. Qasemi: Intekhab-e-Nasr-e-Mu‘asir-e-Farsi, Department of Persian, University of Delhi, Delhi-110 007, 1991.

2. Khan, Hakim Zaki Ahmad: Nisāb-e-Jadeed-e-Farsi, Jayyed Press, Ballimaran, Delhi-110 006.

3. Hameedi, Mehdi: Darya-e-Gauhar (Vol. I), Intesharat-e-Amir Kabir, Tehran, Iran, 1343/1964

4. Kamshad, Hasan: Modern Persian Prose, Cambridge University Press, 1966.

Course Name: **Modern Persian Poetry**

Course Level: 300-399
Semester-6
Credit: 4

Contact Classes: 40, Non-Contact Classes: 20

Learning Outcome:

- Interpret different issues related to nationalism, issues of women and children in the light of Persian poetries.
- Students learn to identify and understand socio-cultural and economic scenario of Iran reflected in Modern Persian Poetry literature.
- Make the learner understand about constitutional and Islamic revolution of Iran and their impact on modern Persian poetry literature.

Unit 1 **20 Marks**

An Outline History of Modern Persian Poetry

Unit: 2 **60 Marks**

a
. Malik-ush Shuara Bahar
  i. Ai charkh
  ii. Baghichaye Tazabahar
  iii. Chashma-o-Sang

b. Parwin Ittesami
  i. Ai Gurbeh
  iv. Ashk-i-Yateem

c. Parvez Natel Khanlari
  i. Mahdar Murdab
  ii. Khane-i-Matruk

d. Iraj Mirza
  i. Madar
  ii. Sharab

e. Shahryar
  i. Hala Chera
  ii. Parvana dar Atish

f. Nima Yushij
  i. Ai Shab
  ii. Chashma-i-Kuchak

Reading Lists:

1. Khan, Dr. M.A. and Dr S.H. Qasemi: Intekhab-e-Nasr-e-Mu'asir-e-Farsi, Department of Persian, University of Delhi, Delhi-110 007, 1991.
2. Khan, Hakim Zaki Ahmad: Nisāb-e-Jadeed-e-Farsi, Jayyed Press, Ballimaran, Delhi-110 006.
3. Hameedi, Mehdi: Darya-e-Gauhar (Vol. I), Intesharat-e-Amir Kabir, Tehran, Iran, 1343/1964
4. Kamshad, Hasan: Modern Persian Prose, Cambridge University Press, 1966.

Course name: **Indo-Persian Prose**

Course Level: 300-399
Semester-6
Credit: 4

Contact Classes: 40, Non-Contact Classes: 20

Learning Outcome:

- Acquire knowledge and get an overview of the society, culture and human knowledge through Persian prose produced in India.
- To acquaint with concert and comprehensive knowledge on the history of medieval India based on Persian sources.

Unit: I **20 Marks**

a. Historical Background of Indo- Persian Prose Literature

Unit: II **60 Marks**

a. **Tarikh-i- Firuzshahi**
۱- در بیان کافتن جو

b. **Tarikh-i- Asham**
۲- قصه ملک آشام

c. Jawameul Hekayat

i. Four Hekayat from Adabiyat-i-Kuhan

Reading Lists:

1. ShehabuddinTalesh, *Tarikh-i-Asham or Fathiyah-i-Ibriyah,* trans. by Dr. Mazhar Asif, Guwahati: DHAS, 2009
2. Dr, Mohini Kumar Saikia, *Assam Muslim Relation and Its Cultural Significance*, Golaghat: Luit Printers, 1978
3. Khan, Hakim Zaki Ahmed: Nisāb-e-Jadeed-e-Farsi, Jayyed Press, Ballimaran, Delhi
4. Nasr-e-Kohan; Intersharat-e-Vizarat-e-Farhang-o-Hunar, Idareh Kull-e Nigarish, Tehran, Iran

Course Name: **Indo-Persian Poetry**

Course Level: 300-399
Semester-6
Credit: 4

Contact Classes: 40, Non-Contact Classes: 20

Learning Outcome:

- Highlight contributions of great Indian origin Persian poets in globalizing Indian culture and tradition.
- Provide comprehensive list of poets such as Amir Khusrau, Iqbal, Ghalib, Bedil etc and their contributions in safeguarding composite culture of our country.

Unit-I: **20 Marks**

a. Historical Background of Indo-Persian Poetical Literature

Unit-II: **60 Marks**

a. **Amir Khusrau**
   i. Abar mi Barad wa man
   ii. Be saguftgulhadar Chaman
   iii. Dilam Dar Ashiqiawaretar

b. **Urfi Shirazi**
   f. Dar Wasf-e Kashmir
   ii. Ai matai darddarbazzare jam

c. **Iqbal Lahori**
   i. Ya Rab Darun-i-Sina Dil-i- ba- Khabar Badeh
   ii. Saai bar Jigaram Shula-i- Namak Andaz

Reading Lists:

1. Khan, Hakim Zaki Ahmad: *Nisāb-e-Jadeed-e-Farsi*, Jayyed Press, Ballimaran, Delhi

2. Diwan-e- Amir Khusru, Naval Kishor publication

3. Guzidah-i-Az-Nazm-o-Nasr-i-Farsi (Jeld Awwel)

4. Tutiyan-i- Hind By Dr. Nejamuddin S. Gorekar

Course Name: **History of Sufism**

Course Level: 300-399
Semester-6
Credit: 4

Contact Classes: 40, Non-Contact Classes: 20

Learning Outcome:

- Illustrate origin, meaning and development of Sufism.
- Describe contributions of Sufis in safeguarding human values and universal brotherhood
- Strengthen the relation between Sufism, spiritualism, mysticism and Bhaktism.

Unit-I:	40 Marks

a. Origin and development of Sufism
b. Stages (*Marhals*) & Stations (*Maqams*) of Sufism

Unit-II:	40 Marks

a. Different Silsila (orders) of Sufism
b. Prominent Sufis of India & their contributions

Reading Lists:

1. Mohd.Yahya Tamizi, *Sufi movement in Eastern India*, Delhi: Idarah-i Adabiyat-i Delli, 1992
2. Saiyid Athar Abbas Rizvi, *A History of Sufism in India,* Vol.1., New Delhi: Munshiram Manoharlal Publisheres Pvt. Ltd. 1978
3. Cyprian Rice, *The Persian Sufis*, Abingdon: Routledge, 2011
4. Dr. Maheswar Neog, *Pavitra Assam,* Jorhat: Assam Sahitya Sabha, 2008

LIST OF 15 CORE PAPERS [PHILOSOPHY]

CORE [PHILOSOPHY] - I

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: FIRST
d. Course Name: **ANCIENT INDIAN THOUGHT**
e. Existing Base Syllabus: NA
f. Course Level: 100-199
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I:**Vedic Thought**	-Saṃhita: Meaning, Theology, Cosmology, Ethics -Brāhmaṇas: Meaning, General Character, Theory of Sacrifice, Ethics -Āraṇyakas and Upaniṣads: Meaning, Doctrines of Upaniṣads	15	25
II:**Non-Vedic Thought**	-Bauddha: Four Noble Truths, Impermanence and Momentariness, No-soul -Jaina: Anekāntvāda, Syādvāda, Bondage and Liberation -Cārvaka: Theory of Knowledge, Rejection of Transcendental Entities, Ethics	15	25
III: **Smriti and Epics**	-Manusaṃhita: Dharma -Mahābhārata: Religion, Dharma -Rāmāyaṇa: Idea of Perfect Life	15	25
IV : **Pūrāṇas**	-Pūrāṇa: Meaning, Origin -Pūrāṇa: Content -Pūrāṇa: Ethics	15	25

h. Reading list:

Chatterjee, S. and D. Dutta : *An Introduction to Indian Philosophy*

Dasgupta, S. A : *History of Indian Philosophy. Volume I*

De, S.K., U. N. Ghosal, A. D. Pusalker, R.C. Hazra (eds) : *The Cultural Heritage of India. Volume III*

Keith, A. B : *The Religion and Philosophy of the Veda and Upanisads. Volume II*

Radhakrishnan, S : *Indian Philosophy. Volume I*

Sinha, Jadunath : *Indian Philosophy. Volume I*

Winternitz, M : *A History of Indian Literature. Volume I*

i. Graduate Attributes

i. Course Objectives :

-The Course introduces the students to thoughts which were available in ancient India.
-The Course introduces the ideas and concepts which helped systems of Indian Philosophy to develop.
-The Course introduces the students to the objectives towards which knowledge was directed in ancient India.

ii. Learning Outcomes:

- At the completion of the Course, a student is expected to be able to articulate the distinct areas of thoughts of ancient India.
- At the completion of the Course, a student is expected to be able to determine the characteristics/ distinguishing marks of a specific area of thought in ancient India.
- At the completion of the Course, a student is expected to be able to identify/ trace ideas of ancient India that have continued.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Shakuntala Bora, Gauhati University, shakuntalabora@yahoo.com

CORE [PHILOSOPHY]- II

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: SECOND
d. Course Name: **GREEK PHILOSOPHY**
e. Existing Base Syllabus: PHI-HC-2016
f. Course Level: 100-199
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I: **Pre- Socratics**	-The Milesians: Thales, Anaximander, -The Eleatics: Parmenides, Zeno -The Physicists: Heraclitus, Empedocles	15	25
II: **Sophists and Socrates**	-Protagoras and Gorgias -Socrates' Method -Socrates' Virtue	15	25
III: **Plato**	-Knowledge and Opinion -Theory of Forms -Justice	15	25
IV : **Aristotle**	-Forms and Matter -Causation -Actuality and Potentiality	15	25

h. Reading list:

Stace W.T: *A Critical History of Greek Philosophy*

Barnet J: *Early Greek Philosophy*

B.A.G. Fuller: *History of Philosophy*

F. Copleston : *History of Philosophy, Volume I*

Zeller: *Outlines of Greek Philosophy*

Gomperz: *The Greek Thinkers*

W.K.C. Guthrie: *History of Greek Philosophy*

B.N. Moore: *Philosophy- The Power of Ideas*

ii. Graduate Attributes

i. Course Objectives :

-The objective of the course is to introduce the student to the main tenets of Greek philosophy.

-The objective is to trace the origin of Greek philosophy, beginning from Pre-Socratic to Socrates, Plato and Aristotle.

ii. Learning outcomes:

- It will give the students a comprehensive understanding of early Greek Philosophy. -
-The student will learn about the questions concerning virtue, justice, theory of forms, and causality.
-The student will learn about the different philosophical theories about the composition of the stuff that makes up the world .

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Akoijam Thoibisana, Gauhati University, akoijamthoibisana@gauhati.ac.in

CORE [PHILOSOPHY]- III

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: THIRD
d. Course Name: **INTRODUCTION TO SYSTEMS OF INDIAN PHILOSOPHY**
e. Existing Base Syllabus: NA
f. Course Level: 200-299
g. Syllabus showing each unit against class numbers and marks:

Unit no.	Unit content	No.of classes	Marks
I:**Bauddha-Jaina**	-Bauddha: Source Books and Doctrines of Abhidhamma Buddhism, Source Books and Doctrines of Mahāyāna Buddhism -Jaina: Source Books, Sects, Atheism	15	25
II:**Sāṅkhya-Yoga**	-Sāṅkhya: Early School of Sāṅkhya, Source Books, Basic Doctrines -Yoga: Source Books, Basic Doctrine	15	25
III:**Nyāya-Vaiśeṣika**	-Nyāya: Source Books, Aim and Scope, Basic Doctrines -Vaiśeṣika: Source Books, Aim and Purpose, Basic Doctrines	15	25
IV : **Mīmāṃsā-Vedānta**	-Pūrva-Mīmāṃsā: Source Books, Aim and Purpose, Basic Doctrines -Vedānta: Source Books, Aim and Purpose, Basic Doctrines	15	25

h. Reading list:

Chatterjee, S. and D. Dutta : *An Introduction to Indian Philosophy*

Dasgupta, S : *A History of Indian Philosophy. Volume I*

Mullar, Max : *The Six Systems of Indian Philosophy*

Radhakrishnan, S : *Indian Philosophy. Volume I & II*

Raju, P. T : *Structural Depth of Indian Thought*

Sinha, Jadunath : *Indian Philosophy. Volume I & II*

Sharma, C : *A Critical Survey of Indian Philosophy*

iii. Graduate Attributes

i. Course Objectives :

-The Course introduces the students to systems of Philosophy which developed in India before the widespread influence of outside thoughts.
-The Course introduces the students to the books and scholars need to be studied to have a proper understanding of the systems.
- The Course introduces the students to the basic ideas and thoughts of each specific system.

ii. Learning outcomes:

-At the completion of the Course, a student is expected to be able to name the systems of philosophy that originated in India before outside influence became prevalent.
- At the completion of the Course, a student is expected to be able to identify the books and scholars to be studied to develop an understanding of a definite system of Indian Philosophy.
-At the completion of the Course, a student is expected to be able to state the basic concepts and theories that are specific to a system.

j. Theory credit : 4
k. Practical credit: NA
l. No. of required Classes: 60
m. No. of contact Classes: 45
n. No. of non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Shakuntala Bora, Gauhati University, shakuntalabora@yahoo.com

CORE [PHILOSOPHY]- IV

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: FOURTH
d. Course Name: **INTRODUCTION TO WESTERN PHILOSOPHY**
e. Existing Base Syllabus: PHI-HG-1016
f. Course Level: 200-299
g. Syllabus showing each unit against class numbers and marks:

Unit no.	Unit content	No.of classes	Marks
I:	-Definition, Nature and Scope of Philosophy -Branches of Philosophy	15	25
II:	-Substance: Descartes, Spinoza, Leibnitz -Hume: causality -Kant: Space and Time	15	25
III:	-Empiricism, Rationalism -Scepticism -Criticism	15	25
IV :	-Realism -Idealism -Absolutism	15	25

h. Reading list:

Descartes: *Discourse on Method; Meditation on First Philosophy*

Spinoza: *Ethics (Part I: Concerning God; and Part 2: On the Nature and Origin of the Mind)*

Leibniz: *Monadology*

Locke: *An Essay Concerning Human Understanding (Book I: Neither Principles nor Ideas Are Innate; and Book 2: Of Ideas)*

Berkeley: *Three Dialogues between Hylas and Philonous (The First Dialogue)*

Hume: *An Enquiry Concerning Human Understanding (Part I, Section II and III: The Origin and Association of Ideas; Part II, Section VII: Of the Idea of Necessary Connexion)*

Kant: *Prolegomena to Any Future Metaphysics*

Hegel: *Phenomenology of the Spirit*

Anthony Kenny: *A New History of Philosophy*

Barlingay and Kulkarni: *Critical History of Western Philosophy*

D.W. Hamlyn: *Routledge History of Philosophy*

B.N. Moore and K. Bruder: *Philosophy- The Power of Ideas*

F. Thilly: *A History of Philosophy*

F. Copleston: *A History of Western Philosophy*

R. Scruton: *A Short History of Modern Philosophy*

i. Graduate Attributes

i. **Course Objectives :**

- The course will introduce the students to the history of Modern Western Philosophy.
- Philosophers like Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, as well as the German Idealists like Kant and Hegel will be studied.
- The questions that concern these philosophers and their intensive argument will be read.

ii. Learning Outcomes:

-The course will enable students to understand various philosophical concepts like substance, causality, space and time, etc.
- Students will become familiar with certain ways of putting arguments about the concepts
- Students will also learn the different approaches taken up by rationalism, empiricism and critical thinkers in understanding the concepts.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of required Classes: 60
m. No. of contact Classes: 45
n. No. of con-contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Akoijam Thoibisana, Gauhati University, akoijamthoibisana@gauhati.ac.in

CORE [PHILOSOPHY]-V

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: FOURTH
d. Course Name: **THEORY OF KNOWLEDGE (INDIAN)**
e. Existing Base Syllabus: NA
f. Course Level: 200-299
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I:	-Prama and Aprama -Pramanyavada -Debate on Smriti	15	25
II:	-Pratyaksa: Meaning; Definition (Nyaya, Buddhism, Jaina, Mimamsa, Vedanta) -Anumana: Meaning; Definition (Nyaya, Buddhism, Jaina, Mimamsa, Vedanta)	15	25
III:	-Sabda: Meaning; Definition (Nyaya, Jaina, Mimamsa, Vedanta) -Upamana: Meaning; Definition (Nyaya, Mimamsa, Vedanata) Arthapatti, Anupalabdhi: Meaning; Definition (Mimamsa, Vedanata)	15	25
IV :	-Khyativada: Anyathakhyati, Viparitakhyati -Akhyati, Atmakhyati -Satkhyati, Anirvacaniyakhyati	15	25

h. Reading list:

Chatterjee, S.C: *Nyaya Theory of Knowledge*

Datta, D. M : *Six Ways of Knowing*

Devaraja , N.K: *Advaita Theory of Knowledge*

Kar, V: *Indian Theories of Error*

Sinha, J. N : *Indian Philosophy, Vol I & II*

Dasgupta, S.N: *History of Indian Philosophy*

i Graduate Attributes

i. Course Objectives :

-The course is introduced to make the students familiar with the traditional analysis of knowledge.
-The course is introduced to make the students familiar with the *pramanas* as accepted in the various schools of Indian Philosophy.
-The course is introduced to acquaint the students with various theories of truth and error.

ii. Learning outcomes:

-The course is expected to make the students know how to categorize various theories of knowledge advocated by the schools of Indian Philosophy.
-The course is expected to make the students know how to distinguish various kinds of valid knowledge and to explain the sources of valid knowledge.
- The course is expected to make the students able to analyze various theories of validity and invalidity of knowledge and theories of error.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of required Classes: 60
m. No. of contact Classes: 45
n. No. of non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Mausumi Bhattacharjya, Gauhati University , mausumi1984@gauhati.ac.in

CORE [PHILOSOPHY]-VI

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: FOURTH
d. Course Name: **ETHICS**
e. Existing Base Syllabus: PHI-HC-3036
f. Course Level: 200-299
g. Syllabus showing each unit against class numbers and marks:

Unit no.	Unit content	No.of classes	Marks
I:	-Introduction to Ethics, Definition, Nature and Scope of Ethics, -Utility of Ethics -The Psychological Basis of Ethics: Moral and Non moral action, Voluntary and Non Voluntary actions	15	25
II:	-Moral Concepts: Right and Wrong, Good and Bad, Duty, Ought, Virtue and Vice, Justice -Moral Judgment: Nature of Moral Judgments -Distinction between value judgment and factual judgment	15	25
III:	-Virtue Ethics -Deontological Ethics -Utilitarianism	15	25
IV :	-Ethics and Conflict of Interests and Duties -Freedom and Responsibility -Theories of Punishment: Deterrent, Reformative and Retributive Theory	15	25

h. Reading list:

Bernard Williams: *Ethics and the Limits of Philosophy*

Plato: *Republic*

Aristotle: *Nicomachean Ethics*

Kant : *Groundwork for the Metaphysic of Morals*

John Stuart Mill: *Utilitarianism*

J.C. Smart and Bernard Williams : *Utilitarianism: For and Against*

Peter Singer (ed.): *Applied Ethics*

David Bostock: *Aristotle's Ethics*

N. Pappas : *Routledge Philosophy Guidebook to Plato and the Republic*

W. David Ross: *Foundations of Ethics*

John S. Mackenzie: *Manual of Ethics*

William K . Frankena : *Ethics*

i Graduate Attributes

i. Course Objectives :

-The course attempts to introduce students to the fundamental questions of moral philosophy, with attention to both classic and contemporary readings. What determines the right action from wrong, and how to act morally? How do we decide what morality demands of us in some situations? etc.
- The course also addresses some issues of current moral debate.

ii. Learning outcomes:

- The course will develop analytic and critical thinking regarding ethical dilemmas.
- The course will enhance the ability to apply ethical principles in decision making.
- Students will be able to see how moral principles are involved in different concrete situations.
- It will help the students develop critical thinking on prejudices, superstitions and dogmatic behavior in the domain of ethics

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Padmadhar Choudhury, Gauhati University, padmadhar@gauhati.ac.in

CORE [PHILOSOPHY]-VII

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: FOURTH
d. Course Name: **TRADITIONAL LOGIC**
e. Existing Base Syllabus: PHI-HC-1026
f. Course Level: 200-299
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I: **Basic Logical Concepts**	-Nature and Scope of Logic, Use of Logic -Argument and Argument Form, Differences between Deduction and Induction -Truth and Validity	15	25
II:**Categorical Propositions and Immediate Inference**	-Four Categorical Propositions—A, E, I and O; Distribution of Terms -Translating Ordinary Proposition into Categorical Form, Traditional Square of Opposition -Immediate Inference: Conversion, Obversion and Contraposition	15	25
III: **Categorical Syllogism**	-Mediate Inference: Standard Form Syllogisms, Figure and Mood -Venn Diagrams for Categorical Propositions -Testing validity of Syllogisms by Venn Diagram	15	25
IV : **Syllogism in Ordinary Language**	-Enthymemes, Sorites -Disjunctive and Hypothetical Syllogisms -Dilemma	15	25

h. Reading list:

Chakraborti, Chhanda: Logic: *Informal, Symbolic & Inductive*

Copi, I. M. & Cohen, Carl: *Introduction to Logic*

Hurley, Patrick: *Introduction to Logic*

i Graduate Attributes

i. Course Objectives :

- The course introduces students to the basics of traditional logic (Aristotelian) logic.
- The course is designed to introduce the students the basic concepts and terms used in reasoning and argumentation.
- The course introduces the students the methods and principles for distinguishing correct from incorrect reasoning.

ii. Learning Outcomes:

- On the completion of the course students will be able to distinguish valid and invalid deductive arguments.
- The students will be able to identify the basic logical structure of arguments in ordinary language by translating them into proper logical form.
- The students will be able to construct valid syllogisms, and they will learn about syllogisms in ordinary language.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr Jahnabi Deka, Gauhati University, jahnabideka@gmail.com

CORE [PHILOSOPHY]-VIII

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: FIFTH
d. Course Name: **PHILOSOPHY OF RELIGION**
e. Existing Base Syllabus: PHI-HC-4026
f. Course Level: 300-399
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I:	-Philosophy of Religion: Definition, Nature and Scope -Distinction between Philosophy of Religion and Theology -Mysticism	15	25
II:	-Cosmological Argument -Ontological Argument -Teleological Argument; Moral Argument	15	25
III:	-Reason, Faith, Revelation -Immortality of Soul -Miracle; Incarnation	15	25
IV :	-Deism, Pantheism, Panentheism -Anti-religious theories- Logical Positivism, Marxism -Freedom of will	15	25

h. Reading list:

John Hick: *Philosophy of Religion*

John Hick: *Classical and Contemporary Readings in the Philosophy of Religion*

Miall Edwards: *Philosophy of Religion*

B. Mitchell: *Philosophy of Religion*

Peterson and Others: *Reason and Religious Belief: An Introduction to the Philosophy of Religion*

Smart: *Religion and Faith*

i. Graduate Attributes

ii. Course Objectives :

-The course is introduced to acquaint the students with the meaning, nature and scope of Philosophy of Religion.
-The course is introduced to make the students familiar with basic religious concepts along with its philosophical significance.
-The course is introduced to develop in the students a critical and philosophical outlook towards various faiths and dogmas.

iii. Learning Outcomes:

-The course is expected to enable the students to provide philosophical justification of the important religious concepts like proofs for the existence of God, relation between God and the world, faith and reason, etc.
-The course is expected to enable the students to justify the issues of immortality of the soul, freedom of the will, miracle, incarnation, etc.
-The course is expected to provide the students with proper understanding and clarification of the concepts.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Mausumi Bhattacharjya, Gauhati University , mausumi1984@gauhati.ac.in

CORE [PHILOSOPHY]-IX

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: FIFTH
d. Course Name: **THEORY OF REALITY (INDIAN)**
e. Existing Base Syllabus: NA
f. Course Level: 300-399
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I:	-Māyā and Jagat: Advaita Vedānta -Acit: Viśiṣṭādvaita Vedanta -Guṇa ; Prakṛti: Sāṅkhya	15	25
II:	-Brahman and Iśvara: Advaita Vedānta, Viśiṣṭādvaita Vedanta, Nyāya-Vaiśeṣika -Jīva: Advaita Vedānta, Viśiṣṭādvaita Vedanta -Puruṣa: Sāṅkhya	15	25
III:	-Padārtha: Nyāya -Padārtha: Vaiśeṣika -Tattva: Jaina	15	25
IV :	-Theories of Evolution and Illusion (*Pariṇāmavāda, Vivartavāda*) -Theory of Atomic Agglomeration (*Ārambhavāda*) -Theory of Dependent Co-origination (*Pratītyasamutpāda*)	15	25

h. Reading list:

Chatterjee, S. and D. Dutta : *An Introduction to Indian Philosophy*

Dasgupta, S : *A History of Indian Philosophy. Volume I*

Mullar, Max : *The Six Systems of Indian Philosophy*

Radhakrishnan, S : *Indian Philosophy. Volume I & II*

Sinha, Jadunath : *Indian Philosophy. Volume I & II*

Sinha, J: *Indian Realism*

Sharma, C : *A Critical Survey of Indian Philosophy*

i Graduate Attributes

i Course Objectives :

-The Course introduces the students to what is considered as reality by various systems of Indian Philosophy.
- The Course introduces the students to ideas of reality, whose knowledge is considered as essential by systems of Indian Philosophy.
- The Course introduces the students to Concepts which are considered as essential by systems of Indian Philosophy for having understanding of reality.

ii. Learning outcomes:

-At the completion of the Course, a student is expected to be able to state clearly what are the different realities admitted by different systems of Indian Philosophy.
-At the completion of the Course, a student is expected to be able to explain the nature of the realities as accepted by systems of Indian Philosophy.
-At the completion of the Course, a student is expected to be able to point out and elucidate the concepts whose understanding is considered as important by systems of Indian Philosophy for understanding the nature of reality.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Shakuntala Bora, Gauhati University, shakuntalabora@yahoo.com

CORE [PHILOSOPHY]-X

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: FIFTH
d. Course Name: **ANALYTIC PHILOSOPHY**
e. Existing Base Syllabus: PHI-HC-5016
f. Course Level: 300-399
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I:	-Introduction to Analytic Philosophy, Distinction between Classical Philosophy and Analytic Philosophy -Analytic Philosophy as a revolt against traditional Philosophy -Brief introduction to prominent philosophers of Analytic Philosophy	15	25
II:	-G. E. Moore: A defence of Common Sense (Textual Study)	15	25
III:	-Russell**:** On Denoting (Textual Study)	15	25
IV :	Early Wittgenstein: Picture Theory of Meaning (Textual Study)	15	25

h. Reading list:

Moore, G. E. : "*Defence of Common Sense*"

Russell, B : *"On Denoting"*

Wittgenstein, L: *Tractatus Logico-Philosophicus*

Ammerman, R.R .(ed) : *Classics of Analytic Philosophy*

Gross, B.R : *Analytic Philosophy*

Pitcher, G : *Philosophy of Wittgenstein*

Pradhan, R.C : *Recent Developments in Analytic Philosophy*

i.Graduate Attributes

i. Course Objectives :

- The course is designed to get the students acquainted with one of the most influential schools of Contemporary Western Philosophy.
- The course introduces to the students analytic philosophers like G. E. Moore, Bertrand Russell and Early Wittgenstein.

ii. Learning Outcomes:

- The students will be able to understand the features of analytic philosophy, and will be able to distinguish between classical philosophy and analytic philosophy.
- The students will understand the importance of language in dissecting philosophical issues.
- The students will be able to inculcate critical and reflective thinking.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Prof. Sauravpran Goswami, Gauhati University, sauravpran2@gauhati.ac.in

CORE [PHILOSOPHY]-XI

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: FIFTH
d. Course Name: **SYMBOLIC LOGIC**
e. Existing Base Syllabus: PHI-HC-2026
f. Course Level: 300-399
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I: **Introduction to Symbolic Logic**	-Symbolic Logic –its development -Nature and Scope of Symbolic Logic -Symbols and their uses	15	25
II:**Logical Connectives and Symbolization**	**-**Simple and Compound Statements -Logical Connectives and Variables -Symbolization of everyday language	15	25
III: **Truth Function and Truth Table Method**	-Truth Functions, Interdefinability of Logical Connectives -Construction of Truth Tables -Determining Tautology, Contradiction and Contingent Statements; and validity of arguments (Direct and Indirect) by using Truth Tables, Decision Procedure	15	25
IV:**Method of Deduction**	-Formal Proof of Validity -Rules of Inference and Rules of Replacement -Construction of Formal Proof of validity for arguments	15	25

h. Reading list:

Chakraborti, Chhanda: *Logic: Informal, Symbolic & Inductive*

Copi, I. M : *Symbolic Logic*

Copi, I. M. & Cohen, Carl: *Introduction to Logic*

Hurley, Patrick: *Introduction to Logic*

i . Graduate Attributes

i. Course Objectives :

- The course introduces students to the basics of symbolic logic (modern deductive logic).
- The course introduces tools for symbolizing everyday language and arguments using symbolic notation.
- The course is designed to introduce the students the formal principles and techniques of modern symbolic logic for distinguishing valid arguments from the invalid arguments.

ii. Learning Outcomes:

- On the completion of the course, students will be able to break down an argument and analyze the truth conditions of its component parts.
- The students will be able to symbolize everyday language.
- The students will be able to construct formal proof of validity.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr Jahnabi Deka, Gauhati University, jahnabideka@gmail.com

CORE [PHILOSOPHY]-XII

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: SIXTH
d. Course Name: **SOCIAL AND POLITICAL PHILOSOPHY**
e. Existing Base Syllabus: PHI-HC-4036
f. Course Level: 300-399
g. Syllabus showing each unit against class numbers and marks:

Unit no.	Unit content	No.of classes	Marks
I:	-Nature and Scope of Social and Political Philosophy -Concept of Individual and Society, Relation between Individual and Society -Different Theories concerning evolution of society	15	25
II:	-Socialism: Marxism, Class Struggle -Democracy -Human Rights and Gender Justice	15	25
III:	-Mahabharata: Dandaniti, Rajdharma -Law and Governance -Lokasamgraha	15	25
IV :	-Kautilya: Sovereignty, Seven Pillars of state craft -Society, Social Life -Internal security, External affairs	15	25

h. Reading list:

Chatterjee, P.B: *A Handbook of Social Philosophy*
Robert N. Beck: *Handbook in Social Philosophy*
Garcia, Manuel B : *Introductory Sociology: A Unified Approach*
George Sabine: *A History of Political Theory*
J. Sinha: *Outlines of Political Philosophy*

Priyanka Pandey : *Rajdharma in Mahabharata*

Sitansu S. Chakravarty: *Ethics in the Mahabharata*

Kavita A. Sharma & Indu Ramchandani : *Teachings from the Mahabharata*

Kautilya- Chanakya Arthasastra: *A Treatise on the Art of Government*

R. Shmasastry: *Kautilya's Arthasastra*

i.Graduate Attributes

i. **Course Objectives :**

-To explore different theories and concepts regarding the evolution of the society and the individual.

-To make a critical analysis regarding the relation between society and individual.

-To make learners aware of the problems faced by the individual in the society in the name of class and caste division, gender discrimination etc.

-The course will explore how social systems, political beliefs and public institutions can impact human flourishing.

-The course is introduced to make the students familiar with various social and political concepts as found in the Mahabharata and in the Arthsastra

ii. **Learning Outcome:**

- Learners will be able to express thoughts on some major philosophical questions in the area of social philosophy with respect to the intellectual and historical developments of the questions.

- Learners will be able to articulate some of the major problems.

- Students will be able to think about questions like 'how should human beings live together?' , 'what sort of society should we aim at?,' etc.

- Learners will have a clear vision of human rights and gender discrimination, which will help them understand some social and political prejudices.

- The course is expected to make the students describe as well as analyse the social and political concepts such as rajadharma, dandaniti, lokasamgraha, seven pillars of state craft as found in these two sastras.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Padmadhar Choudhury, Gauhati University, padmadhar@gauhati.ac.in, and Mausumi Bhattacharjya, Gauhati University , mausumi1984@gauhati.ac.in

CORE[PHILOSOPHY]-XIII

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: SIXTH
d. Course Name: **CONTEMPORARY INDIAN PHILOSOPHY**
e. Existing Base Syllabus: PHI-HC-4016
f. Course Level: 300-399
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I:	- K.C. Bhattacharya: Concept of Philosophy, Absolute and its alternative forms -Aurobindo: Evolution , Integral Yoga	15	25
II:	-Vivekananda: Practical Vedanta, Universal Religion -Tagore: Concept of Man, Humanism	15	25
III:	-Radhakrishnan: Religious Experience, Intellect and Intuition - Iqbal: Intuition, Self	15	25
IV :	-Gandhi: Truth and Non-violence, Religion, Sarvodaya, Trusteeship -Ambedkar: Social Justice, Democracy	15	25

h. Reading list:

K.C. Bhattacharya: *Studies in Philosophy, Vol II*

K. Bagchi: *The Philosophy of K.C. Bhattacharya*

S.K. Maitra: *An Introduction to the Philosophy of Sri Aurobindo*

Complete Works of Swami Vivekananda (relevant chapters)

R.N. Tagore: *Religion of Man*

S. Radhakrishnan: *An Idealist View of Life*

M. Iqbal: *The Secrets of Self; The Mysteries of Selflessness*

D.M. Datta: *The Philosophy of Mahatma Gandhi*

D. Keer : *Ambedkar, Life and Mission*

Nilima Sharma: *Twentieth Century Indian Philosophy*

D. M. Datta: *Chief Currents of Contemporary Philosophy*

i . Graduate Attributes

i . Course Objectives :

-The course is introduced to make the students familiar with the contemporary approach to philosophy.
-The course is introduced to acquaint the students with the philosophical ideas of contemporary Indian philosophers like K.C. Bhattacharya, Aurovindo, Vivekananda, Tagore, Radhakrishnan, Iqbal, Gandhi and Ambedkar.

ii .Learning Outcomes:

- The course is expected to make the students learn how to compare the contemporary approach to philosophy with the traditional one.
- The course is expected to make the students explain as well as analyze the concepts as found in the philosophies of these philosophers
- The course is expected to make the students revise their philosophical outlook in the light of contemporary Indian philosophy.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Mausumi Bhattacharjya, Gauhati University , mausumi1984@gauhati.ac.in

CORE[PHILOSOPHY]-XIV

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: SIXTH
d. Course Name: **EXISTENTIALISM**
e. Existing Base Syllabus: PHI-HC-5026
f. Course Level: 300-399
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I: **Kierkegaard**	-The three stages of human existence -Subjectivity and Truth	15	25
II: **Nietzsche**	-Nihilism, Perspectivism, The Death of God -The Superman, The Will to Power	15	25
III: **Heidegger**	-*Dasein*; Being-in-the-world -Care and the Problem of Primordial Truth	15	25
IV : **Sartre**	-Existentialism; Being -Freedom and Bad-Faith	15	25

h. Reading list:

Kierkegaard: *Concluding Unscientific Postscript*

Nietzsche: *The Will to Power; Basic Writings of Nietzsche*

Heidegger: *Being and Time [Part One:: Division One : Preparatory Fundamental Analysis of Dasein]*

Sartre: *Basic Writings; Existentialism and Humanism; Being and Nothingness*

H. J. Blackham : *Six Existentialist Thinkers*

Margaret Chatterjee: *Existentialist Outlook*

M.K. Bhadra: *Phenomenology and Existentialism*

Mary Warnock: *Existentialism*

Hubert L. Dreyfus: *Being-in-the-World: A Commentary on Heidegger's Being and Time, Division I*

i. Graduate Attributes

i. **Course Objectives** :

-The objective of the course is to introduce students to various existentialist thinkers like Kiekeggard, Nietzsche, Heidegger and Sartre.
-The objective of the course is to make them families with the existential issues that all humans face in their everyday lives, like anxiety, fear, dread, freedom, death, etc.

ii. **Learning Outcomes**:

-The learning objective of the course is to enable students to understand the meaning of life that is not superficial.
-The learning objective is to make the students come face-to-face with real life-problems and also various ways to improve and work on their will to live life well.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Dr. Akoijam Thoibisana, Gauhati University, akoijamthoibisana@gauhati.ac.in

CORE[PHILOSOPHY]-XV

a. Four-year Undergraduate Programme
b. Subject: Philosophy
c. Semester: SIXTH
d. Course Name: **PHILOSOPHY OF LANGUAGE**
e. Existing Base Syllabus: PHI-HE-6026
f. Course Level: 300-399
g. Syllabus showing each unit against class numbers and marks :

Unit no.	Unit content	No.of classes	Marks
I:	-Nature of Philosophy of Language -Scope of Philosophy of Language -History of Philosophy of Language	15	25
II:	-Ideational Theory of Meaning: Locke -Verifiability Theory of Meaning: Ayer -Use Theory of Meaning: Wittgenstein	15	25
III:	-Correspondence Theory of Truth -Coherence Theory of Truth -Pragmatic Theory of Truth	15	25
IV :	-Speech Act Theory of: Austin -Performative and Constative Utterance -Locutionary Act and Illocutionary Act	15	25

h. Reading list:

Alston, William P : *Philosophy of Language*

Austin, J. L : *How to Do Things with Words*

Devitt M. & Richard Hanley (ed.) : *The Blackwell Guide to Philosophy of Language*

Frege, Gottlob : *On Sense and Reference*

Lycan, G : *Philosophy of Language: A Contemporary Introduction*

Russell, B: *On Denoting*

Searle, J. R : *Philosophy of Language*

Wittgenstein, L : *Philosophical Investigations (Relevant Sections)*

i . Graduate Attributes

i. Course Objectives :

-Introduce the students with the philosophical study of Language as distinct from linguistics, concepts of meanings related to various theories of truth.
-Distinction between constative and performative utterances and the different acts that are performed while making different utterances

ii. Learning Outcomes:

-Students will be able to make the basis difference between philosophical study of Language and scientific study of Language.
- Students will be able to appreciate the different approaches to meaning.
- They will be able to appreciate the different acts that are performed by different utterances.

j. Theory Credit : 4
k. Practical Credit: NA
l. No. of Required Classes: 60
m. No. of Contact Classes: 45
n. No. of Non-Contact Classes: 15
o. Particulars of Course Designer (Name, Institution, email id): Prof. Begum Bilkis Banu, Gauhati University, begumbilkisbanu@gauhati.ac.in

Four Year Undergraduate Programme
Subject: Political Science

Semester	Paper
1st Semester	POL 01-01: Introduction to Political Theory (Core)
2nd Semester	POL 02-01: Indian Govt. & Politics (Core)
3rd Semester	POL 03-01: Perspectives on Public Administration (Core)
4th Semester	POL 04-01: Understanding International Relations (Compulsory) POL 04-02: Political Theory: Concepts and Debates (Compulsory) POL 04-03: Political Processes in India (Compulsory) POL 04-04: Public Policy and Administration in India (Compulsory)
5th Semester	POL 05-01: Western Political Philosophy (Compulsory) POL 05-02: Indian Political Thought (Compulsory) POL 05-03a: United Nations and Global Conflict (Optional) POL 05-03b: Optional Comparative Government and Politics (Optional) POL 05-04a: Introduction to India's Foreign Policy (Optional) POL 05-04b: Understanding South Asia (Optional)
6th Semester	POL 06-01: Human Rights: Traditions and Debates (Compulsory) POL 06-02: Feminism: Theory and Practice (Compulsory) POL 06-03a: Politics in Northeast India (Optional) POL 06-03b: Conflict and Peace Building (Optional) POL 06-04a: Rural Local Governance: Theory & Practice (Optional) POL 06-04b: Urban Local Governance: Theory & Practice (Optional)

Four Year Undergraduate Programme

Subject: Political Science

Semester: 1st Semester

Course Name: POL 01-01: Introduction to Political Theory (Core)

Existing Base Syllabus:

Course Level: 100

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Barasa Deka, Gauhati University, barasajnu@gmail.com

Dr. Joanna Mahjebeen, Gauhati University, jmajebeen@gmail.com

Dr. Pallabi Medhi, Guwahati College, Guwahati, pallabiamal@gmail.com

Course Objectives:

- This course aims to introduce the students to the idea of political theory, its history and approaches, and an assessment of its critical and contemporary trends.
- It is also designed to introduce the basic concepts of political theory.
- The course also attempts reconcile political theory and practice through reflections on the ideas and practices related to democracy.

Course Outcomes:

- After completing the course students will be better equipped to understand the key concepts in political theory and various related conceptual categories.
- They will also be in a better position to engage in application of concepts and understand the limitations.

- It will also help in developing critical thinking regarding the functioning of the political system in relation to the context the students are situated in.
- The foundation for understanding the contemporary political developments would also be laid down by the course.

Unit I: Understanding Political Theory

a. What is Politics?
b. What is Political Theory?
c. Relevance of political theory

Unit II: Approaches and Contemporary Perspectives on Political Theory

a. Liberal
b. Marxist
c. Feminist

Unit III: Concepts in Political Theory

a. State

b. Rights

c. Liberty

d. Equality

e. Justice

Unit IV: Understanding Democracy

a. Concept of Democracy

b. Types of democracy

c. Critique of democracy

Readings List:

Unit-I

Bellamy, R. (1993) 'Introduction: The Demise and Rise of Political Theory', in Bellamy, R. (ed.) *Theories and Concepts of Politics*. New York: Manchester University Press, pp. 1-14.
Bhargava, R. (2008) 'What is Political Theory', in Bhargava, R and Acharya, A. (eds.) *Political Theory: An Introduction.* New Delhi: Pearson Longman, pp. 2-16.
Bharghava, R, 'Why Do We Need Political Theory', in Bhargava, R. and Acharya, A. (eds.) *Political Theory: An Introduction.* New Delhi: Pearson Longman, pp. 17-36.

Mukherjee, S. and Ramaswami, S. (1999). What is Political Theory in Mukherjee, S. and Ramaswami, S. A History of Political Thought: Plato to Marx. New Delhi, Prentice Hall of India Pvt. Ltd. Pp. 1-8

Mukhopadhyay, A.K. (2019), An Introduction to Political Theory, New Delhi: Sage Publications

Sabine, George H. (1939) What is A Political Theory? in the Journal of Politics, Vol. 1, No 1. Pp. 1-16

Unit-II

Asirvatham, E & K.K. Misra (1998), *Political Theory,* Upper India Publishing, pp. 20-39.

Callinicos, A. (2004) "Marxism and Politics" in in Leftwich, A. (ed.) What is Politics? Cambridge, Polity Press, pp.53-65

Corrin, Chris(1999), Feminist perspectives on Politics, Routledge, London and New York, pp. 1-18.

Gauba, O.P (2009), An Introduction to Political Theory, Macmillan Publishers India Ltd, pp. 80-93.

Glaser, D. (1995) 'Normative Theory', in Marsh, D. and Stoker, G. (eds.) *Theory and Methods in Political Science.* London: Macmillan, pp. 21-40.

Menon, N. (2008) 'Gender', in Bhargava, R. and Acharya, A. (eds.) *Political Theory: An Introduction.* New Delhi: Pearson Longman, pp. 224-235.

Sanders, D. (1995) 'Behavioral Analysis', in Marsh, D. and Stoker, G. (eds.) *Theory and Methods in Political Science.*London: Macmillan, pp. 58-75.

Squires, J. (2004) ‘Politics Beyond Boundaries: A Feminist Perspective’ in Leftwich, A. (ed.) What is Politics? Cambridge, Polity Press, pp. 119-134

Unit-III

Acharya, A. (2008) ‘Equality’, in Bhargava, R. and Acharya, A. (eds.) Political Theory: An Introduction. New Delhi: Pearson Longman, pp. 58-73.

Das, S. (2008) ‘State’, in Bhargava, R. and Acharya, A. (eds.) *Political Theory: An Introduction.* New Delhi:Pearson Longman, pp. 170-187.

Menon, K. (2008) Justice’, in Bhargava, R. and Acharya, A. (eds.) Political Theory: An Introduction. New Delhi: Pearson Longman, pp. 74-82.

Shorten, A. (2008) ‘Nation and State’, in McKinnon, C. (ed.) *Issues in Political Theory*, New York: Oxford University Press, pp. 33-55.

Sriranjani, V. (2008) ‘Liberty’, in Bhargava, R. and Acharya, A. (eds.) Political Theory: An Introduction.New Delhi: Pearson Longman, pp. 40-57.

Talukdar, P.S. (2008) ‘Rights’, in Bhargava, R. and Acharya, A. (eds.) *Political Theory: An Introduction.* New Delhi: Pearson Longman, pp. 88-105.

Talukdar, P.S. (2008) ‘Rights’, in Bhargava, R. and Acharya, A. (eds.) Political Theory: An Introduction. New Delhi: Pearson Longman, pp. 88-105.

Unit-IV

Acharya, A. (2008) ‘Affirmative Action’, in Bhargava, R. and Acharya, A. (eds.) Political Theory: An Introduction. New Delhi: Pearson Longman, pp. 298-307.

Arblaster, A. (1994) *Democracy*. (2nd Edition). Buckingham: Open University Press.

Christiano, Thomas. (2008) ‘Democracy’, in McKinnon, Catriona. (ed.) *Issues in Political Theory*, New York: Oxford University Press, pp. 80-96.

Sen, A. (2003) ‘Freedom Favours Development,’ in Dahl, R., Shapiro, I. and Cheibub, A. J. (eds.) *The Democracy Sourcebook.* Cambridge, Massachusetts: MIT Press, pp. 444-446.

Sethi, A. (2008) ‘Freedom of Speech and the Question of Censorship’, in Bhargava, R. And Acharya, A. (eds.) Political Theory: An Introduction. New Delhi: Pearson Longman, pp. 308-319.

Srinivasan, J. (2008) ‘Democracy’, in Bhargava, R. and Acharya, A. (eds.) *Political Theory: An Introduction.*New Delhi: Pearson Longman, pp. 106-128.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 2nd Semester

Course Name: POL 02-01: Indian Government and Politics (Core)

Existing Base Syllabus:

Course Level: 200

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Vikas Tripathi, Gauhati University, vikastripathi@gauhati.ac.in

Dr. Sumana Das, B. Baruah College, Guwahati, sumana_ghy1@yahoo.com

Course Objectives:

- The paper aims at introducing students to the nature, emergence and functioning of the Constitution of India.
- The paper seeks to impart learning on the significance of the idea of citizenship and rights and how has constitution incorporated them and what does it reflect on the nature of Indian constitution.
- The paper intends to make students understand the normative basis of key public institutions in India and the nature of their functioning.
- The paper aims to explore the distinctiveness of Indian federalism and how does the emergence of new institutions like NITI Aayog reflect on the changing character of federalism in India.

Course Outcomes:

- Students will develop an understanding of the legacy of national movement and the principles that shaped the formation and functioning of the Constituent Assembly of India.

It will help in developing critical thinking about role of ideas and norms in shaping democracy in India. It will make them understand what is constitution and how has the working of contributed to the consolidation of democracy in India.

- Students will be able to make sense of the institutional design, challenges and resilience marking key public institutions in India.
- The students will develop basic understanding on the constitutional provisions related to the legislative procedures in Indian Parliament. It will enhance their understanding related to the procedures, practices related to the passage of a bill from drafting to its passage by the Parliament.
- It will help students in developing a nuanced understanding of the importance of states in Indian politics and how the changing character of federalism in India made states the key player.

Unit-I: Indian Constitution: Emergence and Distinctiveness

a. Constituent Assembly: Historical Backdrop and Formation
b. Basic Features of Indian Constitution
c. Amendment of Constitution: Nature and Procedure

Unit-II: Citizenship and Rights

a. Citizenship: Meaning and Provisions in the Constitution
b. Fundamental Rights and Fundamental Duties
c. Directive Principles of State Policy

Unit-III: Institutions

a. The Executive: President, Prime Minister and the Council of Ministers, Bureaucracy in India
b. The Parliament: Composition, Legislative Procedure in Parliament, Question of Decline
c. The Judiciary: The Supreme Court, Appointment of Judges, Independence, Judicial Activism

Unit-IV: Federalism and Local Government

a. Nature of Federal System: Constitutional Provisions, Distinctive Features, NITI Ayog and Changing Character
b. Integration of Princely States in India,Union and Its Territory
c. Panchayati Raj Institutions in India: Emergence, Composition, Powers and Functions, Actual Working

Reading List:

Unit-I

Austin, Granville. 1966. The Indian constitution: cornerstone of a nation. New Delhi: Oxford University Press.

Austin, Granville. 1999. Working a democratic constitution: the Indian experience. New Delhi: Oxford University Press.

Bhargava, Rajeev. 2008. Politics and ethics of the Indian constitution. New Delhi: Oxford University Press.

Bhatia, Gautam. 2019. The Transformative Constitution: a radical biography in nine acts. New Delhi: Oxford University Press.

Chaube, Shibani Kinkar. 2000. Constituent assembly of India: springboard of revolution. New Delhi: Manohar Publishers & Distributors.

Choudhry, Sujit, Madhav Khosla & Pratap Bhanu Mehta.2016. The Oxford Handbook of the Indian Constitution. New Delhi : Oxford University Press.

Hasan, Zoya, Eswaran Sridharan, and R. Sudarshan. 2004. India's living constitution: ideas, practices,controversies. Delhi: Permanent Black.

Indian Politics, Contemporary Issues and concerns, M.P Singh and Rekha Saxena, PHI pvt. Ltd, New Delhi, 2008

Khosla, Madhav. 2020. India's founding moment: the constitution of a most surprising democracy.Cambridge, Massachusetts: Harvard University Press.

Pylee, M V. 1967. Constitutional History of India. Bombay : Asia Publishing House

Unit-II

Austin, Granville. 1966. The Indian constitution: cornerstone of a nation. New Delhi:Oxford University Press.

Basu, Durga Das. 2022. Introduction to the Constitution of India. New Delhi : Lexis Nexis

Bhargava, Rajeev. 2008. Politics and ethics of the Indian constitution. New Delhi: Oxford UniversityPress.

Choudhry, Sujit, Madhav Khosla & Pratap Bhanu Mehta.2016. The Oxford Handbook of the Indian Constitution. New Delhi : Oxford University Press

Khosla, Madhav. 2020. India's founding moment: the constitution of a most surprising democracy.Cambridge, Massachusetts: Harvard University Press.

Unit-III

Agrawal, Arun. 2005. "The Indian Parliament" in Devesh Kapur and Pratap Bhanu Mehta (ed.) PublicInstitutions in India: Performance and Design, New Delhi: Oxford University Press, 77-104.

Burra, Arudra. 2010. "The Indian Civil Service and the nationalist movement: neutrality, politics andcontinuity". Commonwealth & Comparative Politics. 48 (4): 404-432.

Choudhry, Sujit, Madhav Khosla & Pratap Bhanu Mehta.2016. The Oxford Handbook of the Indian Constitution. New Delhi : Oxford University Press

Das, SK. 2013. The Civil Services of India. New Delhi : Oxford University Press.

Hewitt, Vernon and Shirin M. Rai. 2010. "Parliament," in Niraja Gopal Jayal and Pratap Bhanu Mehta(ed.). The Oxford companion to politics in India. New Delhi: Oxford University Press, pp.28-42.

M.P Singh and Rekha Saxena. 2008. Indian Politics: Contemporary Issues and concerns, New Delhi, PHI Pvt. Ltd.

Khare, H. 2003. "Prime Minister and Parliament: Redefining accountability in the age of coalitiongovernment," in Ajay K. Mehra, and G.W. Kueck, (ed.). The Indian Parliament: A Comparative Perspective. New Delhi: Konark, pp.350- 368.

Krishna, Anirudh. 2010. "Continuity and change: the Indian administrative service 30 years ago andtoday". Commonwealth & Comparative Politics. 48 (4): 433-444.

Manor, James. 2015. "The Presidency," in Devesh Kapur , Pratap Bhanu Mehta and Milan Vaishnav (ed.). Rethinking Public Institutions in India. New Delhi: Oxford University Press.

Mehta, Pratap Bhanu. 2007. "The rise of judicial sovereignty," Journal of Democracy 18 (2), pp.70-83.

Saxena, N. C. 2010. "The IAS officer - predator or victim?" Commonwealth & Comparative Politics.48 (4): 445-456.

Shankar, B. L., and Valerian Rodrigues. 2010. The Indian Parliament: a democracy at work. Oxford:Oxford University Press.

Shankar, Shylashri. 2009. Scaling justice: India's Supreme Court, anti-terror laws, and social rights.New Delhi: Oxford University Press.

Verma, Rahul and Vikas Tripathi. 2013. Making Sense of the House: Explaining the Decline of theIndian Parliament amidst Democratization, Studies in Indian Politics, 1(2), pp.153-177.

Unit-IV

Arora Balveer. 2015. “Foundations and Development of Indian Federalism: Lessons Learnt andUnlearnt”, Yojana, pp. 22-26.

Arora, Balveer. et. al. 2013. “Indian federalism,” in K.C. Suri (ed.) ICSSR Research Surveys andExplorations: Political Science: Indian Democracy, Volume 2. New Delhi: Oxford University Press.

Indian Politics, Contemporary Issues and Concerns, M.P Singh and Rekha Saxena, PHI pvt. Ltd, New Delhi, 2008.

Krishna, Anirudh. 2010. “Local Politics”, in: Mehta, Pratap B. and Niraja Gopal Jayal (eds.).The Oxford Companion to Politics in India. New Delhi et al.: Oxford University Press, pp.299-316

Kumar, Rajiv. 2021. “NITI Aayog: Redefining Federalism”, Yojana, pp. 8-11.

Manor, James. 2010. “Local Governance”, in: Mehta, Pratap B. and Niraja Gopal Jayal (eds.).The Oxford Companion to Politics in India. New Delhi et al.: Oxford University Press, pp.61-79.

Pehl Malte and Subtra Mitra. 2010. “Federalism”, in: Mehta, Pratap B. and Niraja Gopal Jayal (eds.).The Oxford Companion to Politics in India. New Delhi et al.: Oxford University Press, pp.43-60.

Rao, M Govind. 2016. Role and Functions of NITI Aayog, Economic and Political Weekly, pp. 13-16, Vol. 50 No. 4

Tillin, Louise. 2019. Indian Federalism. (OSIIC) New Delhi: Oxford University Press.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 3rd Semester

Course Name: POL 03-01: Perspectives on Public Administration (Core)

Existing Base Syllabus:

Course Level: 300

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Prof. Jayanta Krishna Sarmah, Gauhati University, jayanta1947@gauhati.ac.in

Prof. Dhruba Pratim Sharma, Gauhati University, dhruba75@gauhati.ac.in

Dr. Diganta Kalita, B. P. Chaliha College, Nagarbera, dkalita72@gmail.com

Course Objectives:

- The course seeks to provide an introduction to the discipline of Public Administration and its significance in contemporary times.
- The course aims to encompass Public Administration in its historical context with an emphasis on the various classical and contemporary administrative theories.
- The course intends to explore some of the recent trends including good governance, new public management, feminism, ecological conservation and how the call for greater democratization is restructuring public administration.
- The course attempts to provide the students a comprehensive understanding on contemporary administrative developments.

Course Outcomes:

- Students will learn the basic concepts related to Public Administration and its significance

- Students will understand the major classical and contemporary administrative theories and approaches and a critical thinking on them.
- It will help students to understand importance of personnel administration in an administrative system and issues related to it including civil service neutrality and need, role and independence of Public Service Commission.
- Students will develop basic understanding on recent debates in public administration.

Unit-I: Public Administration as a Discipline

a. Meaning, Dimensions and Significance
b. Public and Private Administration
c. Evolution of Public Administration

Unit-II: Theoretical Perspectives

a. Scientific Management (Frederick Winslow Taylor)
b. Administrative Management (Luther Gulick, Lyndall Urwick and Henri Fayol)
c. Ideal-Type Bureaucracy (Max Weber)
d. Human Relations Theory (George Elton Mayo)
e. Ecological Approach (Fred Warren Riggs)

Unit-III: Personnel Administration

a. Recruitment-Training-Promotion
b. Public Service Commission: Need, Role and Independence
c. Neutrality in the Public Service

Unit -IV: Major Approaches in Public Administration

a. New Public Service Approach
b. New Public Management
c. Good Governance
d. Feminist Perspective

Reading List:

Unit-I

Basu, Rumki, *Public Administration: Concepts and Theories*, Sterling Publishers, New Delhi, 2014

D. Rosenbloom, R. Kravchuk and R. Clerkin, (2009) *Public Administration: Understanding Management, Politics and Law in Public Sector*, 7th Edition, New Delhi: McGraw Hill, pp.1-40

G. Alhson(1997): 'Public and Private Management', in Shafritz, J. and Hyde , A (eds) *Classics of Public Administration*, 4th Edition. Forth Worth: Hartcourt Brace. TX. PP 510-529

M. Bhattacharya (2008) *New Horizons of Public Administration*, 5th Revised Edition. New Delhi: Jawahar Publishers, pp 37-44

M. Bhattacharya , *RestructuringPublic Administration: A New Look*, New Delhi: Jawahar Publishers, 2012

M. Bhattacharya, *New Horizons of Public Administration*, New Delhi: Jawahar Publishers, 2011

N. Henry, *Public Administration and Public Affairs*, 12th Edition, New Jersey: Pearson, 2013

Nicholas Henry, *Public Administration and Public Affairs*, Prentice Hall, 1999

P. Dunleavy and C. Hood, 'From old Public Administration to New Public Management', Public Money and Management, VOL. XIV No 3, 1994

W.Wilson (2004) 'The Study of Administration', in B. Chakravarty and M. Bhattacharya (eds), *Administrative Change and Innovation : a Reader*, New Delhi: Oxford University Press, pp.85-101.

Unit-II

A. Singh, *Public Administration: Roots and Wings*. New Delhi: Galgotia Publishing Company, 2002

B. Miner, 'Elton Mayo and Hawthrone', in *Organisational Behaviour 3: Historical Origins and the Future.* New York: M.E. Sharpe, 2006

D. Gvishiani, *Organisation and Management*, Moscow: Progress Publishers, 1972

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E. J. Ferreira, A. W. Erasmus and D. Groenewald , Administrative Management, Juta Academics, 2010

F. Riggs, *Administration in Developing Countries: The Theory of Prismatic Society*. Boston: Houghton Miffin, 1964

F. Taylor, 'Scientific Management', in J. Shafritz, and A. Hyde, (eds.) *Classics of Public Administration,* 5th Edition. Belmont: Wadsworth, 2004

M. Weber,'Bureaucracy', in C. Mills, and H. Gerth, F*rom Max Weber: Essays in Sociology*. Oxford: Oxford University Press, 1946

P. Mouzelis, 'The Ideal Type of Bureaucracy' in B. Chakrabarty, And M. Bhattacharya, (eds), *Public Administration: A Reader*, New Delhi: Oxford University Press,2003

R. Arora, 'Riggs' Administrative Ecology' in B. Chakrabarty and M. Bhattacharya (eds), *Public Administration: A reader*, New Delhi, Oxford University Press, 2003

Warren. G.Bennis, *Beyond Bureaucracy*, Mc Graw Hill, 1973

Unit-III

Appleby, H Paul, 'Public Administration in India', Report of a survey, Manager of a publication, Govt. of India, Delhi, 1953, p-12.

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Articles 315 to 317 of the Indian Constitution.

Chopra, K. Rakesh, *Management of Human Resources*, V. K. Publishing House Barrelly, 1989, p-10, 20.

First Report of UPSC, 1951, P-9.

Gladden, The Civil Service: Its Problems and Future, p-88, 180.

Goel, S. L., *Personnel Administration and Management*: Sterling Publishers, New Delhi, 1993 (ed) p-7, 40, 105-111.

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Jucious, M.J. *Personnel Management*, Richard Inco, Illinois, p-2.

Pfiffner, *Public Administration*, p-251.

Pigors, P, and Myres, C.A., Personnel *Administration*: McGraw Hill, Tokyo, 1961, p-1.

Rastogi, T. N. , *Personnel Management, Perspecters and Techniques,* Anand Publication Pvt. Ltd, New Delhi, 1995, p-46, 54, 137.

Refurbishing of Personnel Administration - Scaling New Heights.

Report of the Royal Commission on the Civil Services, 1929-31, pp, 6-69.

Tenth Reports of the Second Administrative Reforms Commission (Relevant Portions) https://darpg.gov.in/sites/default/files/personnel_administration10.pdf.

The Civil Services (Classification, Control and Appeal), Rules. Nos 38, 39, 42 and 44.

Tickner, E. J., *Modern Staff Training*, p-9.

Unit-IV

A. Gray, and B. Jenkins, 'From Public Administration to Public Management' in E. Otenyo and N. Lind, (eds.) *Comparative Public Administration: The Essential Readings*: Oxford University Press, 1997.

A. Leftwich, 'Governance in the State and the Politics of Development', in *Development and Change*. Vol. 25, 1994.

B. Chakrabarty, *Reinventing Public Administration: The India Experience.* New Delhi: Orient Longman, 2007.

Basu, Rumki, *Public Administration in the 21st Century: A Global South Perspective* , Taylor and Franchis, 2019.

C. Hood, 'A Public Management for All Seasons', in J. Shafritz, & A. Hyde, (eds.) *Classics of Public Administration*, 5th Edition, Belmont: Wadsworth, 2004.

F. Riggs,*The Ecology of Public Administration, Part 3,* New Delhi: Asia Publishing House, 1961.

H. Frederickson, 'Toward a New Public Administration', in J. Shafritz, & A. Hyde, (eds.) *Classics of Public Administration*, 5th Edition, Belmont: Wadsworth, 2004.

M. Bhattacharya, 'Chapter 2 and 4', in *Social Theory, Development Administration and Development Ethics,* New Delhi: Jawahar Publishers, 2006.

M. Bhattacharya, 'Contextualizing Governance and Development' in B. Chakrabarty and M. Bhattacharya, (eds.) *The Governance Discourse.* New Delhi: Oxford University Press,1998.

M. Bhattacharya, *Public Administration: Issues and Perspectives,* New Delhi: Jawahar Publishers, 2012.

R. B. Denhart& J. V. Denhart [Arizona State University] " The New Public Service: Serving Rathet Than Steering", in Public Administration Review ,Volume 60, No-6,November-December 2000.

Singh, Shivani. (2016), Governance: Issues and Challenges, New Delhi, Sage Publications.

Stivers, Camilla, 'Feminist Theory of Public Administration' in *Defining Public Administration*, eBook ISBN-9780429501074, 2000.

U. Medury, *Public administration in the Globalisation Era*, New Delhi: Orient Black Swan, 2010.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 4th Semester

Course Name: POL 04-01: Understanding International Relations (Compulsory)

Existing Base Syllabus:

Course Level: 400

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Shubhrajeet Konwer, Gauhati University, sk489@gauhati.ac.in

Dr. Rubul Patgiri, Gauhati University, rubulpatgiri@gauhati.ac.in

Dr. Anubhav Sarma, Damdama College, Kulhati, anubhabsarmah1988@gmail.com

Course Objectives:

- The course aims to introduce the students to the basic understanding of international relations.
- To the growing linkages and interactions between domestic and international issues under the evolving process of globalization imperative for knowing and understanding global politics is increasingly being felt.
- The course is designed to equip the students with theoretical, historical and conceptual insights to understand the evolving dynamics of international relations.

Course Outcomes:

- To make students understand the key theoretical approaches in international relations
- To familiarize students with the history of evolution of international relations in the twentieth century
- To enable students to comprehend the nature of global economy.
- To demonstrate the basic knowledge of some of the contemporary global issues.

Unit-I: Theoretical Perspectives

a. Classical Realism and Neo-Realism
b. Liberalism and Neo-Liberalism
c. Marxist Approaches
d. Feminist Perspective

Unit-II: An Overview of Twentieth Century IR History-World War II onwards

a. World War II: Causes and Consequences
b. Origin, Evolution and End of the Cold War
c. Post Cold War Era and Emerging Centres of Power

Unit-III: The Global Economy

a. Global economic order and the Bretton Woods Institutions (IMF, WB and WTO)
b. Neoliberal Economic Policies-Economic Globalization and TNCs
c. Regionalism and Regional Economic Groupings-ASEAN and European Union
d. Emerging Multilateralism-G20 and BRICS

Unit-IV: Contemporary Global Issues

a. Ecological Issues
b. International Terrorism
c. Human Security
d. Migration

Reading List:

Unit-I

A. Frank, (1966) 'The Development of Underdevelopment' *Monthly Review,* pp. 17-30.

E. Carr, (1981) The Twenty Years Crisis, 1919-1939: An Introduction to the Study of International Relations, London: Macmillan, pp. 63-94.

F. Halliday, (1994) *Rethinking International Relations,* London: Macmillan, pp. 147-166.

H. Bull, (2000) 'The Balance of Power and International Order', in M. Smith and R. Little (eds), Perspectives on World Politics, New York: Routledge, pp. 115-124.

H. Morgenthau, (2007) 'Six Principles of Political Realism', in R. Art and R. Jervis, International Politics, 8th Edition, New York: Pearson Longman, pp. 7-14

I. Wallerstein, (2000) 'The Rise and Future Demise of World Capitalist System: Concepts for Comparative Analysis', in Michael Smith and Richard Little (eds), *Perspectives on World Politics,* New York: Routledge, pp. 305-317.

J. Galtung, (2000) 'A Structural Theory of Imperialism', in M. Smith and R. Little, (eds), *Perspectives on World Politics*, New York: Routledge, pp. 292-304.

J. Goldstein and J. Pevehouse, (2007) International Relations, New York: Pearson Longman, pp. 127-137. R. Jackson and G. Sorensen, (2007) Introduction to International Relations: Theories and Approaches, 3rd Edition, Oxford: Oxford University Press, pp. 97-128.

J. Goldstein and J. Pevehouse, (2007) *International Relations,* New York: Pearson Longman, pp. 494-496; 500-503.

J. Goldstein and J. Pevehouse, (2007) *International Relations,* New York: Pearson Longman, pp. 138-148.

J. Goldstein and J. Pevehouse, (2007) *International Relations,* New York: Pearson Longman,

J. Tickner, (2007) 'A Critique of Morgenthau's Principles of Political Realism', in R. Art and R. Jervis, *International Politics,* 8th Edition, New York: Pearson Longman, pp. 15-28.

K. Waltz, (2007) 'The Anarchic Structure of World Politics', in R. Art and R. Jervis, International Politics, 8th Edition, New York: Pearson Longman, pp. 29-49.

M. Nicholson, (2002) International Relations: A Concise Introduction, New York: Palgrave, pp. 6-7.

M. Nicholson, *International Relations: A Concise Introduction*, New York: Palgrave, 2002, pp. 120-122.

M. Nicholson, *International Relations: A Concise Introduction*, New York: Palgrave, 2002, pp.

Modern History Sourcebook: Summary of Wallerstein on World System Theory, Available at http://www.fordham.edu/halsall/mod/Wallerstein.asp, Accessed: 19.04.2013

New York: Oxford University Press, pp. 142-149; 155-158.

P. Viotti and M. Kauppi (2007), *International Relations and World Politics: Security, Economy, Identity*, Pearson Education, pp. 40-85.

R. Keohane and J. Nye, (2000) 'Transgovernmental Relations and the International Organization', in M. Smith and R. Little (eds.), Perspectives on World Politics, New York: Routledge, pp. 229-241.

Rumki Basu, (ed)(2012) International Politics: Concepts, Theories and Issues New Delhi, Sage.
S. Hobden and R. Jones, (2008) 'Marxist Theories of International Relations' in J. Baylis and S. Smith (eds), *The Globalization of World Politics: An Introduction to International Relations*,
S. Smith and P. Owens, (2008) 'Alternative Approaches to International Theory' in J. Baylis and S. Smith (eds), *The Globalization of World Politics: An Introduction to International Relations*, New York: Oxford University Press, pp. 181-184.
S. Smith and P. Owens, (2008) 'Alternative Approaches to International Theory' in J. Baylis
T. Dunne and B. Scmidt, (2008) 'Realism', in J. Baylis and S. Smith (eds), The Globalization of World Politics: An Introduction to International Relations, New York: Oxford University Press, pp. 90-107.
T. Dunne, (2008) 'Liberalism', in J. Baylis and S. Smith (eds.), The Globalization of World Politics: An Introduction to International Relations, New York: Oxford University Press, pp. 108-123.

Unit-II

Brezeznski, Z. (2005) *Choice: Global Dominance or Global Leadership*. New York: Basic Books, pp. 85-127.34
Carrtuthers, S.L. (2005) 'International History, 1900-1945' in Baylis, J. and Smith, S. (eds.) (2008) *The Globalization of World Politics. An Introduction to International Relations*.4th edn. Oxford: Oxford University Press, pp. 76-84.
Calvocoressi, P. (2001) *World Politics: 1945—2000*. Essex: Pearson, pp. 3-91.
Gill, S. (2005) 'Contradictions of US Supremacy' in Panitch, L. and Leys, C. (eds.) *Socialist Register: The Empire Reloaded*. London: Merlin Press. 2004, London, Merlin Press and New York, Monthly Review Press. *Socialist Register*, pp.24-47.
Hobsbawm, E. (1995) *Age of Extreme: The Short Twentieth Century, 1914—1991*. London: Abacus, pp. 225-226.
Scott, L. (2005) 'International History, 1945-1990' in Baylis, J. and Smith, S. (eds.) (2008) *The Globalization of World Politics An Introduction to International Relations*.4th edn. Oxford: Oxford University Press, pp. 93-101.
Taylor, A.J.P. (1961) *The Origins of the Second World War*. Harmondsworth: Penguin, pp.29-65.
Therborn, G. (2006) 'Poles and Triangles: US Power and Triangles of Americas, Asia and Europe' in Hadiz, V.R. (ed.) *Empire and Neo Liberalism in Asia.* London: Routledge, pp.23-37.

Unit-III

A. Heywood, (2011) *Global Politics,* New York: Palgrave-McMillan, pp. 454-479.

A. Narlikar, (2005) *The World Trade Organization: A Very Short Introduction,* New York: Oxford University Press, pp. 22-98.

Chatterjee, Aneek. International Relations Today: Concepts and Application. Pearson

Crane, Robert (ed.). Building bridges among the BRICS

Dattagupta, Rupak. Global Politics. Pearson

J. Goldstein, (2006) *International Relations,* New Delhi: Pearson, pp. 392-405 (MNC).

J. Goldstein, (2006) *International Relations,* New Delhi: Pearson, pp. 327-368, 392-405 (MNC).

Andrew Heywood, (2015) *Global Politics* London: Palgrave, pp.466-486.

Kripalini, Manjeet. India in the G20: Rule taker to Rule maker. Routledge

Larionova, Marina and Kirton, John (eds.). BRICS and Global Governance. Routledge

Gilpin, R. (2003) *Global Political Economy: Understanding the International Economic Order.* Hyderabad: Orient Longman, pp. 278- 304.

John Stopford, Multinational Corporations, Foreign Policy, Fall, 1998

Oliver Stuenkel, (2020). *The BRICS and Future of Global Order*, London: Lexinton Books.

P. Hirst, G. Thompson and S. Bromley, (2009) *Globalization in Question,* Cambridge: Polity Press, pp. 68-100 (MNC).

Pero, Siti Darwinda Mohamed. Leadership in Regional Community Building: Comparing ASEAN and the European Union. Palgrave Macmillan

R. Mansbach and K. Taylor, (2012) 'International Political Economy', *Introduction to Global Politics,* 2nd Edition, New York: Routledge, pp. 470-478.

R. Picciotto, (2003) 'A New World Bank for a New Century', in C. Roe Goddard et al., *International Political: State-Market Relations in a Changing Global Order*, Boulder: Lynne Reinner, pp. 341-351.

T. Cohn, (2009) *Global Political Economy: Theory and Practice,* pp. 130-140 (IMF), 208-218 (WTO).

V.Peterson**,** (2009) 'How Is The World Organized Economically?', in J. Edkins and M. Zehfuss (eds.) *Global Politics: A New Introduction*, New York: Routledge, pp. 271- 293.

Unit-IV

A. Acharya, (2011) 'Human Security', in J. Baylis, S. Smith and P. Owens (eds.) *Globalization of World Politics,* New York: Oxford University Press, pp. 480-493.

A. Acharya, (2001) ‘Human Security: East versus West’, in *International Journal,* Vol. 56, no. 3, pp. 442-460.

A.Heywood, (2011) *Global Politics,* New York: Palgrave, pp. 282-301.

A.Heywood, (2011) *Global Politics,* New York: Palgrave, pp. 383-411.

A. Vanaik, (2007) *Masks of Empire,* New Delhi: Tulika, pp. 103-128.

Jindal, N. & Kumar, K. (2018), Global Politics: Issues and Perspectives, New Delhi, Sage Publications

J. Kiras, (2011) ‘Terrorism and Globalization’, in J. Baylis, S. Smith and P. Owens (eds.) *Globalization of World Politics,* New York: Oxford University Press, pp. 366-380.

J. Volger, (2011) ‘Environmental Issues’, in J. Baylis, S. Smith and P. Owens (eds.) *Globalization of World Politics*, New York: Oxford University Press, pp. 348-362.

K. Shimko, (2005) *International Relations Perspectives and Controversies,* New York: Hughton-Mifflin, pp. 317-339.

P. Bidwai, (2011) ‘Durban: Road to Nowhere’, in *Economic and Political Weekly,* Vol.46, No. 53, December, pp. 10-12.

P. Viotti and M. Kauppi, (2007) *International Relations,* New Delhi: Pearson, pp. 276-307.

N. Carter, (2007) *The Politics of Environment: Ideas, Activism, Policy*, Cambridge: Cambridge University Press, pp. 13-81.

S. Tadjbakhsh and A. Chenoy, (2007) *Human Security,* London: Routledge, pp. 13-19; 123-127; 236-243

Four Year Undergraduate Programme

Subject: Political Science

Semester: 4th Semester

Course Name: POL 04-02: Political Theory: Concepts and Debates (Compulsory)

Existing Base Syllabus:

Course Level: 400

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Prof. Akhil Ranjan Dutta, Gauhati University, akhilranjan@gauhati.ac.in
Ms. Bondita Borbora, Dudhnoi College, Dudhnoi, bonditaborbora@gmail.com

Course Objectives:

- Help the students familiarize with the basic normative concepts of political theory. Each concept is related to a crucial political issue that requires analysis with the aid of our conceptual understanding.
- Encourage critical and reflective analysis and interpretation of social practices through the relevant conceptual toolkit.
- Introduce the students to the important debates in the subject. These debates prompt us to consider that there is no settled way of understanding concepts and that in the light of new insights and challenges, besides newer ways of perceiving and interpreting the world around us, we inaugurate new modes of political debates.

Course Outcomes:

- Understand the dimensions of shared living through these political values and concepts.
- Appreciate how these values and concepts enrich the discourses of political life, sharpening their analytical skills in the process.
- Reflect upon some of the important debates in political theory.

- Develop critical thinking and the ability to make logical inferences about socio-economic and political issues, on the basis of comparative and contemporary political discourses in India.

Unit-I: Freedom and Equality

a. Freedom: Lockean notion of Negative Freedom & Amartya Sen's notion of Development as Freedom

b. Equality: Procedural Equality and Substantive Equality

c. Egalitarianism: Background inequalities and differential treatment

Unit-II: Justice

a. Distributive Justice: John Rawls
b. Libertarian theories of Justice: F. A. Hayek
c. Global Justice

Unit-III: Rights and Obligation

a. The Universality of Rights and Differentiated Rights
b. Rights, Obligation and Civil Disobedience
c. Theories of Political Obligation: Conservatism, Consent Theory, Anarchism

Unit-IV: Major Debates

a. Whatever happens to nation-state? *Sovereignty under Globalization*.
b. How do we accommodate diversity in plural society? *Diversity and Multiculturalism*.
c. How do we deal with the *climate changes*? *Ecological Rights* as human rights

Reading List:

Unit-I

Acharya, Ashok. (2008) 'Affirmative Action', in Bhargava, Rajeev and Acharya, Ashok. (eds.) Political Theory: An Introduction. New Delhi: Pearson Longman, pp. 298-307.

Andrew Heywood (1994) Political Theory. London: Palgrave Macmillan, PP. 253-258, 284-294

Carter, Ian. (2003) 'Liberty', in Bellamy, Richard and Mason, Andrew (eds.). Political Concepts. Manchester: Manchester University Press, pp. 4-15.

Casal, Paula &amp; William, Andrew.(2008) 'Equality', in McKinnon, Catriona. (ed.) Issues in Political Theory. New York: Oxford University Press, pp. 149- 165.

Knowles, Dudley. (2001) Political Philosophy. London: Routledge, pp. 69- 132.
Riley, Jonathan. (2008) 'Liberty' in Mckinnon, Catriona (ed.) *Issues in Political Theory*, New York: Oxford University Press, pp. 103-119.
Swift, Adam. (2001) Political Philosophy: A Beginners Guide for Student's and Politicians. Cambridge: Polity Press, pp. 51-88, 91-132.

V. Sriranjani (2008) 'Liberty', in Bhargava, Rajeev and Acharya, Ashok. (eds.) Political Theory: An Introduction. New Delhi: Pearson Longman, pp. 41-57.

Unit-II

Bedau, Hugo Adam. (2003) 'Capital Punishment', in LaFollette, Hugh (ed.). The Oxford Handbook of Practical Ethics. New York: Oxford University Press, pp. 705-733.

Dutta, Akhil Ranjan. (ed.) (2011) "Political Theory-Issues, Concepts and Debates" Arun Prakashan, Panbazar, Guwahati.
Menon, Krishna. (2008) 'Justice', in Bhargava, Rajeev and Acharya, Ashok. (eds.) Political Theory: An Introduction. New Delhi: Pearson Longman, pp. 74-86.

Wolf, Jonathan. (2008) 'Social Justice', in McKinnon, Catriona. (ed.) Issues in Political Theory.New York: Oxford University Press, pp. 172-187.

Swift, Adam. (2001) Political Philosophy: A Beginners Guide for Student's and Politicians. Cambridge: Polity Press, pp. 9-48.

Knowles, Dudley. (2001) Political Philosophy.London: Routledge, pp. 177-238.

McKinnon, Catriona. (ed.) (2008) Issues in Political Theory.New York: Oxford University Press, pp. 289-305.

Unit-III

Seglow, Jonathan. (2003) 'Multiculturalism' in Bellamy, Richard and Mason, Andrew (eds.). Political Concepts. Manchester: Manchester University Press, pp. 156-168.

Tulkdar, P.S. (2008) 'Rights' in Bhargava, Rajeev and Acharya, Ashok. (eds.) Political Theory:

An Introduction. New Delhi: Pearson Longman, pp. 88-104.

McKinnon, Catriona. (2003) 'Rights', in Bellamy, Richard and Mason, Andrew. (eds.)

Young, Iris M. 1989. 'Polity and Group Difference: A Critique of the Ideal of Universal Citizenship' *Ethics*, No.2 pp.250-274

Unit-IV

Hyums, Keith. (2008) 'Political Authority and Obligation', in Mckinnon, Catriona. (ed.) Issues in Political Theory, New York: Oxford University Press, pp. 9-26

Martin, Rex. (2003) 'Political Obligation', in Bellamy, Richard and Mason, Andrew. (eds.)

Political Concepts, Manchester: Manchester University Press, pp. 41-51.

Gutmann, Amy. '*Multiculturalism and "The Politics of Recognition": Essays by Charles Taylor*. Princeton: Princeton University Press.

Kymlicka, Will.1995.*Multicultural Citizenship: A Liberal Theory of Minority Rights*. Oxford: Clarendon Press.

Kymlicka, Will.2002. *Contemporary Political Philosophy: An Introduction*. New York: Oxford University Press. (pp.327-377)

Mahajan, Gurpreet(ed.).1999. *Democracy, Difference and Social Justice.* New Delhi: Oxford University Press

Mahajan, Gurpreet.2002. *The Multicultural Path: Issues of Diversity and Discrimination in Democracy*. New Delhi: Sage. .(pp.85-123)

Parekh, Bhiku.1999. 'Cultural Diversity and Liberal Democracy' in Gurpreet Mahajan (ed.) *Democracy, Difference and Social Justice.* New Delhi: Oxford University Press.

Raz, Joseph. 1989. 'Multiculturalism: A Liberal Perspective' *Dissent*, winter pp.67-69

Taylor, Charles.1994.' The Politics of Recognition' in Amy Gutmann (ed.) *Multiculturalism and the Politics of Recognition.* New Jersey: Princeton University Press.

Mookherjee, Monica, 'Multiculturalism', in Mckinnon, Catriona. (ed.) Issues in Political Theory. New York: Oxford University Press, pp. 218- 234.

Seglow, Jonathan, ‘Multiculturalism’, in Bellamy, Richard and Mason, Andrew. (eds.) Political Concepts, Manchester: Manchester University Press, pp. 156-168

M. Shamsul Haque, ‘Environmental Discourse and Sustainable Development: Linkages and Limitations’*, Ethics and the Environment*, Vol. 5, No. 1 (2000), pp. 3-21

Guha. Ramachandra (ed) *Social Ecology,* Oxford University Press, Delhi, 1990

Four Year Undergraduate Programme

Subject: Political Science

Semester: 4th Semester

Course Name: POL 04-03: Political Processes in India (Compulsory)

Existing Base Syllabus:

Course Level: 400

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Vikas Tripathi, Gauhati University, vikastripathi@gauhati.ac.in

Prof. Dhruba Pratim Sharma, Gauhati University, dhruba75@gauhati.ac.in

Dr. Dadul Dewri, Pub-Kamrup College, Baihata, daduldewri79@gmail.com

Course Objectives:

- An understanding of the political process thus calls for a different mode of analysis that is offered by political sociology.
- This course maps the working of 'modern' institutions, premised on the existence of an individual society, in a context marked by communitarian solidarities and their mutual transformation thereby.
- It also familiarizes students with the working of the Indian State, paying attention to the contradictory dynamics of modern state power.

Course Outcomes:

- This Course is helpful in making students familiar with the significant political processes shaping Indian Politics in last seven decades.
- As such, the paper would help the students to know in detail about electoral processes and trends, party system in India, dynamics of Indian politics including regionalism, caste and religion as well as the changing nature of the Indian State.
- Their engagement with the selected scholarly articles included in the reading list will essentially orient them towards the larger intellectual and research tradition on issues of Indian politics.
- The paper will be helpful in terms of competitive examinations including NET/JRF, SLET as well as research in the field of Indian Politics.

Unit-I: Electoral Process in India

a. Election Process: First Past the Post System, Proportional Representation System
b. Representation of the People Act,1951
c. Election Commission of India and Electoral Reforms

Unit-II: Party System

a. National and State Party
b. Trends in the Party System
c. Voting Behaviour, Determinants of Voting Behaviour

Unit-III: Dynamics of Indian Politics

a. Regionalism and Secessionism
b. Caste and Politics
c. Religion and Politics, Debates on Secularism

Unit-IV: Changing Nature of Indian State

a. Developmental, Welfare and Coercive Dimensions
b. Affirmative Action Policies

c. Development and Displacement Debate

Reading List:

Unit-I

A. Heywood, (2002) 'Representation, Electoral and Voting', in *Politics*, New York; Palgrave pp. 223-245

A. Evans, (2009) 'Elections System', in J. Bara and M. Pennington, (eds.) *Comparative Politics*, New Delhi: Sage Publications, pp. 93-119

https://eci.gov.in/files/file/9315-the-representation-of-people-act-1951/

E. Sridhar and M. Vaishnav, (2017) 'Election Commission of India', in D. Kapur, P B Mehta and M Vaishnav, (eds.) *Rethinking Public Institutions in India*, New Delhi: Oxford University Press, pp. 417-463.

Lok Sabha Secretariate, (2020) 'Electoral Reforms in India: Reference Note' https://loksabhadocs.nic.in/Refinput/New_Reference_Notes/English/04022020_105450_102120474.pdf

P.B. Mehta. 2001. "Is Electoral and Institutional Reform the Answer?", *Seminar,* 506 https://www.indiaseminar.com/2001/506/506%20pratap%20bhanu%20mehta.htm

U.K. Singh and A. Roy, (2019) 'Introduction' in *Election Commission of India: Institutionalising Democratic Uncertainties,* New Delhi: Oxford University Press.

Unit-II

A. H. Schakel, C. K. Sharma & W. Swenden, (2019). India after the 2014 general elections: BJP dominance and the crisis of the third-party system, Regional & Federal Studies, 29 (3), 329-354.

C. Jaffrelot, (2008) 'Why Should We Vote? The Indian Middle Class and the Functioning of World's Largest Democracy', in Religion, Caste and Politics in India, Delhi: Primus, pp. 604-619

E. Sridharan, (2012) 'Introduction: Theorizing Democratic Consoloidation, Parties and Coalitions', in *Coalition Politics and Democratic Consolidation in Asia,* New Delhi: Oxford University Press.

R. Kothari, (2002) 'The Congress System', in Z. Hasan (ed.) *Parties and Party Politics in India,* New Delhi: Oxford University Press, pp. 39-55.

P. Chibberand R. Verma, (2019). 'The Rise of the Second Dominant Party System in India: BJP's New Social Coalition in 2019', *Studies in Indian Politics*, 7(2), 131-148.

Y. Yadav, (2000) ‘Understanding the Second Democratic Upsurge’ in F. Frankel, Z. Hasan and R. Bhargava (eds.) *Transforming India: Social and Political Dynamics in Democracy,* New Delhi: Oxford University Press, pp. 120-145

Y. Yadav and S. Palshikar, (2006). ‘Party System and Electoral Politics in the Indian States, 1952-2002: From hegemony to convergence.’ *India's Political Parties* 6, 73-116.
Y. Yadav (1999). Electoral Politics in the Time of Change: India's Third Electoral System, 1989-1999. Economic and Political Weekly, 34 (35), 2393-2399.
Y. Yadav, (200) ‘Understanding the Second Democratic Upsurge’, in F. Frankel, Z. Hasan and R. Bhargava (eds.) Transforming India; Social and political Dynamics in Democracy, New Delhi: Oxford University Press, pp. 120-145

Unit-III

Narain Iqbal. 1976. “Cultural Pluralism, National Integration and Democracy in India”, *Asian Survey*, 16(10), October, 903-17
Baruah, Sanjib. 2010. “Regionalism and Secessionism”, in Jayal and Mehta (eds). *The Oxford Companion to Politics in India.* pp 181-92
M. Chadda, (2010) ‘Integration through Internal Reorganization’, in S. Baruah (ed.) *Ethnonationalism in India: A Reader,* New Delhi: Oxford University Press, pp. 379-402
P. Brass, (1999) ‘Crisis of National Unity: Punjab, the Northeast and Kashmir’, in *The Politics of India Since Independence,* New Delhi: Cambridge University Press and Foundation Books, pp.192-227.
M. Weiner, (2001) ‘The Struggle for Equality: Caste in Indian Politics’, in Atul Kohli (ed.) *The Success of India's Democracy*, New Delhi: Cambridge University Press, pp. 193-225.
N. Chandhoke, (2010) ‘Secularism’, in P. Mehta and N. Jayal (eds.) The Oxford Companion to Politics in India, New Delhi: Oxford University Press, pp. 333-346.
R. Kothari, (1970) ‘Introduction’, in *Caste in Indian Politics,* Delhi: Orient Longman, pp. 3-25
T. Pantham, (2004) ‘Understanding Indian Secularism: Learning from its Recent Critics’, in R. Vora and S. Palshikar (eds.) *Indian Democracy: Meanings and Practices,* New Delhi: Sage pp. 235-256

Unit-IV

Ashok Acharya. (2008). Affirmative Action. In Rajeev Bhargava & Ashok Acharya (Eds.), *Political theory:An introduction,* Delhi: Pearson, pp.

Ashwini Deshpande. 2008. ‘Quest for Equality: Affirmative Action in India’, Indian Journal of Industrial Relations, 44 (2).

A Verma, (2007) ‘Police Agencies and Coercive Power’, in S. Ganguly, L. Diamond and M. Plattner (eds.) *The State of India’s Democracy,* Baltimore: John Hopkins University Press, pp. 130-139.

Bina Agarwal. (1997). ‘Bargaining and Gender Relations: Within and Beyond the Household’, *Feminist Economics,* 3 (1).

Chandra, Kanchan. 2007. “Counting heads: a theory of voter and elite behavior in patronage democracies”, in Herbert Kitschelt and Steven Wilkinson, (eds.) *Patrons, Clients and Policies: Patterns of Democratic Accountability and Political Competition,* Cambridge University Press: Cambridge, 84-140
Kohli Atul. 2006 “Politics of Economic Growth in India1980-2005: Part I”, Economic and Political Weekly, 41(13), April 1, pp.1251-59.

Kohli, Atul. 2006 “Politics of Economic Growth in India1980-2005: Part II”, Economic and Political Weekly, 41(14), April 8, pp.1361-70.

S. Palshikar, (2008) ‘The Indian State: Constitution and Beyond’, in R. Bhargava (ed.) *Politics and Ethics of the Indian Constitution,* New Delhi: Oxford University Press, pp. 143-163.
T. Byres, (1994) ‘Introduction: Development Planning and the Interventionist State Versus Liberalisation and the Neo-Liberal State: India, 1989-1996’, in T. Byres (ed.) *The State Development Planning and Liberalisation in India,* New Delhi: Oxford University Press, 1994, pp.1-35

Four Year Undergraduate Programme

Subject: Political Science

Semester: 4th Semester

Course Name: POL 04-04: Public Policy and Administration in India (Compulsory)

Existing Base Syllabus:

Course Level: 400

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Prof. Alaka Sarmah, Gauhati University, alakasarmah63@gauhati.ac.in

Prof. Jayanta Krishna Sarmah, Gauhati University, jayanta1947@gauhati.ac.in

Dr. Diganta Kalita, B. P. Chaliha College, Nagarbera, dkalita72@gmail.com

Course Objectives:

- The course seeks to provide an introduction to the discipline of public policy and its significance in contemporary times.
- The course seeks to explain the various aspects of public financial administration.
- The course seeks to provide an introduction to the interface between public policy and administration in India
- The course attempts to provide the students a comprehensive understanding on social welfare administration.

Course Outcomes:

- The students will understand the basic concept of public policy, policy analysis , public policy process and governance.The students also get the knowledge of different stages of public policy in terms of theoretical formulation.
- The student will learn about the principles of financial management, which are necessary for the examination purpose.
- Students will develop basic understanding on the best practices in public administration such as RTI, e-Governance etc
- The student will learn about the various welfare policies and the role of governance in it.

Unit -I: Public Policy

a. Concept, Relevance and Approaches
b. Formulation, Implementation and Evaluation
c. Public Policy Process in India

Unit-II: Financial Administration

a. Concept and Significance of Budget
b. Various Approaches and Types of Budgeting
c. Budget cycle in India

Unit -III: Citizen and Administration Interface

a. Public Service Delivery
b. Redressal of Public Grievances: Lokpal
c. Citizens’ Charter

Unit-IV: Social Welfare Administration

a. Concept and Approaches of Social Welfare
b. Social Welfare Policies
  - Education: Right to Education
  - Health: National Health Mission

- Food: Right to Food Security
- Employment: MNREGA

Reading List:

Unit-I

Chakrabarty, B. & Chand, P. (2016), Public Policy: Concepts, Theory and Practice, New Delhi: Sage Publications

J. Anderson, (1975) *Public Policy Making*. New York: Thomas Nelson and sons Ltd.

M. Howlett, M. Ramesh, and A. Perl, (2009), *Studying Public Policy: Policy Cycles and Policy subsystems,* 3rd edition, Oxford: Oxford University Press

Mary Jo Hatch and Ann .L. Cunliffe Organisation Theory :*Modern, Symbolicand Postmodern Perspectives*, Oxford University Press,2006

Michael Howlett, *Designing Public Policies : Principles And Instruments*, Rutledge, 2011 *The Oxford Handbook Of Public Policy*, Oxford University Press, 2006

Prabir Kumar De, *Public Policy and Systems*, Pearson Education, 2012

R.B. Denhardt and J.V. Denhardt, (2009) *Public Administration,* New Delhi: Brooks/Cole

R.V. Vaidyanatha Ayyar, *Public Policy Making In India*, Pearson,2009

Surendra Munshi and Biju Paul Abraham [Eds.] *Good Governance, Democratic Societies and Globalisation*, Sage Publishers, 2004

T. Dye, (1984) *Understanding Public Policy,* 5th Edition. U.S.A: Prentice Hall, pp. 1-44 *The Oxford Handbook of Public Policy,* OUP, 2006

T. Dye, (2002) *Understanding Public Policy*, New Delhi: Pearson

Xun Wu, M.Ramesh, Michael Howlett and Scott Fritzen , *The Public Policy Primer: Managing The Policy Process*, Rutledge, 2010

Y. Dror, (1989) *Public Policy Making Reexamined.* Oxford: Transaction Publication

Unit-II

Caiden, N.(2004) ‘ Public Budgeting Amidst Uncertainity and Instability’, in Shafritz, J.M. &

Erik-Lane, J. (2005) *Public Administration and Public Management: The Principal Agent Perspective.* New York: Routledge
Henry, N.(1999) *Public Administration and Public Affairs.* New Jersey: Prentice Hall
Hyde, A.C. (eds.) *Classics of Public Administration*. Belmont: Wadsworth

Unit-III

Jenkins, R. and Goetz, A.M. (1999) 'Accounts and Accountability: Theoretical Implications of the Right to Information Movement in India', in *Third World Quarterly.* June
M.J.Moon, *The Evolution of Electronic Government Among Municipalities: Rheoteric or Reality*, American Society For Public Administration, Public Administration Review, Vol 62, Issue 4, July –August 2002
Mukhopadyay, A. (2005) 'Social Audit', in *Seminar.* No.551. 37
Pankaj Sharma, E-*Governance: The New Age Governance*, APH Publishers, 2004
Pippa Norris, *Digital Divide: Civic Engagement, Information Poverty and the Internet in Democratic Societies*, Cambridge: Cambridge University Press, 2001.
R. Putnam, *Making Democracy Work*, Princeton University Press, 1993
Sharma, P.K. &Devasher, M. (2007) 'Right to Information in India' in Singh, S. and Sharma, P. (eds.) *Decentralization: Institutions and Politics in Rural India*. New Delhi: Oxford University Press
Stephan Goldsmith and William D. Eggers, *Governing By Network: The New Shape of the Public Sector*, Brookings Institution [Washington], 2004
United Nation Development Programme, *Reconceptualising Governance*, New York, 1997
Vasu Deva, *E-Governance In India: A Reality*, Commonwealth Publishers, 2005
World Development Report, World Bank, Oxford University Press, 1992.

Unit-IV

Basu Rumki (2015) *Public Administration in India Mandates, Performance and Future Perspectives*, New Delhi, Sterling Publishers
http://www.cefsindia.org

J.Dreze and Amartya Sen, *Indian Development: Selected Regional Perspectives*, Oxford: Clareland Press, 1997

Jean Drèze and Amartya Sen, *India, Economic Development and Social Opportunity,* Oxford: Oxford University Press, 1995

Jugal Kishore, *National Health Programs of India: National Policies and Legislations*, Century Publications, 2005

K. Lee and Mills, *The Economic Of Health In Developing Countries*, Oxford: Oxford University Press, 1983

K. Vijaya Kumar, *Right to Education Act 2009: Its Implementation as to Social Development in India,* Delhi: Akansha Publishers, 2012.

Marma Mukhopadhyay and Madhu Parhar(ed.) *Education in India: Dynamics of Development*, Delhi: Shipra Publications, 2007

Nalini Juneja, *Primary Education for All in the City of Mumbai: The Challenge Set By Local Actors'*, International Institute For Educational Planning, UNESCO: Paris, 2001

National Food Security Mission: **nfsm**.gov.in/Guidelines/XIIPlan/**NFSM**XII.pdf

Pradeep Chaturvedi [ed.], *Women And Food Security: Role of Panchayats*, Concept Publishers, 1997

Reetika Khera- Rural Poverty And Public Distribution System, EPW, Vol-XLVIII, No.45-46, Nov 2013

Surendra Munshi and Biju Paul Abraham [eds.] *Good Governance, Democratic Societies and Globalisation*, Sage Publishers, 2004

www.righttofoodindia.org

www.un.org/millenniumgoals

Four Year Undergraduate Programme

Subject: Political Science

Semester: 5th Semester

Course Name: POL 05-01: Western Political Philosophy (Compulsory)

Existing Base Syllabus:

Course Level: 500

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Barasa Deka, Gauhati University, barasa@gauhati.ac.in
Dr. Barnali Deka, Mangaldai College, dekabarnali067@gmail.com

Course Objectives:

- This course attempts to introduce the close interconnectedness of philosophy and politics.
- It is attempted at taking the students through the history of western political thought in various periods of its development.
- This course also attempts to explore the political questions of different periods and their relevance in analysing the contemporary political developments.

Course Outcomes:

- It will help the students in understanding the interconnectedness of philosophy and politics and interpret ideas underlying traditions in political philosophy
- It will help to analyze the debates and arguments of leading political philosophers belonging to different traditions.

- The students will be in a position to appraise the relevance of political philosophy in understanding contemporary politics.

Unit-I: Antiquity

a. Plato: Theory of Forms, Justice, Philosopher Ruler
b. Aristotle: Citizenship, Justice, Classification of governments

Unit-II: Interlude

a. Renaissance
b. Machiavelli: Virtue, Morality and Statecraft, Republicanism

Unit-III: Social Contract Tradition

a. Hobbes: State of Nature, Social Contract, State
b. Locke: Laws of Nature, Natural Rights, Social Contract, Property
c. Rousseau: State of nature, Social Contract, General Will

Unit-IV: Liberal and Marxist Thought

a. J.S. Mill: Utilitarianism and Liberty
b. Marry Wollstonecraft: Women and Rights
c. Karl Marx: Historical Materialism, Class Struggle

Reading List:

Unit-I

C. Reeve, (2009) 'Plato', in D. Boucher and P. Kelly, (eds) *Political Thinkers: From Socrates to the Present,* Oxford: Oxford University Press, pp. 62-80

C. Taylor, (1995) 'Politics', in J. Barnes (ed.), *The Cambridge Companion to Aristotle*. Cambridge: Cambridge University Press, pp. 232-258

J. Coleman, (2000) 'Aristotle', in J. Coleman *A History of Political Thought: From Ancient Greece to Early Christianity,* Oxford: Blackwell Publishers, pp.120-186

R. Kraut, (1996) 'Introduction to the study of Plato', in R. Kraut (ed.) *The Cambridge Companion to Plato*. Cambridge: Cambridge University Press, pp. 1-50.

S. Okin, (1992) 'Philosopher Queens and Private Wives', in S. Okin*Women in Western Political Thought,* Princeton: Princeton University Press, pp. 28-50

T. Burns, (2009) 'Aristotle', in D. Boucher, and P. Kelly, (eds) *Political Thinkers: From Socrates to the Present.* Oxford: Oxford University Press, pp.81-99.

Unit-II

A. Skoble and T. Machan, (2007) *Political Philosophy: Essential Selections*. New Delhi: Pearson Education, pp. 9-32.

A. Skoble and T. Machan, (2007) *Political Philosophy: Essential Selections*. New Delhi: Pearson Education pp. 131-157.

B. Constant, (1833) 'The Liberty of the Ancients Compared with that of the Moderns', in D. Boaz, (ed), (1997) *The Libertarian Reader*, New York: The Free Press.

D. Baumgold, (2009) 'Hobbes', in D. Boucher and P. Kelly (eds) *Political Thinkers: From Socrates to the Present.* Oxford: Oxford University Press, pp. 189-206.

J. Coleman, (2000) 'Introduction', in *A History of Political Thought: From Ancient Greece to Early Christianity,* Oxford: Blackwell Publishers, pp. 1-20.

Q. Skinner, (2000) 'The Theorist of Liberty', in *Machiavelli: A Very Short Introduction*. Oxford: Oxford University Press, pp. 54-87.

Q. Skinner, (2010) 'Preface', in *The Foundations of Modern Political Thought Volume I,* Cambridge: Cambridge University Press pp. ix-xv.

Unit-III

A. Bloom, (1987) 'Jean-Jacques Rousseau', in Strauss, L. and Cropsey, J. (eds.) History of Political Philosophy, 2nd edition. Chicago: Chicago University Press, pp. 559-580.

A. Ryan, (1996) 'Hobbes's political philosophy', in T. Sorell, (ed.) Cambridge Companion to Hobbes. Cambridge: Cambridge University Press, pp. 208-245.

A. Skoble and T. Machan, (2007) *Political Philosophy: Essential Selections*. New Delhi: Pearson Education, pp. 181-209.

B. Nelson, (2008) *Western Political Thought*. New York: Pearson Longman, pp. 221-255.

C. Macpherson (1962) *The Political Theory of Possessive Individualism: Hobbes to Locke*. Oxford University Press, Ontario, pp. 17-29.

C. Macpherson, (1962) *The Political Theory of Possessive Individualism: Hobbes to Locke*. Oxford University Press, Ontario, pp. 194-214.

I. Hampsher-Monk, (2001) A History of Modern Political Thought: Major Political Thinkers from Hobbes to Marx, Oxford: Blackwell Publishers, pp. 69-116

I.Hampsher-Monk, (2001) 'Thomas Hobbes', in A History of Modern Political Thought: Major Political Thinkers from Hobbes to Marx, Oxford: Blackwell Publishers, pp. 1-67.

J. Waldron, (2009) 'John Locke', in D. Boucher and P. Kelly, (eds) *Political Thinkers: From Socrates to the Present.* Oxford: Oxford University Press, pp. 207-224

M. Keens-Soper, (2003) 'Jean Jacques Rousseau: The Social Contract', in M. Forsyth and M. Keens-Soper, (eds) *A Guide to the Political Classics: Plato to Rousseau.* New York: Oxford University Press, pp. 171-202.

R. Ashcraft, (1999) 'Locke's Political Philosophy', in V. Chappell (ed.) The Cambridge Companion to Locke, Cambridge. Cambridge University Press, pp. 226-251.

<u>Unit-IV</u>

A. Skoble and T. Machan, (2007) Political Philosophy: Essential Selections, New Delhi: Pearson Education, pp. 328-354.

A. Skoble, and T. Machan, (2007) Political Philosophy: Essential Selections, New Delhi: Pearson Education, pp. 286-327.

B. Ollman (1991) Marxism: An Uncommon Introduction, New Delhi: Sterling Publishers. G. Blakely and V. Bryson (2005) Marx and Other Four Letter Words, London: Pluto

C. Jones, (2002) 'Mary Wollstonecraft's *Vindications* and their Political Tradition' in C. Johnson, (ed.) *The Cambridge Companion to Mary Wollstonecraft,* Cambridge: Cambridge University Press, pp. 42-58.

H. Magid, (1987) 'John Stuart Mill', in L. Strauss and J. Cropsey, (eds), *History of Political Philosophy*, 2nd edition. Chicago: Chicago University Press, pp. 784-801.

J. Cropsey, (1987) ‘Karl Marx’, in L. Strauss and J. Cropsey, (eds) *History of Political Philosophy*, 2ndEdition. Chicago: Chicago University Press, pp. 802-828.

L. Wilde, (2003) ‘Early Marx’, in D. Boucher and P. Kelly, P. (eds) *Political Thinkers: From Socrates to the Present.* New York: Oxford University Press, pp. 404-435.

P. Kelly, (2003) ‘J.S. Mill on Liberty’, in D. Boucher, and P. Kelly, (eds.) *Political Thinkers: From Socrates to the Present*. New York: Oxford University Press, pp. 324-359.

S. Ferguson, (1999) ‘The Radical Ideas of Mary Wollstonecraft’, in Canadian Journal of Political Science XXXII (3), pp. 427-50, Available at http://digitalcommons.ryerson.ca/politics, Accessed: 19.04.2013.

Selections from A Vindication of the Rights of Woman, Available at http://oregonstate.edu/instruct/phl302/texts/wollstonecraft/womana. html#CHAPTER%20II, Accessed: 19.04.2013.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 5th Semester

Course Name: POL 05-02: Indian Political Thought (Compulsory)

Existing Base Syllabus:

Course Level: 500

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Joanna Mahjebeen, Gauhati University, jmahjebeen@gauhati.ac.in

Dr. Ankita Baruah, Darrang College, Tezpur, ankitabaruah65@gmail.com

Course Objectives:

- To introduce the students to the diversity of thinkers in the Indian political tradition.
- To enable them to understand the trajectory of development of Indian Political Thought spanning over two millennia
- To introduce students to the social context which influenced the formation of such ideas
- To provide a sense of the broad streams of Indian thought while encouraging a specific knowledge of individual thinkers and texts.

Course Outcomes:

- Better understand the themes and issues in political thought of India.
- Compare and contrast positions of leading political thinkers in India on issues that are constitutive of modern India.

- Comprehend the importance of the socio-political context for the emergence of the ideas.
- Assess the relevance of political thought of India in understanding contemporary politics.

Unit-I: Ancient Political Thought

a. Kautilya: Theory of State
b. Manu: Social laws

Unit-II: Medieval Political Thought

a. Ziauddin Barani: Ideal Polity
b. Abul Fazl: Governance and Administration

Unit-III: Modern Political Thought

a. Raja Ram Mohan Roy: Reformist ideas
b. Gandhi: Swaraj; Satyagraha; Critique of Modern Civilisation
c. Nehru: Secularism, Socialism

Unit-IV: Caste, Class and Gender in Indian Political Thought

a. Ambedkar: The Revolution against Caste
b. Lohia: Socialism
c. Tarabai Shinde: Patriarchy and Caste

Reading List:

Unit-I

Kautilya, (1997) 'The Elements of Sovereignty' in R. Kangle (ed. and trns.), *Arthasastra of Kautilya,* New Delhi: Motilal Publishers, pp. 511- 514.

Manu, (2006) 'Rules for Times of Adversity', in P. Olivelle, (ed. &trans.) *Manu's Code of Law: A Critical Edition and Translation of the Manava- Dharamsastra*, New Delhi: OUP, pp. 208-213.

P. Olivelle, (2006) 'Introduction', in *Manu's Code of Law: A Critical Edition and Translation of the Manava –Dharmasastra,* Delhi: Oxford University Press, pp. 3- 50

R. Kangle, (1997) *Arthashastra of Kautilya-Part-III: A Study,* Delhi: Motilal Banarsidass, rpt., pp. 116- 142.

R. Sharma, (1991) 'Varna in Relation to Law and Politics (c 600 BC-AD 500)', in *Aspects of Political Ideas and Institutions in Ancient India,* Delhi: Motilal Banarsidass, pp. 233- 251.

Singh, M.P., (2011), *Kautilya: Theory of Stat,* in M.P. Singh & Himanghsu Roy(ed) Indian Political Thought: Themes and Thinkers, Pearson Publications, New Delhi, pp 1-17.

Sinha, Nalini (2011), Manu: Social Laws, in M.P. Singh & Himanghsu Roy(ed) *Indian Political Thought: Themes and Thinkers*, Pearson Publications, New Delhi, pp 18-29

V. Mehta, (1992) 'The Cosmic Vision: Manu', in *Foundations of Indian Political Thought,* Delhi: Manohar, pp. 23- 39.

V.Mehta, (1992) 'The Pragmatic Vision: Kautilya and His Successor', in *Foundations of Indian Political Thought,* Delhi: Manohar, pp. 88- 109.

Unit-II

Fazl, A., (1873) *The Ain-i Akbari* (translated by H. Blochmann), Calcutta: G. H. Rouse, pp. 47-57.

Habib, I. (1998) 'Ziya Barni's Vision of the State', in *The Medieval History Journal*, Vol. 2, (1), pp. 19- 36.

Habib, I. (1998). A Political Theory For The Mughal Empire — A Study Of The Ideas Of Abu'l Fazl. *Proceedings of the Indian History Congress*, *59*, 329–340.

Habib,I. (1998) 'Two Indian Theorist of The State: Barani and Abul Fazal', in *Proceedings of the Indian History Congress*. Patiala, pp. 15- 39.

M. Alam, (2004) 'Sharia Akhlaq', in *The Languages of Political Islam in India 1200- 1800,* Delhi: Permanent Black, pp. 26- 43

M. Alam, (2004) 'Sharia in Naserean Akhlaq', in *Languages of Political Islam in India1200-1800,* Delhi: Permanent Black, pp. 46- 69.

Mehta, V.R. (1992) 'The Imperial Vision: Barni and Fazal', in *Foundations of Indian Political Thought,* Delhi: Manohar, pp. 134- 156.

Unit-III

A. Parel, (ed.), (2002) 'Introduction', in *Gandhi, Freedom and Self Rule*, Delhi: Vistaar Publication.

B. Zachariah, (2004) *Nehru,* London: Routledge Historical Biographies, pp. 169-213.

C. Bayly, (2010) 'Rammohan and the Advent of Constitutional Liberalism in India 1800- 1830', in Sh. Kapila (ed.), *An intellectual History for India*, New Delhi: Cambridge University Press, pp. 18- 34. T.

Chakrabarty, B. & Pandey, R.K. (2009), *Modern Indian Political Thought: Text and Context*, New Delhi, Sage Publications

J. Nehru, (1991) 'Selected Works', in S. Hay (ed.), *Sources of Indian Tradition, Vol. 2,* Second Edition, New Delhi: Penguin, pp. 317-319.
M. Gandhi, (1991) 'Satyagraha: Transforming Unjust Relationships through the Power of the Soul', in S. Hay (ed.), *Sources of Indian Tradition*, Vol. 2.Second Edition, New Delhi: Penguin, pp. 265-270.

Mukherjee, R. (2009). Gandhi's Swaraj. *Economic and Political Weekly*, *44*(50), 34–39. http://www.jstor.org/stable/25663887
P. Chatterjee, (1986) 'The Moment of Arrival: Nehru and the Passive Revolution', in *Nationalist Thought and the Colonial World: A Derivative Discourse?* London: Zed Books, pp. 131-166

Pantham, (1986) 'The Socio-Religious Thought of Rammohan Roy', in Th. Panthom and K. Deutsch, (eds.) *Political Thought in Modern India*, New Delhi: Sage, pp.32-52.

Parekh, Bhikhu (1991), *Nehru and the National Philosophy of India*, Economic and Political Weekly, Vol. 26, No. 1/2 (Jan. 5-12,), pp. 35-48
Parekh, Bhikhu (1997), *Gandhi: A Very Short Introduction*, Oxford University Press, New York, pp 64-91.

R. Pillai, (1986) 'Political thought of Jawaharlal Nehru', in Th. Pantham, and K. Deutsch (eds.), *Political Thought in Modem India*, New Delhi: Sage, pp. 260- 274.

Unit-IV

B. Ambedkar, (1991) 'Constituent Assembly Debates', S. Hay (ed.), *Sources of Indian Tradition, Vol. 2,* Second Edition, New Delhi: Penguin, pp. 342-347.
B. Mungekar, (2007) 'Quest for Democratic Socialism', in S. Thorat, and Aryana (eds.), *Ambedkar in Retrospect - Essays on Economics, Politics and Society,* Jaipur*: IIDS* and Rawat Publications, pp. 121-142.

Doctor, A. H. (1988). Lohia's Quest for an Autonomous Socialism. *The Indian Journal of Political Science*, *49*(3), 312–327.
Kumar, Sanjay, Lohia: Democracy, in M.P. Singh & Himanghsu Roy(ed) Indian Political Thought: Themes and Thinkers, Pearson Publications, New Delhi, pp 251-258.
P. Chatterjee, (2005) 'Ambedkar and the Troubled times of Citizenship', in V. Mehta and Th. Pantham (eds.), *Political ideas in modern India: Thematic Explorations,* New Delhi: Sage, pp. 73-92.

T. Shinde, (1993) 'Stree Purusha Tulna', in K. Lalitha and Susie Tharu (eds), Women Writing in India, New Delhi, Oxford University Press, pp. 221-234
Tolpadi, R. (2010), Context*, Discourse and Vision of Lohia's Socialism*, *Economic and political Weekly*, 45(40), 71–77.

V. Rodrigues, (2007) 'Good society, Rights, Democracy Socialism', in S. Thorat and Aryama (eds.), *Ambedkar in Retrospect - Essays on Economics, Politics and Society,* Jaipur*: IIDS* and Rawat Publications.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 5th Semester

Course Name: POL 05-03a: United Nations and Global Conflict (Optional)

Existing Base Syllabus:

Course Level: 500

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Shubhrajeet Konwer, Gauhati University, sk489@gauhati.ac.in
Dr. Ratul Ch. Kalita, Tihu College, Tihu, ratulchkalita70@gmail.com

Course Objectives:

- This course provides a comprehensive introduction to the most important multilateral political organization in international relations.
- It provides a detailed account of the organizational structure and the political processes of the UN, and how it has evolved since 1945, especially in terms of dealing with the major global conflicts.
- The course imparts a critical understanding of the UN's performance until now and the imperatives as well as processes of reforming the organization in the context of the contemporary global system.

Course Outcomes:

- To make students learn the importance of United Nations as an organization.

- To enable students to have a basic understanding of the political processes of the United Nations.
- To make students learn the relevance of United Nations and its intervention in global conflicts critically.
- To help students identify and analyse the key conflicts that have shaped contemporary global politics.

Unit-I: The United Nations

a. A Historical Overview of the United Nations
b. Principles and Objectives
c. Structures and Functions: General Assembly; Security Council, and Economic and Social Council; the International Court of Justice

Unit-II: The United Nations in Conflict Resolution

a. Collective security during the Cold War
b. Peace Keeping, Peace Making and Enforcement, Peace Building and Responsibility to Protect
c. Reforming the UN

Unit-III: Specialised Agencies of the UN: Role and Challenges

a. United Nations Development Programme (UNDP)
b. United Nations Environment Programme (UNEP)
c. United Nations High Commissioner for Refugees (UNHCR)
d. The World Health Organisation (WHO)

Unit-IV: Major Global Conflicts Since the End of the Cold War

a. The war in Afghanistan
b. The war in Iraq
c. The war in Ukraine

Reading List:

Unit-I

Armstrong, D., Lloyd, L. and Redmond, J. (2004) International organisations in world politics.3rd edn. New York: Palgrave Macmillan, pp. 42-43.

Basu, Rumki (2014) United Nations: Structure and Functions of an international organization, New Delhi, Sterling Publishers

Gareis, S.B. and Varwick, J. (2005) The United Nations: An introduction. Basingstoke: Palgrave, pp. 15-21.

Unit-II

Claude, I. (1984) Swords into plowshares: the progress and problems of international organisation. 4th edn. New York: Random House

Baylis, J. and Smith, S. (eds.) (2008) The globalization of world politics. an introduction to international relations. 4th edn. Oxford: Oxford University Press, pp. 405-422.

Calvocoressi, P. (2001) World Politics: 1945-200. 3rd edn. Harlow: Pearson Education, pp. 116-124.

Dodds, F. (ed.) (1987) The way forward: beyond the agenda 21. London: Earthscan.

Ghali, B.B. (1995) An agenda for peace. New York: UN, pp.5-38. United Nations Department of

Public Information. (2008) The United Nations Today. New York: UN.

Nambiar, S. (1995) 'UN peace-keeping operations', in Kumar, S. (eds.) The United Nations at fifty. New Delhi, UBS, pp. 77-94.

Rajan, M.S., Mani, V.S and Murthy, C.S.R. (eds.) (1987) The nonaligned and the United Nations. New Delhi: South Asian Publishers.

Sangal, P.S. (1986) 'UN, peace, disarmament and development', in Saxena, J.N. et.al.United Nations for a better world. New Delhi: Lancers, pp.109-114.

Unit-III

Baxi, U. (1986) 'Crimes against the right to development', in Saxena, J.N. et.al.United Nations for a better world. New Delhi: Lancers, pp.240-248.

Goldstein, J. and Pevehouse, J.C. (2006) International relations.6th edn. New Delhi: Pearson, pp. 265-282.

J.S. (2003) International relations.3rd edn. Delhi: Pearson Education, pp 43-51. Moore, J.A. Jr. and Pubantz, J. (2008) The new United Nations. Delhi: Pearson Education, pp.24-27.

Moore, J.A. Jr. and Pubantz, J. (2008) The new United Nations. Delhi: Pearson Education, pp.119-135.

Moore, J.A. Jr. and Pubantz, J. (2008) The new United Nations. Delhi: Pearson Education, pp. 91-112.

South Asia Human Rights Documentation Centre. (2006) Human rights: an overview. New Delhi: Oxford University Press.

Taylor, P. and Groom, A.J.R. (eds.) (2000) The United Nations at the millennium. London: Continuum, pp. 21-141.

Thakur, R. (1998) 'Introduction', in Thakur, R. (eds.) Past imperfect, future uncertain: The UN at Ffifty. London: Macmillan, pp. 1-14.

Whittaker, D.J. (1997) 'Peacekeeping', in United Nations in the contemporary world. London: Routledge, pp. 45-56.

Unit-IV

Fawcett, L. (2023) The Iraq War 20 years on: towards a new regional architecture, International Affairs, Volume 99, Issue 2, March ,Pages 567–585, https://doi.org/10.1093/ia/iiad002

James Ellison, Michael Cox, Jussi M. Hanhimäki, Hope M. Harrison, N. Piers Ludlow, Angela Romano, Kristina Spohr&VladislavZubok (2023) The war in Ukraine, Cold War History, 23:1, 121-206, DOI: 10.1080/14682745.2023.2162329

Ratten, V. (2023). The Ukraine/Russia conflict: Geopolitical and international business strategies. *Thunderbird International Business Review*, 65(2), 265– 271. https://doi.org/10.1002/tie.22319

Shahrani, M. N. (Ed.). (2018). Modern Afghanistan: The Impact of 40 Years of War. Indiana University Press.https://doi.org/10.2307/j.ctv8j6dx

Walldorf C. W; (2022) Narratives and War: Explaining the Length and End of U.S. Military Operations in Afghanistan. International Security 2022; 47 (1): 93–138. doi: https://doi.org/10.1162/isec_a_00439

Four Year Undergraduate Programme

Subject: Political Science

Semester: 5th Semester

Course Name: POL 05-03b: Comparative Government and Politics (Optional)

Existing Base Syllabus:

Course Level: 500

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Shubhrajeet Konwer, Gauhati University, sk489@gauhati.ac.in
Dr. Jintu Gohain, R. G. Baruah College, Guwahati, gohain89@gmail.com

Course Objectives:

- Students will leave this course with the foundational knowledge they need to understand comparative politics.
- Understanding the topic of Political Science is facilitated by studying the many constitutions, each of which has its own history, institutions, and points of divergence.

Course Outcomes:

- To analyse the importance of different methods of "comparison".
- To understand the different forms of governments..
- To assess the working of institutions .

Unit-I: Introduction to Comparative Politics

a. Meaning and Nature
b. Comparative methods
c. Traditional and modern approaches to understanding of comparative politics

Unit-II: Introduction to British Constitution

a. History, Conventions, Features
b. Monarchy
c. Parliament
d. PM and the cabinet

Unit-III: Introduction to US Constitution

a. History and Features
b. President and the Congress
c. Supreme Court
d. Federalism

Unit-IV: Introduction to the Swiss Constitution

a. History and features
b. Federal Council and the Federal Assembly
c. Swiss Federation
d. Federal Courts

Reading List:

Unit-I

Bara, J & Pennington, M. (eds.). (2009) Comparative Politics. New Delhi: Sage.

Caramani, D. (ed.). (2008) Comparative Politics. Oxford: Oxford University Press.

Hague, R. and Harrop, M. (2010) Comparative Government and Politics: An Introduction.(Eight Edition). London: Palgrave McMillan.

Ishiyama, J.T. and Breuning, M. (eds.). (2011) 21st Century Political Science: A Reference Book. Los Angeles: Sage.

Newton, K. and Deth, Jan W. V. (2010) Foundations of Comparative Politics: Democracies of the Modern World. Cambridge: Cambridge University Press.

O'Neil, P. (2009) Essentials of Comparative Politics.(Third Edition). New York: WW. Norton & Company, Inc.

Unit-II

Bhagwan, Vishnoo and VidyaBhushan and VandhanaMohla (2022)World Constitutions: A comparative Study , Sterling Publishers.

Kapur, A.C. (2010) Select Constitutions, S. Chand.

Palekar, S.A. (2009) Comparative Government and Politics. New Delhi: PHI Learning Pvt. Ltd.

Unit-III

Bhagwan, Vishnoo and VidyaBhushan and VandhanaMohla (2022)World Constitutions: A comparative Study , Sterling Publishers.

Kapur, A.C. (2010) Select Constitutions, S. Chand.

Palekar, S.A. (2009) Comparative Government and Politics. New Delhi: PHI Learning Pvt. Ltd.

Unit-IV

Bhagwan, Vishnoo and VidyaBhushan and VandhanaMohla (2022) World Constitutions: A comparative Study , Sterling Publishers.

Kapur, A.C. & Mishra, K.K. (2010) Select Constitutions, S. Chand.

Palekar, S.A. (2009) Comparative Government and Politics. New Delhi: PHI Learning Pvt. Ltd.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 5th Semester

Course Name: POL 05-04a: Introduction to India's Foreign Policy (Optional)
Existing Base Syllabus:

Course Level: 500

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Rubul Patgiri, Gauhati University, rubulpatgiri@gauhati.ac.in

Dr. Ankita Baruah, Darrang College, Tezpur, ankitabaruah65@gmail.com

Course Objectives:

- The course seeks to provide basic knowledge of India's foreign policy.
- Foreign policy of India is dynamic and wider area of study.
- By exposing students to the various aspects of foreign policy formulation process in India, evolving nature of India's engagement with different powers and actors and its major foreign policy initiatives, the course is structured to equip them with the basic knowledge necessary to follow India's foreign issues and debates.

Course Outcomes:

- To enable students to learn about the evolution of India's engagement with the world and foreign policy formulation process in India.

- To familiarize students the nature of India’s evolving relationship with major powers and its neighbours.
- To demonstrate the knowledge of multilateral diplomacy of India.

Unit-I: Making of India’s Foreign Policy:

a. Evolution of India’s foreign policy-Nehruvian tradition and India in the new world order
b. Domestic and External determinants,
c. Policy formulation process-the Institutional structure (MEA, PMO and Parliament)

Unit-II: India and Major Powers

India’s relations with
a. USA,
b. Russia
c. China

Unit-III: India and its Neighbours

a. Pakistan,
b. Bangladesh
c. Sri Lanka
d. Concept of ‘Extended Neighbourhood’ and India’s Look (Act) East Policy.

Unit-IV: India’s Multilateral Diplomacy

a. India and the United Nations
b. India and International financial Institutions,
c. India and Climate change

Reading List:

Unit-I

A. Appadorai (1982). Domestic Roots of India’s Foreign Policy: 1947-72, New Delhi: Oxford University Press.

A.P. Rana: The Imperatives of Non-Alignment: A Conceptual Study of India's Foreign Policy Strategy in the Nehru Period. Macmillan, New Delhi, 1976

C. Mohan, (2013) ‘Changing Global Order: India’s Perspective’, in A. Tellis and S. Mirski (eds.), Crux of Asia: China, India, and the Emerging Global Order, Carnegie Endowment for International Peace: Washington.

Ch. Ogden, (2011) ‘International ‘Aspirations’ of a Rising Power’, in David Scott (ed.), Handbook of India’s International Relations, London: Routeledge, pp.3-31

Chaudhury, Rudra, (2015). ‘The Parliament’ in David M. Malone et al (eds). *The Oxford Handbook of Indian Foreign Policy*, UK: Oxford University Press.

J. Bandhopadhyaya, (1970). The Making of India's Foreign Policy, New Delhi: Allied Publishers.

Madan, Tanvi, (2015). ‘Officialdom: South Block and Beyond’ in David M. Malone et al. (eds). *The Oxford Handbook of Indian Foreign Policy*, UK: Oxford University Press.

Mansingh, Surjit , (1998). Nehru s Foreign Policy, Fifty Years On, New Delhi: Mosaic Books

P. Mehta, (2009) ‘Still Under Nehru’s Shadow? The Absence of Foreign Policy Frameworks in India’, in India Review, Vol. 8 (3), pp. 209–233.

R. Rajgopalan and V. Sahni (2008), ‘India and the Great Powers: Strategic Imperatives, Normative Necessities’, in South Asian Survey, Vol. 15 (1), pp. 5–32.

S. Cohen, (2002) India: Emerging Power, Brookings Institution Press.

S. Ganguly and M. Pardesi, (2009) ‘Explaining Sixty Years of India’s Foreign Policy’, in India Review, Vol. 8 (1), pp. 4–19.

Saksena, P. (1996). ‘India’s Foreign Policy: The Decision Making Process’, *International Studies*, 33 (4): 391-405.

Sunil Khilnani, (2015). ‘India’s Rise: The Search for Wealth and Power in the Twenty-First Century’ in David M. Malone et at, eds. *The Oxford Handbook of Indian Foreign Policy*, New Delhi: Oxford University Press.

W. Anderson, (2011) 'Domestic Roots of Indian Foreign Policy', in W. Anderson, Trysts with Democracy: Political Practice in South Asia, Anthem Press: University Publishing Online.

Unit-II

A. Singh, (1995) 'India's Relations with Russia and Central Asia', in International Affairs, Vol. 71 (1): 69-81.

A. Tellis and S. Mirski, (2013) 'Introduction', in A. Tellis and S. Mirski (eds.), Crux of Asia: China, India, and the Emerging Global Order, Carnegie Endowment for International Peace: Washington.

D. Mistry, (2006) 'Diplomacy, Domestic Politics, and the U.S.-India Nuclear Agreement', in Asian Survey, Vol. 46 (5), pp. 675-698.

H. Pant, (2008) 'The U.S.-India Entente: From Estrangement to Engagement', in H. Pant, Contemporary Debates in Indian Foreign and Security Policy: India Negotiates Its Rise in the International System, Palgrave Macmillan: London.

H. Pant, (2011) 'India's Relations with China', in D. Scott (ed.), Handbook of India's International Relations, London: Routeledge, pp. 233-242.

Li Li, (2013) 'Stability in Southern Asia: China's Perspective', in A. Tellis and S. Mirski (eds.), Crux of Asia: China, India, and the Emerging Global Order, Carnegie Endowment for International Peace: Washington.

M. Zafar, (1984), 'Chapter 1', in India and the Superpowers: India's Political Relations with the Superpowers in the 1970s, Dhaka, University Press.

R. Hathaway, (2003) 'The US-India Courtship: From Clinton to Bush', in S. Ganguly (ed.), India as an Emerging Power, Frank Cass: Portland.

S. Mehrotra, (1990) 'Indo-Soviet Economic Relations: Geopolitical and Ideological Factors', in India and the Soviet Union: Trade and Technology Transfer, Cambridge University Press: Cambridge, pp. 8-28.

S. Raghavan, (2013) 'Stability in Southern Asia: India's Perspective', in A. Tellis and S. Mirski (eds.), Crux of Asia: China, India, and the Emerging Global Order, Carnegie Endowment for International Peace: Washington.

Unit-III

Amitav Acharya, (2015). ‘India’s ‘Look East’ Policy’ in David M. Malone et al, (eds.) *The Oxford Handbook of Indian Foreign Policy*, New Delhi: Oxford University Press.

D. Scott, (2009) ‘India's “Extended Neighbourhood” Concept: Power Projection for a Rising Power’, in India Review, Vol. 8 (2), pp. 107-143

David M. Malone (2018). Does Elephant Dance?, New Delhi: Oxford University Press

David M. Malone et al, eds. (2015). *The Oxford Handbook of Indian Foreign Policy*, New Delhi: Oxford University Press.

Haokip, Thongkholal. (2015). India’s Look East Policy: Prospects and Challenges for Northeast India. *Studies in Indian Politics*, 3 (2), 198-211

Harsh V. Pant, (2021). Politics and Geopolitics: Decoding India’s Neighbourhood Challenges, New Delhi: Rupa Publications.

J. N. Dixit, (2010). India’s Foreign Policy and Its Neighbours, New Delhi: Gyan Publishing House

S. Cohen, (2002) ‘The World View of India’s Strategic Elite’, in S. Cohen, India: Emerging Power, Brookings Institution Press, pp. 36-65.

S. Muni, (2003) ‘Problem Areas in India’s Neighbourhood Policy’, in South Asian Survey, Vol. 10 (2), pp. 185-196.

V. Sood, (2009) ‘India and regional security interests’, in Alyssa Ayres and C. Raja Mohan (eds), Power realignments in Asia: China, India, and the United States, New Delhi: Sage.

Unit-IV

A. Narlikar, (2006) ‘Peculiar Chauvinism or Strategic Calculation? Explaining the Negotiating Strategy of a Rising India’, in International Affairs, Vol. 82 (1), pp. 59-76.

David M. Malone (2018). Does Elephant Dance?, New Delhi: Oxford University Press

Jason A. Kirk, (2015). India and the International Financial Institutions’ in David M. Malone et al, (eds.)*The Oxford Handbook of Indian Foreign Policy*, New Delhi: Oxford University Press.

Manu Bhagavan, (2015). ‘India and United Nations: Or Things Fall Apart’ in David M. Malone et al, eds. *The Oxford Handbook of Indian Foreign Policy*, New Delhi: Oxford University Press.

N. Dubash, (2012) ‘The Politics of Climate Change in India: Narratives of Enquiry and Co benefits’, Working Paper, New Delhi: Centre for Policy Research.

Navroz K. Dubash and Lavanya Rajaman, (2015). ‘Multilateral Diplomacy on Climate Change’ in David M. Malone et al, (eds.)*The Oxford Handbook of Indian Foreign Policy*, New Delhi: Oxford University Press.

Poorvi Chitalkar and David M. Malone, (2015). ‘India and Global Governance’ in David M. Malone et at, (eds.)*The Oxford Handbook of Indian Foreign Policy*, New Delhi: Oxford University Press.

S. Cohen, (2002) ‘The World View of India’s Strategic Elite’, in S. Cohen, India: Emerging Power, Brookings Institution Press, pp. 36-65.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 5th Semester

Course Name: POL 05-04b: Understanding South Asia (Optional)

Existing Base Syllabus:

Course Level: 500

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Shubhrajeet Konwer, Gauhati University, sk489@gauhati.ac.in
Dr. Ratul Ch. Kalita, Tihu College, Tihu, ratulchkalita70@gmail.com

Course Objectives:

- The course introduces the historical legacies and geopolitics of South Asia as a region.
- It imparts an understanding of political regime types as well as the socioeconomic issues of the region in a comparative framework.
- The course also apprises students of the common challenges and the strategies deployed to deal with them by countries in South Asia.

Course Outcomes:

- To identify geo-political and historical construction of South Asia as a region.
- To analyse the politics and socio-economic issues of the South Asian Region.

- To assess the relevance of regionalism in South Asia and India's position in the region.

Unit-I: South Asia- Understanding South Asia as a Region

a. Colonial Legacies
b. Geopolitics of South Asia
c. Regional cooperation in South Asia

Unit-II: Politics and Governance in Contemporary South Asia

a. Nepal: Monarchy and Democracy
b. Pakistan: Political Stability and the Role of the Army
c. Bangladesh: State of Democracy and Religious Fundamentalism
d. Sri Lanka: Constitutional Crises and Economy

Unit-III: Foreign Policies of Countries of South Asia

a. Nepal
b. Pakistan
c. Bangladesh
d. Sri Lanka

Unit-IV: South Asia: Regional Issues and Challenges

a. Human Development in South Asia
b. Insurgency and Terrorism
c. Refugees and Migration

Reading List:

Unit-I

Acharya, J. and Bose, T.K. (2001) ‘The New Search for a Durable Solution for Refugees: South Asia’, in Samaddar, S. and Reifeld, H. (eds.) Peace as Process: Reconciliation and Conflict Resolution in South Asia. New Delhi: Vedams ,pp-137-157 73

Baxter, C. (ed.) (1986) The Government and Politics of South Asia. London: Oxford University Press.

Brass, P. (ed.) (1986)Routledge Handbook of South Asian Politics. London: Routledge, pp.1-24 72 I.

Hagerty, D.T. (ed.) (2005) South Asia in World Politics, Oxford: Rowman and Littlefield.

Hewitt, V. (1992) ‘Introduction’, in The International Politics of South Asia. Manchester: Manchester University Press, pp.1-10.

Muni, S.D. (2003) ‘South Asia as a Region’, South Asian Journal, 1(1), August-September, pp. 1-6

Muni, S.D. and Jetley, R. (2010) ‘SAARC prospects: the Changing Dimensions’, in Muni, S.D. (ed.) Emerging dimensions of SAARC. New Delhi: Foundation Books, pp. 1-31.

Rizvi, G. (1993) South Asia in a Changing International Order. New Delhi: Sage

Thakur, R. and Wiggin, O.(ed.) (2005) South Asia and the world. New Delhi: Bookwell.

Unit-II

Burki, S.J. (2010) ‘Pakistan’s Politics and its Economy’, in Brass, P. (ed.) Routledge Handbook of South Asian Politics. London: Routledge, pp. 83-97.

Jha, N.K. (2008) ‘Domestic Turbulence in Nepal: Origin, Dimensions and India’s Policy Options’, in Kukreja, V. and Singh, M.P. (eds.) Democracy, Development and Discontent in South Asia. New Delhi: Sage, pp. 264-281

Kukreja, V. (2003) Contemporary Pakistan. New Delhi: Sage, pp. 75-111 and 112-153.

Kukreja, V. and Singh, M.P. (eds) (2008) Democracy, Development and Discontent in SouthAsia. New Delhi: Sage.

Mendis, D. (ed.) Electoral Processes and Governance in South Asia. New Delhi: Sage, pp.15-52.

Subramanyam, K. (2001) ‘Military and Governance in South Asia’, in V.A (ed.) Problems of Governance in South Asia. New Delhi: Centre for Policy Research &Konark Publishing House, pp.201-208.

Unit-III

Ali, G. (Ed.). (2022). Pakistan's Foreign Policy: Contemporary Developments and Dynamics (1st ed.). Routledge.https://doi.org/10.4324/9781003250920

Basrur, Rajesh M., (2011) 'Foreign Policy Reversal: The Politics of Sri Lanka's Economic Relations with India', in E. Sridharan (ed.), International Relations Theory and South Asia: Security, Political Economy, Domestic Politics, Identities, and Images Vol. 1 (Delhi, 2011; online edn, Oxford Academic, 23 Jan. 2014), https://doi.org/10.1093/acprof:oso/9780198069652.003.0007.

Dietrich, Simone; Mahmud, Minhaj; Winters, Matthew S. (2017). Foreign Aid, Foreign Policy, and Domestic Government Legitimacy: Experimental Evidence from Bangladesh. The Journal of Politics, doi:10.1086/694235

Mainali, R. (2022). Analysing Nepal’s Foreign Policy: A Hedging Perspective. Journal of Asian Security and International Affairs, 9(2), 301–317. https://doi.org/10.1177/23477970221098491

Pandey, A. (2021) Routledge Handbook on South Asian Foreign Policy, Routledge.

Unit-IV

Haq, Khadija (ed.) (2017) , 'Human Security for South Asia', in Khadija Haq (ed.), *Economic Growth with Social Justice: Collected Writings of MahbubulHaq* (Oxford), https://doi.org/10.1093/oso/9780199474684.003.0029

Hoyt, T.D. (2005) ‘The War on Terrorism: Implications for South Asia’, in Hagerty, D.T. (ed.) South Asia in World Politics. Lanham: Roman and Littlefield Publishers, pp.281-295.

Lama, M. (2003) ‘Poverty, Migration and Conflict: Challenges to Human Security in South Asia’, in Chari, P.R. and Gupta, S. (eds.) Human Security in South Asia: Gender, Energy, Migration and Globalisation. New Delhi: Social Science Press, pp. 124-144

P. R. Chari, Sonika Gupta (2003) Human Security in South Asia: Energy, Gender, Migration, and Globalisation, Berghahn Books.

Phadnis, U. (1986) ‘Ethnic Conflicts in South Asian States’, in Muni, S.D. et.al. (eds.) Domestic Conflicts in South Asia : Political, Economic and Ethnic Dimensions. Vol. 2. New Delhi: South Asian Publishers, pp.100-119.

Wilson, J. (2003) ‘Sri Lanka: Ethnic Strife and the Politics of Space’, in Coakley, J. (ed.) The Territorial Management of Ethnic Conflict. Oregon: Frank Cass, pp. 173-193.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 6th Semester

Course Name: POL 06-01: Human Rights: Traditions and Debates (Compulsory)

Existing Base Syllabus:

Course Level: 600

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Prof. Akhil Ranjan Dutta, Gauhati University, akhilranjan@gauhati.ac.in
Ms. Bondita Borbora, Dudhnoi College, Dudhnoi, bonditaborbora@gmail.com

Course Objectives:

- To understand human rights, its origin and debates. It is important for students to know how debates on human rights have taken distinct forms historically and in the contemporary world.
- To impart knowledge on the significant development of human rights starting from European tradition to Cairo Declaration.
- To deal with several issues which violate Human Rights through a comparative study. The course seeks to anchor all issues in the Indian context, and pulls out another country to form a broader comparative frame.
- To explore challenges on Human Rights and future possibility.

Course Outcomes:

- To understand various dimensions of Human Rights and multiple challenges.

- To make sense of institutional framework as well as theoretical perspectives of human rights.
- To develop critical thinking and the ability to make logical inferences about socio-economic and political issues.

Unit-I: Human Rights: Theories and Institutionalization

a. Growth and Evolution of Human Rights
b. Three Generations of Human Rights
c. Are Human Rights Universal? Issue of Cultural Relativism.
d. Institutionalization: UDHR, ICCPR, ICESCR, Human Rights Council

Unit-II: Traditions of Human Rights

a. European Tradition: European Convention on Human Rights, 1953
b. American Tradition: American Convention of Human Rights, 1969
c. African Tradition: African Charter on Human and Peoples' Rights, 1986
d. Islamic Tradition: Cairo Declaration on Human Rights in Islam, 1990

Unit-III: Structural Violence and Human Rights

a. Caste Question: India
b. Gender and Domestic Violence: India
c. Migration and Refugees: South Asia
d. Race: South Africa

Unit-IV: Contemporary Debates, Issues and Possibilities

a. Challenges: Market economy & Ecological Crisis
b. State Authoritarianism
c. Issues: Human Development and Human Security

d. Possibilities: MDGs, SDGs

Reading List:

Unit-I

Alison Dundes Renteln , *The Concept of Human Rights* , Anthropos, Bd. 83, H. 4./6. (1988), pp. 343-364

D. O'Byrne, (2007) '*Theorizing Human Rights', in Human Rights: An Introduction*, Delhi, Pearson, pp.26-70.

I: J. Hoffman and P. Graham, (2006) 'Human Rights', *Introduction to Political Theory*, Delhi, Pearson, pp. 436-458.

J. Morsink, (1999) *The Universal Declaration of Human Rights: Origins, Drafting and Intent*, Philadelphia: University of Pensylvania Press, pp. ix-xiv

Jack Donnelly, Cultural Relativism and Universal Human Rights, *Human Rights Quarterly*,

Jack Donnelly, Human Rights as Natural Rights, *Human Rights Quarterly*, Vol. 4, No. 3

M. Ishay, (2004) *The History of Human Rights: From Ancient Times to the Globalization* Era, Delhi: Orient Blackswan.

SAHRDC (2006) 'Introduction to Human Rights'; 'Classification of Human Rights: An Overview of the First, Second, and Third Generational Rights', in *Introducing Human Rights*, New Delhi: Oxford University Press.

U. Baxi, (1989) 'From Human Rights to the Right to be Human: Some Heresies', in S. Kothari and H. Sethi (ed.), Rethinking Human Rights, Delhi: Lokayan, pp.181-166

Vol. 6, No. 4 (Nov., 1984), pp. 400-419

Yasin, Adil-Ul, and Archana Upadhyay, *Human Rights* Akansha Publishing House, New Delhi, 2004

Unit-II

A guide to the African human rights system: Celebrating 30 years since the entry into force of the African Charter on Human and Peoples' Rights 1986 – 2017 (2017) Edited by Centre for Human Rights, Faculty of Law, University of Pretoria; South Africa: Pretoria University Press

C. Grabenwarter et al., (2014) *European Convention on Human Rights: Commentary, Germany* Beck/Hart Publishing

Irfaan Jaffer (2021), *Traditional Islamic Ethics: The Concept of Virtue and Its Implications for Contemporary Human Rights*, US: Vernon publish

Ludovic Hennebel, Hélène Tigroudja (2021) *The American Convention on Human Rights: A Commentary*, New York: Oxford University Press

Murray and Evans (eds.) *The African Charter on Human and Peoples' Rights: The System in Practice*, 1986-2000; (2002)

Thomas M. Antkowiak and Alejandra Gonza (2017) *The American Convention on Human Rights: Essential Rights*, New York: Oxford University Press

William A. Schabas (2015) The *European Convention on Human Rights: A Commentary, United Kingdom*: Oxford University Press

Unit-III

A. Pinto, (2001) 'UN Conference against Racism: Is Caste Race?', in Economic and Political Weekly, Vol. 36(30)

Ahmad, M. (2002) 'Homeland Insecurities: Racial Violence the Day after September 11', Social Text, 72, Vol. 20(3), pp. 101-116.

D. O'Byrne, (2007) 'Apartheid', in Human Rights: An Introduction, Delhi: Pearson, pp. 241-262.

R. Wasserstorm, (2006), 'Racism, Sexism, and Preferential Treatment: An approach to the Topics', in R. Goodin and P. Pettit, Contemporary Political Philosophy: an Anthology, Oxford: Blackwell, pp-549-574

Singh, U. (2007) 'The Unfolding of Extraordinariness: POTA and the Construction of Suspect Communities', in The State, Democracy and Anti-terror Laws in India, Delhi: Sage Publications, pp.165-219

Unit-IV

Acharya, Amitav “Human Security” in John Baylis, Steve Smith and Patricia Owens (eds) The Globalisation of World Politics (Oxford: Oxford University Press, 2008),pp. 490-505

Caroline Thomas, ‘Global Governance, Development and Human Security: Exploring the Links’ , *Third World Quarterly*, Vol. 22, No. 2 (Apr., 2001), pp. 159-175

Heike Kuhn et al. *Sustainable Development Goals and Human Rights*. Germany: Springer Berlin Heidelberg

M. Shamsul Haque, ‘Environmental Discourse and Sustainable Development: Linkages and Limitations’*, Ethics and the Environment*, Vol. 5, No. 1 (2000), pp. 3-21

Paul Streeten , “Human Development: Means and Ends”, *The Bangladesh Development Studies*, Vol. 21, No. 4 (December 1993), pp. 65-76

Roland Paris , ‘Human Security: Paradigm Shift or Hot Air?’ , *International Security*, Vol. 26, No. 2 (Fall, 2001), pp. 87-102

Stiglitz, Joseph (2002), Globalization and Its Discontents, New York: W.W. Norton & Company

Four Year Undergraduate Programme

Subject: Political Science

Semester: 6th Semester

Course Name: POL 06-02: Feminism: Theory and Practice (Compulsory)

Existing Base Syllabus:

Course Level: 600

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Dr. Barasa Deka, Gauhati University, barasa@gauhati.ac.in

Dr. Joanna Mahjebeen, Gauhati University, jmahjebeen@gauhati.ac.in

Dr. Ankita Baruah, Darrang College, Tezpur, ankitabaruah65@gmail.com

Course Objectives:

- This course is designed to introduce students to the structural and institutional basis of patriarchy as well as the basic concepts in gender studies.
- It would also give them an introduction to feminist thought and its evolving theories including the contemporary developments.
- It attempts to highlight the contribution of women's movements in different parts of the world and also highlights the Indian Women's movement from its inception to the post colonial period with a special focus on gender issues in Northeast India.

Course Outcomes:

- It will help to better appreciate key concepts that offer an understanding of gender inequality.
- Students will be in a position to comprehend the meaning of feminism and the theoretical developments associated with it.
- It will help to appraise the origin and development of feminism in the West and Socialist states.
- This course will help the students to comprehend the trajectory of women's movement in India and the issues addressed.
- It will lead to analysing and understanding the importance of gender in Northeast India in certain key aspects.

Unit-I: Understanding Patriarchy

a. Patriarchy and gender
b. Sex/gender distinction: Nature-nurture debate
c. Private-public dichotomy

Unit-II: Feminism: Concept and Theories

a. Concept of Feminism
b. Theories of Feminism: Liberal, Socialist, Marxist, Radical
e. New developments in feminist thought: Eco-feminism, Black feminism, Queer

Unit-III: History of Feminism

a. Origins of Feminism in the West: France, Britain and United States of America

b. Feminism in the Socialist Countries: China, Cuba and erstwhile USSR

Unit-IV: The Indian Experience

a. Social Reforms Movement and women in the nationalist movement

b. Women's movement in the post-colonial period : issue of family and property rights, work and violence
c. Gender issues in Northeast India: conflict, peacemaking and politics

Reading List:

Unit-I

Bhasin, Kamla (1993), *What is Patriarchy?,* Kali for Women

Bhasin, Kamla (2000), *Understanding Gender,* Kali for Women

Davidoff, L. (1998). 'Regarding Some "Old Husbands'" Tales: Public and Private in Feminist History'. In J. Landes (Ed.), Feminism, the Public and the Private. Oxford: Oxford University Press.

Eagly, A. H., & Wood, W. (2013). The Nature-Nurture Debates: 25 Years of Challenges in Understanding the Psychology of Gender. Perspectives on Psychological Science, 8(3), 340–357. http://www.jstor.org/stable/44289881

Geetha, V. (2002) *Gender*. Calcutta: Stree, pp 1-20

Geetha, V. (2007) *Patriarchy*. Calcutta: Stree.

http://www.du.ac.in/fileadmin/DU/Academics/course_material/hrge_06.pdf,

M. Kosambi, (2007) *Crossing Thresholds,* New Delhi, Permanent Black, pp. 3-10; 40-46

N. Menon (2008) 'Gender', in R. Bhargava and A. Acharya (eds), *Political Theory: An Introduction,* New Delhi: Pearson, pp. 224-233

S. Ray 'Understanding Patriarchy', Available at

T. Shinde, (1993) 'Stree Purusha Tulna', in K. Lalitha and Susie Tharu (eds), *Women Writing in India,* New Delhi, Oxford University Press, pp. 221-234

Thornton, M. (1991). The Public/Private Dichotomy: Gendered and Discriminatory. Journal of Law and Society, 18(4), 448–463. https://doi.org/10.2307/1410319

U. Chakravarti, (2001) 'Pitrasatta Par ek Note', in S. Arya, N. Menon & J. Lokneeta (eds.) *Naarivaadi Rajneeti: Sangharsh evam Muddey,* University of Delhi: Hindi Medium Implementation Board, pp.1-7

Unit-II

B. Hooks, (2010) 'Feminism: A Movement to End Sexism', in C. Mc Cann and S. Kim (eds), *The Feminist Reader: Local and Global Perspectives,* New York: Routledge, pp. 51-57

Jagger, Alison. (1983) *Feminist Politics and Human Nature*. U.K.: Harvester Press, pp. 25- 350.

R. Delmar, (2005) 'What is Feminism?', in W. Kolmar & F. Bartkowski (eds) *Feminist Theory: A Reader,* pp. 27-37

Tong, Rosemary (2009), Feminist Thought: A More Comprehensive Introduction, Westview Press, pp11-127.

Unit-III

Bryson Valerie. (1992) Feminist Political Theory : An Introduction. London: Macmillan

Eisentein, Zillah. (1979) *Capitalist Patriarchy and the Case for Socialist Feminism*. New York: Monthly Review Press, pp. 271-353.

Jayawardene, Kumari. (1986) *Feminism and Nationalism in the Third World*. London: Zed Books, pp. 1-24, 71-108, and Conclusion.

Rowbotham, Shiela. (1993) *Women in Movements*. New York and London: Routledge, Section I, pp. 27-74 and 178-218.

Unit-IV

Bhattacharya, J. (2010). GENDER, PEACEMAKING AND THE CASE OF NORTHEAST INDIA. *The Indian Journal of Political Science*, *71*(1), 233–239. http://www.jstor.org/stable/42748384

Chinoy, Anuradha M., *Militarism and Women in South Asia*, New Delhi: Kali for Women, 2002.

Deeka, Meeta, *Women's Agency and Social Change: Assam and Beyond*, New Delhi: Sage, 2013.

Desai, Neera & Thakkar, Usha.(2001) *Women in Indian Society*. New Delhi: National Book Trust.

Dhamala.R, Ranju, and Sukalpa Bhattacharjee (eds.) *Human Rights and Insurgency: The North-East India,* Delhi: Shipra Publications, 2002.

Dutta, Anuradha, *Assam in the Freedom Movement*, Calcutta: Darbari Prokashan, 1991.

Forbes, Geraldine (1998) *Women in Modern India*. Cambridge: Cambridge University Press, pp. 1-150.
Gandhi, Nandita & Shah, Nandita. (1991) *The Issues at Stake – Theory and Practice in Contemporary Women's Movement in India*. Delhi: Zubaan, pp. 7-72.
I. Agnihotri and V. Mazumdar, (1997) 'Changing the Terms of Political Discourse: Women's Movement in India, 1970s-1990s', *Economic and Political Weekly*, 30 (29), pp. 1869-1878.
Mahanta, A. (ed.) (2002) Human Rights and Women of North East India, Centre for Women's Studies, Dibrugarh University, Dibrugarh

Manchanda, Rita, (ed.) *Women, War and Peace in South Asia: Beyond Victimhood to Agency*, New Delhi: Sage Publications, 2001.

R. Kapur, (2012) 'Hecklers to Power? The Waning of Liberal Rights and Challenges to Feminism in India', in A. Loomba *South Asian Feminisms,* Durham and London: Duke
Sharma, Dipti, *Assamese Women in the Freedom Struggle*, Calcutta: Punthi Pustak, 1993.

University Press, pp. 333-355

Four Year Undergraduate Programme

Subject: Political Science

Semester: 6th Semester

Course Name: POL 06-03a: Politics in Northeast India (Optional)

Existing Base Syllabus:

Course Level: 600

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Prof. Alaka Sarmah, Gauhati University, alakasarmah63@gauhati.ac.in

Prof. Dhruba Pratim Sharma, Gauhati University, dhruba75@gauhati.ac.in

Dr. Dipjyoti Bhuyan, T.H.B. College, Jamuguri, djbhuyan100@gmail.com

Course Objectives:

- This course is designed to introduce students to the general perceptions about politics in Northeast India.
- It would also give them an introduction to colonial experience in Northeast India.
- It attempts to highlight the different ethnic movements in different parts of the Northeast India and contemporary politics in Northeast India.

Course Outcomes:

- It will help to better appreciate key concepts that offer an understanding about political development in Northeast India.
- Students will be in a position to comprehend the meaning of political development in Northeast India.
- This course will help the students to comprehend the trajectory of ethnic movement in Northeast India and the issues addressed.
- It will lead to analysing and understanding the importance of Issues of Northeast India in certain key aspects.

Unit-I: Colonial Policy- Annexation and Administration

a. Geo-Strategic Location and Socio-Cultural Diversity.
b. Expansion and Consolidation of Colonial Rule
c. Excluded and Partially Excluded areas: Inner Line.
d. Anti-Colonial revolts (Phulaguri Dhewa and Patharughat) and Freedom Struggle

Unit-II: Post-Colonial Developments

a. Immigration and Problem of Refugees.
b. Question of Identity: Naga Nationalism
c. Sixth Schedule.
d. Re-organisation of Northeast India

Unit-III: Political Developments in Assam

a. Language Politics.
b. Assam Movement.
c. Bodo Movement.
d. Rise of insurgency: ULFA and NDFB.

Unit-IV: Changing Nature of State Politics in Assam

a. Emergence of Regional Parties: AGP.
b. Formation of Autonomous Councils: Rabha and Mising.

c. Citizenship: NRC and CAA.

Reading List:

Barpujari, H.K. (1980), *Assam in the Days of Company 1826-1858*, Spectrum Publications, Sole Distributors: United Publishers, Gauhati, Assam.

Baruah, Sanjib (2007), *Durable Disorder: Understanding the Politics of Northeast India*, Delhi: Oxford University Press.

Bhaumik, Subir (2009), *Troubled Periphery: Crisis of India's North-East*, Sage Publications, New Delhi.

Das, Samir Kumar (1994), *ULFA: United Liberation Front of Assam: A Political Analysis*, Ajanta Publications.

Dutt, K.N. (1958), *Landmarks in the Freedom Struggle of Assam*, Guwahati.

Dutta, Nandana (2012), *Questions of Identity in Assam: Location, Migration, Hybridity*, New Delhi, Sage Publications.

Gait, Edward (2008), *A History of Assam*, Lawyers Book Stall, Guwahati.

Goswami, Sandhya, (1990), *Language Politics in Assam*, Ajanta Publishing House.

Guha, Amalendu, (1977), *Planter Raj to Swaraj- Freedom Struggle and Electoral Politics in Assam 1826-1947*, People's Publishing House Private Limited, New Delhi.

Haokip, T. (2015), *India's Look East Policy and the North East*, New Delhi, Sage Publications.

Hazarika, Jatin and Sharma, Dhruba Pratim (2021), *Administrative History of Undivided Assam (1826-1947)*, Assam Regional Branch, Indian Institute of Public Administration, and Anwesha Publications, Guwahati.

Hussain, Monirul (1993), *The Assam Movement: Class, Ideology and Identity*, Manak Publishing House with Har Anand Publications, Delhi.

Mahanta, Nani G. (2013), *Confronting the State: ULFA's Quest for Sovereignty*, SAGE Studies on India's North East, New Delhi: SAGE Publications India Pvt. Ltd.

Misra, Udayon (1991), *Nation Building and Development in North-East India*, Purbanchal Prakash, Guwahati.

Ray, B. Datta and S.P. Agarwal (1996), *Reorganisation of North-East India since 1947*, Concept Publishing Company.

Saikia, Jaideep (2007), *Frontiers in Flames: North-East India in Turmoil*, Viking, New Delhi

Sanajaoba, Naorem (2005), *Manipur Past and Present*, Mittal Publications, New Delhi.

Sarmah, Alaka (1999), *Impact of Immigration on Assam Politics*, Ajanta Publishing House, New Delhi.

Sarmah, Alaka, (2013) (ed), *Democracy and Diversity in North East India*, DVS Publications, Guwahati.

Sarmah, Alaka and Konwer, Shubhrajeet (2015) (ed.), *Frontier States: Essays on Democracy, Society and Security in NE India*, DVS Publications, Guwahati.

Sengupta, Madhumita (2016), *Becoming Assamese: Colonialism and New Subjectivities in Northeast India*, London: Routledge.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 6th Semester

Course Name: POL 06-03b: Conflict and Peace Building (Optional)

Existing Base Syllabus:

Course Level: 600

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Prof. Akhil Ranjan Dutta, Gauhati University, akhilranjan@gauhati.ac.in
Prof. Jayanta Krishna Sarmah, Gauhati University, jayanta1947@gauhati.ac.in

Mr. Rahul Bania, Tezpur College, Tezpur, rahulbania81@gmail.com

Course Objectives:

- To create an understanding of a variety of conflict situations among students in a way that they can relate to them through their lived experiences.
- To introduce practical conflict resolution techniques and strategies
- To encourages the use of new information technologies and innovative ways of understanding these issues by teaching students skills of managing and resolving conflicts and building peace.
- To pursue ways to reduce violent conflict and promote justice by means of negotiation and nonviolent action

Course Outcomes:

- To learn the basic concepts about conflict and Peace Building.
- To Understand different approaches and theories to peace and conflict studies.
- To learn the various skills and techniques as conflict responses in the society.
- To understand the nature of socio cultural conflicts based on ethnic, religious and gender.
- Students will understand, compare and evaluate theories and research on the causes of intergroup and international conflict and violence.
- Develop a critical understanding of how societies develop nonviolent means of basic social change, recover from violence, and prevent it from reoccurring in the future.

Unit-I: Conflict and its Concepts

a. Understanding Conflict

b. Conflict Resolution and Peace Building

c. Conflict Management and Conflict Transformation

Unit-II: Dimensions of Conflict

a. Economic/Resource Sharing Conflicts

b. Forms of conflicts: Ethnic, Religious and Gender

c. Territorial Conflict

Unit-III: Conflict Responses: Skills and Techniques-I

a. Negotiations: Trust Building

b. Mediation: Skill Building; Active Listening

c. Role of UNO and Civil Society in Peace Building

Unit-IV: Conflict Responses: Skills and Techniques-II

a. Track I, Track II & Multi Track Diplomacy

b. Gandhian Methods

C. Media, NGOs and Peace Building

Reading List:

Unit-I

Ashutosh Varshney, Ethnic Conflict and Civic Life: Hindus and Muslims in India (New Haven: Yale University Press, 2002).

Ballentine, Karen and Jake Sherman. 2003. The political economy of armed conflict: beyond greed and grievance. Boulder, Co.: Lynne Rienner Publishers

Cordell, Karl and Stefan Wolff. 2009. Ethnic conflict: causes, consequences, and responses. Cambridge; Malden, MA: Polity

Galtung, Johan. (1969). Violence, Peace, and Peace Research. Journal of Peace Research, 6:3, pp. 167-191.

O. Ramsbotham, T. Woodhouse and H. Miall, (2011) 'Understanding Contemporary Conflict',in Contemporary Conflict Resolution, (Third Edition), Cambridge: Polity Press, pp. 94-122.

W. Zartman, (1995) 'Dynamics and Constraints In Negotiations In Internal Conflicts', in William Zartman (ed.), Elusive Peace: Negotiating an End to Civil Wars, Washington: The Brookings Institute, pp. 3-29.
C. Mitchell, (2002) 'Beyond Resolution: What Does Conflict Transformation Actually Transform?', in Peace and Conflict Studies, 9:1, May, pp.1-23. 16
S. Ryan, (1990) 'Conflict Management and Conflict Resolution', in Terrorism and Political Violence, 2:1, pp. 54-71.
J. Lederach, (2003) The Little Book of a Conflict Transformation, London: Good Books.
I. Doucet, (1996) Thinking About Conflict, Resource Pack for Conflict Transformation: International Alert.
M. Lund, (2001) 'A Toolbox for Responding to Conflicts and Building Peace', in L. Reychler and T. Paffenholz, eds., Peace-Building: A Field Guide, Boulder: Lynne Rienner, pp. 16-20.

L. Schirch, (2004) The Little Book of Strategic Peacebuilding, London: Good Books.

Unit-II

P. Le Billon, (2009) 'Economic and Resource Causes of Conflicts', in J. Bercovitch, V. Kremenyuk and I. Zartman (eds.) The Sage Hand Book of Conflict Resolution, London: Sage Publications, pp. 210-224.

R. Rubenstein, (2003) ‘Sources’, in S. Cheldelin, D. Druckman and L. Fast (eds.) Conflict: From Analysis to Intervention, London: Continuum, pp.55-67.

S. Ayse Kadayifci-Orellana, (2009) ‘Ethno-Religious Conflicts: Exploring the Role of Religion in Conflict Resolution’, in J. Bercovitch, V. Kremenyuk and I. Zartman (eds.) The Sage Hand Book of Conflict Resolution, London: Sage Publications, pp. 264-284.

Unit-III

C. Webel and J. Galtung (eds.), (2007) The Handbook of Peace and Conflict Studies, London: Routledge.

Ethnic Conflicts, Palgrave Macmillan: New York, pp. 1-30.

H. Saunders, (1999) A Public Peace Process: Sustained Dialogue to Transform Racial and

J Bercovitch, V. Kremenyuk, and I. Zartman (eds.), (2009) The Sage Hand Book of Conflict

N. Behera, ‘Forging New Solidarities: Non-official Dialogues’, in M. Mekenkamp, P. Tongeren and H. Van De Veen (eds.), Searching For Peace In Central And South Asia, London: Lynne Rienner Publishers, pp. 210-236.

R. Wagner and D. Winter, (eds.), Peace, Conflict, and Violence: Peace Psychology forthe

Resolution, London: Sage Publications.

Unit-IV

Banks, Michael and Mitchell Christopher (Eds), 1990, A Handbook on the Analytical Problem Solving Approach, Institute for Conflict Analysis and Resolution, George Mason University.

Bruce Bueno de Mesquita (1980), “Theories of International Conflict: An Analysis and an Appraisal,” in Ted R Gurr ed., Handbook of Political Conflict: Theory and Research, New York, The Free Press

Gulrez, M. (2004) Conflict Transformation in West Asia, New Delhi, Uppal Publishing House.

H. Burgess and G. Burgess, (2010) Conducting Track II, Washington D.C: United States Institute of Peace.

S. Mason and M. Siegfried, (2010) Debriefing Mediators To Learn Their Experiences, Washington D.C: United States Institute of Peace.

I. Zartman and A. De Soto, (2010) Timing Mediation Initiatives, Washington D.C: United

States Institute of Peace. 17
A. Smith and D. Smock, (2010) Managing A Mediation Process, Washington D.C: United States Institute of Peace.
J. Davies and E. Kaufman (eds.), (2003) Second Track/Citizens' Diplomacy: Concepts and Techniques for Conflict Transformation, Rowman & Littlefield: Maryland.
J Bercovitch, V. Kremenyuk, and I. Zartman (eds.), (2009) The Sage Hand Book of Conflict Resolution, London: Sage Publications. M. Steger, (2001) ‘Peace building and Non-Violence: Gandhi’s Perspective on Power’, in D. Christie, R. Wagner and D. Winter, (eds.), Peace, Conflict, and Violence: Peace Psychology for the 21st Century Englewood Cliffs, New Jersey: Prentice-Hall.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 6th Semester

Course Name: POL 06-04a: Rural Local Governance: Theory & Practice (Optional)

Existing Base Syllabus:

Course Level: 600

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

Prof. Jayanta Krishna Sarmah, Gauhati University, jayanta1947@gauhati.ac.in

Dr. Diganta Kalita, B. P. Chaliha College, Nagarbera, dkalita72@gmail.com

Dr. Jintu Gohain, R. G. Baruah College, Guwahati, gohain89@gmail.com

Course Objectives:

- The course seeks to provide an introduction to the Rural Local Governance and its significance in contemporary times.
- This course encompasses local governance in its historical context. This course acquaints students with the Rural Local Institutions and their actual working.
- The course seeks to explain the various aspects of decentralization and democratic decentralization. It further encourages a study of rural local institutions in their mutual interaction and their interaction with the people.
- The course attempts to provide the students a comprehensive understanding on rural local finance.

Course Outcomes:

- This paper will help students understand the importance of grass root political institutions in empowering people.
- The students also gain knowledge about the important and significance of rural local governance.
- Student will learn the constitutional structure of the rural local bodies.
- Student will understand the inter relationship among the concepts of decentralization, democracy and participation.

Unit-I: Rural Local Governance: Concept and Evolution

a. Understanding Rural Local Governance
b. Rural Local Governance: Views of M.K. Gandhi, B.R. Ambedkar, R.M. Lohia, Vinoba Bhave, J. P. Narayan
c. Evolution and Important Committees: Balwant Rai Mehta Committee (1957), Ashok Mehta Committee (1978), L. M. Singvi Committee (1986)- 64th Constitutional Amendment Bill (1989)- 65th Constitutional Amendment Bill (1989)

Unit-II: Constitutional Perspectives of Rural Local Governance

a. 73rd Amendment Act: Major Features; 11th Schedule of the Constitution of India
b. Rural Local Governance in Tribal Areas: 6th Schedule of the Constitution of India
c. PESA (1996) : Key Provisions

Unit-III: Perspectives of Decentralization in Rural Local Governance

a. Democratic Decentralization: Key issues
b. Delegation and Devolution
c. Localization of Sustainable Development Goals: Challenges

Unit-IV: Rural Local Finance: Concept and Practice

a. Devolution of Funds to Panchayati Raj Institutions
b. Social Audit and Audit Online

c. e-Gram Swaraj

Reading List:

Unit-I

Chakrabarty, B. & Pandey, R.K, (2019), *Local Governance in India*, New Delhi, Sage
Das, N. 2006, *Bharator panchayati raj and Asamor swayatwa sashan*, Mritunjoy
Maheshwari, S.R. 2006 *Local Governance in India*, Lakshami Naraian Agarwal, Agra.
Maheswaari, S.R., *Local Govt. in India*, Lakshami Narain, Agra, 2010Mishra, S. N., Anil D. Orient Black Swan, New Delhi, (2012)
P. deSouza, (2002) 'Decentralization and Local Government: The Second Wind of Democracy in India', in Z. Hasan, E. Sridharan and R. Sudarshan (eds.) *India's Living Constitution: Ideas,Practices and Controversies,* New Delhi: Permanent Black

Raghunandan, J. R: *Decentralization and local governments: The Indian Experience*,
Venkata Rao, V.: *A Hundred Years of Local Self Government in Assam*, Bani

Unit-II

Alam, M.2007*, Panchayati Raj in India,* National Book Trust, New Delhi
Baviskar, B.S and George Mathew (eds) 2009 *Inclusion and Exclusion in local governance*: *Field Studies from rural India*, New Delhi, Sage
Gosh, B.K.2002, *The Assam Panchayat Act, Assam* Law House, Guwahati.
Joshi, R.P and Narwani, G.S,2002, *Panchayati Raj in India*, Rawat Publication Jaipur
Ray, B.Dutta,and Das, G. (Ed) *Dimensions of Rural Development in North East India,* Akansha, New Delhi

Unit-III

Bidyut Chakrabarty, *Reinventing Public Administration: The Indian Experience*, Orient Longman, 2007
D. A. Rondinelli and S.Cheema, *Decentralisation and Development*, Beverly Hills: Sage Publishers, 1983

Dube, M.P. and Padalia, M. (Ed.) 2002, *Democratic Decentralization and Panchayati Raj in India,* Anamika Publishers, New Delhi

Gabriel Almond and Sidney Verba, *The Civic Culture*, Boston: Little Brown, 1965

Mishra & Shweta Mishra: Public Governance and Decentralisation, Mittal Publications, NewDelhi, 2003

M.P.Lester, *Political Participation- How and Why do People Get Involved in Politics* Chicago: McNally, 1965

N.G. Jayal, *Democracy and The State: Welfare, Secular and Development in Contemporary India*, Oxford : Oxford University Press, 1999.

Noorjahan Bava, *Development Policies and Administration in India*, Delhi: Uppal Publishers, 2001

Satyajit Singh and Pradeep K. Sharma [eds.] *Decentralisation: Institutions and Politics in Rural India*, OUP, 2007

<u>Unit-IV</u>

Atul Kohli (Ed.). *The Success of India's Democracy*, Cambridge: Cambridge University Press.

Bidyut Chakraborty and Rajendra Kumar Pandey, *Modern Indian Political Thought – Text and Context*, Sage, New Delhi, 2009.

M.Venkatarangaiya and M.Pattabhiram- *Local Government in India*, Allied Publishers-1969

SR Maheswari, *Local Government in India*, Lakshmi Narain Agarwal, 2008.

Mathur, Kuldeep: *Panchayatiraj*, Oxford, 2013

Sarmah, J. K. and Kalita Diganta: - *GRAMYA STHANIYO XAKHON,* Arun Prakashan, Guwahati, 2013

Niraja Gopal Jayal and others: *Local Governance in India – Decentralization and Beyond*, Oxford University Press, 2006.

Subrata K. Mitra. 2001. Making local government work: Local elites, panchayati raj and governance in India,

Ghosh, Buddhadeb &Girish Kumar: *State Politics and Panchayats in India*, New Delhi: Manohar Publishers, 2003

Sudhakar, V.: *New Panchayati Raj System: Local Self-Government Community Development* - Jaipur: Mangal Deep Publications, 2002.

Four Year Undergraduate Programme

Subject: Political Science

Semester: 6th Semester

Course Name: POL 06-04b: Urban Local Governance: Theory and Practice (Optional)

Existing Base Syllabus:

Course Level: 600

Theory Credit: 60

Practical Credit: 0

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 0

Particulars of Course Designer:

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Prof. Dhruba Pratim Sharma, Gauhati University, dhruba75@gauhati.ac.in

Dr. Diganta Kalita, B. P. Chaliha College, Nagarbera, dkalita72@gmail.com

Dr. Jintu Gohain, R. G. Baruah College, Guwahati, gohain89@gmail.com

Course Objectives:

- The objective of this course is to make students aware of the significance of governance in the context of urban development and management.
- This course is intended to equip students with a basic understanding of the constitutional structure related to the governance of cities and of the urban areas.
- It will enhance different theoretical understanding and debates like public participation in urban governance, human environment interaction and of right to the cities.

Course Outcomes:

- Have a basic understanding of the policies and institutions governing cities and urban areas.

- Have a basic knowledge of the constitutional structure of urban governance.
- Understand the concepts and different dimensions of urban governance highlighting the major debates in the contemporary times.
- Evaluate the importance of urban governance in the context of a globalising world, environment, administration and development.
- Equipping students with the skill to analyse good governance practices and initiatives of urban governance system.

Unit-I: Introduction to Urban Local Governance

a. Urbanization Trends in globalizing 21st Century
b. Sustainable Urban Development: Theory and Practice
c. Genesis of 74th Amendment of the Constitution of India

Unit-II: Constitutional and Legal Structure of Urban Local Governance

d. Constitutional provisions of Urban Local Governance
e. Overview of legislations on Urban Local Bodies: Parliament and State Legislatures
f. Urban Policies and Schemes: Focus Areas

Unit-III: Development and Environmental Governance

a. Ecology conservation and environmental governance in urban areas
b. Human-Environment interaction
c. Smart Cities Mission, right to the city

Unit-IV: Good Governance Initiative and Practices

a. Urban Public Service Delivery
b. Country and Town Planning
c. Public Housing and Slum Development

Reading List:

Unit-I

Bardhan, P. & Dilip Mookherjee, Decentralization and Local Governance In Developing Countries: A Comparative Perspective, MIT Press, 2006

Chakrabarty, B. & Pandey, R.K, (2019), Local Governance in India, New Delhi, Sage Publications

Mishra & Shweta Mishra: Public Governance and Decentralisation, Mittal Publications, New Delhi, 2003

Maheshwari, S.R. 2006 Local Governance in India, Lakshami Naraian Agarwal, Agra

Maheswaari, S.R., Local Govt. in India, Lakshami Narain, Agra, 2010Mishra, S. N., Anil D.

M.P.Lester, Political Participation- How and Why do People Get Involved in Politics Chicago: McNally, 1965

P. DeSouza, (2002) 'Decentralization and Local Government: The Second Wind of Democracy in India', in Z. Hasan, E. Sridharan and R. Sudarshan (eds.) India's Living Constitution: Ideas,Practices and Controversies, New Delhi

Sachdeva, P. Local Government in India, Pearson Publishers, 2011

T.R. Raghunandan, Decentralization and Local Governments: The Indian Experience, Readings On the Economy, Polity and Society, Orient Blackswan, 2013

Unit-II

Alam, M.2007, Panchayati Raj in India, National Book Trust, New Delhi

Joshi, R.P and Narwani, G.S, 2002, Panchayati Raj in India, Rawat Publication Jaipur

Baviskar, B.S and George Mathew (eds) 2009 Inclusion and Exclusion in local governance: Field Studies from rural India, New Delhi, Sage

Bidyut Chakrabarty, Reinventing Public Administration: The Indian Experience, Orient Longman 2007

K.C. Sivaramakrishnan, Governing Megacities: Fractured Thinking, Fragmented Setup, Oxford University Press, 2014

Niraja Gopal Jayal and others: Local Governance in India – Decentralization and Beyond, Oxford University Press, 2006.

Noorjahan Bava, Development Policies and Administration in India, Delhi: Uppal Publishers, 2001

Parth J. Shah and Makarand Bokore, Ward Power-Decentralised Urban Governance, Centre for Civil Society, 2006

Reserve Bank of India, Municipal Finance in India: An Assessment, 2007

Subrata K. Mitra. Making local government work: Local elites, panchayati raj and governance in India, 2001

Unit-III

Diya Mehra, Protesting Publics in Indian Cities: the 2006 sealing drive and Delhi's traders, Economic and Political Weekly, 2012

Partha Mukhopadhyay, Unsmart Cities, Livemint, 2016

M.P. Ram Mohan and Anvita Dulluri, Constitutional mandate and judicial initiatives influencing Water, Sanitation and Hygiene (WASH) programmes in India, Journal of Water Sanitation and Hygiene for Development, 2017

Ministry of Housing and Urban Poverty Alleviation, Mission Document: National Urban Livelihoods Mission, Government of India (2013)

Gautam Bhan, "This is no longer the city I once knew": Evictions, the urban poor and the right to the city in millennial Delhi, Environment & Urbanisation, 2009

Amit Chandra and Rajul Jain, Property Rights of Street Vendors, Centre for Civil Society, 2015

B. C. Smith, Good Governance and Development, Palgrave, 2007

World Bank Report, Governance and Development, 1992

Ramachandra Guha, Environmentalism: A Global History, Longman Publishers, 1999

J.P. Evans, Environmental Governance, Routledge, 2012

Emilio F. Moran, Environmental Social Science: Human - Environment interactions and Sustainability, Wiley-Blackwell, 2010

Burns H Weston and David Bollier, Green Governance: Ecological Survival, Human Rights, and the Law of the Commons, Cambridge University Press, 2013

Unit-IV

B. Chakrabarty and M. Bhattacharya, (eds.) The Governance Discourse. New Delhi: Oxford University Press,1998

D. Crowther, Corporate Social Responsibility, Deep and Deep Publishers, 2008
Jayal, N. G. (1999), Democracy and the state: Welfare, Secularism, Development in Cotemporary India, Oxford University Press.

Jean Drèze and Amartya Sen, India, Economic Development and Social Opportunity, Oxford University Press, 1995
Jean Dreze and Amartya Sen, An Uncertain Glory: India and Its Contradictions, Princeton University Press, 2013
K. Lee and Mills, The Economic of Health in Developing Countries, Oxford University Press, 1983
Maxine Molyneux and Shahra Razavi , Gender, Justice, Development, and Rights , Oxford University Press, 2002
Partha Mukhopadhyay and Patrick Heller, State-produced inequality in an Indian city, 2015
Pushpa Sundar, Business & Community: The Story of Corporate Social Responsibility in India, New Delhi: Sage Publications, 2013

Sanjay K. Agarwal, Corporate Social Responsibility in India, Sage Publishers, 2008
Surendra Munshi and Biju Paul Abraham [eds.], Good Governance, Democratic Societies And Globalisation, Sage Publishers, 2004
United Nation Development Programme, Reconceptualising Governance, New York, 1997
Model State Affordable Housing Policy for Urban Areas, MHUPA, 2013
Maharashtra Slum Areas (Improvement, Clearance and Redevelopment) Act, 1971
National Urban Housing and Habitat Policy, 2007

Syllabus

Four Year Undergraduate Programme (FYUGP)

Gauhati University

SANSKRIT (Core Course)

Semester I

INTRODUCTION TO SANSKRIT

Marks: 100 **Total Credit: 4**

Base Syllabus: UG CBCS
Course Level: 100-199

Unit No	Unit Content	Credit	No. of Classes	Marks
I	Introduction to Vedic Literature (Introduction to Saṁhitā, Brāhmaṇa, Āraṇyaka, Upaniṣad & Vedāṅgas)	1	12	30
II	Introduction to Classical Sanskrit Literature (Epics, Purāṇa, *Pañcamahākāvya,* Nāṭaka)	1	12	25
III	Introduction to Śāstras (Vyākaraṇa,Darśana, Alaṁkāraśāstra)	1	12	30
IV	Origin and Development of Sanskrit Language and Devanāgarī Lipi	1	08	15

Reading List:

1. Gaurinath Shastri, A Concise History of Sanskrit Literature, MLBD, Delhi.
2. Maurice Winternitz, Indian Literature (Vol. I-III), also Hindi Translation, MLBD, Delhi.
3. A.B. Keith, History of Sanskrit Literature, also Hindi translation, MLBD, Delhi.
4. M. Krishnamachariar, History of Classical Sanskrit Literature, MLBD, Delhi.
5. Baldev Upadhyay, Sanskrit Sahitya ka Itihas, Sharda Niketan, Varanashi.
6. Baldev Upadhyay, Vedik Sahitya aur Sanskriti, Varanashi.
7. Kane, P.V. *History of the Dharmaśāstras* Vol. 1.
8. Shivasvarup Sahay, Bharatiya Puralekho ka Adhyayan (studies in ancient Indian inscriptions).
9. Dani, Ahmad Hasan :IndianPaleography, Oxford, 1963.
10. Satyamurty, K.: Text Book of Indian Epigraphy, Lower Price Publication, Delhi 1992.

Graduate Attributes:

Disciplinary Knowledge,
Communication,
Sense of pride for Indian Culture,
Inclination to Indian Knowledge System.

Course Objectives:

a. Students will acquire knowledge of Vedic and Classical Sanskrit Literature
b. Students will gain basic knowledge of Indian Scriptures that reflects the base of Indian society and culture
c. Students will study the history and background of Sanskrit language and Devnagari script.

Learning Outcomes:

After going through this unit students will be able

a. to appreciate the value of knowledge regarding ancient Indian literature.
b. to gain knowledge about various Indian scriptures which are the root of Indian Civilization.
c. to appreciate Indian Knowledge System that evolved in the initial stage of human civilization.
d. to grasp the linguistic significance of Sanskrit and its scripts.

Total Credit: 4

No. of Theory Classes: 44

No. of Practical Classes: 0

Course Designer: Chairperson, UGCCS, Dept. of Sanskrit, Gauhati University (GU)
Name: Prof. Sudeshna Bhattacharjya, HOD, Dept. of Sanskrit, GU
Email ID: sbmgu2010@gmail.com

Semester II

FUNCTIONAL SANSKRIT AND YOGA

Marks: 100 **Total Credit: 4**

Base Syllabus: UG CBCS
Course Level: 100-199

Unit No	Unit Content	Credit	No. of Classes	Marks
I	Sanskrit Conversation	1	8	20
II	Subhāṣitas (From the works of Kālidāsa, Bhavabhūti and Śrīharṣa)	1	12	25
III	Introduction to Yoga (Definition of Yoga, Concept of Aşţāṅgayoga w.r.t. Yogasūtra, I.2, I.12-16, II.29,30,32,46,49,50, III.1-4)	1	12	30
IV	Refinement of Behaviour (*Jňānayoga, dhyānayaga, karmayoga, bhaktiyoga Gītā*, III.5, 8, 10-16, 20,21)	1	12	25

Reading List:

1. Apte, V.S. - The Students' Guide to Sanskrit Composition, Chowkhamba Sanskrit Series, Varanasi
2. Sambhashanasandesha, Sanskrit Bharati, Bangalore.
3. Kale, M.R. - Higher Sanskrit Grammar, MLBD, Delhi (Hindi Translation also available).
4. Kanshiram - Laghusiddhāntakaumudī (Vol.1), MLBD, Delhi
5. M.R. Kale (Ed.), Nītiśatakam of Bhartṛhari, MLBD., Delhi.
6. B.K Chaturvedi, ChanakyaNeeti (Chanakya's Aphorism on morality), Diamond Books, New Delhi.
7. The Yogasutras of Patanjali: On concentration of mind. Delhi: Motilal Banarsidass,
8. Whicher, Ian. The integrity of the Yoga darshana: A reconsideration of Classical Yoga. Delhi: D.K.Printworld, 2000.

9. Legget, Trevor. Sankara on the Yoga Sutra: A full translation of the newly discovered text. Delhi: Motilal Banarsidass, 2006.
10. Radhakrishnan, S. Indian Philosophy. Vol. I & II. London: George Allen & Unwin, 1958.
11. Śrimadbhagavadgītā - A Guide to Daily Living, English translation and notes by Pushpa Anand, Arpana Publications, 2000.
12. Goswami, Ashok Kumar, *Subhāṣitasaṁgraha*, Guwahati.

Graduate Attributes:

Disciplinary Knowledge,
Communication Skill,
Upgraded Ethical Value,
Knowledge of ancient Indian Life style,
Balanced Outlook to life,
Self-Control and Self-Management,
Inclination to Indian Knowledge System.

Course Objectives:

a. Students will acquire knowledge of Indian Value System and will get expertise in spoken Sanskrit.

b. Students will gain knowledge of Yoga and the importance of its philosophy for running a balanced life style.

c. Students will acquire knowledge in the Indian way of self-control and self-management.

Learning Outcomes:

After going through this unit students will be able

a. to appreciate the value of Sanskrit Language.
b. to gain knowledge about the ethical equations of human life which are the root of proper growth and prosperity in the society.
c. to appreciate Indian Knowledge System that evolved for a holistic development in the society.
d. to grasp the equation of a balanced life style through self-control and self-management.

Total Credit:	4
No. of Theory Classes:	44
No. of Practical Classes:	0

Semester III

NATIONALISM IN SANSKRIT

Marks: 100 **Total Credit: 4**

Base Syllabus: UG CBCS
Course Level: 200-299

Unit No	Unit Content	Credit	No. of Classes	Marks
I	Indian concept of nation, meaning, etymology, fundamental elements of nationalism in the light of Sanskrit literature	1	10	25
II	National symbols and their significances	1	12	25
III	Concept of Bharatvarsha in ancient and modern Sanskrit literature	1	10	20
IV	Ancient Indian administrative system (saptāṅga Theory, ṣāḍguṇya Theory, maṇḍala Theory, Four Upāyas, Divine origin of Kings, śaktis w.r.t., Mahābhārata, Manusaṁhitā & Kauṭilya's Arthaśāstra)	1	12	30

Reading List:

1. Altekar, A.S. State and Government in Ancient India, Motilal Banarsidass, Delhi, 2001.
2. Belvalkar, S.K. Mahabharata : Santi Parvam, 1954.
3. Ghosal, U.N. A History of Indian Political Ideas, Bombay,1959.
4. Law, N. S. Aspect of Ancient Indian Polity, Calcutta, 1960.
5. Prasad, Beni. Theory of Government in Ancient India, Allahabad, 1968.
6. Saletore, B.A. Ancient Indian Political Thought and Institutions, Bombay, 1963.
7. Sharma, R. S. Aspects of Political Ideas and Institutions in Ancient India, Motilal Banarsidass, Delhi, 1996.
8. Verma, V.P. Studies in Hindu Political Thought and its Metaphysical Foundations, Delhi, 1954.
9. Arthashastra of Kautilya (ed.) Kangale, R.P. Delhi, Motilal Banarasidas 1965.
10. Visnu purana, (Eng. Tr.) H.H. Wilson, PunthiPustak, reprint, Calcutta, 1961.

11. Satapatha brahmana (3 Vols), (Eng. trans. ed.) Jeet Ram Bhatt, E. B.L. Delhi, 2009.
12. Chatterjee, P. The Nation and its Fragments: Colonial and Postcolonial Histories,
13. Manu’s Code of Law (ed. & trans.) : Olivelle, P. (A Critical Edition and Translation of the Mānava- Dharmaśāstra), OUP, New Delhi, 2006.
14. Ramayana of Valmaki. (Eng. Tr.) H.P. Shastri, London, 1952-59. (3 Vols).
15. Gandhi, M.K. The Collected Works of Mahatma Gandhi, Ahmedabad, Navajivan, 1958.
16. Pradhan, R. Raj to Swaraj, Macmillan, New Delhi, 2008.
17. Sharma, J. Hindutva: Exploring the Idea of Hindu Nationalism, Penguin, 2003.
18. Shukla,Hiralal, Modern Sanskrit Literature, Delhi, 2002.
19. Bhandarkar , D.R. Some Aspects of Ancient Indian Hindu Polity, Banaras Hindu University.
20. Singh, G.P. & Singh, S.Premananda. Kingship in Ancient India: Genesis and Growth, Akansha Publishing House, Delhi, 2000.

Graduate Attributes:

Disciplinary Knowledge,
True idea of Nation and Nationalism through Indian Perspective,
Knowledge of Indian National Symbols,
Inclination to Indian Knowledge System,
Knowledge of values connected to Ancient Indian Administration,
Growth of Patriotism.

Course Objectives:

a. Students will acquire knowledge of Indian Concept of Nation and Nation building.

b. Students will gain knowledge about the importance of the Indian National Symbols and their inner Philosophies.

c. Students will gain knowledge about the soulful Bharatavarsha which once remained the epitome of culture and Ideas of refined and higher strata.

Learning Outcome:

After going through this unit students will be able

a. to grasp the concept of Nation and Nation Building from an emic Perspective.
b. to understand the importance of the Indian National Symbols and their Philosophies which are the symbols of Indian Thought and Ethos.
c. to appreciate Indian Knowledge System that evolved for a holistic development in the society.
d. to grasp the original idea of Bharatavarsha, its Boundaries and Values.

e. to gain knowledge in the field of Ancient Indian Administrative System that could bring a very strong base of Prosperity for a quite long time in our country.

Total Credit: 4

No. of Theory Classes: 44

No of. Practical Classes: 0

Semester IV

CLASSICAL SANSKRIT LITERATURE (COMPULSORY)

Marks: 100 **Total Credit: 4**

Base Syllabus: UG CBCS
Course Level: 200-299

Unit No	Unit Content	Credit	No. of Classes	Marks
I	Rāmāyaṇa (Śaratvarṇanam, Varṣāvarṇam of the Kiṣkindhakāṇḍa)	1	12	25
II	Mahābhārata (Śāntiparva,ch. 191, Sabhāparva,ch.66,67)	1	12	25
III	Raghuvaṁśam (Canto II)	1	10	25
IV	Nītiśatakam (verse no. 1-50)	1	10	25

Reading List:

1. M.R. Kale (Ed.), Raghuvaṁśam of Kālidāsa, MLBD, Delhi
2. C.R. Devadhar (Ed.), Raghuvaṁśam of Kālidāsa, MLBD. Delhi
3. Gopal Raghunath Nandargikar (Ed.), Raghuvaṁśam of Kālidāsa, MLBD, Delhi
4. M.R. Kale (Ed.), Nītiśatakam of Bhartṛhari, MLBD., Delhi
5. Ramayana of Valmaki, (Eng. Tr.) H.P. Shastri, London, 1952-59. (3 Vols)
6. Krishnamachariar: History of Classical Sanskrit Literature, MLBD, Delhi
7. Gaurinath Shastri: A Concise History of Sanskrit Literature, MLBD, Delhi
8. Mahābhārata (7 Vols), (Eng. Tr.) H.P. Shastri, London, 1952-59

Graduate Attributes:

Disciplinary Knowledge,
True idea of Writing skills of ancient Indian Sanskrit Poets through Indian Perspective,
Upgraded Knowledge of Ancient Indian Value System,
Inclination to Indian Knowledge System,
Attraction to our own culture,

Solution for many problems that grew through wrong Interpretation of Indian Culture and Tradition.

Course Objectives:

a. Students will acquire knowledge of Indian Concept of Epics and poetry.

b. Students will gain knowledge about the importance of the Ramayana and the Mahabharata even in present day life.

c. Students will gain knowledge about the basic moral values that can establish a Balanced Society.

d. students will acquire the confidence of projecting the beautiful literary styles of our Ancient Poets in world forum.

Learning Outcomes:

After going through this unit students will be able

a. to grasp the concept of poetry from an Emic Perspective.
b. to understand the Importance of the two Great Indian Epics, i.e. the Ramayana and the Mahabharata.
c. to appreciate Indian Knowledge System that evolved for a holistic development in the society.
d. to grasp the original idea Human Values and their Requirements in the Present Society
e. to gain Specific knowledge in the field of Ancient Indian Literature that Remained a Source of Inspiration for many Writers of the World.

Total Credit:	4
No. of Theory Classes:	44
No. of Practical Classes:	0

Semester IV

BASICS OF SANSKRIT GRAMMAR (DSE, ELECTIVE I)

Marks: 100 **Total Credit: 4**

Base Syllabus: UG CBCS
Course Level: 100-199

Unit No	Unit Content	Credit	No. of Classes	Marks
I	Declension and Conjugation Śabdarūpa (svarānta, vyaňjanānta, Sarvanāma,saṁkhyā), Dhāturūpa (bhū,gam,nī,dṛś,vṛt,as,ad,kṛ,hu,div,śru, āp,tan,yā,rud,han,vid,cur,sādh)	1	12	25
II	Māhesvarasūtra and Uccāraṇasthāana of Sanskrit Letters	1	12	25
III	Scientific Background of Sanskrit Grammar	1	12	25
IV	Technical Terms of Sanskrit Grammar (prakṛti, dhātu,prātipadika,kṛt, taddhita, guṇa,vṛddhi, samprasāraṇa, ādeśa, āgama, nişṭhā,laghu,guru,savarṇa,nadī,it,ṭi,upadhā, bhāşitapuṁşka,sāvadhātuka, ārdhadhātuka, vibhāşā,abhyasta, kṛtya)	1	8	25

Reading List:

1. Kale, M.R. Higher Sanskrit Grammar, MLBD, Delhi. (Hindi Translation also available)
2. Basu,S.C.Vaiyakarana sidhhanta kaumudi (Vols I, II)
3. Basu, S.C.Astadhyayi (Vols I, II)
4. Vidyasagar,Ishvarachandra, Samagra Vyakarana Kaumudi
5. Chakraborty,Satyanarayan,Paniniya Sabdasastra,Sanskrit Pustak Bhandar,Kolkata
6. Vyakarana Prabha
7. Apte, V.S.,The Students' Guide to Sanskrit Composition, Chowkhamba Sanskrit
8. Varadraj, Laghusiddhantakaumudi, Gitapress, Gorakhpur
9. Dr.Kapildev Dvivedi , Sanskrit Vyakaranevam Laghusiddhant Kaumudi, Visvavidyalayprakashan, Varanasi.
10. Kanshiram Laghusiddhāntakaumudī (Vol. I), MLBD, Delhi, 2009.

Graduate Attributes:

Disciplinary Knowledge,
Basic ideas and Technicalities of Sanskrit Grammar and Linguistics,
Upgraded Knowledge of Sanskrit Language,
Communicative skill,
Knowledge of writing Sanskrit in a correct way,
Inclination to Indian Knowledge System,
Analytical Base for Scientific approach to any Indian Language.

Course Objectives:

a. Students will acquire knowledge of Basic Sanskrit Grammar.
b. Students will gain knowledge about the Scientific base of Sanskrit Grammar.
c. Students will gain knowledge about the technique of forming Sanskrit words.
d. Students will acquire the confidence of going for Translation Studies.

Learning Outcomes:

After going through this course student will be able

a. to grasp the basic concepts of Sanskrit Grammar.
b. to understand the Importance of Sanskrit Grammar in any type of Linguistic Study.
c. to appreciate Indian Knowledge System that evolved for a Linguistic Treasure House.
d. to grasp the basic Techniques of Translation Studies.

Total Credit:	4
No. of Theory Class:	44
No of Practical Class:	0

Semester IV

HISTORY OF VEDIC LITERATURE (DSE, ELECTIVE II)

Marks: 100 **Total Credit: 4**

Base Syllabus: UG CBCS
Course Level: 100-199

Unit No	Unit Content	Credit	No. of Classes	Marks
I	Saṁhitā (History)	1	10	25
II	Brāhmaṇa (History)	1	10	25
III	Āraṇyaka and Upaniṣad (History)	1	12	25
IV	Vedāṅgas (History)	1	12	25

Reading List:

1. M. Krishnamachariar, History of Classical Sanskrit Literature, MLBD, Delhi.
2. Gaurinath Shastri, A Concise History of Sanskrit Literature, MLBD, Delhi.
3. Maurice Winternitz, Indian Literature (Vol. I-III), also Hindi Translation, MLBD, Delhi.
4. A.B. Keith, History of Sanskrit Literature, also Hindi translation, MLBD, Delhi.
5. Baldev Upadhyay, Sanskrit Sahitya ka Itihas, Sharda Niketan, Varanasi.
6. Ṛksūktāvalī, H.D. Velankar, VaidikaSanshodhana Mandala, Pune, 1965.
7. Vaidik Sangrah, Krishnalaal, Eastern Book Linkers, Delhi.
8. Ṛksūktavaijayantī, H.D. Velankar, Bharatiya Vidya Bhavan, Bombay, 1972.
9. ŚatapathaBrāhmaṇa , (Ed.) Ganga Prasad Upadhyaya, SLBSRS Vidyapeeth, Delhi.
10. Śuklayajurveda-Saṁhitā, (Vājasaneyi-Mādhyandina), (Ed.) Jagadish Lal Shastri, MLBD, Delhi, 1978.
11. Atharvaveda (Śaunakīya): (Ed.) Vishva Bandhu, VVRI, Hoshiharpur, 1960.

Graduate Attributes:

Disciplinary Knowledge,
Basic ideas and Technicalities of Vedic Literature,
Upgraded Ideas of the Brahmanas,
Aranyakas and Upanisads,
Inclination to Indian Knowledge System,
Analytical Base for Some of the Important Upanishadic Ideas,
Knowledge of the origin of various Academic Fields in Ancient India on the basis of the study on the Vedangas.

Course Objectives:

a. Students will acquire knowledge of Important Arenas of Vedic Literature
b. Students will gain knowledge of Social Values of the Vedic Culture
c. Students will gain knowledge about Upanishadic Concepts of Life's Goal
d. Students will acquire knowledge about the base of Some of the Important fields of Modern Subjects through the Study of teh Vedangas

Learning Outcome:

After going through this course student will be able

a. to grasp the techniques Used in the Vedic Mantras.
b. to understand the Importance of Vedic Study in the Modern Day world.
c. to appreciate Indian Knowledge System that evolved in the Vedic Society.
d. to correlate Vedic Knowledge in Various field of modern education.
e. to bring a synergy between Indian Knowledge System and various modern academic concepts and ideas.

Total Credit:	4
No. of Theory Classes:	44
No. of Practical Classes:	0

Semester IV

POLITICS AND PROSODY (DSE, ELECTIVE II)

Marks: 100 **Total Credit: 4**

Base Syllabus: UG CBCS
Course Level: 100-199

Unit No	Unit Content	Credit	No. of Classes	Marks
I	Introduction to Sanskrit Poetics	1	12	25
II	Forms of Kāvya Literature (dṛśya,śravya,miśra,campū,mahākāvya, khaṇḍakāvya,gadya,kathā,ākhyāyikā, w.r.t. Sāhityadarpaṇa)	1	12	25
III	Figures of Speech (anuprāsa, yamaka śleşa, upamā,rūpaka,sandeha,bhrāntiman, apahnuti,utprekşā,atiśayokti,tulyayogitā, dīpaka,dṛşṭānta,nidarśanā,vyatireka,samāśokti, svabhābokti aprastutapraśaṁsā, arthāntaranyāsa, kāvyaliṁga, vibhāvanā)	1	12	25
IV	Sanskrit Metres (gāyatrī,uşṇīk,anuşṭup,bṛhatī,paṁkti, trişṭp, jagatī,bhujaṅgaprayāta,toṭaka, anuşṭup,āryā, mālinī. śikhariṇī, vasantatilaka,mandākrāntā, sragdharā śārdūlavikrīḍita, indravajrā, upendrvajrā,upajāti)	1	8	25

Reading List:

1. Kane,P.V., Historyof Sanskrit Poetics , MLBD, Delhi
2. Brown, Charles Philip (1869). Sanskrit Prosody and Numerical Symbols Explained. London: Trübner& Co.
3. Deo, Ashwini. S (2007). The Metrical Organization of Classical Sanskrit Verse, (PDF). Journal of Linguistics 43 (01): 63–114. doi:10.1017/s0022226706004452
4. Dasgupta, S.N., A History of Sanskrit Literature: Classical Period, University of Calcutta, 1977.
5. Keith, Arthur Berriedale, A History of Sanskrit Literature, MLBD, Delhi
6. KrishnamachariarM,Classical Sanskrit Literature,MLBD, Delhi.
7. Gaurinath Shastri, A Concise History of Sanskrit Literature, MLBD, Delhi.
8. Kane, P.V, Sahityadarpana of Visvanatha, MLBD
9. Chandomanjari of Gangadasa, Chaukhamba Surabharati Prakashan, Varanasi

Graduate Attributes:

Disciplinary Knowledge,
Basic Ideas and Technicalities of Sanskrit Classical Literature,
Upgraded Ideas of Various Types and Nature of Sanskrit Poetry,
A Clear Idea about the Indian Stylistics,
Inclination to Indian Knowledge System,
Growing Knack for Indian Concept of Prosody and Poetics.

Course Objectives:

a. Students will acquire knowledge of Important Arenas of Classical Sanskrit Literature

b. Students will gain knowledge about various Types of Sanskrit Poetry some of which can be revived with New Vigour.

c. Students will gain knowledge about Indian Stylistics and thereby will remain Confident in the Process of the Scientific Analysis of Various Poetic Ideas and Concept

d. Students will acquire knowledge about the Important Technicalities of Sanskrit Prosody that can be Re-established in the Present arena of Indian Literature.

Learning Outcome:

After going through this course students will be able

a. to grasp the Literary Merits and Demerits of Sanskrit Writings.
b. to understand the Importance of Literary Techniques Applied by the Ancient Indian Writers of Sanskrit.
c. to appreciate Indian Knowledge System that evolved in the Society Reflected through Various Sanskrit Works.
d. to correlate Various Ideas and Concepts of Sanskrit Poetics with Different fields of modern Knowledge System.

Total Credit:	4
No. of Theory Classes:	44
No. of Practical Classes:	0

Semester V

INTRODUCTION TO VEDAS (COMPULSORY)

Marks: 100 **Total Credit: 4**

Base Syllabus: UG CBCS
Course Level: 200-299

Unit No	Unit Content	Credit	No. of Classes	Marks
I	Saṁhitā (Ṛgveda,Agnisūkta I.1; Ūşāsūkta,III.61;Akşasūkta X.34; Hiraṇyagarbhasūkta X.121; Yajurveda,Śivasaṁkalpasūkta, XXXVI.1-6 Atharvaveda, Bhūmisūkta, XII.1-20.)	1	10	25
II	Brāhmaṇa & Āraṇyaka (Śatapathabrāmaṇa, *Manumatsyakathā,*I.8.1-10; Taittirīyāraṇyaka, *Paňcamahāyajňa*,II.10)	1	12	25
III	Muṇḍakopaniṣad (Muṇḍaka I&II)	1	12	25
IV	Vedic Grammar (Upasarga, Vedic Infinitives, Vedic Subjunctives, Declension & Conjugation)	1	10	25

Reading List:

1. *Atharvaveda* (Śaunakīya):(Ed.)VishvaBandhu,VVRI,Hoshiharpur,1960.
2. *ŚatapathaBrāhmaṇa*,(Ed.) Ganga Prasad Upadhyaya, SLBSRS VIdyapeeth, Delhi.
3. *ŚuklayajurvedaSaṁhitā,*(Vājasaneyi Mādhyandina), (Ed.) Jagadish Lal Shastri, MLBD, Delhi, 1978.
4. *Ṛksūktāvalī,* H.D.Velankar,VaidikaSanshodhanaMandala,Pune,1965.
5. *Ṛksūktavaijayantī,* H.D.Velankar, Bharatiya Vidya Bhavan,Bombay,1972.
6. S. Radhakrishnan (Ed) The Principal Upanisads, Allen & Unwin; Harper India

Graduate Attributes:

Disciplinary Knowledge,
Knowledge of the History and Development of Indian Literature,
Specific Knowledge of Vedic Culture,

Inclination to Indian Knowledge System,
Knowledge of values Ethos connected to Ancient Indian Society,
Sensitivity Regarding Nature and Surroundings.

Course Objectives:

a. Students will acquire knowledge of Vedic Society and Vedic Literature.

b. Students will gain knowledge about the importance of the Balanced way of Life and its Inner Philosophies that kept Our Ancestors Happy and Healthy.

c. Students will Gain knowledge about the Rites and Rituals Connected to Various Gods of Vedic Pantheon.

d. Learners will Find the Connection between the Vedic Ethos and the Indian Tradition and Culture.

Learning Outcomes:

After going through this course student will be able

a. to grasp the concept of Vedic Gods and Goddesses.
b. to understand the Importance of Some of the Basic but Valuable Notions of Community Leaving.
c. to appreciate Indian Knowledge System that evolved for a holistic development in the society.
d. to grasp the original idea of Sacrifice and Vedic Rites.
e. to gain knowledge in the field of Ancient Indian society that evolved with the Notion of Enjoyment through Renunciation.

Total Credit:	4
No. of Theory Classes:	44
No. of Practical Classes:	0

FYUG Course

Sub: Sanskrit

Semester-V

Sanskrit Prose, Poetry and Drama (DSE, Elective I)

Marks-100 **Total Credit: 4**

Base Syllabus : UG CBCS

Course Level : 200-299

Unit No.	Unit Content	Credit	No of Class.	Marks
I	**Daśakumāracarita (*Viśrutacaritam*)** **Kādambarī (*Śukanāsopadeśa*)**	**1**	**12**	**25**
II	**Kālikāpurāṇa (Portions Connected to Geography, History and Religious Importance of Ancient Kāmarūpa)**	**1**	**10**	**25**
III	**Abhijñanaśakunatalam**	**1**	**12**	**25**
IV	**Sanskrit in World Literature (Rāmāyaṇa and Mahābhārata in South East Asian Countries, Sanskrit Fables in World Literature**	**1**	**10**	**25**

Readings List

1. Prahlad Kumar,Sukanāsopadeśa,Meharchand Laksmandas,Delhi
2. Surendradeva,Viśrutacaritam, Sahitya Bhandar, Meerut
3. M.R. Kale: Abhijñanaśakunatalam, MLBD,Delhi.
4. Edgerten, Franklin (1924), *The Paňcatantra Reconstructed* (Vol I: Text and Critical Apparatus, Vol.II : Introduction and Translation), New Haven : American Oriental Series.

5.B.N. Shastri, (ed) Kalikapurana, Nag Publishers

6. Prabhat Ch.Sarma,Kadambari, Translated into Assamese, ABILAC Guwahati, Assam

7. Mahulikar, Dr. Gauri, Effect of Ramayana On Various Cultures AndCivilisation, Ramayana Institute.

8. *The* Paňcatantra, Viṣṇuśarma, translated from Sanskrit with an Introduction by Chandra Rajan, Penguin Books, India, 1993.

9. Banerji,Suresh Chandra, Influence of Sanskrit outside India, A Companion to Sanskrit Literature, MLBD,1971

<u>Graduate Attributes</u> : Disciplinary Knowledge, Basic Ideas and Technicalities of Sanskrit Classical Literature , Upgraded Ideas about the Writing style of Poets like Kālidāsa and Daṇḍī , Deep rooted moral Values A Clear Idea about Ancient Indian Society Indian , Inclination to Indian Knowledge System, Appreciation for the Expanded Growth of Sanskrit Literature.

Course Objectives : a. Students will acquire knowledge of Important Arenas of Classical Sanskrit Literature .

b. Students will gain knowledge about various Types of Sanskrit Poetry some of which has Marked their Existence in the World Literature.

c. Students will gain knowledge about Indian Ethos Through the stories of the Fables.

d.students will acquire knowledge about the Importance of Ancient Assam.

Learning Outcome : After going through this unit students will be able ....

- **a. to grasp the Literary Styles of Various Sanskrit Poets .**
- **b. to understand the Importance of Literary Techniques Applied by the Ancient Indian Writers of Sanskrit.**
- **c. to appreciate Indian Knowledge System that evolved in the Society Reflected through Various Sanskrit Works.**
- **d. to correlate Various Ideas and Concepts of Sanskrit Literature with many of the World Phenomenon**
- **e. to Undertake Pride in Assessing the Earlier Treasures of Ancient Assam.**

Total Credit=4. No. of Theory Class= 44. No of. Practical Class -0

Course Designer : Chairperson, UGCCS, Dept of Sanskrit, Gauhati University

Name . Prof. Sudeshna Bhattacharjya, HOD, Sanskrit, Gauhati University

Email ID: sbmgu2010@gmail.com

FYUG Course

Sub: Sanskrit

Semester-V

Art of Balanced Living (DSE, Elective II)

Marks-100 **Total Credit: 4**

Base Syllabus : UG CBCS

Course Level : 200-299

Unit No.	Unit Content	Credit	No of Class.	Marks
I	**Self Presentation** (*Bṛhadāraṇyakopanişad* 2,4,5)	1	12	25
II	**Concentration (*Gītā,*I.1, I.45, II. 3,6,41,52,59,64, 60,67,III.36-39, IV.5,16,38-39,42,VI.36,XVII.14-19)**	1	12	25
III	**Self Management (*Gītā,* II. 7,47,IV.11, VII. 21,VIII.7, IX.26,XI. 55, XII. 11,13-19)**	1	12	25
IV	**Inter-dependence of Nature and Human world (Environmental Background of Sanskrit Literature, Importance of Sanskrit Literature from**	1	08	25

The View Point of Science of Environment,

Concept of *Ṛta* and Mother Earth and Worships of

Rivers in Vedic Literature, Water Harvesting

System in Arthaśāstra, Underground Water

Hydrology in *Bṛhatsaṁhitā,* Universal

Environmental Issues in Literature of

Kālidāsa.

Reading List

1. ***Arthaśāstra of Kauṭilya*-(ed), Kangale, R.P. Delhi, MLBD,1965**
2. ***Śrīmadbhagavadgītā* –English Translation by Jaydayal Gyandka, Tattavivecinī Gītā Press, Gorakhpur,1997**
3. ***Śrīmadbhagavadgītārahasya* – The Hindu Philosophy of Life, Ethics and Karmayogaśāstra Religion, Original Sanskrit Stanzas with English Translation, Bal Gangadhar tilak & Balchandra Sitaram Sukthankar, J.S. Tilak & S.S. Tilak,1965.**
4. **Dwivedi, O.P., *The Essence of the Vedas*, Visva Bharati Research Institute, Gyanpur, Varanasi,1990**
5. **Sinha, K.R., *Ecosystem Preservation Through Faith and Tradition in India,*J.Hum. Ecol., Delhi University, New Delhi, 1991**

Graduate Attributes : Disciplinary Knowledge, Adherence to the Techniques of Concentration of Mind , Attainment of Teachings of Self Management through Indian Perspective , Social Connection, Love and Attraction for the Nature , Inclination to Indian Knowledge System, Appreciation for the Scientific Way of Preservation of Nature Reflected Through Sanskrit Works.

Course Objectives : a. Students will acquire knowledge of Important Steps for Self Concentration .

b. Students will gain knowledge about the Spiritual Way of Self Management.

c. Students will gain knowledge about Indian Ethos Regarding the Balance Between Nature and the Human world as Reflected Through Various Sanskrit Works.

d.students will acquire knowledge about the Importance of the Protection of Nature.

Learning Outcome : After going through this unit students will be able ....

a. to grasp the Psychological Upgradation in acquiring the Power of Self Control.

b. to understand the Importance of the Practice of Self Control and Concentration in One's Life.
c. to appreciate Indian Knowledge System that evolved in the Society Reflected through Various Sanskrit Works.
d. to correlate Various Ancient Ideas and Concepts of Conservation of Nature.
e. to get accustomed to Remain Thankful and Satisfied in life.
f. to remain Connected with the Fellow Beings in the Society

.

Total Credit=4. No. of Theory Class= 44. No of. Practical Class -0

Course Designer : Chairperson, UGCCS, Dept of Sanskrit, Gauhati University

Name . Prof. Sudeshna Bhattacharjya, HOD, Sanskrit, Gauhati University

Email ID: sbmgu2010@gmail.com

FYUG Course

Sub: Sanskrit

Semester-V

Theatre and Dramaturgy in Sanskrit (DSE, Elective III)

Marks-100 **Total Credit: 4**

Base Syllabus : UG CBCS

Course Level : 200-299

Unit No.	Unit Content	Credit	No of Class.	Marks
I	**Theatre: Types and Construction**	1	08	20

(Types of Theatre : *vikṛṣṭa*(oblong),

Caturasra (square),*tryasra* (triangular), *jeşṭha* (big),*madhyama* (medium),*avara* (small),*bhūmiśodhana* (Testing the Land),*māpa* (measurement of the site), *mattavāraṇī* (raising of pillars),*raṅgapīṭha* and *raṅgaśīrşa* (stage), *dārukarma* (work of Wood),*nepathyagṛha* (greenroom) *Prekşopaveśa* (auditorium), Doors for entry and exit

II Drama: Vastu (Subject matter),Neta 1 12 30

(Hero) And Rasa (Definition of Drama and its Various names ,*dṛśya,śravya,rūpa,rūpaka,abhineya*; *abhinaya* and its types: *āṅgika*(gestural), *vācika* (oral),*sāttvika* (representation of *sattva),āhārya* (dresses and make-up), *vastu* (Subject matter): *ādhikārika* (principal),*prāsaṅgika* (subsidiary),Five kinds of *arthaprakṛti*, *kāryāvasthā* (stages of the action of actor),and *sandhi* (segments), *arthopakşepaka* (interludes), kinds of dialogues: A.*sarvaśrāvya* or *prakāśa* (aloud),B.*aśrāvya* or *svagata* (spoken aside),C.*niyataśrāvya* :*janāntika* (personal address),*apavārita* (confidential), D. *ākāśabhāşita* (conversation with imaginary person), *Netā* : Four kinds of heroes, three kinds of heroines, *sūtradhāra* (stage manager),*Pāripārśvika* (assistant of the *Sūtradhāra*), *vidūşaka*(jester), *kaňcukī* (chamberlain) *pratināyaka* (villain),*Rasa :* definitionand constituent, ingredients of *rasanişpatti, bhāva* (emotions), *vibhāva* (determinant), *anubhāva* (consequent), *sattvikabhāva* (involuntary state),*sthāyibhāva* (permanent states), *vyabhicāribhāva* (complementary psychological states),*svāda* (pleasure), Four kinds of mental levels, *vikāsa* (cheerfulness), *vistāra* (exaltation),*kşobha* (agitation),*vikşepa*(perturbation)

III – Tradition and History of Indian Theatre 1 12 25

Origin and Development of stage in different ages:Pre-historic,Vedic age,epic-puranic age,court theatre,temple thetre,open theatre, modern theatre,folk theatre,commercial theatre,national and state level theatre

IV History of Theatre in Assam 1 12 25

***(aṅkiyā nāṭ, bhāonā, ojāpāli, bhrāmyamān* theatre etc.**

Readings List

1.Ghosh,M.M.-*Nāṭyaśāstra ofBharatamuni*,pp.18-32.

2. Hass,*TheDaśarūpa:ATreatiseonHinduDramaturgy*, kārika7,8,11-24,30,36,43,48,57-65.

3. Hass,*TheDaśarūpa:ATreatiseonHinduDramaturgy,*kārikās 2/1-5,8,9,15.

4. Hass ,*The Daśarūpa:A Treatise on Hindu Dramaturgy,* kārikās 4/1-8,43,44.

5.Farley, P.Richmond,(2007),ed.*IndianTheatre:traditions of performance*, vol-I,OriginsofSanskritTheatre*,* pp. 25-32.

6 Ghosh , M.M, *Nāṭyaśāstra of Bharatamuni*, vol-1, Manisha Granthalaya, Calcutta, 1967.

7.ChakravartyShrutidhara-Architecture in the Natyasastra, Studies inSanskritLiterature,CultureandArt,PratibhaPrakashan,Delhi,2011

Graduate Attributes : Disciplinary Knowledge, Basic Ideas and Technicalities of Sanskrit dramaturgy and Theatre , Ideas about the Varieties of Stage and its Auxileries , Knowledge about the Psychological Uplift Through Sanskrit Dramatic Performance , Inclination to Indian Knowledge System, Appreciation for the Expanded Growth of Sanskrit Literature.

Course Objectives : a. Students will acquire knowledge of various aspects of Sanskrit Drumaturgy .

b. Students will gain knowledge about various Types of Stages Used in the Dramatic Performance in Ancient India.

c. Students will gain knowledge about Indian Ethos Connected with the Concept of Indian Theatre..

d.students will acquire knowledge about the Important Aspects of Various Types of Dramatic Performances of Assam.

Learning Outcome : After going through this unit students will be able ....

a. to understand the basic ideas and concepts that exited behind the origin and development of Sanskrit Drama .
b. to grasp the psychological base of Sanskrit Dramaturgy.
c. to appreciate Indian Knowledge System that evolved in the Society Reflected through Various Sanskrit Works.
d. to correlate various ideas and concepts of Sanskrit dramaturgy with many of the World performances
e. to undertake pride in deciphering the rich tradition and culture of Drama and Theatre in Assam.

Total Credit=4. No. of Theory Class= 44. No of. Practical Class -0

Course Designer : Chairperson, UGCCS, Dept of Sanskrit, Gauhati University

Name . Prof. Sudeshna Bhattacharjya, HOD, Sanskrit, Gauhati University

Email ID: sbmgu2010@gmail.com

FYUG Course

Sub: Sanskrit

Semester-VI

Indian Philosophy(Compulsory)

Marks-100 **Total Credit: 4**

Base Syllabus : UG CBCS

Course Level : 200-299

Unit No.	Unit Content	Credit	No of Class.	Marks
I	**Aspects of Indian Philosophy**	**1**	**10**	**25**

	(Meaning of *darśana,* salient features of Indian Philosophy, Broad divisions of Indian Philosophy, salient features of the Systems of Indian Philosophy: *āstika* and *nāstika*)			
II	**Ontology and Epistemology** **(Based on Tarkasaṁgraha)**	**1**	**12**	**25**
III –	**Sāṅkhyakārikā**	**1**	**12**	**25**
IV –	**Introduction to Advaita philosophy and Swami Vivekananda's Practical Vedānta**	**1**	**10**	**25**

Reading List

1. A Primer of Indian Logic, Kuppuswami Shastri, Madras, 1951.TarkasaṁgrahaofAnnambhaṭṭa(withDīpikā&Nyāyabodhinī),(Ed. &Tr.)Athalye&Bodas, Mumbai, 1930.
2. TarkasaṁgrahaofAnnambhaṭṭa(withDīpikā&Nyāyabodhinī),(Ed.&Tr.) Virupakshananda, SriRamkrishna Nath, Madras, 1994.
3. *Tarkasaṁgraha of Annambhaṭṭa* (with Dīpikā commentary with Hindi Translation), (Ed.&Tr), PankajKumarMishra,ParimalPublication,Delhi-7. 2013.
4. Kumar, Narendra, Tarkasaṁgraha,HansaPrakashan,Jaipur.
5. Chatterjee,S.C.&D.M.Datta-Introduction to Indian Philosophy, CalcuttaUniversity, Calcutta, 1968 (HindiTranslationalso).
6. Chatterjee,S.C.–*The Nyāya Theory of Knowledge*,Calcutta, 1968.
7. Hiriyanna,M.- Outline of Indian Philosophy, London, 1956 (also Hindi Translation).

8.Bhattacharya,Chandrodaya,*The Elements of Indian Logic and Epistemology*, Maitra,S.K.,Fundamental Questions of IndianMetaphysics&Logic,

10.R.N.Sarma,*EpistemologyofPrabhakaraSchoolofPurvamimamsa*

,Guwahati,2005

11Biswas, M.*Samkhya-YogaEpistemology*–A Study, D.K. Print

world, New Delhi

12. Virupaksha Nanda(Ed). *Sankhyakarika of Isvarakrishna* ,

Vedanta Press

13. Vasant Kr. Lal, Contemporary Indian Philosophy, MLBD, Delhi

14. *Works of Swami Vivekananda* (9 Volumes), Ramakrishna

Mission, Kolkata

Graduate Attributes : Disciplinary Knowledge, Basic Ideas of Indian Philosophical concepts and thought , Psychological Uplift Through Cognitive appreciation , Inclination to Indian Knowledge System.

Course Objectives : a. Students will acquire knowledge of various aspects of Indian Philosophy .

b. Students will gain knowledge about the Basic difference between Indian Western Philosophy.

c. Students will gain knowledge about Indian Ethos Connected with Indian Philosophical Ideas .

d.students will acquire knowledge about the Important Aspects

of Vivekananda's Philosophy.

Learning Outcome : After going through this unit students will be able ....

- **a. to understand the basic ideas and concepts of Indian Philosophy .**
- **b. to grasp the psychological base Connected to Indian Philosophical Thoughts and Ideas.**
- **c. to appreciate Indian Knowledge System that evolved in the Society Reflected through Various Sanskrit Works.**
- **d. to correlate various ideas and concepts of Indian Philosophy with many of the Western Thoughts.**

Total Credit=4.　　No. of Theory Class= 44.　　No of. Practical Class -0

Course Designer : Chairperson, UGCCS, Dept of Sanskrit, Gauhati University

Name . Prof. Sudeshna Bhattacharjya, HOD, Sanskrit, Gauhati University

Email ID: sbmgu2010@gmail.com

FYUG Course

Sub: Sanskrit

Semester-VI

History of Sanskrit Scientific Literature (DSE, Elective I)

Marks-100　　**Total Credit: 4**

Base Syllabus : UG CBCS

Course Level : 200-299

Unit No.	Unit Content	Credit	No of Class	Marks
I	**Indian Medical Science(Āyurveda)**	**1**	**08**	**25**
II	**Astrology, Astronomy and Mathematics**	**1**	**12**	**25**
III	**Botanical Studies (Vṛkṣāyurveda)**	**1**	**12**	**25**
IV	**Indian System of Architecture(Vāstuśāstra)**	**1**	**12**	**25**

Reading List

1. M.Krishnamachariar, *History of Classical Sanskrit Literature*, MLBD, Delhi.
2. GaurinathShastri, *AConciseHistoryofSanskritLiterature*,MLBD,Delhi.
3. Maurice Winternitz, History of *Indian Literature* (Vol. 3-Part -II), also Hindi Translation,MLBD,Delhi.
4. V. Subrahmanya Sastri, Brihatsamhita, MLBD Bangalore
5. Srivastava, Ar. A.K. *The History of Indian Architecture*, 2022

Graduate Attributes : Disciplinary Knowledge, Basic Ideas of Indian Scientific concepts and thought , Inclination to Indian Knowledge System,

Course Objectives : a. Students will acquire knowledge of various aspects of Sanskrit Scientific Literature .

b. Students will gain knowledge about the Base of India's Cognitive heirerchy.

c. Students will gain knowledge about Indian Traditional and Cultural Attachment with Science.

Learning Outcome : After going through this unit students will be able ....

a. to understand the basic ideas and concepts of Sanskrit Scientific Literature .
b. to grasp the Psychological and Cultural base Indian Scientific Thoughts and Ideas.
c. to appreciate Indian Knowledge System that evolved in the Society Reflected through Various Sanskrit Works.
d. to correlate various ideas and concepts of Ancient India with many of the Modern Thoughts.

Total Credit=4. No. of Theory Class= 44. No of. Practical Class -0

Course Designer : Chairperson, UGCCS, Dept of Sanskrit, Gauhati University

Name . Prof. Sudeshna Bhattacharjya, HOD, Sanskrit, Gauhati University

Email ID: sbmgu2010@gmail.com

FYUG Course

Sub: Sanskrit

Semester-VI

Grammar and Linguistics (DSE, Elective II)

Marks-100 **Total Credit: 4**

Base Syllabus : UG CBCS

Course Level : 200-299

Unit No.	Unit Content	Credit	No of Class	Marks

I	**Sandhi Prakaraṇa (on the basis of *Laghusiddhāntakaumudī*)**	**1**	**12**	**25**
II	**Vibhaktyarthaprakaraṇa(on the basis of *Laghusiddhāntakaumudī***	**1**	**08**	**25**
III	**Indo-European Language Family**	**1**	**12**	**25**
IV	**Phonetic Changes (Grimm's Law, Grassman's Law, Verner's Law Fortunatov's Law, Collitz' Law of Palatalization, Assimilation, Dissimilation, Syncope, Epinthesis, Anaptysis, Haplology)**	**1**	**12**	**25**

Reading List

1. M.R.Kale,Higher Sanskrit Grammar, MLBD, Delhi(HindiTranslationalsoavailable).

2.Kanshiram,2.Laghusiddhāntakaumudī(Vol.I), MLBD, Delhi,2009.

3.Basu,S.C.Vaiyakaranasidhhantakaumudi(VolsI,II)

4.Basu, S.C .Astadhyayi(Vols I,II)

4. Vidyasagar, Ishvarachandra,SamagraVyakaranaKaumudi

5. Online ToolsforSanskrit Grammardevelopedby Computational LinguisticsGroup,DepartmentofSanskrit,UniversityofDelhi:http://sanskrit.du.ac.in.

6. Chakraborty,Satyanarayan,PaniniyaSabdasastra,SanskritPustakBhandar,Kolkata

7. DevasarmaRamanikanta,Laghusiddhantakaumudi

9. Burrow,T.,SanskritLanguage(alsotrans.intoHindibyBholashankarVyas), ChaukhambaVidyaBhawan,Varanasi,1991.

10. Crystal,David,TheCambridgeEncyclopediaofLanguage,Cambridge,1997.

11. Ghosh, B.K. *Linguistic Introduction to Sanskrit,* Sanskrit Pustak Bhandar

Graduate Attributes : Disciplinary Knowledge, Basic Ideas of Science behind Sanskrit Grammar and Language , Inclination to Indian Knowledge System,. Knowledge of the Development of the Sounds in Sanskrit Language

Course Objectives : a. Students will acquire knowledge of various aspects of Sanskrit Language .

b. Students will gain knowledge about the Base of Euphonic Combination

c. Students will gain knowledge about the Source of Sanskrit Language

Learning Outcome : After going through this unit students will be able ....

a. **to understand the basic ideas and concepts of Sanskrit Grammar .**
b. **to grasp the Linguistic Base of Sanskrit.**
c. **to appreciate Indian Knowledge System that evolved in the Society Reflected through Various Sanskrit Works.**
d. **to correlate various ideas and concepts of Sanskrit with many of the Modern Languages.**

Total Credit=4. No. of Theory Class= 44. No of. Practical Class -0

Course Designer : Chairperson, UGCCS, Dept of Sanskrit, Gauhati University

Name . Prof. Sudeshna Bhattacharjya, HOD, Sanskrit, Gauhati University

Email ID: sbmgu2010@gmail.com

FYUG Course

Sub: Sanskrit

Semester-VI

Modern Sanskrit Literature (DSE, Elective III)

Marks-100 **Total Credit: 4**

Base Syllabus : UG CBCS

Course Level : 200-299

Unit No. Unit Content Credit No of Class Marks

I	**Introduction to Modern Sanskrit Literature**	**1**	**08**	**25**
II	***Stutipraśastimañjarī* of Mukunda Madhava Sharma(Anundoram Barooah, K.K.Handique,Sankaradeva, Madhavadeva) and Selected poems of Harshadev Madhav *snānagṛhe*, *Mṛtyuẖ* I,II,*Khaniẖ*)**	**1**	**12**	**25**
III	***Avināśi* (Sanskrit Novel) (First Two Chapters)**	**1**	**12**	**25**
IV	**Sanskrit Studies in Assam**	**1**	**12**	**25**

Reading List

1. Joshi,K.R.&S.M.Ayachuit^{2} *PostIndependenceSanskritLiterature*,Nagpur,1991.
2. Prajapati,ManibhaiK.^{2}*PostIndependenceSanskritLiterature:ACriticalSurvey*,Patna, 2005.
3. UshaSatyavrat*SanskritDramas oftheTwentiethCentury*,MeharChandLachmandas, Delhi, 1987.
4. DwivediRahas Bihari–AdhunikMahakāvyaSamikshanam
5. TripathiRadhaVallabh–SanskritSahityaBeesaveenShatabdi,1999,Delhi6.Musalgaonkar Kesava Rao – Adhunik Sanskrit KāvyaParampara, 20047.Naranga, S.P. – KalidasaPunarnava,
8. Upadhyaya,Ramji–AdhunikSanskritNatak,Varanasi
9. AbhirajaRajendraMisra,Kalpavalli(samakālīnasamkrtakavyasamkalanam,SahityaAcademy, 2013

10. Mukunda Madhava Sharma Stutiprasastimanjari,

11. Biswanarayan Shastri, **Avināśi,**

12. Biswanarayan Shastri, **Sanskrit Studies in Assam,**

13. Malini Goswami, Asamat Sanskrit Carccar Itihas ,Publication Board, Assam

14. Sarma, Narendra Nath, *An Aspect of the Cultural Heritage of Assam,* Bani Prakash Mandir, Guwahati

Graduate Attributes : Disciplinary Knowledge, Acquaintance with the Modern Style of Sanskrit Writing , Inclination to Indian Knowledge System,. Knowledge of the Contribution of Numerous Sanskrit Scholars of Assam.

Course Objectives : a. Students will acquire knowledge of various aspects of Modern Sanskrit Language and Literature

b. Students will gain knowledge about the contributions of Modern Sanskrit Scholars of Assam

c. Students will gain knowledge about the History of early Assam.

Learning Outcome : After going through this unit students will be able ....

a. **to understand the basic ideas and concepts of Modern Sanskrit Grammar .**
b. **to grasp the Linguistic Changes Happened in modern Sanskrit.**
c. **to appreciate Indian Knowledge System that evolved in the Society Reflected through Various Sanskrit Works.**
d. **to correlate various ideas and concepts of Modern Sanskrit with those Used in many of the Literary Works of Today's India.**

Total Credit=4. No. of Theory Class= 44. No of. Practical Class -0

Course Designer : Chairperson, UGCCS, Dept of Sanskrit, Gauhati University

Name . Prof. Sudeshna Bhattacharjya, HOD, Sanskrit, Gauhati University

Email ID: sbmgu2010@gmail.com

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COMMERCE & MANAGEMENT

Syllabus

Four Year Undergraduate Programme (FYUGP)

Gauhati University

Bachelor of Commerce (B.Com.)

Core Papers Common for all four specializations

a. Human Resource Management
b. Accounting
c. Marketing Management
d. Finance

Semester I

Course Name: **Business Organization and Management**

Existing based syllabus: UGCBCS
Course level: 100 to 199

Credit: **4**
Total Marks: **100**

Unit 1: Introduction: Nature and Purpose of Business, Factors to be considered for starting a business, Forms of Business Organization; Business formats- Brick & Mortar;Brick & Click; E-commerce; Franchising; Outsourcing Nature and Functions of Management (An overview); Managerial Competencies-concept.
16 Classes (20 Marks)

Unit 2: Business Environment: Meaning and layers of Business Environment- (micro/immediate, meso/intermediate, macro and international); Business ethics and social responsibility.
8 Classes (12 Marks)

Unit 3: Planning and Organizing: Strategic Planning (concepts), Decision-making- process and techniques; Organizing: -Formal and Informal Organizations, Centralization and Decentralization, Delegation, Factors affecting organizational design Organizational structures & Organograms – Divisional, Product, Matrix, Project and Virtual Organization.
12 Classes (20 Marks)

Unit 4: Directing and Controlling: Motivation- meaning, importance and factors affecting motivation, Leadership- meaning, importance, trait and leadership styles, Communication – New trends and directions (Role of IT and social media); Controlling–Principles of controlling; Measures of controlling, Relationship between planning and controlling.
12 Classes (24 Marks)

Unit 5: Contemporary Issues in Management: Business Process Reengineering (BPR), Learning Organization, Six Sigma, Supply Chain Management, Work-life Balance;Freelancing; Flexi-time and work from home; Co-sharing/co-working. 12 Classes (24 Marks)

Suggested Readings:

● Basu, C. (2017). Business Organisation and Management. McGraw Hill Education.New Delhi.
● Drucker, P. F. (1954). The Practice of Management. Newyork: Harper & Row.
● Kaul, V. K. (2012). Business Organisation Management. Pearson Education.
● Koontz, H., &Weihrich, H. (2012). Essentials of Management: An International and Leadership Perspective. Paperback.
● Laasch, O. (2022). Principles of Management, 2e, Sage Textbook

- Sherlekar, S. A. (2016). Modern Business Organisation and Management. Himalaya Publishing House

Objective:

The course aims to provide basic knowledge to the students about the organization and management of a business enterprise.

Learning outcome:

On successful completion of the paper students will be able to understand about organization structure and its process; develop knowledge and skills regarding management principles and functions required to run an organization.

No. of Contact Classes: 60

Course Designer: Dr. Tilak Ch. Das, Gauhati University, tilak@gauhati.ac.in

Semester I

Course Name: **Financial Accounting**

Existing based syllabus: UGCBCS
Course level: 100 to 199

Credit: **4**
Total Marks: **100**

Unit 1: Theoretical Framework (12 Classes) (20 Marks)

i. Accounting as an information system, the users of financial accounting information and their needs. Qualitative characteristics of accounting, information. Functions, advantages and limitations of accounting. Branches of accounting. Bases of accounting: cash basis and accrual basis.
ii. The nature of financial accounting principles : entity, money measurement, going concern, cost, realization, accruals, periodicity, consistency, prudence (conservatism), materiality and full disclosures.

iii. Accounting Standards: Concept, needs and objectives; procedure for issuing Accounting Standards in India. Salient features of First-Time Adoption of Indian Accounting Standard (Ind-AS) 101. Salient features of Indian Accounting Standards Ind AS 1, 2, 16 and AS 9. International Financial Reporting Standards (IFRS): - Need and procedures of Issue.

Unit 2: Measurement of Business Income (12 Classes) (20 Marks)

i. Measurement of business income-Net income, Application of accounting period, continuity doctrine and matching concept in the measurement of net income. Objectives of measurement.
ii. Capital and revenue expenditures and receipts
iii. Revenue recognition: Recognition of income and expenses as per AS 9.
iv. Inventory Valuation: Meaning and Significance.

Unit 3: Final Accounts (12 Classes) (20 Marks)

Preparation of financial statements of non-corporate business entities: Sole proprietorship and Partnership firms.

Unit 4: Hire-Purchase, Instalment Systems and Branches (12 Classes) (20 Marks)

i. **Accounting for Hire-Purchase and Instalment Systems:** Meaning, features, advantages and disadvantages of Hire Purchase and Instalment Systems, Rights of Hire Purchaser and Hire Vendor, Journal entries and preparation of ledger accounts excluding default and repossession.

ii. **Accounting for Branches:** Meaning, Needs and Objectives of Branch Accounting. Systems of dependent Branch Accounting and their Accounting Treatments (Only debtors system, stock and debtors system).

Unit 5: Computerised Accounting System (12 Classes) (20 Marks)

Computerised Accounting Systems: Meaning, components, and advantages, Difference between manual and computerised accounting, Various types of Accounting packages/software and their advantages and disadvantages; Tally 9 and its features, working on TALLY. Simple Practical Problems

Suggested Readings:

1. Robert N Anthony, David Hawkins, Kenneth A. Merchant, *Accounting: Text and Cases*. McGraw- Hill Education, 13th Ed. 2013.
2. Charles T. Horngren and Donna Philbrick, *Introduction to Financial Accounting,* Pearson Education.
3. J.R. Monga, *Financial Accounting: Concepts and Applications*. Mayur Paper Backs, New Delhi.
4. M.C.Shukla, T.S. Grewal and S.C.Gupta. *Advanced Accounts. Vol.-I. S.* Chand & Co., New Delhi.
5. B. B. Dam, H C Gautam and others, *Financial Accounting*, Gayetri Publications, Guwahati
6. K. R. Das & K. M. Sinha. *Financial Accounting*
7. S.N. Maheshwari, and. S. K. Maheshwari. *Financial Accounting*. Vikas Publishing House, New Delhi.
8. Deepak Sehgal. *Financial Accounting.* Vikas Publishing H House, New Delhi.
9. Bhushan Kumar Goyal and HN Tiwari, *Financial Accounting,* International Book House
10. Goldwin, Alderman and Sanyal, *Financial Accounting,* Cengage Learning.
11. Tulsian, P.C. *Financial Accounting,* Pearson Education.
12. *Compendium of Statements and Standards of Accounting*. The Institute of Chartered Accountants of India, New Delhi

Note: The latest edition of the text books should be used.

Course objective:

To provide students with a foundational understanding of financial accounting principles and practices used in preparing and presenting financial statements.

Learning outcome:

By the end of the course, students will be able to record, classify, and summarize financial transactions, prepare financial statements in accordance with accounting standards, and analyze basic financial information for decision-making purposes.

No. of Contact Classes: 60

Course Designer: Prof. Prashanta Sharma, Dr. Upasana Borpujari, Gauhati University, prs@gauhati.ac.in, upasna.borpujari@gmail.com

Semester I

Course Name: **Indian Financial System**

Existing based syllabus: UGCBCS
Course level: 100 to 199

Credit: **4**
Total Marks: **100**

Unit 1: Introduction **(12 Classes)** **(20 Marks)**
Financial System-Meaning, Components of Financial system, Functions of Financial System, Financial System and Economic Development, Overview of Indian Financial System.

Unit 2: Financial markets **(12 Classes)** **(20 Marks)**
Financial Market- Classifications of Financial Markets; Money market- its constitutions, functions and significance; Capital Market- Primary and secondary market of capital market and its significance.

Unit 3: Financial Institutions **(12 Classes)** **(20 Marks)**
Banking Financial Institutions- Types of Banks, Functions of Banks, Structure of Indian Banking System; Non-Banking Financial institutions, types and structure; Mutual Funds, Insurance Companies and Pension Funds.

Unit 4: Financial Services **(12 Classes)** **(20 Marks)**
Meaning, features and importance, Types of Financial Services- Factoring, Leasing, Venture Capital, Consumer Finance and Housing Finance.

Unit 5: Regulatory Institutions **(12 Classes)** **(20 Marks)**
Reserve Bank of India- organization, objectives, Role and Functions; Securities and Exchange Board of India-Organization and objectives; Insurance Regulatory and Development Authority of India; Pension Fund Regulatory and Development Authority.

Suggested Readings:

1. The Indian Financial System by Bharati Pathak, Pearson Education.
2. Financial Institutions and Markets by L M Bhole, Tata MC Graw Hill.
3. Dynamics of Financial Markets and Institutions in India by R M Srivastava and Divya Nigam, Excel Books.
4. Indian Financial System by H R Machiraju, Vikas Publishing House.
5. The Indian Financial System and Development by Vasant Desai, Himalaya Publishing House.
6. Indian Financial System by P N Varshney and D K Mittal, Sultan Chand & Sons.

Objective:

To provide students the basic knowledge of Indian Financial System and its components, institutions and their functions.

Course Outcome:

The learning outcomes of the Indian financial system include understanding the diverse components and functions of the system, the role of regulatory bodies, the impact of policies on economic growth, and the development of analytical skills to evaluate and navigate financial markets effectively

No. of Contact Classes: 60

Course Designer: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Semester II

Course Name: **Corporate Accounting**

Existing based syllabus: UGCBCS
Course level: 200 to 299

Credit: **4**
Total Marks: **100**

Unit 1: **Final Accounts** **(12 Classes)** **(20 Marks)**

Preparation of Final Accounts of a Joint Stock Company (as per Companies Act, 2013) with necessary adjustments.

Unit 2: Incentive Equity, Buy Back, and Valuation of shares and goodwill
(12 Classes) **(20 Marks)**

i. **Incentive Equity**: Right and Bonus Shares: Meaning, Advantages and Disadvantages, Provisions as per Companies Act, 2013 and their Accounting Treatment.
ii. **Buy back of shares**: Meaning, Provisions of Companies Act, 2013 and Accounting Treatment.
iii. **Valuation of shares and goodwill**: Meaning, provision of Companies Act on Valuation of Shares and Valuation of Goodwill, Concepts and calculation: simple problem only.

Unit 3: Internal Reconstruction of Companies **(12 Classes)** **(20 Marks)**

Concept and meaning of Internal Reconstruction, Different forms of Internal Reconstruction; Provisions as per Companies Act and Accounting treatment for Alteration of Share Capital and Reduction of Share Capital; Preparation of Balance Sheet after Internal Reconstruction.

Unit 4: Amalgamation of Companies: **(12 Classes)** **(20 Marks)**

Meaning and objectives; Provisions as per Accounting Standard 14; Amalgamation in the nature of Merger and Purchase; Consideration for Amalgamation; Accounting Treatment for Amalgamation and preparation of Balance Sheet after Amalgamation.

Unit 5: Accounts of Holding Company **(12 Classes)** **(20 Marks)**

Concept and meaning of different terms: holding company, subsidiary company, pre-acquisition profit/loss, post-acquisition profit/loss, minority interest; cost of control.
Meaning and needs for consolidation of financial statements as per AS 21.
Preparation of consolidated balance sheet of a holding company with one subsidiary.

Note:
1.The relevant Indian Accounting Standards in line with the IFRS for all the above topics should be covered.
2.Any revision of relevant Indian Accounting Standard would become applicable immediately.

Suggested Readings:

1. Hanif and Mukherjee**: *Corporate Accounting***
2. B. B. Dam, H C Gautam and others, *Corporate Accounting*, Gayetri Publications, Guwahati
3. K. R. Das & K. M. Sinha. ***Corporate Accounting***
4. M.C.Shukla, T.S. Grewal and S.C.Gupta*. Advanced Accounts. S.* Chand & Co., New Delhi.
5. S. N. Maheshwari Corporate Accounting -, Vikash Publishing House
6. S. Sehgal & D. Sehgal, Advanced Accounting Taxmann Publication
7. Modern Accounting by Hanif and Mukherjee, Tata McGrow Hill.
8. V. K. Saxena Advanced Accounting - Sultan Chand & sons.

Objective:

To help the students to acquire the conceptual knowledge of the corporate accounting and to learn the techniques of preparing the financial statements.

Course Outcome:

The learning outcomes of corporate accounting include the ability to analyse and interpret financial statements, apply accounting standards and principles to prepare accurate financial reports, and make informed financial decisions based on a thorough understanding of corporate financial performance

No. of Contact Classes: 60

Course Designer: Prof. Prashanta Sharma, Dr. Upasana Borpujari, Gauhati University, prs@gauhati.ac.in, upasna.borpujari@gmail.com

Semester II

Course Name: **Principles and Practice of Management**

Existing based syllabus: UGCBCS
Course level: 200 to 299

Credit: **4**
Total Marks: **100**

Unit 1: Introduction: Meaning and importance of management; Coordination mechanisms in organisations; Management theories- classical, neo-classical and modern theory of management; Managerial functions; Mintzberg Managerial Role Model, Indian Ethos for Management: Value-Oriented Holistic Management. (12 Classes) (20 Marks)

Unit 2: Planning: Organisational objective setting; Decision-making environment (certainty, risk, uncertainty); Techniques for individual and group decision-making; Planning vis-à-vis Strategy-meaning,Business and Corporate Level Strategies. (12 Classes) (20 Marks)

Unit 3: Motivation: Motivation Theory: needs (including Maslow's theory), incentives, Equity and two-factor theory (Herzberg); McGregor Theory X and Theory,Goal Setting Theory, Reinforcement theory). (12 Classes) (20 Marks)

Unit 4: Leadership: Leadership Theory, Situational, Behavioural and Contemporary theories of Leadership), Likert's scale Theory, Blake &Mouton's Managerial Grid theory, Transactional Vs. Transformational Leadership. (12 Classes) (20 Marks)

Unit 5: Contemporary Issues in Management: Management challenges of the 21st Century; Factors reshaping and redesigning management purpose:-(Digitization and Automation of the work processes, Globalization Uncertainties, ethical and environmental issues), Values & Ethics - Case studies of renowned Indian Corporates. Workplace diversity, Democracy and Sociocracy in management and organisational structure (12 Classes) (20 Marks)

Suggested Readings:

- Drucker, P. F. (1954). The Practice of Management. Newyork: Harper & Row.
- Drucker, P. F. (1999). Management Challenges for the 21st Century. Harper Collins Publishers Inc.
- Chakraborty, S. K. (1997). Human Values for Managers. Wheeler Publishing
- Griffin. (2013). Management Principles and Application. Cengage.
- Koontz, H., &Weihrich, H. (2012). Essentials of Management: An International and Leadership Perspective. McGraw Hill Publications
- Laasch, O. (2022). Principles of Management, 2e, Sage Textbook
- Mitra, J. K. (2018). Principles of Management.Oxford University Press.
- Rao, V. S. P. (2020). Management Principles and Applications. Taxmann Publications.
- Sharlekar, S. A. (2010). Management (Value-Oriented Holistic Approach). Himalaya Publishing House. (Chapters 3 and 4)
- Tulsian, P. C., & Pandey, V. (2021). Business Organisation & Management. Pearson Education, India

Course Objective:
The objective of the course on principles and practice of management is to provide students with a comprehensive understanding of the fundamental principles, theories, and techniques of management.
Learning Outcomes:
By the end of the course, students will be able to apply management principles and theories in practical situations, demonstrate effective leadership skills, analyse and solve management problems, and make informed decisions to enhance organizational effectiveness

No. of Contact Classes: 60

Course Designer: Dr. Tilak Ch. Das, Prof. Aparajeeta Borkakoty, Gauhati University,
tilak@gauhati.ac.in, apara_jeeta@yahoo.com

Semester II

Course Name: Principles of Marketing

Existing based syllabus: UGCB CS
Course level: 200 to 299

Credit: 4
Total Marks: 100

Unit 1: Introduction: Nature, scope and importance of marketing; Evolution of marketing; Selling vs Marketing; Marketing mix, Marketing environment: concept, importance, and components (Economic, Demographic, Technological, Natural, Socio-Cultural and Legal).
(12 Classes) (20 Marks)

Unit 2: Consumer Behaviour: Nature and Importance, Consumer buying decision process; Factors influencing consumer buying behaviour.
Market segmentation: concept, importance and bases; Target market selection; Positioning concept, importance and bases; Product differentiation vs. market segmentation.
(12 Classes) (20 Marks)

Unit 3: Product: Concept and importance, Product classifications; Concept of product mix; Branding, packaging and labeling; Product-Support Services; Product life-cycle; New Product Development Process; Consumer adoption process**.** (12 Classes) (20 Marks)

Unit 4: Pricing: Significance. Factors affecting price of a product. Pricing policies and strategies. Distribution Channels and Physical Distribution: Channels of distribution - meaning and importance; Types of distribution channels; Functions of middle man; Factors affecting choice of distribution channel; Wholesaling and retailing; Types of Retailers; e-tailing, Physical Distribution. (12 Classes) (20 Marks)

Unit 5: **Promotion**: Nature and importance of promotion; Communication process; Types of promotion: advertising, personal selling, public relations & sales promotion, and their distinctive characteristics; Promotion mix and factors affecting promotion mix decisions;
Recent developments in marketing: Social Marketing, online marketing, direct marketing, services marketing, green marketing, Rural marketing; Consumerism
(12 Classes) (20 Marks)

Suggested Readings:

1. Kotler, Philip, Gary Armstrong, Prafulla Agnihotri and Ehsanul Haque. *Principles of Marketing*. 13th edition. Pearson Education.
2. Michael, J. Etzel, Bruce J. Walker, William J Stanton and Ajay Pandit. *Marketing: Concepts and Cases.* (Special Indian Edition)., McGraw Hill Education.
3. William D. Perreault, and McCarthy, E. Jerome., *Basic Marketing*. Pearson Education.
4. Majaro, Simon. *The Essence of Marketing*. Pearson Education, New Delhi.
5. The Consumer Protection Act 1986.
6. Iacobucci and Kapoor, *Marketing Management: A South Asian Perspective*. Cengage Learning.
7. Dhruv Grewal and Michael Levy, *Marketing,* McGraw Hill Education.
8. Chhabra, T.N., and S. K. Grover. *Marketing Management.* Fourth Edition. Dhanpat Rai & Company.
9. Neeru Kapoor, *Principles of Marketing*, PHI Learning.
10. Rajendra Maheshwari, *Principles of Marketing*, International Book House.

Course Objective:

The objective of the course on principles of marketing is to provide students with a comprehensive understanding of the fundamental concepts, strategies, and techniques used in marketing.

Learning Outcomes:

By the end of the course, students will be able to analyse consumer behavior, develop marketing strategies, utilize marketing tools and techniques, and evaluate marketing campaigns to effectively target and engage customers in diverse market environments.

No. of contact Classes: 60

Course Designer: Dr. Angana Borah, Dr. Saptadweepa Shandilya Gauhati University, angana.ght@gmail.com, saptashandilya@gmail.com

Major Papers

Specialization:

1. Human Resource Management
2. Accounting
3. Marketing Management
4. Finance

1. Specialization: **Human Resource Management**

Semester III

Course Name: **Human Resource Management** (Major 1)

Existing based syllabus: UGCB CS
Course level: 300 to 399

Credit: **4**
Total Marks: **100**

Unit 1: Introduction

Human Resource Management: Concept, Activities and Functions, Concept of Human Capital, Role Status and competencies of HR Manager, HR Policies, HRM vs HRD. Emerging Challenges of Human Resource Management; Empowerment; Downsizing; Human Resource Information System and Human Resource Accounting. (12 Classes) (20 Marks)

Unit 2: Acquisition of Human Resource

Human Resource Planning- Quantitative and Qualitative dimensions; job analysis – job description and job specification; Recruitment- Process, Methods, Sources, Selection – Concept and process; test and interview; placement and induction (12 Classes) (20 Marks)

Unit 3: Training and Development

Concept and Importance; Identifying Training and Development Needs; Training Programmes, Types, Evaluating Training Effectiveness; Training Process Outsourcing; Management Development; Career Development, Managing employee well being and concept of work life balance and quality of work life. (12 Classes) (20 Marks)

Unit 4: Performance Appraisal

Nature, objectives and importance; Modern techniques and systems of performance appraisal; potential appraisal and employee counseling; transfers and promotions; Compensation: concept and policies; job evaluation; methods of wage payments and incentive plans; fringe benefits. (12 Classes) (20 Marks)

Unit 5: Maintenance

Employee health and safety; employee welfare; social security; Employer-Employee relations- an overview; concept of redeployment, redundancy, attrition, VRS, downsizing, layoffs and retrenchment, ethics and HRM. (12 Classes) (20 Marks)

Suggested Readings:

1. Gary Dessler. *A Framework* for *Human Resource Management*. Pearson Education.
2. DeCenzo, D.A. and S.P. Robbins, *Personnel/Human Resource Management*, Pearson Education.
3. Bohlendar and Snell, *Principles of Human Resource Management,* Cengage Learning

4. Ivancevich, John M. *Human Resource Management*. McGraw Hill.
5. Wreather and Davis. *Human Resource Management*. Pearson Education.
6. Robert L. Mathis and John H. Jackson. *Human Resource Management*. Cengage Learning.
7. TN Chhabra, *Human Resource Management,* Dhanpat Rai & Co., Delhi
8. Biswajeet Patttanayak, *Human Resource Management, PHI Learning*
9. Neeru Kapoor*, Human Resource Management,* Taxmann Publication

Note: Latest edition of text books may be used.

Course objective:

To provide students with a comprehensive understanding of the principles and practices of managing human resources in organizations.

Learning outcome:

Students will be able to apply various HR strategies and techniques to effectively recruit, select, develop, and retain employees.

No. of Contact Classes: 60

Course Designer: Dr. Tilak Ch. Das, Prof. Aparajeeta Borkakoty, Gauhati University, tilak@gauhati.ac.in, apara_jeeta@yahoo.com

Course Name: **Entrepreneurship** (Major 2)

Existing based syllabus: UGCB CS
Course level: 300 to 399

Credit: **4**
Total Marks: **100**

Unit 1: Introduction to Entrepreneurship
Concepts, traits, determinants and importance of entrepreneurship; Creative behavior; Evolution of entrepreneurship- theories and thoughts, Entrepreneurial eco-system, entrepreneurship and economic development, barriers to entrepreneurship, Dimensions of entrepreneurship, entrepreneurship vs. intrapreneurship (15 Lectures) (25 Marks)

Unit 2: Entrepreneurship and Micro, Small and Medium Enterprises
Role of business houses and family business in India; The contemporary role models in Indian business: their values, business philosophy and behavioural orientations; Conflict in family business and its resolution. (15 Lectures) (25 Marks)

Unit 3: Public and private partnership in business, support and sustainability of entrepreneurship. Requirement, availability and access to finance, marketing assistance, technology, and industrial accommodation, The concept, role and functions of business incubators, Mobilising resources for start-up -angel investors, venture capital and private equity fund.
(15 Lectures) (25 Marks)

Unit 4: Sources of business ideas and tests of feasibility.
Significance of writing the business plan/ project proposal; Contents of business plan/ project proposal; Designing business processes, location, layout, operation, planning & control; preparation of project report (various aspects of the project report such as size of investment, nature of product, market potential may be covered); Project submission/ presentation and appraisal thereof by external agencies, such as financial/non-financial institutions
(15 Lectures) (25 Marks)

Suggested Readings:

1. Kuratko and Rao, *Entrepreneurship: A South Asian Perspective,* Cengage Learning.
2. Robert Hisrich, Michael Peters, Dean Shepherd, *Entrepreneurship,* McGraw-Hill Education
3. Desai, Vasant. *Dynamics of Entrepreneurial Development and Management*. Mumbai, Himalaya Publishing House.
4. Dollinger, Mare J. *Entrepreneurship: Strategies and Resources*. Illinois, Irwin.
5. Holt, David H. *Entrepreneurship: New Venture Creation*. Prentice-Hall of India, New Delhi.
6. Plsek, Paul E. *Creativity, Innovation and Quality*. (Eastern Economic Edition), New Delhi: Prentice-Hall of India. ISBN-81-203-1690-8.
7. Singh, Nagendra P. *Emerging Trends in Entrepreneurship Development*. New Delhi: ASEED.
8. SS Khanka, *Entrepreneurial Development,* S. Chand & Co, Delhi.
9. K Ramachandran, *Entrepreneurship Development,* McGraw-Hill Education
10. SIDBI Reports on Small Scale Industries Sector.

Note: Latest edition of text books may be used.

Course objective:

To enable students to understand the key concepts, processes, and challenges involved in starting and managing a business venture.

Learning outcome:

Students will be able to develop a comprehensive business plan, assess market opportunities, and apply entrepreneurial strategies to successfully launch and grow a business.

No. of Contact Classes: 60

Course Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

Course Name: **Business Laws** (Major 3)

Existing based syllabus: UGCB CS
Course level: 300 to 399

Credit: **4**
Total Marks: **100**

Unit 1: The Indian Contract Act, 1872: General Principle of Law of Contract

Contact- meaning, characteristics and kinds

a) Essentials of a valid contract - Offer and acceptance, consideration, contractual capacity, free consent, legality of objects.
b) Void agreements
c) Discharge of a contract – modes of discharge, breach and remedies against breach of contract.
d) Contingent contracts
e) Quasi – contracts **(12 Classes) (20 Marks)**

Unit 2: The Indian Contract Act, 1872: Specific Contract

a) Contract of Indemnity and Guarantee
b) Contract of Bailment
c) Contract of Agency **(12 Classes) (20 Marks)**

Unit 3: The Sale of Goods Act, 1930

a) Contract of sale, meaning and difference between sale and agreement to sell.
b) Conditions and warranties
c) Transfer of ownership in goods including sale by a non-owner
d) Performance of contract of sale
e) Unpaid seller – meaning, rights of an unpaid seller against the goods and the buyer.

(12 Classes) (20 Marks)

Unit 4: Partnership Laws

A) The Partnership Act, 1932

a. Nature and Characteristics of Partnership
b. Registration of a Partnership Firms
c. Types of Partners
d. Rights and Duties of Partners
e. Implied Authority of a Partner
f. Incoming and outgoing Partners
g. Mode of Dissolution of Partnership

B) The Limited Liability Partnership Act, 2008

a) Salient Features of LLP
b) Differences between LLP and Partnership, LLP and Company
c) LLP Agreement,
d) Partners and Designated Partners
e) Incorporation Document
f) Incorporation by Registration
g) Partners and their Relationship **(12 Classes) (20 Marks)**

Unit 5 (A): The Negotiable Instruments Act 1881

Meaning, Characteristics, and Types of Negotiable Instruments : Promissory Note, Bill of Exchange, Cheque

a) Holder and Holder in Due Course, Privileges of Holder in Due Course.
b) Negotiation: Types of Endorsements
c) Crossing of Cheque
d) Bouncing of Cheque

5(B): Right to Information Act 2005: Important definitions, object, scope, obligation of public authorities under the act; rights for obtaining information; disposal of request, information commission, appeal and penalties. **(12 Classes) (20 Marks)**

Suggested Readings:

1. M.C. Kuchhal, and Vivek Kuchhal, *Business Law*, Vikas Publishing House, New Delhi.
2. Avtar Singh, *Business Law*, Eastern Book Company, Lucknow.
3. Ravinder Kumar, *Legal Aspects of Business*, Cengage Learning
4. SN Maheshwari and SK Maheshwari, *Business Law*, National Publishing House, New Delhi.
5. Aggarwal S K, *Business Law*, Galgotia Publishers Company, New Delhi.
6. Bhushan Kumar Goyal and Jain Kinneri, *Business Laws*, International Book House
7. Sushma Arora, *Business Laws*, Taxmann Pulications.
8. Akhileshwar Pathak, *Legal Aspects of Business*, McGraw Hill Education, 6th ed.
9. P C Tulsian and Bharat Tulsian, *Business Law*, McGraw Hill Education
10. Sharma, J.P. and Sunaina Kanojia, *Business Laws*, Ane Books Pvt. Ltd., New Delhi

Note: Latest edition of text books may be used.

Course objective:

To gain knowledge of the branches of law which relate to business transactions, certain corporate bodies and related matters.

Course Outcome:

On completion of this course, learners will be able to: appreciate the relevance of business law to individuals and businesses and law in an economic and social context.

No. of Contact Classes: 60

Course Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com
Department of Commerce, commerce@gauhati.ac.in

Semester IV

Course Name: **Fundamentals of Financial Management** (Major 4)

Existing based syllabus: UGCB CS
Course level: 400 to 499

Credit: **4**
Total Marks: **100**

Unit 1: Introduction

Nature, scope and objective of Financial Management, Time value of money, Risk and return (including Capital Asset Pricing Model), Valuation of securities – Bonds and Equities (12 Classes) (20 Marks)

Unit 2: Investment Decisions

The Capital Budgeting Process, Cash flow Estimation, Payback Period Method, Accounting Rate of Return, Net Present Value (NPV), Net Terminal Value, Internal Rate of Return (IRR), Profitability Index, Capital budgeting under Risk – Certainty Equivalent Approach and Risk-Adjusted Discount Rate. (12 Classes) (20 Marks)

Unit 3: Financing Decisions

Cost of Capital and Financing Decision: Sources of long-term financing Estimation of components of cost of capital. Methods for Calculating cost of equity capital, Cost of Retained Earnings, Cost of Debt and Cost of Preference Capital, Weighted Average cost of capital (WACC) and Marginal cost of capital. Capital structure –Theories of Capital Structure (Net Income, Net Operating Income, MM Hypothesis, Traditional Approach). Operating and financial leverage; Determinants of capital structure (12 Classes) (20 Marks)

Unit 4: Dividend Decisions

Theories for Relevance and irrelevance of dividend decision for corporate valuation; Cash and stock dividends; Dividend policies in practice (12 Classes) (20 Marks)

Unit 5: Working Capital Decisions

Concepts of working capital, the risk-return trade off, sources of short-term finance, working capital estimation, cash management, receivables management, inventory management and payables management. (12 Classes) (20 Marks)

Note:

1. In addition, the students will work on Spreadsheet for doing basic calculations in finance (Unit 2 and 3 above) and hence can be used for giving students subject related assignments for their internal assessment.

2. There shall be 4 Credit Hrs. for Lectures + one Credit hr. (Two Practical Periods per week per batch) for Practical Lab + one credit Hr for Tutorials (per group)

3. Latest edition of text books may be used.

Suggested Readings:

1. James C. Van Horne and Sanjay Dhamija, *Financial Management and Policy*, Pearson Education
2. Levy H. and M. Sarnat . *Principles of Financial Management*. Pearson Education
3. Brigham and Houston, *Fundamentals of Financial Management,* Cengage Learning
4. Khan and Jain. *Basic Financial Management*, McGraw Hill Education
5. Prasanna Chandra, *Fundamentals of Financial Management*. McGraw Hill Education
6. Singh, J.K. *Financial Management- text and Problems*. Dhanpat Rai and Company, Delhi.

7. Rustagi, R.P. *Fundamentals of Financial Management*. Taxmann Publication Pvt. Ltd.

Course Objective:

The objective of the Fundamentals of Financial Management course is to provide students with a comprehensive understanding of the basic principles and concepts of financial management in order to make sound financial decisions.

Learning Outcomes:

1. Students will gain knowledge of financial analysis techniques and be able to interpret financial statements to evaluate the financial health of a company.
2. Students will develop the skills to assess investment opportunities, calculate the cost of capital, and make informed capital budgeting decisions.

No. of Contact Classes: 60

Course Designer: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: **Labour Laws** (Major 5)

Existing based syllabus: UGCB CS
Course level: 400 to 499

Credit: **4**
Total Marks: **100**

Unit I: Introduction (15 Lecture) (25 Marks)

Meaning, classifications, history and development of Labour Legislations in India, Laws related working conditions.

- Factories Act 1948
- Shops and Establishment Act
- Contract Labour (Abolition and Regulation Act)
- Plantations Act
- Mines Act

Unit II: Legislations related to wages (15 Lecture) (25 Marks)

- Minimum Wages Act 1948
- Payment of Wages Act 1936
- Equal Remuneration Act

Unit III: Legislations related to Employment and Service Conditions (15 Lecture) (25 Marks)

- Industrial Disputes Act 1947
- Trade Unions Act 1926
- Industrial Employment (Standing Order) Act

Unit IV: Some aspects of agricultural labour, types of Unorganised Labour and statutory safeguard. (15 Lecture) (25 Marks)

Suggested Readings:

- Sharma, J.P., Simplified Approach to Labour Laws. Bharat Law House (P) Ltd.
- VenkatRatnam, C.S. Industrial Relations: Text and Cases, Oxford University Press, Delhi.
- Mamoria, Mamoria and Gankar (2010), Dynamics of Industrial Relations. Himalaya Publishing House, Delhi.
- MonappaArun (2012), Industrial Relations and Labor laws. Tata McGraw Hill Edition, New Delhi
- Monappa, A., Nambudiri, R., &Selvaraj P. (2012), Industrial Relations and Labour Laws. New Delhi: Tata McGraw Hill Education.
- Sinha, P.R.N., Sinha, InduBala and Shekhar (2017), SeemaPriyadarshini,,Industrial Relations, Trade Unions and Labour Legislation, Pearson Education,

Course objective:
To familiarize students with the legal framework governing employment relationships and labour rights.

Learning outcome:
Students will acquire a thorough understanding of labour laws and regulations, enabling them to interpret and apply legal provisions in the workplace.

No. of Contact Classes: 60

Course Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

Course Name: **Industrial Relations** (Major 6)

Existing based syllabus: UGCB CS
Course level: 400 to 499

Credit: **4**
Total Marks: **100**

Unit I: Introduction to Industrial Relations (15 Lecture) (25 Marks)

Background, evolution, approaches to Industrial Relations, History of Industrial Relation in India, Pre and Post Independence, Indicators of the State of Industrial Relations.

Unit II: Trade Unions (15 Lecture) (25 Marks)

Theoretical framework and foundations, characteristics, Managing India Trade Unions, New Role of trade unions in context of globalisation, IT, trade Negotiations and Collective Bargaining, Problems of Trade Unions.

Unit III: Industrial Disputes (15 Lecture) (25 Marks)

Nature & Causes, Industrial conflicts, grievances and handling, classification of Industrial Disputes. Dispute Resdution, workers Participation in Management Machinery.

Unit IV: Contemporary Issues in Industrial Resolution, Employee Participation in Labour Management, Labour Policy, economic policy and industrialisation. Industrial Relations and technological change India and International Labour Standards. (15 Lecture) (25 Marks)

Suggested Readings:

1. PK Padhi, Industrial Relations and Labour Law, PHI Learning
2. ArunMonappa, Industrial Relations and Labour Law, McGraw Hill Education
3. SC Srivastav, Industrial Relations and Labour Law, Vikas Publishing House
4. C.S VenkataRatnam, Industrial Relations, Oxford University Press
5. P.L. Malik's Handbook of Labour and Industrial Law, Vol 1 and 2, Eastern Book Company
6. JP Sharma, Simplified Approach to Labour Laws, Bharat Law House (P) Ltd

Course Objective:

To develop students' knowledge and understanding of the complex relationship between employers, employees, and trade unions in the workplace.

Learning Outcome:

Students will gain the ability to analyze and manage employment relationships, negotiate collective bargaining agreements, and handle workplace conflicts effectively.

No. of Contact Classes: 60

Course Designer: Dr. Tilak Ch. Das, Prof. Aparajeeta Borkakoty, Gauhati University, tilak@gauhati.ac.in, apara_jeeta@yahoo.com

Course Name: **Cost and Management Accounting** (Major 7)

Existing based syllabus: UGCB CS
Course level: 400 to 499

Credit: **4**
Total Marks: **100**

Unit I : Cost Accounting: Preliminaries (12 Classes) (20 Marks)
Meaning of cost, costing and cost accounting; objectives and functions of cost accounting; costing as an aid to management; cost concepts and classification, Relationship between cost accounting and financial accounting; Cost accounting and Management Accounting; Methods and Techniques of costing; Concept of cost audit; Preparation of cost sheet.

Unit II : Accounting for Material, Labour and Overhead (12 Classes) (20 Marks)
Material control concept and techniques; E.O.Q. ABC Analysis and VED Analysis.
Labour cost control procedures; labour turnover; idle time and over time; methods of wage payment - time and piece rates.
Importance and classification of overhead; Factory administrative and selling overheads; allocation and apportionment of overhead; Absorption of overhead - under and over absorption. (Simple application)

Unit III: Management Accounting: Preliminaries (12 Classes) (20 Marks)
Meaning and objectives of Management Accounting; Decision situation and Role of Management Accountant; Management accounting Techniques: Ratio analysis - Meaning ofRatio and Ratio analysis; uses, significance and limitations of Ratio analysis; Activity Ratios, Liquidity Ratios, Profitability Ratios and Solvency ratios;

Unit IV: Marginal Costing and Budget & Budgetary Control (12 Classes) (20 Marks)
Meaning of marginal costing, Assumptions of marginal costing, managerial applications of marginal costing, Advantages and disadvantages of marginal costing; Cost- Volume- Profit Analysis and Break Even analysis (simple Applications),.
Meaning of Budget and Budgetary control; Classification of budgets according to time, function and flexibility; Master budget, Preparation of Flexible Budget and Cash Budget; Performance Budget and Zero Based Budgeting

Unit V: Standard Costing and Variance Analysis (12 Classes) (20 Marks)
Meaning of Standard Cost & Standard Costing; Advantages of standard costing; Standard costing Vs. Budgetary control; Variance analysis; Classification and computation of variance (Simple application)

Suggested Readings:

1. Management and Cost Accounting - Shashi K. Gupta & R. K. Sharma, Kalyani Publishers.
2. Arora M. N. - Cost Accounting Principles & Practices; Vikas, New Delhi.
3. Jain S. P. & Narang K. L. - Cost Accounting; Kalyani, New Delhi.
4. Khan M. Y. & Jain P. K. - Management Accounting, Tata Mcgrow Hill.

Course Objective:

The objective of the Cost and Management Accounting course is to provide students with the knowledge and skills to effectively collect, analyze, and interpret financial and non-financial information for managerial decision-making and control within an organization.

Learning Outcomes:

1. Students will be able to apply cost accounting techniques to determine product costs, analyse cost behaviour, and make informed decisions regarding pricing, product mix, and cost control.
2. Students will develop the skills to design and implement management accounting systems, including budgeting, variance analysis, and performance measurement, to support planning, control, and decision-making processes in organizations.

No. of Contact Classes: 60

Course Designer: Prof. Prashanta Sharma, Gauhati University, prs@gauhati.ac.in

Semester V

Course Name: **Cost and Management Accounting** (Major 8)

Existing based syllabus: UGCB CS
Course level: 500 to 599

Credit: **4**
Total Marks: **100**

Unit I: Basic Issues in Economic Growth and Development: Concept and Measures of economic growth and Development; determinants of economic development, Human Development Index, Kautilya 's Arthashastra and economic development **(12 Classes) (20 Marks)**
Unit II: Overview of Indian economy: India as a developing economy, India as a mixed economy, India as a dualistic economy, India as a federal economy, evolutionof Indian Planning from Planning Commission to Niti Aayog-, Monetary and Fiscal policies with their implications on economy **(12 Classes) (20 Marks)**
Unit III: Agriculture Sector: Agrarian growth and performance in different phases of policy regimes , Crop pattern , Green Revolution ; White and Yellow Revolution , land reforms in India, cooperative farming in India , tribal agricultural practices , production of other allied sectors like horticulture fisheries and aquaculture , livestock and animal husbandry , Food Security Issues , Agricultural Marketing, Policy initiatives of the Government of India for the development of agricultural sector. **(12 Classes) (20 Marks)**
Unit IV: Industrial Sector: Phases of Industrialization – the rate and pattern of industrial growth across alternative policy regimes(Industrial Policy 1948, IP Resolution 1956, Industrial Licensing Policy , New Industrial Policy 1991); MSMEs –role and challenges , Public sector – its role, performance and reforms; industrial sickness, disinvestment , privatization, Public Private Partnership ; Role of Foreign capital , Structural Changes and Performance of India's Foreign Trade and Balance of Payments;; Export policies and performance; India and the WTO, Industrialization in North Easter Region- Types of industries, industrial policies, Act East policy, Cross Border Trade, Border Area Development, Institutions – NEDFI, DONER, NEC **(12 Classes) (20 Marks)**
Unit V: Service Sector: service sector and its role in Indian economy, contribution to national Income, employment and exports revenue, India's service revolution, 'Digital India Mission' issues and challenges for India's service sector growth **(12 Classes) (20 Marks)**

Suggested Readings:

1. Mishra and Puri, Indian Economy, Himalaya Publishing House
2. P.K. Dhar , Indian Economy –Its Growing Dimensions , Kalyani Publishers
3. Gaurav Dutt and KPM Sundarum, Indian Economy, S. Chand & Company.
4. Bhagwati, J. and Desai, P. India: Planning for industrialization, OUP, Ch 2.
5. Uma Kapila (2021) , Indian Economy – Performance and Policies , Academic Foundation , New Delhi
6. Vinay G.B(2019) Indian Economy , Oxford University Press

Course Objective:

The objective of the Indian Economy course is to provide students with an in-depth understanding of the key economic principles, policies, and factors that shape the Indian economy, enabling them to analyze and interpret its dynamics and challenges.

Learning Outcomes:

1. Students will gain knowledge of the major macroeconomic indicators, such as GDP growth, inflation, and unemployment, and understand how these factors impact the overall performance of the Indian economy.
2. Students will develop the ability to analyse the structure and composition of the Indian economy, including its sectors, such as agriculture, industry, and services, and comprehend the role of each sector in the overall economic growth.

3. Students will be able to identify and evaluate the various economic policies implemented by the government, such as fiscal policy, monetary policy, and trade policy, and assess their impact on the Indian economy.
4. Students will understand the significance of demographic trends, population dynamics,

No. of Contact Classes: 60

Course Designer: Department of Commerce, Gauhati University, commerce@gauhati.ac.in

Course Name: **Strategic Human Resource Management** (Major 9)

Existing based syllabus: UGCB CS
Course level: 500 to 599

Credit: **4**
Total Marks: **100**

Unit-I: Introduction **(15 Classes) (25 Marks)**
Strategic role of HRM, Planning and implementing strategic HR policies HR Strategies to increase organizational performance, Cultural diversity

Unit-II: Managing Strategic Organization **(15 Classes) (25 Marks)**
Managing Strategic Organizational renewal- Managing change and OD, instituting TQM Programmes, Creating Team based Organizations, HR and BPR (Business Process Reengineering), Flexible work arrangement.

Unit-III: Establishing Strategic Plans **(15 Classes) (25 Marks)**
Establishing Strategic Compensation Plans, Trends, Objectives and Approaches to international compensation **(15 Classes) (25 Marks)**

Unit-IV: HR in International Context:
Managing global HR- HR and the internalization of business, International recruitment at different levels, issues in staff selection and retention, Training, Development and maintaining international employees, Expatriate Training.

Suggested Readings:

1. **Personnel Management, Text and Cases**, Author: C. B. Mamoria and S. V. Gankar, Pub: Himalaya Publications
2. **Delivering Competitive Advantages** Author: Clive Morton, Andrew Newall, Jon Sparkes, Pub: Jaico Publishing House 1st edition.
3. **International HRM** – Managing People in International Context, Author: Dowling, Welch
4. **Selected Readings in HRD**- by Kuldee Singh, T.V. Rao, Baburaj Nair: Tata McGraw-Hill Publishing Company Limited
5. **Strategic Human Resource Management**- by William P. Athony, Pamella L. Perrewe, K. Michele Kacmar: Harcourt Brace Jovanovich College Publishing
6. Charles Greer, Strategic Human Resource Management, Pearson Education
7. Gary Dessler, Human Resource Management, PHI, New Delhi.

Course Objective:

The objective of the Strategic Human Resource Management course is to provide students with an understanding of how to align human resource practices with organizational strategy in order to enhance employee performance, engagement, and overall organizational effectiveness.

Learning Outcomes:

1. Students will gain knowledge of strategic HRM concepts and frameworks and be able to analyze how HR practices can contribute to achieving organizational goals and competitive advantage.
2. Students will develop the skills to design and implement HR strategies and policies that align with the organization's strategic objectives, including recruitment, selection, training and development, performance management, and employee retention.
3. Students will understand the importance of managing diversity and inclusion in the workplace and be able to develop strategies to create an inclusive and supportive organizational culture.

4. Students will learn to effectively manage employee engagement, motivation, and productivity through strategies such as employee involvement, reward systems, and work-life balance initiatives.
5. Students will be able to analyze and address HR challenges and issues related to globalization, technological advancements, and changing workforce dynamics, and develop strategies to adapt and thrive in a dynamic business environment.

No. of Contact Classes: 60

Course Designer: Dr. Tilak Ch. Das, Gauhati University, tilak@gauhati.ac.in

Course Name: **Labour Welfare and Social Security** (Major 10)

Existing based syllabus: UGCB CS
Course level: 500 to 599

Credit: **4**
Total Marks: **100**

Unit I: Introduction- Labour Welfare & Labour Markets- Nature and characterises of Labour market in India, Labour productivity, Labour market policies, Socio- economic aspects affecting labour welfare, welfare benefits. **(15 Classes) (25 Marks)**

Unit II: Globalisation and Labour markets in India, Labour emigration and its impact, International Labour Organisation (ILO), objectives and Labour Welfare in India. **(15 Classes) (25 Marks)**

Unit III: Social Security

Meaning, objective, types of social security, Social assistance and social insurance, development of social security in India, Social security measures for industrial employees. International standards of social security. Quality of Work Life, Counselling **(15 Classes) (25 Marks)**

Unit IV: Social Security Legislations

Employees Provident Fund Act, Employees State Insurance Act, Workers Compensation Act 1923, Payment of Gratuity Act, Maturity Benefit Act, Unorganised workers Social Security Act 2008. **(15 Classes) (25 Marks)**

Suggested Readings:

1. Kapoor, N.D., Elements of Industrial Law, Sultan Chand, New Delhi, 2020
2. Garg, Ajay, Labour Laws one should know, Nabhi Publication, New Delhi, 2020
3. Kumar H.L., Practical Guide to Employees' Provident Funds, Universal Law Publishing Co., New Delhi, 2020
4. Srivastava S C, Industrial Relations And Labour Laws, Vikas Publishing House, Noida
5. Kumar H.L., Labour Laws Everybody Should Know, Universal Law Publishing Co., New Delhi, 2020
6. Kumar H.L. , Practical Guide to Payment of Gratuity, Universal Law Publishing Co., New Delhi, 2020
7. Kumar H.L., Practical Guide to Labour Management, Universal Law Publishing Co., New Delhi, 2020
8. Kumar H.L., Compliances under Labour Law, Universal Law Publishing Co., New Delhi, 2020
9. Sarma A.M., Aspects of Labour Welfare and Social Security, Himalaya Publishing Hous, Mumbai, 2016
10. Subba Rao P, Labour Welfare And Social Security, Himalaya Publishing House, Mumbai, 2009
11. Parry Jonatha, Breman, Kapadia, The Worlds of Industrial Labour, Sage Publications, New Delhi,
12. Introduction to Social Security, ILO Office, Geneva,

Course Objective: To develop students' knowledge and awareness of the social security measures and welfare programs implemented for the welfare of workers.

Learning Outcome: Students will gain an understanding of the various social security schemes and labour welfare initiatives, enabling them to assess their impact and contribute to the well-being of employees.

No. of Contact Classes: 60

Course Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

Course Name: **Performance Management** (Major 11)

Existing based syllabus: UGCB CS
Course level: 500 to 599

Credit: **4**
Total Marks: **100**

Unit I: Introduction **(15 Classes)** **(25 Marks)**
Meaning, concept and brief background of Performance Management, its importance, Place of PM in Human Resource Management; performance Management Framework- Process – Mid Cycle and End Cycle- Steps in Performance management

Unit II: Performance Management Planning **(15 Classes)** **(25 Marks)**
Organisations mission, strategy and goals, Goals Settling, Quality of goals, Employee Engagement through Performance Management System, Performance Planning process and employee performance.

Unit III: Performance Appraisal **(15 Classes)** **(25 Marks)**
Definitions, dimensions, objectives, advantages & disadvantages, characteristics, process limitation methods- traditional and modern, Performance assessment.

Unit IV: Contemporary Issues in PM **(15 Classes)** **(25 Marks)**
Linking Performance to compensating & Rewards and recognition, Creating PM Culture through HR Progress and practices.Competency Mapping, Competency Mapping & its Linkage with Career Development and Succession Planning,

Suggested Readings:

- Armstrong, M. & Baron, A. (2005), Performance management and development. Mumbai: Jaico Publishing House.
- Bhattacharyya, D. K. (2011), Performance management systems and strategies. India: Pearson Education.
- Chadha, P. (2003), Performance Management: It‘s About Performing Not Just Appraising. McMillan India Ltd.
- Kandula, S. R. Performance Management: Strategies, Interventions, Drivers PHI Lerarning
- Kohli(2008). Performance Management.Oxford University Press.
- Rao, T.V. (2004), Performance Management and Appraisal Systems: HR Tools for Global Competitiveness. Response Books: A division of Sage Publications.
- Shrinivas R. Kandula (2006), Performance Management: Strategies, Intervention & Drivers. Pearson.
- Soumendra, NarainBagchi (2013), Performance Management. Delhi: Cengage Learning India Pvt. Ltd.

Course Objective:

To equip students with the skills and knowledge needed to effectively manage employee performance and enhance organizational productivity.

Learning Outcome:

Students will be able to develop performance appraisal systems, set performance goals, provide constructive feedback, and design performance improvement plans.

No. of Contact Classes: 60

Name of the Designer: Dr. Tilak Ch. Das, Prof. Aparajeeta Borkakoty, Gauhati University, tilak@gauhati.ac.in, apara_jeeta@yahoo.com

Semester VI

Course Name: **International Business** (Major 12)

Existing based syllabus: UGCB CS
Course level: 600 to 699

Credit: **4**
Total Marks: **100**

Unit I: **(12 Classes) (20 Marks)**

a. Introduction to International Business: Globalisation and its importance in world economy; Impact of globalization; International business vs. domestic business: Complexities of international business; Modes of entry into international business.

b. International Business Environment: National and foreign environments and their components - economic, cultural and political-legal environments

Unit II: **(12 Classes) (20 Marks)**

a. Theories of International Trade – an overview (Classical Theories, Product Life Cycle theory, Theory of National Competitive Advantage); Commercial Policy Instruments - tariff and non-tariff measures – difference in Impact on trade, types of tariff and non tariff barriers (Subsidy, Quota and Embargo in detail) ; Balance of payment account and its components.

b. International Organizations and Arrangements: WTO – Its objectives, principles, organizational structure and functioning; An overview of other organizations – UNCTAD,; Commodity and other trading agreements (OPEC).

Unit III: **(12 Classes) (20 Marks):**

a. Regional Economic Co-operation: Forms of regional groupings; Integration efforts among countries in Europe, North America and Asia (NAFTA, EU , ASEAN and SAARC) .

b. International Financial Environment: International financial system and institutions (IMF and World Bank – Objectives and Functions) ; Foreign exchange markets and risk management; Foreign investments - types and flows; Foreign investment in Indian perspective

Unit IV: **(12 Classes) (20 Marks):**

a. Organisational structure for international business operations; International business negotiations.

b. Developments and Issues in International Business: Outsourcing and its potentials for India; Role of IT in international business; International business and ecological considerations.

Unit V: **(12 Classes) (20 Marks)**

a. Foreign Trade Promotion Measures and Organizations in India; Special economic zones (SEZs) and export oriented units (EOUs), ; Measures for promoting foreign investments into and from India; Indian joint ventures and acquisitions abroad.

b. Financing of foreign trade and payment terms – sources of trade finance (Banks, factoring, forfaiting, Banker's Acceptance and Corporate Guarantee) and forms of payment (Cash in advance, Letter of Credit, Documentary Collection, Open Account)

Suggested Readings:

1. Charles W.L. Hill and Arun Kumar Jain, International Business. New Delhi: McGraw Hill Education
2. Daniels John, D. Lee H. Radenbaugh and David P. Sullivan. International Business. Pearson Education
3. Johnson, Derbe., and Colin Turner. International Business - Themes & Issues in the Modern Global Economy. London: Roultedge.
4. Sumati Varma, International Business, Pearson Education.
5. Cherunilam, Francis. International Business: Text and Cases. PHI Learning
6. Michael R. Czinkota. et al. International Business. Fortforth: The Dryden Press.
7. Bennett, Roger. International Business. Pearson Education.

8. Peng and Srivastav, Global Business, Cengage Learning

Course Objective:

To provide students with a comprehensive understanding of the theories, practices, and challenges involved in conducting business across national borders.

Learning Outcome:

By the end of the course, students will be able to analyse and evaluate the impact of globalization on international business, demonstrate knowledge of cross-cultural management strategies, and develop effective decision-making skills for international trade and investment.

No. of Contact Classes: 60

Course Designer: Department of Commerce, Gauhati University, commerce@gauhati.ac.in

Course Name: **Operations Research in Business** (Major 13)

Existing based syllabus: UGCB CS
Course level: 600 to 699

Credit: **4**
Total Marks: **100**

Unit I: Introduction to Operation Research: Evolution of Operation Research, Nature and characteristics of O.R , phases of O.R, methodology of O.R, Operation research model, role of computer in Operation Research. **(12 Classes) (20 Marks)**

Unit II: Linear Programming: Concept of Linear Programming, Uses and limitations of Linear Programming, Formulation of L.P problems, Concept of slack variable, Procedure of Graphical Method, Simplex Method (solutions of L.P.P. upto 3 iterations) Maximization Problems. (Simple problems related to commerce and business) **(12 Classes) (20 Marks)**

Unit III: Inventory Control, concepts and benefits of inventory control, Different types of costs in inventory system, Formulation and solution of Economic order quantity (EOQ) model, selective inventory control techniques (ABC Analysis and VED Analysis) **(12 Classes) (20 Marks)**

Unit IV: Study of Replacement, Replacement Problem, Replacement of items whose maintenance cost increases with time and the value of money remains same during the period, Replacement of items whose maintenance cost increases with time and the value of money also changes with time, selection of best item (machine) amongst two**.** **(12 Classes) (20 Marks)**

Unit V: Project Management, basic differences between PERT and CPM, phases of project management, PERT / CPM network, rules for network construction, critical path analysis, Float of an Activity and Event, Critical Path, project scheduling with uncertain activity times (only simple numerical examples are needed) **(12 Classes) (20 Marks)**

Suggested Readings:

1. Operations Research 9th Edition, Kantiswarup, Gupta P.K. & Sultan Chand & Sons Manmohan Operations Research – An introduction 6th Edition, Taha H.A., Hall of India
2. Operations Research Techniques for Management 7th Edition, Kapoor V.K., Sultan Chand & Sons
3. Operations Research 9th Edition, Kanti Swarup, Gupta P.K. & Sultan Chand & Sons
4. Operations Research: Theory and Applications 4th Edition, J.K Sharma

Course Objective:

To introduce students to the principles and techniques of operations research and their application in solving complex business problems.

Learning outcome: By the end of the course, students will be able to apply quantitative models and optimization techniques to analyze business operations, make informed decisions, and improve overall efficiency and effectiveness in a variety of operational contexts.

No. of Contact Classes: 60

Course Designer: Dr. Mahuya Deb, Gauhati University, mahuya8@gmail.com

Course Name: **Technology in Human Resource Management** (Major 14)

Existing based syllabus: UGCB CS
Course level: 600 to 699

Credit: **4**
Total Marks: **100**

Unit I: Introduction of Technology in HR evolution of technology in HR, its role, core of HR technologies: Artificial Intelligence (AI), Cloud Computing, Machine Learning(ML), Internet of things (IOT) , basic concept of E-HRM , Human Resource Information System (HRIS)
(15 Classes) **(25 Marks)**

Unit II. Transforming HR:HR roles and their technology needs, the changing HR landscape, transformation in HR functions, Enterprise resource Planning: Meaning and benefits, Role of ERP in HRM, Digital Transformation in HRM decision Making **(15 Classes)** **(25 Marks)**

Unit III: Human Resources Information System (HRIS)
Introduction to HRIS-Concept, Need, Purpose of Information Systems designed for HR, HR Metrics, HR Administration and HRIS, Disruptive Technologies and emerging trends in HRIS
(15 Classes) **(25 Marks)**

Unit IV: Current Trends in HR Technology Major Technology trends, Remote working and HR, Cloud based HR, Regulatory and Legal Issues regarding use of Technology.
(15 Classes) **(25 Marks)**

Suggested Readings:

- Marr, Bernard. Data-Driven HR: How to Use Analytics and Metrics to Drive Performance, Kogan Page, Limited, 2018. ProQuest Ebook Central.
- Roy Mac Leod (Ed.) New Technology and the workers Response, Sage Publications, New Delhi.
- Stacey Harris, Introduction to HR Technologies: Understand How to Use Technology to Improve Performance and Processes, 1st Edition (2021).
- Deborah Waddill, , Digital HR A Guide to Technology-Enabled Human Resources, Society for Human Resource Management
- Joshbersin (2021), HR Technology 2021: The Definitive Guide.

Course Objective:

To explore the role of technology in human resource management and develop an understanding of how technological advancements can enhance HR processes and practices.

Learning Outcome:

By the end of the course, students will be able to identify and evaluate various HR technologies, demonstrate proficiency in utilizing HR software and systems, and strategize the implementation of technology-driven solutions to improve HR functions such as recruitment, training, performance management, and employee engagement.

No. of Contact Classes: 60

Course Designer: Dr. Tilak Ch. Das, Gauhati University & Dr. Mahuya Deb, Gauhati University, tilak@gauhati.ac.in, mahuya8@gmail.com

Course Name: **Training and Development** (Major 15)

Existing based syllabus: UGCB CS
Course level: 600 to 699

Credit: **4**
Total Marks: **100**

Unit I: Introduction- Training, Learning, Development, Importance and Need of Training; training in human resource management, benefits of training Integrating training with Performance Management Systems and Compensation. Strategic training **(15 Classes)** **(25 Marks)**

Unit II: Training Needs Assessment
Assessing the Need for training and the participants- identification of training needs Levels of training need assessment- Program designing and delivery. Use of technology; training evaluation, level of evaluation; evaluation models. **(15 Classes)** **(25 Marks)**

Unit III: Training Methods, Process, Learning
Learning theories and process, Learning Cycle, Designing effective training programs, training methods and Aids: -On the Job & Off the Job Training, Management Development:
Lecture Method, Role Play, In-basket Exercise, Simulation, Vestibule Training, Management Games, Case Study, Programmed Instruction, Sensitivity Training **(25 Classes)** **(30 Marks)**

Unit IV: Training and Development in India
Emerging pattern of training in India, Review on T&D Programmes in India.
(10 Classes) **(20 Marks)**

Suggested Readings:

- Chabbra, T.N.(2016). Human Resource Management: Concepts and Issues. DhanpatRai and Co. Publications.
- Durai, P.(2016). Human Resource Management (2nd ed.). New Delhi: Pearson Education.
- Graig, Robert L. and Bittel, Lester r. (Ed): Training and Development Hand Book, McGraw-Hill, New Delhi .
- ILO, Teaching and Training Methods for Management Development Hand Book, McGraw-Hill , New York .
- Mondy, A., Wayne and Martocchio, J. J. (2016). Human Resource Management (14th Ed.). Pearson Education Publications.
- Nadler, Leonard :Corporat Human Resource Development, Van Nostrand Reinhold, ASTD, New York .
- Rao, T.V: Human Resource Development, Sage Publications, New Delhi

Course objective:

To provide students with a comprehensive understanding of the theories, methods, and processes involved in employee training and development.

Learning outcome:

Students will gain the ability to analyze training needs, design effective training programs, and evaluate the impact of training on employee performance and organizational success.

No. of Contact Classes: 60

Name of the Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

2. Specialization: Accounting

Semester III

Course Name: **Advanced Financial Accounting** (Major 1)

Existing based syllabus: UGCB CS
Course level: 300 to 399

Credit: **4**
Total Marks: **100**

Unit I: Royalty **(12 Classes) (20 Marks)**
Royalty accounts: Meaning of Royalty, Minimum Rent and Short working. Accounting Treatment and preparation of Royalty Account including impact of Strikes & Lockouts, excluding Sub-lease.

Unit II: Departmental Accounts **(12 Classes) (20 Marks)**
Meaning and objectives; allocation of common expenses; System of preparation of departmental trading and profit and loss accounts ; inter-department transfer

Unit III: Accounting for Amalgamation and Dissolution of Partnership Firms **(12 Classes) (20 Marks)**
Accounting for Dissolution of Partnership Firm including insolvency of partners, Sale to a limited company and piecemeal distribution. Accounting for Amalgamation of Partnership Firms

Unit IV: Insurance Claims **(12 Classes) (20 Marks)**
Insurance policy for a business firm – Procedure for taking up Insurance Policy for loss stock and loss of profit; Meaning of Insurance claims, procedure to lodge insurance claim; Average clause and indemnity period. Procedure of ascertaining loss of stock and loss of profit; Ascertainment of claims against loss of stock and loss of profit.

Unit V: Government Accounting **(12 Classes) (20 Marks)**
Meaning, features and Objectives of Government Accounting; difference between Commercial Accounting and Government Accounting; General Principles of Government Accounting; Demand for Grant, Appropriation Accounts, Re-appropriation; System of financial administration and financial control in India; Accounts keeping of the Government; Classification of Accounts – Consolidated Fund, Contingency Fund and Public Accounts; Government Accounting Standards Advisory Board.

Suggested Readings:

1. Anthony, R., Hawkins, D., &amp; Merchant, K. A. (2010). Accounting: Text and Cases. New York: McGraw-Hill Education.

2. Goyal, B. K., &amp; Tiwari, H. N. (2019).Financial Accounting. New Delhi: Taxmann Publication.

3. Jain, S. P., &amp; Narang, K. L. (2016).Advanced Accountancy. New Delhi: Kalyani Publishers.

4. Horngren, C. T., Sundem, G. L., Elliott, J. A., &amp; Philbrick, D. (2013). Introduction to Financial Accounting. London: Pearson Education.

5. Maheshwari, S. N., Maheshwari, S. K., &amp; Maheshwari, S. K. (2018).Financial Accounting. New Delhi: Vikas Publishing House Pvt. Ltd.

6. Monga, J. R. (2017). Financial Accounting: Concepts and Applications. New Delhi: Mayur

7. Godwin, N., Alderman, W., &amp; Sanyal, D. (2016).Financial Accounting. Boston: Cengage Learning.

8. Shukla, M. C., Grewal, T. S., &amp; Gupta, S. C. (2016).Advanced Accounts. Vol.-I. New Delhi: S. Chand Publishing.

9.Tulsian, P. C. (2007). Financial Accounting. New Delhi: Tata McGraw Hill Publishing Co. Ltd.

10. Dam, B. B., &amp; Gautam, H. C. (2019).Advanced Accounting.Gayatri Publications, Guwahati.

Objective: The course aims to impart advanced knowledge on financial accounting applicable in business of special nature and on Government accounting system**.**

Learning Outcome: By the end of the course, students will be able to apply advanced financial accounting principles and techniques to analyze and interpret financial statements, make informed financial decisions, and comply with relevant accounting standards and regulations.

No. of Contact Classes: 60

Course Designer: Prof. Prashanta Sharma, Dr. Upasana Borpujari, Gauhati University, prs@gauhati.ac.in, upasna.borpujari@gmail.com

Course Name: **Entrepreneurship** (Major 2)

Existing based syllabus: UGCB CS
Course level: 300 to 399

Credit: **4**
Total Marks: **100**

Unit I: Introduction to Entrepreneurship
Concepts, traits, determinants and importance of entrepreneurship; Creative behavior; Evolution of entrepreneurship- theories and thoughts, Entrepreneurial eco-system, entrepreneurship and economic development, barriers to entrepreneurship, Dimensions of entrepreneurship, entrepreneurship vs. intrapreneurship (15 Lectures) (25 Marks)

Unit II: Entrepreneurship and Micro, Small and Medium Enterprises
Role of business houses and family business in India; The contemporary role models in Indian business: their values, business philosophy and behavioural orientations; Conflict in family business and its resolution. (15 Lectures) (25 Marks)

Unit III: Public and private partnership in business, support and sustainability of entrepreneurship. Requirement, availability and access to finance, marketing assistance, technology, and industrial accommodation, The concept, role and functions of business incubators, Mobilising resources for start-up -angel investors, venture capital and private equity fund. (15 Lectures) (25 Marks)

Unit IV: Sources of business ideas and tests of feasibility.
Significance of writing the business plan/ project proposal; Contents of business plan/ project proposal; Designing business processes, location, layout, operation, planning & control; preparation of project report (various aspects of the project report such as size of investment, nature of product, market potential may be covered); Project submission/ presentation and appraisal thereof by external agencies, such as financial/non-financial institutions
(15 Lectures) (25 Marks)

Suggested Readings:

1. Kuratko and Rao, *Entrepreneurship: A South Asian Perspective,* Cengage Learning.
2. Robert Hisrich, Michael Peters, Dean Shepherd, *Entrepreneurship,* McGraw-Hill Education
3. Desai, Vasant. *Dynamics of Entrepreneurial Development and Management*. Mumbai, Himalaya Publishing House.4.
4. Dollinger, Mare J. *Entrepreneurship: Strategies and Resources*. Illinois, Irwin
5. Holt, David H. *Entrepreneurship: New Venture Creation*. Prentice-Hall of India, New Delhi.
6. Plsek, Paul E. *Creativity, Innovation and Quality*. (Eastern Economic Edition), New Delhi: Prentice-Hall of India. ISBN-81-203-1690-8.
7. Singh, Nagendra P. *Emerging Trends in Entrepreneurship Development*. New Delhi: ASEED.
8. SS Khanka, *Entrepreneurial Development,* S. Chand & Co, Delhi.
9. K Ramachandran, *Entrepreneurship Development,* McGraw-Hill Education
10. SIDBI Reports on Small Scale Industries Sector.

Note: Latest edition of text books may be used.

Course Objective:

To enable students to understand the key concepts, processes, and challenges involved in starting and managing a business venture.

Learning Outcome:

Students will be able to develop a comprehensive business plan, assess market opportunities, and apply entrepreneurial strategies to successfully launch and grow a business.

No. of Contact Classes: 60

Course Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

Course Name: **Business Laws** (Major 3)

Existing based syllabus: UGCB CS
Course level: 300 to 399

Credit: **4**
Total Marks: **100**

Unit I: The Indian Contract Act, 1872: General Principle of Law of Contract
Contact- meaning, characteristics and kinds

a) Essentials of a valid contract - Offer and acceptance, consideration, contractual capacity, free consent, legality of objects.
b) Void agreements
c) Discharge of a contract – modes of discharge, breach and remedies against breach of contract.
d) Contingent contracts
e) Quasi – contracts **(12 Classes) (20 Marks)**

Unit II: The Indian Contract Act, 1872: Specific Contract

a) Contract of Indemnity and Guarantee
b) Contract of Bailment
c) Contract of Agency **(12 Classes) (20 Marks)**

Unit III: The Sale of Goods Act, 1930

a) Contract of sale, meaning and difference between sale and agreement to sell.
b) Conditions and warranties
c) Transfer of ownership in goods including sale by a non-owner
d) Performance of contract of sale
e) Unpaid seller – meaning, rights of an unpaid seller against the goods and the buyer.

(12 Classes) (20 Marks)

Unit IV: Partnership Laws

A) The Partnership Act, 1932
- a. Nature and Characteristics of Partnership
- b. Registration of a Partnership Firms
- c. Types of Partners
- d. Rights and Duties of Partners
- e. Implied Authority of a Partner
- f. Incoming and outgoing Partners
- g. Mode of Dissolution of Partnership

B) The Limited Liability Partnership Act, 2008
- h) Salient Features of LLP
- i) Differences between LLP and Partnership, LLP and Company
- j) LLP Agreement,
- k) Partners and Designated Partners
- l) Incorporation Document
- m) Incorporation by Registration
- n) Partners and their Relationship **(12 Classes) (20 Marks)**

Unit V (A): The Negotiable Instruments Act 1881
Meaning, Characteristics, and Types of Negotiable Instruments: Promissory Note, Bill of Exchange, Cheque

a) Holder and Holder in Due Course, Privileges of Holder in Due Course.
b) Negotiation: Types of Endorsements
c) Crossing of Cheque
d) Bouncing of Cheque

5(B): Right to Information Act 2005: Important definitions, object, scope, obligation of public authorities under the act; rights for obtaining information; disposal of request, information commission, appeal and penalties.

(12 Classes) (20 Marks)

Suggested Readings:

1. M.C. Kuchhal, and Vivek Kuchhal, *Business Law*, Vikas Publishing House, New Delhi.
2. Avtar Singh, *Business Law*, Eastern Book Company, Lucknow.
3. Ravinder Kumar, *Legal Aspects of Business*, Cengage Learning
4. SN Maheshwari and SK Maheshwari, *Business Law*, National Publishing House, New Delhi.
5. Aggarwal S K, *Business Law*, Galgotia Publishers Company, New Delhi.
6. Bhushan Kumar Goyal and Jain Kinneri, *Business Laws*, International Book House
7. Sushma Arora, *Business Laws*, Taxmann Pulications.
8. Akhileshwar Pathak, *Legal Aspects of Business*, McGraw Hill Education, 6th ed.
9. P C Tulsian and Bharat Tulsian, *Business Law*, McGraw Hill Education
10. Sharma, J.P. and Sunaina Kanojia, *Business Laws*, Ane Books Pvt. Ltd., New Delhi

Note: Latest edition of text books may be used.

Course Objective:

To gain knowledge of the branches of law which relate to business transactions, certain corporate bodies and related matters.

Course Outcome:

On completion of this course, learners will be able to: appreciate the relevance of business law to individuals and businesses and law in an economic and social context.

No. of Contact Classes: 60

Name of the Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

Semester IV

Course Name: **Fundamentals of Financial Management** (Major 4)

Existing based syllabus: UGCB CS
Course level: 400 to 499

Credit: **4**
Total Marks: **100**

Unit I: Introduction
Nature, scope and objective of Financial Management, Time value of money, Risk and return (including Capital Asset Pricing Model), Valuation of securities – Bonds and Equities
(12 Classes) (20 Marks)

Unit II: Investment Decisions
The Capital Budgeting Process, Cash flow Estimation, Payback Period Method, Accounting Rate of Return, Net Present Value (NPV), Net Terminal Value, Internal Rate of Return (IRR), Profitability Index, Capital budgeting under Risk – Certainty Equivalent Approach and Risk-Adjusted Discount Rate. (12 Classes) (20 Marks)

Unit III: Financing Decisions
Cost of Capital and Financing Decision: Sources of long-term financing Estimation of components of cost of capital. Methods for Calculating cost of equity capital, Cost of Retained Earnings, Cost of Debt and Cost of Preference Capital, Weighted Average cost of capital (WACC) and Marginal cost of capital. Capital structure –Theories of Capital Structure (Net Income, Net Operating Income, MM Hypothesis, Traditional Approach). Operating and financial leverage; Determinants of capital structure (12 Classes) (20 Marks)

Unit IV: Dividend Decisions
Theories for Relevance and irrelevance of dividend decision for corporate valuation; Cash and stock dividends; Dividend policies in practice (12 Classes) (20 Marks)

Unit V: Working Capital Decisions
Concepts of working capital, the risk-return trade off, sources of short-term finance, working capital estimation, cash management, receivables management, inventory management and payables management. (12 Classes) (20 Marks)

Note:

1. In addition the students will work on Spreadsheet for doing basic calculations in finance (Unit II and III above) and hence can be used for giving students subject related assignments for their internal assessment.

2. There shall be 4 Credit Hrs. for Lectures + one Credit hr. (Two Practical Periods per week per batch) for Practical Lab + one credit Hr for Tutorials (per group)

3. Latest edition of text books may be used.

Suggested Readings

1. James C. Van Horne and Sanjay Dhamija, *Financial Management and Policy*, Pearson Education
2. Levy H. and M. Sarnat . *Principles of Financial Management*. Pearson Education
3. Brigham and Houston, *Fundamentals of Financial Management,* Cengage Learning
4. Khan and Jain. *Basic Financial Management*, McGraw Hill Education

5.Prasanna Chandra, *Fundamentals of Financial Management*. McGraw Hill Education
6.Singh, J.K. *Financial Management- text and Problems*. Dhanpat Rai and Company, Delhi.
7.Rustagi, R.P. *Fundamentals of Financial Management*. Taxman Publication Pvt. Ltd.

Course Objectives:

The objective of the Fundamentals of Financial Management course is to provide students with a comprehensive understanding of the basic principles and concepts of financial management in order to make sound financial decisions.

Learning Outcomes:

1. Students will gain knowledge of financial analysis techniques and be able to interpret financial statements to evaluate the financial health of a company.
2. Students will develop the skills to assess investment opportunities, calculate the cost of capital, and make informed capital budgeting decisions.

No. of Contact Classes: 60

Course Designer: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: Cost Accounting (Major 5)
Credit: 4
Total Marks: 100
4th Semester

Existing based syllabus: UGCBCS
Course Level: 400 to 499

CONTENTS:

Unit 1: Introduction (10 classes) (15 Marks)

Meaning, objectives and advantages of cost accounting; Difference between cost accounting and financial accounting; Cost concepts and classifications; Elements of cost and preparation of Cost Sheet; Installation of a costing system; Role of a cost accountant in an organisation

Unit 2: Elements of Cost: Material (10 classes) (20 Marks)

Material/inventory control techniques. Accounting and control of purchases, storage and issue of materials. Methods of pricing of materials issues — FIFO, LIFO, Simple Average, Weighted Average, Replacement, Standard Cost. Treatment of Material Losses, Stores ledger, EOQ, levels of Inventory

Unit 3: Elements of Cost: Labour: (10 classes) (15 Marks)

Accounting and Control of labour cost. Time keeping and time booking. Concept and treatment of idle time, over time, labour turnover and fringe benefits. Methods of wage payment and the Incentive schemes- Halsey, Rowan, Taylor's Differential piece wage.

Unit 4: Elements of Cost: Overheads (10 classes) (15 Marks)

Classification, allocation, apportionment and absorption of overheads; Under- and over-absorption; Calculation of Machine Hour Rate;

Treatments interest on capital, depreciation, packing expenses, bad debts, research and development expenses.

Unit 5: Methods of Costing (10 classes) (20 Marks)

Unit costing, Job costing, Contract costing, Process costing (including treatment of process losses, valuation of work in progress).

Unit 6: Book Keeping in Cost Accounting (10 classes) (15 Marks)

Integral and non-integral systems; Reconciliation of cost and financial accounts.

Suggested Reading:

1. Charles T. Horngren, Srikant M. Datar, Madhav V. Rajan **, *Cost Accounting: A Managerial Emphasis*, Pearson Education.**
2. Drury, Colin. *Management and Cost Accounting.* Cengage Learning.
3. Jawahar Lal, *Cost Accounting*. McGraw Hill Education
4. Nigam, B.M. Lall and I.C. Jain. *Cost Accounting: Principles and Practice*. PHI Learning
5. Rajiv Goel, *Cost Accounting*. International Book House
6. Singh, Surender. *Cost Accounting,* Scholar Tech Press, New Delhi.
7. Jain, S.P. and K.L. Narang. *Cost Accounting: Principles and Methods*. Kalyani Publishers
8. Arora, M.N. *Cost Accounting – Principles and Practice.* Vikas Publishing House, New Delhi.
9. Maheshwari, S.N. and S.N. Mittal. *Cost Accounting: Theory and Problems*. Shri Mahavir Book Depot, New Delhi.
10. Iyengar, S.P. Cost Accounting. Sultan Chand & Sons
11. H.V. Jhamb, *Fundamentals of Cost Accounting,* Ane Books Pvt. Ltd.

Course objective: To equip students with the knowledge and skills necessary to analyze and control costs in order to support effective management decision-making.

Learning outcome: By the end of the course, students will be able to apply cost accounting techniques to determine product costs, calculate relevant cost information for decision-making, implement cost control measures, and evaluate performance within an organization.

No. of Contact Classes: 60

Designer Name: Prof. Prashanta Sharma, Dr. Upasana Borpujari, Gauhati University, prs@gauhati.ac.in, upasna.borpujari@gmail.com

Course Name: **Income Tax Law and Practice (Major 6)**
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 400 to 499

Unit 1: Introduction (12 classes) (20 Marks)

Basic concepts: Income, agricultural income, person, assessee, assessment year, previous year, gross total income, total income.

Residential status; Scope of total income on the basis of residential status Exempted income under section 10

Unit 2: Computation of Income under different heads-1 (12 classes) (20 Marks)

Income from Salaries; Income from house property

Unit 3: Computation of Income under different heads-2 (12 classes) (20 Marks)

Profits and gains of business or profession; Capital gains; Income from other sources

Unit 4: Computation of Total Income and Tax Liability (12 classes) (20 Marks)

Income of other persons included in assessee's total income; Aggregation of income and set-off and carry forward of losses; Deductions from gross total income; Rebates and reliefs

Computation of total income of individuals and firms; Tax liability of an individual and a firm; Five leading cases decided by the Supreme Court

Unit 5: Preparation of Return of Income (12 classes) (20 Marks)

Filing of returns: Manually, On-line filing of Returns of Income & TDS; Provision & Procedures of Compulsory On-Line filing of returns for specified assesses, Permanent Account Number (PAN).

Note:

1. There shall be a practical examination of 20 Marks on E-filling of Income Tax Returns using a software utility tool. The student is required to fill appropriate Form and generate the XML file.

2. There shall be 4 Credit Hrs. for Lectures + one Credit hr. (Two Practical Periods per week per batch) for Practical Lab + one credit Hr for Tutorials (per group)

3. Latest edition of text books and Software may be used.

Suggested readings:

1. Singhania, Vinod K. and Monica Singhania. *Students' Guide to Income Tax, University Edition.* Taxmann Publications Pvt. Ltd., New Delhi.
2. Ahuja, Girish and Ravi Gupta. *Systematic Approach to Income Tax.* Bharat Law House, Delhi.

Journals

1. *Income Tax Reports*. Company Law Institute of India Pvt. Ltd., Chennai.
2. *Taxman*. Taxman Allied Services Pvt. Ltd., New Delhi.
3. *Current Tax Reporter*. Current Tax Reporter, Jodhpur.

Software

1. Vinod Kumar Singhania, *e-filing of Income Tax Returns and Computation of Tax*, Taxmann Publication Pvt. Ltd, New Delhi. Latest version
2. 'Excel Utility' available at *incometaxindiaefiling.gov.in*

Course objective: To provide students with a comprehensive understanding of income tax laws and regulations, as well as the practical application of tax planning and compliance.

Learning outcome: By the end of the course, students will be able to comprehend and apply income tax laws, prepare tax computations for individuals and businesses, and provide basic tax planning advice in compliance with relevant tax legislation.

No. of Contact Classes: 60

Designer Name: Prof. Bhaskarjyoti Bora, Dr. Upasana Borpujari, Gauhati University, bhaskarjb2001@yahoo.com, upasna.borpujari@gmail.com

Course Name: Advanced Corporate Accounting (Major 7)
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 400 to 499

Unit 1: (12 classes) (20 Marks)

(i) **Accounting Standards:**

Overview of Accounting Standards in India - Applicability, Interpretation, Scope and Compliance of Ind AS; International Financial Reporting Standards - Ind AS vs. IFRS; National and International Accounting Authorities; Adoption and Convergence of International Financial Reporting Standards (IFRS) in India.

(ii) **Corporate Annual Report**

Meaning, usefulness, statutory provisions, contents and disclosure of corporate information – mandatory and voluntary; Analysis with Case Study. E-filing of annual reports of companies and XBRL Filing with specific practical exercises.

Unit 2: Winding up of Companies (12 classes) (20 Marks)

Meaning and modes of winding up; Types of winding up; Procedures of winding up; Contributories; Preferential payments; Voluntary winding up; Preparation of Liquidator's Final Statement of Account; Preparation of Statement of Affairs.

Unit 3: Accounts of Banking Companies (12 classes) (20 Marks)

Statutory books to be maintained; Special features of Bank book keeping. Advances – its classification and provisions to be made against advances; Rebate on Bills Discounted, Income recognition; Preparation and presentation of Financial Statements of banking companies.

Unit 4: **Accounts of Insurance Companies** (12 classes) (20 Marks)

Books maintained by a life insurance companies and general insurance companies. Accounts of Life insurance company – Revenue Account and Profit and loss Account and ascertainment of profit under Life insurance business; preparation of Balance Sheet using appropriate software; Accounts of general insurance business – Revenue Account, Profit and Loss Account and Balance Sheet of insurance companies.

Unit 5: Investment Accounts (12 classes) (20 Marks)

Meaning of Investment Accounts; cum-interest, ex-interest, cum-dividend and ex-dividend. Accounting for fixed interest earning securities and variable earning securities, bonus shares and right shares.

Profit and Loss prior to incorporation: Meaning of profit or loss prior to incorporation; accounting `treatment of profit or loss prior to incorporation.

Suggested Readings:

1. Goyal, V. K., & Goyal, R. (2013). *Corporate Accounting*. New Delhi: Phi Learning.
2. Jain, S. P., & Narang, K. L. (2016). *Corporate Accounting*. New Delhi: Kalyani Publishers.
3. Goyal, B. K. (2019). *Fundamentals of Corporate Accounting*. New Delhi: Taxmann Publications.
4. Maheshwari, S. N., Maheshwari, S. K., & Maheshwari, S. K. (2009). *Corporate Accounting.* New Delhi: Vikas Publishing House Pvt. Ltd.
5. Monga, J. R. (2019). *Fundamentals of Corporate Accounting*. New Delhi: Scholar Tech Press.
6. Shukla, M. C., Grewal, T. S., & Gupta, S. C. (2016). *Advanced Accounts.* Vol.-I. New Delhi: S. Chand Publishing.
7. Mukherjee, A., & Hanif, M. (2005). *Corporate Accounting*. New Delhi: Tata McGraw Hill Education.
8. Sehgal, A. (2011). *Fundamentals of Corporate Accounting.* New Delhi: Taxmann Publications.

Course objective: To enhance students' knowledge and skills in handling complex accounting issues related to corporate entities, including advanced topics in financial reporting and analysis.

Learning outcome: By the end of the course, students will be able to apply advanced accounting principles and techniques to address complex corporate accounting issues, analyze financial statements for decision-making purposes, and interpret accounting standards relevant to corporate reporting.

No. of Contact Classes: 60

Designer Name: Prof. Prashanta Sharma, Dr. Upasana Borpujari, Gauhati University, prs@gauhati.ac.in, upasna.borpujari@gmail.com

Course Name: Indian Economy (Major 8)
Credit: 4
Total Marks: 100
5th Semester

Existing based syllabus: UGCBCS
Course Level: 500 to 599

Unit I: Basic Issues in Economic Growth and Development: Concept and Measures of economic growth and Development; determinants of economic development, Human Development Index, Kautilya 's Arthashastra and economic development **(12 Classes) (20 Marks)**

Unit II:Overview of Indian economy: India as a developing economy, India as a mixed economy, India as a dualistic economy, India as a federal economy, evolutionof Indian Planning from Planning Commission to Niti Aayog-, Monetary and Fiscal policies with their implications on economy **(12 Classes) (20 Marks)**

Unit III:Agriculture Sector: Agrarian growth and performance in different phases of policy regimes , Crop pattern , Green Revolution ; White and Yellow Revolution , land reforms in India, cooperative farming in India , tribal agricultural practices , production of other allied sectors like horticulture fisheries and aquaculture , livestock and animal husbandry , Food Security Issues , Agricultural Marketing, Policy initiatives of the Government of India for the development of agricultural sector. **(12 Classes) (20 Marks)**

Unit IV: Industrial Sector: Phases of Industrialization – the rate and pattern of industrial growth across alternative policy regimes(Industrial Policy 1948, IP Resolution 1956, Industrial Licensing Policy , New Industrial Policy 1991); MSMEs –role and challenges , Public sector – its role, performance and reforms; industrial sickness, disinvestment , privatization, Public Private Partnership ; Role of Foreign capital , Structural Changes and Performance of India's Foreign Trade and Balance of Payments;; Export policies and performance; India and the WTO, Industrialization in North Easter Region- Types of industries, industrial policies, Act East policy, Cross Border Trade, Border Area Development, Institutions – NEDFI, DONER, NEC **(12 Classes) (20 Marks)**

Unit V: Service Sector: service sector and its role in Indian economy, contribution to national Income, employment and exports revenue, Indias's service revolution,'Digital India Mission' issues and challenges for India's service sector growth **(12 Classes) (20 Marks)**

Suggested Readings:
1. Mishra and Puri, Indian Economy, Himalaya Paublishing House
2. P.K. Dhar , Indian Economy –Its Growing Dimensions , Kalyani Publishers
3. Gaurav Dutt and KPM Sundarum, Indian Economy, S. Chand & Company.
4. Bhagwati, J. and Desai, P. India: Planning for industrialization, OUP, Ch 2.
5. Uma Kapila (2021) , Indian Economy – Performance and Policies , Academic Foundation , New Delhi
6. Vinay G.B(2019) Indian Economy , Oxford University Press

Course Objective: The objective of the Indian Economy course is to provide students with an in-depth understanding of the key economic principles, policies, and factors that shape the Indian economy, enabling them to analyze and interpret its dynamics and challenges.

Learning Outcomes:
1. Students will gain knowledge of the major macroeconomic indicators, such as GDP growth, inflation, and unemployment, and understand how these factors impact the overall performance of the Indian economy.
2. Students will develop the ability to analyze the structure and composition of the Indian economy, including its sectors, such as agriculture, industry, and services, and comprehend the role of each sector in the overall economic growth.
3. Students will be able to identify and evaluate the various economic policies implemented by the government, such as fiscal policy, monetary policy, and trade policy, and assess their impact on the Indian economy.
4. Students will understand the significance of demographic trends, population dynamics,

No. of Contact Classes: 60
Name of the Designer: Department of Commerce, Gauhati University, commerce@gauhati.ac.in

Course Name: Management Accounting (Major 9)
Credit: 4
Total Marks: 100
5th Semester

Existing based syllabus: UGCBCS
Course Level: 500 to 599

Unit 1: Introduction (12 classes) (20 Marks)

Meaning, Objectives, Nature and Scope of management accounting, Difference between cost accounting and management accounting, Application of Cost concepts for managerial decision making; Concept of Cost control and Cost reduction, Cost management

Unit 2: Financial Statement Analysis: (12 classes) (20 Marks)

Meaning and objectives of Financial Statement Analysis; Techniques of Financial Statement analysis – Comparative Statement, Common-size Statement and Trend Analysis. Meaning of Accounting Ratio, Classification of Accounting Ratios; objectives of Ratio Analysis; Advantages and Limitations of Ratio Analysis; Precaution to be taken before using Ratios; Computation of various Ratios – Activity Ratios, Liquidity Ratios, Solvency and Leverage Ratios and Profitability Ratios;

Unit 3: Budgetary Control (12 classes) (20 Marks)

Budgeting and Budgetary Control: Concept of budget, budgeting and budgetary control, objectives, merits, and limitations. Budget administration. Functional budgets. Cash Budget. Fixed and flexible budgets. Preparation of Cash Budget **and** flexible budgets.

Unit 4: Standard Costing (12 classes) (20 Marks)

Standard Costing and Variance Analysis: Meaning of standard cost and standard costing, advantages, limitations and applications. Variance Analysis – material, labour, overheads and sales variances. Disposition of Variances.

Unit 5: Marginal Costing (12 classes) (20 Marks)

Absorption versus Variable Costing: Distinctive features and income determination. Cost-Volume-Profit Analysis, Profit / Volume ratio. Break-even analysis-algebraic and graphic methods. Angle of incidence, margin of safety

Suggested Reading:

1. Charles T. Horngren, Gary L. Sundem, Dave Burgstahler, Jeff O. Schatzberg**.** ***Introduction to Management Accounting*** , Pearson Education.
2. Anthony A. Atkinson, Robert S. Kaplan, Ella Mae Matsumura, S. Mark Young. *Management Accounting*. Dorling Kindersley(India) Pvt. Ltd.
3. Ronald W. Hilton and David E. Platt. *Managerial Accounting: Creating Value in a Global Business Environment,* Mc Graw Hill Education.
4. Singh, Surender. *Management Accounting,* Scholar Tech Press, New Delhi.
5. Goel, Rajiv, *Management Accounting*. International Book House,
6. Arora, M.N. *ManagemenAccounting*. Vikas Publishing House, New Delhi.
7. Maheshwari, S.N. and S.N. *Management Accounting*. Shree Mahavir Book Depot, New Delhi.
8. Singh, S. K. and Gupta Lovleen. *Management Accounting – Theory and Practice*. Pinnacle Publishing House.
9. Khan, M.Y. and Jain, P.K. *Management Accounting*. McGraw Hill Education
10. H.V. Jhamb, *Fundamentals of Management Accounting,* Ane Books Pvt. Ltd.

Course objective: To provide students with a comprehensive understanding of management accounting principles and techniques and their application in supporting managerial decision-making and control.

Learning outcome: By the end of the course, students will be able to apply management accounting tools and techniques to analyze and interpret financial and non-financial information, support strategic and operational decision-making, and assist in planning, budgeting, performance evaluation, and control within organizations.

No. of Contact Classes: 60

Designer Name: Prof. Prashanta Sharma, Dr. Upasana Borpujari, Gauhati University, prs@gauhati.ac.in, upasna.borpujari@gmail.com

Course Name: Fundamentals of Investment (Major 10)
Credit: 4
Total Marks: 100

***Common for two specialization namely (i) Accounting & (ii) Finance**
Existing based syllabus: UGCBCS
Course Level: 500 to 599

Unit 1: Basics of Investment (12 classes) (20 Marks)
Investment-Meaning, Purpose and Objectives, Investment and Speculation, Types of Investment-Commodities, Real Estate and Financial Assets, Security and Non-security form of investment, Investment Attitudes- Return, Risk, Liquidity, Tax Shelter, Convenience; Sources of Financial Information, Return and Risk - Concept and Computation.

Unit 2: Investment in Equities (12 classes) (20 Marks)
Investment in Equities- Advantages and disadvantages of investing in equities, Fundamental Analysis- Economic Analysis, Industry Analysis and Company Analysis; Technical Analysis- Tools of technical analysis- interpretation of charts and patterns; Valuation of Equity Shares, Investment in Mutual Funds.

Unit 3: Investment in Fixed Income Securities (12 classes) (20 Marks)
Bonds – Meaning, Features, Types of Bonds, Estimating Bond Yields, Bond Valuation, Types of Risk in bonds- Default risk, Credit ratings, Consideration for investing in a Bond.

Unit 4: Miscellaneous Investments (12 classes) (20 Marks)
Investment in Real Estate – Meaning, Reasons for Investing in Real Estates, Housing Finance in India; Investment in Gold and Silver– Reasons for investment in Gold and Silver; Investment in Mutual Funds – Benefits, Selection criteria, performance evaluation.

Unit 5: Portfolio Investment (12 classes) (20 Marks)
Portfolio – Meaning and Significance, Portfolio Management Process, Investment Decision Making Approaches- Fundamental approach, Psychological Approach, Academic Approach, Eclectic approach, Common mistakes in Investment Management

Suggested Readings:

1. Fundamentals of Investment Management, V K Bhalla, S.Chand
2. Investment Management, Rajiv Srivastav, Wiley.
3. Security Analysis and Portfolio Management, Kelvin, PHI
4. The Investment Game: Prasanna Chandra, Tata MCGrawHill
5. Investment Analysis and Portfolio Management, M Ranganatham and R Madhumathi, Pearson.

Course objective: To introduce students to the fundamental concepts, theories, and practices of investment analysis and portfolio management.

Learning outcome: By the end of the course, students will be able to analyze investment opportunities, construct and manage investment portfolios, evaluate risk and return trade-offs, and make informed investment decisions based on their understanding of financial markets and investment strategies.

No. of Contact Classes: 60
Designer Name: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: Indirect Taxes (Major 11)
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 500 to 599

Contents:

Unit 1: Introduction: (12 classes) (20 Marks)

Meaning of Indirect Tax, History of Indirect Taxes in India; VAT – concepts and general principles,

Calculation of VAT on Alcohol and Petroleum Products.

Unit 2: Central Excise (12 classes) (20 Marks)

Central Excise Law in brief, Excisable goods, Manufacture and Manufacturer, Valuation of Excise-able amount regarding Alcohol and Petroleum Products.

Unit 3: Customs Law (12 classes) (20 Marks)

Basic concepts of customs law, Territorial waters, high seas, Types of custom duties – Basic, Countervailing & Anti- Dumping Duty, Safeguard Duty, Valuation, Customs Procedures, Import and Export Procedures, Baggage, Exemptions.

Unit 4: Structure of GST in India: (12 classes) (20 Marks)

The Central Goods and Services Tax Act, 2017 and The Assam Goods and Services Tax Act, 2017, History of GST in India, Meaning, Features and Advantages of GST.

Dual GST Model: CGST, SGST, UTGST, IGST, Taxes subsumed by GST, Commodities kept outside the scope of GST. Definition of important terms used in GST Act – concept of place of supply Adjudicating Authority, Agent, Aggregate Turnover, Agriculturist, Business, Business Vertical, Capital Goods, Casual Taxable Person, Goods, Input Tax, Inward Supply, Output Tax, Outward Supply, Place of Business, Services, Supplier.

GST Council and GST Network.

Unit 5: Registration, Levy and Collection of Tax under GST (12 classes) (20 Marks)

Concept of Tax Invoice under GST Section 31, Meaning, Eligibility and Conditions for taking Input Tax Credit; Threshold Limits for Registration, Persons liable for Registration, Persons not liable for Registration, Compulsory Registration in Certain Cases, Procedure for Registration, Deemed Registration; Rates structure of GST, Composition Scheme under GST, Assessment (only basic knowledge) Refunds.

Suggested Readings:

1. Singhania Vinod K. and Monica Singhania, *Students' Guide to Indirect Taxes,* Taxmann Publications Pvt. Ltd., Delhi.
2. V.S. Datey. *Indirect Tax Law and practice,* Taxmann Publications Pvt. Ltd., Delhi,
2. Sanjeev Kumar. *Systematic Approach to Indirect T*axes,
3. S. S. Gupta. *Service Tax* -How to *meet your obligation* Taxmann Publications Pvt. Ltd., Delhi,
4. Grish Ahuja and Ravi Gupta, *Indirect Taxes*, Flair Publication Pvt Ltd

Course objective: To provide students with a comprehensive understanding of indirect taxes, with a focus on the Goods and Services Tax (GST) system.

Learning outcome: By the end of the course, students will be able to comprehend the principles and regulations of GST, effectively apply GST concepts to various business scenarios, navigate GST compliance requirements, and analyze the impact of GST on business operations and decision-making.

No. of Contact Classes: 60

Designer Name: Prof. Bhaskarjyoti Bora, Dr. Upasana Borpujari, Gauhati University, bhaskarjb2001@yahoo.com, upasna.borpujari@gmail.com

Course Name: International Business (Major 12)

6th Semester
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 600 to 699

Unit 1: **(12 Classes) (20 Marks)**

c. Introduction to International Business: Globalisation and its importance in world economy; Impact of globalization; International business vs. domestic business: Complexities of international business; Modes of entry into international business.

d. International Business Environment: National and foreign environments and their components - economic, cultural and political-legal environments

Unit –II **(12 Classes) (20 Marks)**

c. Theories of International Trade – an overview (Classical Theories, Product Life Cycle theory, Theory of National Competitive Advantage); Commercial Policy Instruments - tariff and non-tariff measures – difference in Impact on trade, types of tariff and non tariff barriers (Subsidy, Quota and Embargo in detail) ; Balance of payment account and its components.

d. International Organizations and Arrangements: WTO – Its objectives, principles, organizational structure and functioning; An overview of other organizations – UNCTAD,; Commodity and other trading agreements (OPEC).

Unit –III **(12 Classes) (20 Marks)**

c. Regional Economic Co-operation: Forms of regional groupings; Integration efforts among countries in Europe, North America and Asia (NAFTA, EU , ASEAN and SAARC) .

d. International Financial Environment: International financial system and institutions (IMF and World Bank – Objectives and Functions) ; Foreign exchange markets and risk management; Foreign investments - types and flows; Foreign investment in Indian perspective

Unit –IV **(12 Classes) (20 Marks)**

c. Organisational structure for international business operations; International business negotiations.

d. Developments and Issues in International Business: Outsourcing and its potentials for India; Role of IT in international business; International business and ecological considerations.

Unit –V **(12 Classes) (20 Marks)**

c. Foreign Trade Promotion Measures and Organizations in India; Special economic zones (SEZs) and export oriented units (EOUs), ; Measures for promoting foreign investments into and from India; Indian joint ventures and acquisitions abroad.

d. Financing of foreign trade and payment terms – sources of trade finance (Banks, factoring, forfaiting, Banker's Acceptance and Corporate Guarantee) and forms of payment (Cash in advance, Letter of Credit, Documentary Collection, Open Account)

Suggested Readings:

9. Charles W.L. Hill and Arun Kumar Jain, International Business. New Delhi: McGraw Hill Education
10. Daniels John, D. Lee H. Radenbaugh and David P. Sullivan. International Business. Pearson Education
11. Johnson, Derbe., and Colin Turner. International Business - Themes & Issues in the Modern Global Economy. London: Roultedge.
12. Sumati Varma, International Business, Pearson Education.
13. Cherunilam, Francis. International Business: Text and Cases. PHI Learning
14. Michael R. Czinkota. et al. International Business. Fortforth: The Dryden Press.
15. Bennett, Roger. International Business. Pearson Education.
16. Peng and Srivastav, Global Business, Cengage Learning

Course objective: To provide students with a comprehensive understanding of the theories, practices, and challenges involved in conducting business across national borders.

Learning outcome: By the end of the course, students will be able to analyze and evaluate the impact of globalization on international business, demonstrate knowledge of cross-cultural management strategies, and develop effective decision-making skills for international trade and investment.

No. of Contact Classes: 60

Name of the Designer: Department of Commerce, Gauhati University, commerce@gauhati.ac.in

Course Name: Operations Research in Business (Major 13)

Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 600 to 699

Unit I: Introduction to Operation Research: Evolution of Operation Research , Nature and characteristics of O.R , phases of O.R, methodology of O.R, Operation research model, role of computer in Operation **Research.** **(12 Classes) (20 Marks)**

Unit II: Linear Programming : Concept of Linear Programming, Uses and limitations of Linear Programming, Formulation of L.P problems, Concept of slack variable, Procedure of Graphical Method, Simplex Method (solutions of L.P.P. upto 3 iterations) Maximization Problems. (Simple problems related to commerce and business) **(12 Classes) (20 Marks)**

Unit III: Inventory Control , concepts and benefits of inventory control, Different types of costs in inventory system , Formulation and solution of Economic order quantity (EOQ) model, selective inventory control techniques (ABC Analysis and VED Analysis) **(12 Classes) (20 Marks)**

Unit IV: Study of Replacement: Replacement Problem, Replacement of items whose maintenance cost increases with time and the value of money remains same during the period, Replacement of items whose maintenance cost increases with time and the value of money also changes with time, selection of best item (machine) amongst two. **(12 Classes) (20 Marks)**

Unit V: : Project Management:, basic differences between PERT and CPM, phases of project management, PERT / CPM network, rules for network construction , critical path analysis, Float of an Activity and Event , Critical Path, project scheduling with uncertain activity times (only simple numerical examples are needed) **(12 Classes) (20 Marks)**

Recommended books :

11. Operations Research 9th Edition, Kantiswarup, Gupta P.K. & Sultan Chand & Sons Manmohan Operations Research – An introduction 6th Edition , Taha H.A., Hall of India
12. Operations Research Techniques for Management 7th Edition, Kapoor V.K., Sultan Chand & Sons
13. Operations Research 9th Edition, Kanti Swarup, Gupta P.K. & Sultan Chand & Sons
14. Operations Research : Theory and Applications 4th Edition , J.K Sharma

Course objective: To introduce students to the principles and techniques of operations research and their application in solving complex business problems.

Learning outcome: By the end of the course, students will be able to apply quantitative models and optimization techniques to analyze business operations, make informed decisions, and improve overall efficiency and effectiveness in a variety of operational contexts.

No. of Contact Classes: 60
Name of the Designer: Dr. Mahuya Deb, Gauhati University, mahuya8@gmail.com

Course Name: Computerized Accounting (Major 14)

Credit: 4
Total Marks: 100
6th Semester

Existing based syllabus: UGCBCS
Course Level: 600 to 699

Unit-1: Computerized Accounting: Using Generic Software (20 Classes) (25 Marks)
Taxation: TDS, VAT and Service Tax
Auditing in Computerized Accounting system: Statutory Audit, Voucher verification, Verification of related party transaction, CAAT: Various Tools

Unit-2: Designing Computerised Accounting System (25 Classes) (40 Marks)
Designing Computerised Accounting System using a DBMS Package Creating a voucher entry Form, Preparing ledgers with SQL, Form, and Report Preparing Trial Balance with SQL and Report

Unit-3: Designing Accounting Support System (15 Classes) (35 Marks)
Designing Supplier and customers System for Accounting using Form, Query, Module, and Report; Designing Payroll System for Accounting using Form, Query, Module, and Report

Note:

1. The General Purpose Software referred in this course will be notified by the University Departments every three years. If the specific features, referred in the detailed course above, is not available in that software, to that extent it will be deemed to have been modified.
2. There shall be a practical examination of 100 Marks (Practical-80 Marks, Viva-10 Marks and Work Book- 10 Marks) and duration of Examination shall be 3 Hrs.
3. Teaching arrangements need to be made in the computer Lab
4. There shall be Four Lectures per class and 4 Practical periods per batch to be taught in computer Lab.

Suggested Readings:
The suggested readings and guidelines shall be notified by the university department at least once in three years based on the selected software.

Course objective: To familiarize students with the use of computerized accounting systems and develop their skills in utilizing accounting software for efficient financial management.

Learning outcome: By the end of the course, students will be able to effectively operate computerized accounting software, perform various accounting tasks using computer applications, and utilize technology for accurate and timely financial reporting.

No. of Contact Classes: 60
Designer Name: Prof. Bhaskarjyoti Bora, Dr. Upasana Borpujari, Gauhati University, bhaskarjb2001@yahoo.com, upasna.borpujari@gmail.com

Course Name: Auditing & Assurance (Major 15)

Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 600 to 699

UNIT I: (12 classes) (20 Marks)
Auditing Concepts: Nature, Objective, and basic principles of auditing, limitations of auditing, classes of errors and frauds and auditor's duty threats; ethical principles and concept of auditor's independence, Relationship of auditing with other disciplines.

UNIT II: (12 classes) (20 Marks)
Internal control and internal check: elements of internal control, review and documentation, evaluation of internal control system, internal control questionnaire, internal control check list, tests of control, application of concept of materiality and audit risk, concept of internal audit, Internal control under computerized audit environment.

UNIT III: (12 classes) (20 Marks)
Audit sampling: Types of sampling, test checking, techniques of test check, sampling risk, audit sampling and sampling methods, compliance tests and substantive tests, auditing in depth. Analytical review procedure.

UNIT IV: (12 classes) (20 Marks)
Audit Procedure: Vouching; verification of Assets and liabilities.

UNIT V: (12 classes) (20 Marks)
Audit report; qualifications, disclaimers, adverse opinion, disclosures, auditor's reports and certificates, Audit attestation and certification.

Suggested Books:
1. Auditing and Assurance Standards issued by the ICAI, New Delhi.
2. Principles of Audit and Internal Auditing by Dhruba Dutachowdhury, New Central Book Agency P. Ltd. Kolkata-700009.
3. Principles and Practice of Auditing by R.G. Saxena, Himalaya Publishing House, Mumbai.
4. Contemporary Auditing by Kamal Gupta, Tata McGraw Hill Publishing Co. Ltd.
5. Nobes and Porker, Comparative International Accounting, Pearson Education, New Delhi.
6. International Accounting, by Saudagaram, Taxmann India, New Delhi.
7. Ainapure and Ainapure, Auditing and Assurance, PHI Learning Pvt. Ltd., New Delhi.
8. Auditing by S.K. Dutta Choudhury, New Central Book Agency, Kolkata.
9. Official Publication of ICAI, New Delhi.

Course objective: To introduce students to the principles and practices of auditing, including the role of auditors in ensuring the reliability and integrity of financial information.

Learning outcome: By the end of the course, students will be able to understand the audit process, evaluate internal control systems, perform audit procedures, and communicate audit findings and recommendations in accordance with auditing standards and regulations.

No. of Contact Classes: 60
Designer Name: Prof. Prashanta Sharma, Dr. Upasana Borpujari, Gauhati University, prs@gauhati.ac.in, upasna.borpujari@gmail.com

3. Specialization: Marketing Management

Course Name: Advertising (Major 1)
3rd Semester
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 300 to 399

Unit 1: Introduction: **(12 classes) (20 Marks)**

Communication Process; Advertising as a tool of communication; Meaning, nature and importance of advertising; Types of advertising; Advertising objectives. Audience analysis; Setting of advertising budget:
Determinants and major methods

Unit 2: Media Decisions: **(12 classes) (20 Marks)**

Major media types - their characteristics, internet as an advertising media, merits and demerits; Factors influencing media choice; media selection, media scheduling, Advertising through the Internet-media devices

Unit 3: Message Development; **(12 classes) (20 Marks)**

Advertising appeals, Advertising copy and elements, Preparing ads for different media

Unit 4: Measuring Advertising Effectiveness: **(12 classes) (20 Marks)**

Evaluating communication and sales effects; Pre- and Post-testing techniques.

Unit 5: **(12 classes) (20 Marks)**

a) Advertising Agency: Role, types and selection of advertising agency.
b) Social, ethical and legal aspects of advertising in India.

Suggested Readings:

1. George E Belch, Michael A Belch, Keyoor Purani, *Advertising and Promotion : An Integrated Marketing Communications Perspective (SIE)*, McGraw Hill Education
2. S. Wats Dunn, and Arnold M. Barban. *Advertising: Its Role in Marketing*. Dryden Press
3. Burnett, Wells, and Moriatty. *Advertising: Principles and Practice*. 5th ed. Prentice Hall of India, New Delhi.
4. Batra, Myers and Aakers. *Advertising Management*. PHI Learning.
5. Terence A. Shimp. *Advertising and Promotion: An IMC Approach*. Cengage Learning.
6. Sharma, Kavita. *Advertising: Planning and Decision Making,* Taxmann Publications
7. Jaishree Jethwaney and Shruti Jain, *Advertising Management*, Oxford University Press, 2012
8. Chunawala and Sethia, *Advertising,* Himalaya Publishing House
9. Ruchi Gupta, *Advertising,* S. Chand & Co.
10. O'Guinn, *Advertising and Promotion: An Integrated Brand Approach,* Cengage Learning.

Course objective: To introduce students to the principles, theories, and practices of advertising and develop their understanding of effective advertising strategies and techniques.

Learning outcome: By the end of the course, students will be able to analyze target markets, develop creative advertising campaigns, utilize various advertising media channels, and evaluate the effectiveness of advertising efforts in achieving marketing communication objectives.
No. of Contact Classes: 60
Designer Name: Dr. Angana Borah, Gauhati University, angana.ght@gmail.com

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Course Name: Entrepreneurship (Major 2)
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 300 to 399

Contents:

Unit 1: Introduction to Entrepreneurship

Concepts, traits, determinants and importance of entrepreneurship; Creative behavior; Evolution of entrepreneurship- theories and thoughts, Entrepreneurial eco-system, entrepreneurship and economic development, barriers to entrepreneurship, Dimensions of entrepreneurship, entrepreneurship vs. intrapreneurship (15 Lectures) (25 Marks)

Unit 2: Entrepreneurship and Micro, Small and Medium Enterprises

Role of business houses and family business in India; The contemporary role models in Indian business: their values, business philosophy and behavioural orientations; Conflict in family business and its resolution. (15 Lectures) (25 Marks)

Unit 3: Public and private partnership in business, support and sustainability of entrepreneurship. Requirement, availability and access to finance, marketing assistance, technology, and industrial accommodation, The concept, role and functions of business incubators, Mobilising resources for start-up -angel investors, venture capital and private equity fund. (15 Lectures) (25 Marks)

Unit 4: Sources of business ideas and tests of feasibility.

Significance of writing the business plan/ project proposal; Contents of business plan/ project proposal; Designing business processes, location, layout, operation, planning & control; preparation of project report (various aspects of the project report such as size of investment, nature of product, market potential may be covered); Project submission/ presentation and appraisal thereof by external agencies, such as financial/non-financial institutions

(15 Lectures) (25 Marks)

Suggested Readings:

11. Kuratko and Rao, *Entrepreneurship: A South Asian Perspective,* Cengage Learning.
12. Robert Hisrich, Michael Peters, Dean Shepherd, *Entrepreneurship,* McGraw-Hill Education
13. Desai, Vasant. *Dynamics of Entrepreneurial Development and Management*. Mumbai, Himalaya Publishing House.
14. Dollinger, Mare J. *Entrepreneurship: Strategies and Resources*. Illinois, Irwin.
15. Holt, David H. *Entrepreneurship: New Venture Creation*. Prentice-Hall of India, New Delhi.
16. Plsek, Paul E. *Creativity, Innovation and Quality*. (Eastern Economic Edition), New Delhi: Prentice-Hall of India. ISBN-81-203-1690-8.
17. Singh, Nagendra P. *Emerging Trends in Entrepreneurship Development*. New Delhi: ASEED.
18. SS Khanka, *Entrepreneurial Development,* S. Chand & Co, Delhi.
19. K Ramachandran, *Entrepreneurship Development,* McGraw-Hill Education
20. SIDBI Reports on Small Scale Industries Sector.

Note: Latest edition of text books may be used.

Course objective: To enable students to understand the key concepts, processes, and challenges involved in starting and managing a business venture.

Learning outcome: Students will be able to develop a comprehensive business plan, assess market opportunities, and apply entrepreneurial strategies to successfully launch and grow a business.

No. of Contact Classes: 60

Name of the Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

Course Name: BUSINESS LAWS (Major 3)

Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 300 to 399
Contents

Unit 1: The Indian Contract Act, 1872: General Principle of Law of Contract

Contact- meaning, characteristics and kinds

a. Essentials of a valid contract - Offer and acceptance, consideration, contractual capacity, free consent, legality of objects.
b. Void agreements
c. Discharge of a contract – modes of discharge, breach and remedies against breach of contract.
d. Contingent contracts
e. Quasi – contracts **(12 Classes) (20 Marks)**

Unit 2: The Indian Contract Act, 1872: Specific Contract

e) Contract of Indemnity and Guarantee
f) Contract of Bailment
g) Contract of Agency **(12 Classes) (20 Marks)**

Unit 3: The Sale of Goods Act, 1930

h) Contract of sale, meaning and difference between sale and agreement to sell.
i) Conditions and warranties
j) Transfer of ownership in goods including sale by a non-owner
k) Performance of contract of sale
l) Unpaid seller – meaning, rights of an unpaid seller against the goods and the buyer.

(12 Classes) (20 Marks)

Unit 4: Partnership Laws

C) The Partnership Act, 1932

a. Nature and Characteristics of Partnership
b. Registration of a Partnership Firms
c. Types of Partners
d. Rights and Duties of Partners
e. Implied Authority of a Partner
f. Incoming and outgoing Partners
g. Mode of Dissolution of Partnership

D) The Limited Liability Partnership Act, 2008

m) Salient Features of LLP
n) Differences between LLP and Partnership, LLP and Company
o) LLP Agreement,
p) Partners and Designated Partners
q) Incorporation Document
r) Incorporation by Registration
s) Partners and their Relationship **(12 Classes) (20 Marks)**

Unit 5 (A): The Negotiable Instruments Act 1881

Meaning, Characteristics, and Types of Negotiable Instruments : Promissory Note, Bill of Exchange, Cheque

t) Holder and Holder in Due Course, Privileges of Holder in Due Course.
u) Negotiation: Types of Endorsements
v) Crossing of Cheque
w) Bouncing of Cheque

5(B): Right to Information Act 2005: Important definitions, object, scope, obligation of public authorities under the act; rights for obtaining information; disposal of request, information commission, appeal and penalties. **(12 Classes) (20 Marks)**

Suggested Readings:

1. M.C. Kuchhal, and Vivek Kuchhal, *Business Law*, Vikas Publishing House, New Delhi.
2. Avtar Singh, *Business Law*, Eastern Book Company, Lucknow.
3. Ravinder Kumar, *Legal Aspects of Business*, Cengage Learning
4. SN Maheshwari and SK Maheshwari, *Business Law*, National Publishing House, New Delhi.
5. Aggarwal S K, *Business Law*, Galgotia Publishers Company, New Delhi.
6. Bhushan Kumar Goyal and Jain Kinneri, *Business Laws*, International Book House
7. Sushma Arora, *Business Laws*, Taxmann Pulications.

8. Akhileshwar Pathak, *Legal Aspects of Business*, McGraw Hill Education, 6th ed.
9. P C Tulsian and Bharat Tulsian, *Business Law*, McGraw Hill Education
10. Sharma, J.P. and Sunaina Kanojia, *Business Laws*, Ane Books Pvt. Ltd., New Delhi

Note: Latest edition of text books may be used.

Name of the Designer: Department of Commerce, commerce@gauhati.ac.in
Course objective: To gain knowledge of the branches of law which relate to business transactions, certain corporate bodies and related matters.
Course Outcome: On completion of this course, learners will be able to: appreciate the relevance of business law to individuals and businesses and law in an economic and social context.

No. of Contact Classes: 60
Name of the Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

Course Name: Fundamentals of Financial Management (Major 4)

4th Semester
Credit: 4
Marks: 100

Existing based syllabus: UGCBCS
Course Level: 400 to 499

CONTENTS

Unit 1: Introduction

Nature, scope and objective of Financial Management, Time value of money, Risk and return (including Capital Asset Pricing Model), Valuation of securities – Bonds and Equities (12 Classes) (20 Marks)

Unit 2: Investment Decisions

The Capital Budgeting Process, Cash flow Estimation, Payback Period Method, Accounting Rate of Return, Net Present Value (NPV), Net Terminal Value, Internal Rate of Return (IRR), Profitability Index, Capital budgeting under Risk – Certainty Equivalent Approach and Risk-Adjusted Discount Rate. (12 Classes) (20 Marks)

Unit 3: Financing Decisions

Cost of Capital and Financing Decision: Sources of long-term financing Estimation of components of cost of capital. Methods for Calculating cost of equity capital, Cost of Retained Earnings, Cost of Debt and Cost of Preference Capital, Weighted Average cost of capital (WACC) and Marginal cost of capital. Capital structure –Theories of Capital Structure (Net Income, Net Operating Income, MM Hypothesis, Traditional Approach). Operating and financial leverage; Determinants of capital structure (12 Classes) (20 Marks)

Unit 4: Dividend Decisions

Theories for Relevance and irrelevance of dividend decision for corporate valuation; Cash and stock dividends; Dividend policies in practice (12 Classes) (20 Marks)

Unit 5: Working Capital Decisions

Concepts of working capital, the risk-return trade off, sources of short-term finance, working capital estimation, cash management, receivables management, inventory management and payables management. (12 Classes) (20 Marks)

Note:

4. In addition the students will work on Spreadsheet for doing basic calculations in finance (Unit 2 and 3 above) and hence can be used for giving students subject related assignments for their internal assessment.

5. There shall be 4 Credit Hrs. for Lectures + one Credit hr. (Two Practical Periods per week per batch) for Practical Lab + one credit Hr for Tutorials (per group)

6. Latest edition of text books may be used.

Suggested Readings

1. James C. Van Horne and Sanjay Dhamija, *Financial Management and Policy*, Pearson Education
2. Levy H. and M. Sarnat . *Principles of Financial Management*. Pearson Education
3. Brigham and Houston, *Fundamentals of Financial Management,* Cengage Learning
4. Khan and Jain. *Basic Financial Management*, McGraw Hill Education
5. Prasanna Chandra, *Fundamentals of Financial Management*. McGraw Hill Education
6. Singh, J.K. *Financial Management- text and Problems*. Dhanpat Rai and Company, Delhi.
7. Rustagi, R.P. *Fundamentals of Financial Management*. Taxmann Publication Pvt. Ltd.

Course Objective: The objective of the Fundamentals of Financial Management course is to provide students with a comprehensive understanding of the basic principles and concepts of financial management in order to make sound financial decisions.

Learning Outcomes:

1. Students will gain knowledge of financial analysis techniques and be able to interpret financial statements to evaluate the financial health of a company.
2. Students will develop the skills to assess investment opportunities, calculate the cost of capital, and make informed capital budgeting decisions.

No. of Contact Classes: 60

Name of the Designer: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: Retail Management (Major 5)

Credit: 4
Total Marks: 100
4th Semester

Existing based syllabus: UGCBCS
Course Level: 400 to 499

Unit: I (15 classes) (25 Marks)

Retail Marketing- Characteristics, Importance of retailing, Traditional retail scene in India, Factors affecting high retail growth in India.

Three basic takes of retailing- Get customers into your stores, Convert them into customers, Operate as efficiently as possible. Role of Retailer, Retail Channel Management.

Unit: II (15 classes) (25 Marks)

Evolution of Retail in India, Wheel of Retailing & Retail Life Cycle. Theory and Evolutionary Theories- Direct Process Theory and Natural Selection Theory.

Globalisation of retailing, environmental analysis. Retailing- responding to demographic trends.

Unit: III (15 classes) (25 Marks)

Retail formats, Retail location and Site Decisions, Elements of store design and layout and Visual Merchandising.

Store Retailing- Development Stores, Supermarkets, Convenience Stores, Discount Stores, Catalogue Store, Malls, Types of malls, growth of Malls in India, Advertising & Sales Promotion in Retail.

Non- store retailing- Direct Marketing, Automatic Vending, Mail Order Business, Tele-Shopping, Mobile Retailing, and E- Marketing.

Unit: IV (15 classes) (25 Marks)

Concept of Tenant Mix-, Tenant mix plan, Issue considered in evolving tenan,

Market Logistics- Market logistics decisions-order processing, warehousing, inventory, transportation. Supply Chain Management in Retailing, Retail image.

Merchandise Planning, Category Management, Merchandise Buying, Online Retailing, Long tail retailing business models.

Suggested Books:

1. Retailing Management: Michel Leny & Barton A Weitz, Tata McGraw Hill.
2. Retail Management: Text & Cases: U.C. Malthur, I.K. International Publishing House Pvt. Ltd., New Delhi.
3. Retail Management: Suja Nair, Himalaya Publishing House.
4. Retail Management: Chetan Bajaj, Rajnish Tul & Nidhi Srivastava, Oxford University Press.

Retail Management: Gibson G. Vedamani, Pearson Education

Course objective: To provide students with an understanding of the retail industry and equip them with the knowledge and skills required to manage retail operations successfully.

Learning outcome: By the end of the course, students will be able to comprehend retail management principles, analyze retail strategies, design store layouts, and implement effective merchandising and customer service practices.

No. of Contact Classes: 60
Designer Name: Dr. Angana Borah, Dr. Saptadweepa Shandilya Gauhati University,
angana.ght@gmail.com, saptashandilya@gmail.com

Course Name: Customer Relationship Management (Major 6)

Credit: 4

Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 400 to 499

Unit: I (15 classes) (25 Marks)

Introduction- Meaning of CRM, significance of CRM, Strategies for building relationship, Relationship based pricing schemes, Developing Total Care Programmes, Reasons for Losing Customers.

Unit: II (15 classes) (25 Marks)

Building Customer Relationship- Customer acquisition, Inputs and Requisites for effective acquisition, Customer interaction routes, Factors influencing customer interaction and customer relation process, Customer life Cycle and customer lifetime value.

Unit: III (15 classes) (25 Marks)

CRM Process- Objectives and benefits of CRM process, Implementation of CRM business transaction, Data Mining for CRM- some relevant issues, Changing pattern of e-CRM solutions in the future; Sales force automation (SFA).

Unit: IV (15 classes) (25 Marks)

Information Technology and Customer Relationship Management, CRM in services & support relevant of CRM for Hospitality Services; CRM in Banking and Financial Services; CRM in Insurance.

Suggested Books:

1. Barnes, J.G. (2001), Secrets of Customer Relationship Management: Its all about how you make them feel. University of Virginia: McGraw Hill.
2. Mckenna, R. (1993) Relationship Marketing: Successful Strategies for the age of the customers. Addison- Wesley Publishing Company.
3. Rai, A.K. Customer Relationship Management: Concepts and Cases, 2nd ed. PHI learning
4. Sheth, J.N., & Parvatiyar, A. (2013), Handbook of Relationship Marketing, London, UK, Sage Publications Ltd.

Course objective: To develop students' knowledge and skills in managing customer relationships and utilizing customer-centric strategies to enhance business performance.

Learning outcome: By the end of the course, students will be able to apply customer relationship management techniques, develop customer retention strategies, utilize customer data for personalized marketing, and enhance customer satisfaction and loyalty.

No. of Contact Classes: 60
Designer Name: Dr. Angana Borah, Dr. Saptadweepa Shandilya Gauhati University,
angana.ght@gmail.com, saptashandilya@gmail.com

Course Name: Cost and Management Accounting (Major 7)

Credit: 4

Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 400 to 499

Unit - I : Cost Accounting: Preliminaries (12 Classes) (20 Marks)
Meaning of cost, costing and cost accounting; objectives and functions of cost accounting; costing as an aid to management; cost concepts and classification, Relationship between cost accounting and financial accounting; Cost accounting and Management Accounting; Methods and Techniques of costing; Concept of cost audit; Preparation of cost sheet.

Unit - II : Accounting for Material, Labour and Overhead (12 Classes) (20 Marks)
Material control concept and techniques; E.O.Q. ABC Analysis and VED Analysis.

Labour cost control procedures; labour turnover; idle time and over time; methods of wage payment - time and piece rates.

Importance and classification of overhead; Factory administrative and selling overheads; allocation and apportionment of overhead; Absorption of overhead - under and over absorption. (Simple application)

Unit -III: Management Accounting: Preliminaries (12 Classes) (20 Marks)
Meaning and objectives of Management Accounting; Decision situation and Role of Management Accountant; Management accounting Techniques: Ratio analysis - Meaning ofRatio and Ratio analysis; uses, significance and limitations of Ratio analysis; Activity Ratios, Liquidity Ratios, Profitability Ratios and Solvency ratios;

Unit - IV: Marginal Costing and Budget & Budgetary Control (12 Classes) (20 Marks)
Meaning of marginal costing, Assumptions of marginal costing, managerial applications of marginal costing, Advantages and disadvantages of marginal costing; Cost- Volume- Profit Analysis and Break Even analysis (simple Applications),.

Meaning of Budget and Budgetary control; Classification of budgets according to time, function and flexibility; Master budget, Preparation of Flexible Budget and Cash Budget; Performance Budget and Zero Based Budgeting

Unit - V: Standard Costing and Variance Analysis (12 Classes) (20 Marks)
Meaning of Standard Cost & Standard Costing; Advantages of standard costing; Standard costing Vs. Budgetary control; Variance analysis; Classification and computation of variance (Simple application)

Suggested readings:

1. Management and Cost Accounting - Shashi K. Gupta & R. K. Sharma, Kalyani Publishers.
2. Arora M. N. - Cost Accounting Principles & Practices; Vikas, New Delhi.
3. Jain S. P. & Narang K. L. - Cost Accounting; Kalyani, New Delhi.
4. Khan M. Y. & Jain P. K. - Management Accounting, Tata Mcgrow Hill.

Course Objective: The objective of the Cost and Management Accounting course is to provide students with the knowledge and skills to effectively collect, analyze, and interpret financial and non-financial information for managerial decision-making and control within an organization.

Learning Outcomes:

1. Students will be able to apply cost accounting techniques to determine product costs, analyze cost behavior, and make informed decisions regarding pricing, product mix, and cost control.
2. Students will develop the skills to design and implement management accounting systems, including budgeting, variance analysis, and performance measurement, to support planning, control, and decision-making processes in organizations.

No. of Contact Classes: 60

Name of the Designer: Prof. Prashanta Sharma, Gauhati University, prs@gauhati.ac.in

Course Name: Indian Economy (Major 8)

Credit: 4

Total Marks: 100

5th Semester

Existing based syllabus: UGCBCS
Course Level: 500 to 599

Unit I: Basic Issues in Economic Growth and Development: Concept and Measures of economic growth and Development; determinants of economic development, Human Development Index, Kautilya 's Arthashastra and economic development **(12 Classes) (20 Marks)**
Unit II:Overview of Indian economy: India as a developing economy, India as a mixed economy, India as a dualistic economy, India as a federal economy, evolutionof Indian Planning from Planning Commission to Niti Aayog-, Monetary and Fiscal policies with their implications on economy **(12 Classes) (20 Marks)**
Unit III:Agriculture Sector: Agrarian growth and performance in different phases of policy regimes , Crop pattern , Green Revolution ; White and Yellow Revolution , land reforms in India, cooperative farming in India , tribal agricultural practices , production of other allied sectors like horticulture fisheries and aquaculture , livestock and animal husbandry , Food Security Issues , Agricultural Marketing, Policy initiatives of the Government of India for the development of agricultural sector. **(12 Classes) (20 Marks)**
Unit IV: Industrial Sector: Phases of Industrialization – the rate and pattern of industrial growth across alternative policy regimes(Industrial Policy 1948, IP Resolution 1956, Industrial Licensing Policy , New Industrial Policy 1991); MSMEs –role and challenges , Public sector – its role, performance and reforms; industrial sickness, disinvestment , privatization, Public Private Partnership ; Role of Foreign capital , Structural Changes and Performance of India's Foreign Trade and Balance of Payments;; Export policies and performance; India and the WTO, Industrialization in North Easter Region- Types of industries, industrial policies, Act East policy, Cross Border Trade, Border Area Development, Institutions – NEDFI, DONER, NEC **(12 Classes) (20 Marks)**
Unit V: Service Sector: service sector and its role in Indian economy, contribution to national Income, employment and exports revenue, Indias's service revolution,'Digital India Mission' issues and challenges for India's service sector growth **(12 Classes) (20 Marks)**

Suggested Readings:
1. Mishra and Puri, Indian Economy, Himalaya Paublishing House
2. P.K. Dhar , Indian Economy –Its Growing Dimensions , Kalyani Publishers
3. Gaurav Dutt and KPM Sundarum, Indian Economy, S. Chand & Company.
4. Bhagwati, J. and Desai, P. India: Planning for industrialization, OUP, Ch 2.
5. Uma Kapila (2021) , Indian Economy – Performance and Policies , Academic Foundation , New Delhi
6. Vinay G.B(2019) Indian Economy , Oxford University Press

Course Objective: The objective of the Indian Economy course is to provide students with an in-depth understanding of the key economic principles, policies, and factors that shape the Indian economy, enabling them to analyze and interpret its dynamics and challenges.

Learning Outcomes:
1. Students will gain knowledge of the major macroeconomic indicators, such as GDP growth, inflation, and unemployment, and understand how these factors impact the overall performance of the Indian economy.
2. Students will develop the ability to analyze the structure and composition of the Indian economy, including its sectors, such as agriculture, industry, and services, and comprehend the role of each sector in the overall economic growth.
3. Students will be able to identify and evaluate the various economic policies implemented by the government, such as fiscal policy, monetary policy, and trade policy, and assess their impact on the Indian economy.
4. Students will understand the significance of demographic trends, population dynamics,

No. of Contact Classes: 60
Name of the Designer: Department of Commerce, Gauhati University, commerce@gauhati.ac.in

Course Name: Consumer Behaviour (Major 9)

Credit: 4

Total Marks: 100
5th Semester

Existing based syllabus: UGCBCS
Course Level: 500 to 599

Unit I: Consumer Behaviour: Definition, Stages in the Buying Process; Importance of Market Segmentation in Consumer Behaviour; Participants in the Buying Process; Consumer Behaviour is interdisciplinary. (15 classes) (25 Marks)

Unit II: Factor influencing Consumer Behaviour: Social – Social Class, Culture: Sub-culture, cultural values, Personal; Personality, variety and novelty seeking, consumer motivation. (15 classes) (25 Marks)

Unit III: Consumer attitude: Source of attitude foundation, Tricomponent Attitude model, Reference group influence; types of reference groups; word of mouth and opinion leadership, characteristics of opinion leaders, the self and self image. (15 classes) (25 Marks)

Unit IV: Cross Cultural Analysis & Acculturation: Localisation vs. Standardisation, Diffusion and Adoption of innovation; Types of innovation, the adoption process. Consumer Research. (15 classes) (25 Marks)

Reading:

1. Consumer Behaviour, Indian Prespective Text & Cases Dr. S.L. Gupta, Susmita Pal.
2. Consumer Behaviour: The Indian Context (Concepts and Cases) S. Ramesh Kumar, Pearson.
3. Consumer Behaviour: Leon G. Schiffman, Joseph Wisenblit, S. Ramesh Kumar, Pearson.
4. Consumer Behaviour: Text & Cases, N.K. Sahni. Meenu Gupta, Kalyani.

Course objective: To explore the factors that influence consumer behavior and understand how consumer insights can be applied to marketing strategies.

Learning outcome: By the end of the course, students will be able to analyze consumer decision-making processes, interpret consumer behavior theories, evaluate market research data, and apply consumer behavior insights in developing effective marketing strategies.

No. of Contact Classes: 60
Designer Name: Dr. Angana Borah, Dr. Saptadweepa Shandilya Gauhati University,
angana.ght@gmail.com, saptashandilya@gmail.com

Course Name: Personal Selling and Salesmanship (Major 10)

Credit: 4
Total Marks: 100

5th Semester

Existing based syllabus: UGCBCS
Course Level: 500 to 599

Unit 1: (15 classes) (25 Marks)

Introduction to Personal Selling: Nature and importance of personal selling, myths of selling, Difference between Personal Selling, Salesmanship and Sales Management, Characteristics of a good salesman, types of selling situations, types of salespersons, Career opportunities in selling, Measures for making selling an attractive career.

Unit- II (15 classes) (25 Marks)

Buying Motives: Concept of motivation, Maslow's theory of need hierarchy; Dynamic nature of motivation; Buying motives and their uses in personal selling

Unit- III (15 classes) (25 Marks)

Selling Process: Prospecting and qualifying; Pre-approach; Approach; Presentation and demonstration; handling of objections; Closing the sale; Post sales activities.

Unit- IV (15 classes) (25 Marks)

Sales Reports: reports and documents; sales manual, Order Book, Cash Memo; Tour Diary, Daily and Periodical Reports; Ethical aspects of Selling

Suggested Readings:

1. *Spiro,* Stanton, *and Rich, Management of the Sales force,* McGraw Hill.
2. Rusell, F. A. Beach and Richard H. Buskirk, *Selling: Principles and Practices,* McGraw Hill
3. Futrell, Charles, *Sales Management: Behaviour, Practices and Cases,* The Dryden Press.
4. Still, Richard R., Edward W. Cundiff and Norman A. P. Govoni, *Sales Management: Decision Strategies and Cases,* Prentice Hall of India Ltd., New Delhi,
5. Johnson, Kurtz and Schueing, *Sales Management,* McGraw Hill
6. Pedesson, Charles A. Wright, Milburn d. And Weitz, Barton A., *Selling: Principles and Methods,* Richard, Irvin
7. Kapoor Neeru, *Advertising and personal Selling,* Pinnacle, New Delhi.

Course objective: To develop students' understanding of personal selling techniques and salesmanship skills required to build relationships with customers and achieve sales objectives.

Learning outcome: By the end of the course, students will be able to demonstrate effective personal selling skills, develop sales presentations, apply sales techniques, and build long-term customer relationships.

No. of Contact Classes: 60
Designer Name: Dr. Angana Borah, Dr. Saptadweepa Shandilya Gauhati University, angana.ght@gmail.com, saptashandilya@gmail.com

Course Name: Brand Management (Major 11)
Credit: 4
Total Marks: 100
5th Semester

Existing based syllabus: UGCBCS
Course Level: 500 to 599

Unit: I (15 classes) (25 Marks)
Brand: Definition, Functions, Significance; Types of brands; Scope of Branding; Evolution of brands; Brand elements: name, logo, symbol.

Unit II (15 classes) (25 Marks)
Brand extension; Meaning, Types, Key factors in successful brand extension; brand identify; Brand associations; Brand image; Brand equity- meaning; brand personality.

Unit III (15 classes) (25 Marks)
Brand Positioning; Market segmentation and positioning; Strategies of brand positioning; Successful brand repositioning; The Brand Customer relationship.

Unit IV (15 classes) (25 Marks)
Brand Management Process; Importance of Brand planning; Retail branding in India- Significance, Positioning Strategies for retail brands; Global branding.

Suggested Books:

1. Dr. S.L. Gupta, Brand Management, Text and Cases, Himalaya Publishing House
2. Kevin Lane Keller, Strategic Brand Management, PHI/Pearson Education
3. Keller, Parasuraman, Jacob Strategic Brand Management, Building, Measuring and Managing Brand Equity Pearson Education.

Course objective: To provide students with a comprehensive understanding of brand management principles and strategies to create, maintain, and enhance brand equity.

Learning outcome: By the end of the course, students will be able to analyze brand positioning, develop brand identity, implement brand communication strategies, and apply brand management techniques to build strong and valuable brands.

No. of Contact Classes: 60
Designer Name: Dr. Angana Borah, Gauhati University, angana.ght@gmail.com

Course Name: International Business (Major 12)
6th Semester
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 600 to 699

Unit 1: **(12 Classes) (20 Marks)**

e. Introduction to International Business: Globalisation and its importance in world economy; Impact of globalization; International business vs. domestic business: Complexities of international business; Modes of entry into international business.

f. International Business Environment: National and foreign environments and their components - economic, cultural and political-legal environments

Unit –II **(12 Classes) (20 Marks)**

e. Theories of International Trade – an overview (Classical Theories, Product Life Cycle theory, Theory of National Competitive Advantage); Commercial Policy Instruments - tariff and non-tariff measures – difference in Impact on trade, types of tariff and non tariff barriers (Subsidy, Quota and Embargo in detail) ; Balance of payment account and its components.

f. International Organizations and Arrangements: WTO – Its objectives, principles, organizational structure and functioning; An overview of other organizations – UNCTAD,; Commodity and other trading agreements (OPEC).

Unit –III **(12 Classes) (20 Marks)**

e. Regional Economic Co-operation: Forms of regional groupings; Integration efforts among countries in Europe, North America and Asia (NAFTA, EU , ASEAN and SAARC) .

f. International Financial Environment: International financial system and institutions (IMF and World Bank – Objectives and Functions) ; Foreign exchange markets and risk management; Foreign investments - types and flows; Foreign investment in Indian perspective

Unit –IV **(12 Classes) (20 Marks)**

e. Organisational structure for international business operations; International business negotiations.

f. Developments and Issues in International Business: Outsourcing and its potentials for India; Role of IT in international business; International business and ecological considerations.

Unit –V **(12 Classes) (20 Marks)**

e. Foreign Trade Promotion Measures and Organizations in India; Special economic zones (SEZs) and export oriented units (EOUs), ; Measures for promoting foreign investments into and from India; Indian joint ventures and acquisitions abroad.

f. Financing of foreign trade and payment terms – sources of trade finance (Banks, factoring, forfaiting, Banker's Acceptance and Corporate Guarantee) and forms of payment (Cash in advance, Letter of Credit, Documentary Collection, Open Account)

Suggested Readings:

17. Charles W.L. Hill and Arun Kumar Jain, International Business. New Delhi: McGraw Hill Education
18. Daniels John, D. Lee H. Radenbaugh and David P. Sullivan. International Business. Pearson Education
19. Johnson, Derbe., and Colin Turner. International Business - Themes & Issues in the Modern Global Economy. London: Roultedge.
20. Sumati Varma, International Business, Pearson Education.
21. Cherunilam, Francis. International Business: Text and Cases. PHI Learning
22. Michael R. Czinkota. et al. International Business. Fortforth: The Dryden Press.
23. Bennett, Roger. International Business. Pearson Education.
24. Peng and Srivastav, Global Business, Cengage Learning

Course objective: To provide students with a comprehensive understanding of the theories, practices, and challenges involved in conducting business across national borders.

Learning outcome: By the end of the course, students will be able to analyze and evaluate the impact of globalization on international business, demonstrate knowledge of cross-cultural management strategies, and develop effective decision-making skills for international trade and investment.

No. of Contact Classes: 60

Name of the Designer: Department of Commerce, Gauhati University, commerce@gauhati.ac.in

Course Name: Operations Research in Business (Major 13)

Credit: 4

Total Marks: 100

Existing based syllabus: UGCBCS

Course Level: 600 to 699

Unit I: Introduction to Operation Research: Evolution of Operation Research , Nature and characteristics of O.R , phases of O.R, methodology of O.R, Operation research model, role of computer in Operation **Research.** **(12 Classes) (20 Marks)**

Unit II: Linear Programming : Concept of Linear Programming, Uses and limitations of Linear Programming, Formulation of L.P problems, Concept of slack variable, Procedure of Graphical Method, Simplex Method (solutions of L.P.P. upto 3 iterations) Maximization Problems. (Simple problems related to commerce and business) **(12 Classes) (20 Marks)**

Unit III: Inventory Control , concepts and benefits of inventory control, Different types of costs in inventory system , Formulation and solution of Economic order quantity (EOQ) model, selective inventory control techniques (ABC Analysis and VED Analysis) **(12 Classes) (20 Marks)**

Unit IV: Study of Replacement: Replacement Problem, Replacement of items whose maintenance cost increases with time and the value of money remains same during the period, Replacement of items whose maintenance cost increases with time and the value of money also changes with time, selection of best item (machine) amongst two. **(12 Classes) (20 Marks)**

Unit V: : Project Management:, basic differences between PERT and CPM, phases of project management, PERT / CPM network, rules for network construction , critical path analysis, Float of an Activity and Event , Critical Path, project scheduling with uncertain activity times (only simple numerical examples are needed) **(12 Classes) (20 Marks)**

Recommended books :

15. Operations Research 9th Edition, Kantiswarup, Gupta P.K. & Sultan Chand & Sons Manmohan Operations Research – An introduction 6th Edition , Taha H.A., Hall of India
16. Operations Research Techniques for Management 7th Edition, Kapoor V.K., Sultan Chand & Sons
17. Operations Research 9th Edition, Kanti Swarup, Gupta P.K. & Sultan Chand & Sons
18. Operations Research : Theory and Applications 4th Edition , J.K Sharma

Course objective: To introduce students to the principles and techniques of operations research and their application in solving complex business problems.

Learning outcome: By the end of the course, students will be able to apply quantitative models and optimization techniques to analyze business operations, make informed decisions, and improve overall efficiency and effectiveness in a variety of operational contexts.

No. of Contact Classes: 60
Name of the Designer: Dr. Mahuya Deb, Gauhati University, mahuya8@gmail.com

Course Name: **Consumer Affairs and Customer Care (Major 14)**
Credit: 4
Total Marks: 100
6th Semester

Existing based syllabus: UGCBCS
Course Level: 600 to 699

Unit 1: Conceptual Framework (12 classes) (20 Marks)

Consumer and Markets: Concept of Consumer, Nature of markets, Concept of Price in Retail and Wholesale, Maximum Retail Price (MRP) and Local Taxes, Fair Price, labeling and packaging

Experiencing and Voicing Dissatisfaction: Consumer Satisfaction/dissatisfaction-Grievances-complaint, Consumer Complaining Behaviour: Alternatives available to Dissatisfied Consumers; Internal and External Complaint handling: Corporate Redress Systems and Public Redress Systems

Unit 2: The Consumer Protection Act, 1986 (CPA) (12 classes) (20 Marks)

Objectives and Basic Concepts: Consumer, goods, service, defect in goods, deficiency in service, spurious goods and services, unfair trade practice, restrictive trade practice.

Organizational set-up under the Consumer Protection Act: Advisory Bodies: Consumer Protection Councils at the Central, State and District Levels, Basic Consumer Rights; Adjudicatory Bodies: District Forums, State Commissions, National Commission: Their Composition, Powers, and Jurisdiction (Pecuniary and Territorial), Role of Supreme Court under the CPA.

Unit 3: Grievance Redress Mechanism under the Consumer Protection Act, 1986:
(12 classes) (20 Marks)

Who can file a complaint? Grounds of filing a complaint; Limitation period; Procedure for filing and hearing of a complaint; Disposal of cases, Relief/Remedy to be be provided; Temporary Injunction, Enforcement of order, Appeal, frivolous and vexatious complaints; Offences and penalties.

Seven Leading Cases decided under Consumer Protection Act: Medical Negligence; Banking; Insurance; Housing & Real Estate; Electricity, Water, and Telecom Services; Education; Defective Product; Unfair Trade Practice.

Unit 4: Industry Regulators and Consumer Complaint Redress Mechanism
(12 classes) (20 Marks)

i. Banking: RBI and Banking Ombudsman
ii. Insurance: IRDA and Insurance Ombudsman
iii. Telecommunication: TRAI
iv. Food Products: FSSAI (an overview)
v. Electricity Supply: Electricity Regulatory Commission
vi. Advertising: ASCI

Unit 5: Consumer Protection in India (12 classes) (20 Marks)

Consumer Movement in India:; Evolution of Consumer Movement in India. Formation of consumer organizations and their role in consumer protection, Recent developments in Consumer Protection in India, National Consumer Helpline, Citizens Charter, Product testing.

Quality and Standardization: Voluntary and Mandatory standards; Role of BIS, Indian Standards Mark (ISI), Ag-mark, Hallmarking, Licensing and Surveillance; ISO: An overview

<u>Suggested Readings</u>:

1. Khanna, Sri Ram, Savita Hanspal, Sheetal Kapoor, and H.K. Awasthi. *Consumer Affairs"*
(2007) Delhi University Publication. 334 pp.
2. Aggarwal, V. K. (2003). *Consumer Protection: Law and Practice*. 5th ed. Bharat Law House, Delhi, or latest edition.
3. Girimaji, Pushpa (2002). *Consumer Right for Everyone* Penguin Books.
4. Nader, Ralph (1973). *The Consumer and Corporate Accountability*. USA, Harcourt Brace Jovanovich, Inc.
5. Sharma, Deepa (2011).*Consumer Protection and Grievance-Redress in India: A Study of Insurance Industry* (LAP LAMBERT Academic Publishing GmbH & Co.KG, Saarbrucken, Germany. 263 pp.
6. Empowering Consumers e-book, www.consumeraffairs.nic.in
7. ebook, www.bis.org
8. *The Consumer Protection Act, 1986*

Articles

1. Verma, D. P. S. (2002). Developments in Consumer Protection in India. Journal of Consumer Policy. Vol. 25. No. pp 107 –123.
2. Verma, D.P.S. (2002). Regulating Misleading Advertisements, Legal Provisions and Institutional Framework. Vikalpa. Vol. 26. No. 2. pp. 51-57.
3. Ralph L. Day and Laird E. Landon, Jr. (1997). Towards a Theory of Consumer Complaining Behaviour. Ag Woodside, et al. (eds.). Consumer and Industrial Buying Behaviour. New York; North Holland pp. 425-37.
4. George, S. Day and A. Aaker (1970). A Guide to consumerism. Journal of Marketing. Vol. 34. pp 12-19.
5. Sharma, Deepa (2003).New measures for Consumer Protection in India. *The Indian Journal* of *Commerce.* Vol.56. No.4. pp. 96-106
6. Sharma, Deepa (2011).Consumer Grievance Redress by Insurance Ombudsman. *BIMAQUEST*.Vol.11. pp.29-47.

Periodicals

1. Consumer Protection Judgments (CPJ) (Relevant cases reported in various issues)
2. Recent issues of magazines: *Insight*, published by CERC, Ahmedabad ‘*Consumer Voice*’, Published by VOICE Society , New Delhi.
3. *Upbhokta Jagran*, Ministry of Consumer Affairs, Govt, of India. New Delhi.

Websites: www.ncdrc.nic.in www.fcamin.nic.in www.consumeraffairs.nic.in www.iso.org.in www.bis.org www.ascionline.org.in www.trai.gov.in www.irda.gov.in www.derc.gov.in www.rbi.org.in

Course objective: To provide students with a comprehensive understanding of consumer affairs and customer care practices, focusing on effective management of customer relationships and resolution of consumer issues.

Learning outcome: By the end of the course, students will be able to comprehend consumer rights and protection, develop strategies for managing customer complaints and inquiries, implement customer care initiatives, and enhance overall customer satisfaction and loyalty

No. of Contact Classes: 60

Designer Name: Dr. Angana Borah, Dr. Saptadweepa Shandilya Gauhati University, angana.ght@gmail.com, saptashandilya@gmail.com

Course Name: Marketing of Services (Major 15)

Credit: 4

Total Marks: 100

Existing based syllabus: UGCBCS

Course Level: 600 to 699

Unit: I (15 classes) (25 Marks)
Introduction; Service Sector, growth of services, state of services, nature and characteristics of services, challenges of intangibility, need for marketing.

Unit: II (15 classes) (25 Marks)
Service marketing mix; product, price, place, promotion; service distribution strategy,Franchising, participants, service process.

Unit: III (15 classes) (25 Marks)
Service system and customer behaviour; front office, back office operation system, service delivery system, need to know customer, customer as a decision maker.

Unit: IV (15 classes) (25 Marks)
Service decision process; need for new services, information search, service evaluation, pre and post purchase behaviour, Marketing of Health Services, Tourism, Insurance & Banking.

Suggested Books:
Services Marketing- K. Rama Mohana Rao, Pearson Education, New Delhi
Textbook of Marketing of Services: The Indian Experience- NimitChowdhary,Macmillan Publishers India
Service Marketing, Text & Cases, Harsh Verma, Pearson.
Service Marketing, People, Technology, Strategy- Lovelock, Wirtz, Chatterjee, Pearson.
Service Marketing, Integrating Customer Focus Across the firm, Zeithaml, Bitner,Gremler, Pandit.

Course objective: To provide students with a comprehensive understanding of the unique characteristics and challenges of marketing services and develop their ability to design and implement effective marketing strategies for service-based businesses.

Learning outcome: By the end of the course, students will be able to analyze service marketing environments, develop service marketing plans, apply service-specific marketing techniques, and effectively promote and manage service offerings to meet customer needs and preferences.

No. of Contact Classes: 60
Designer Name: Dr. Angana Borah, Dr. Saptadweepa Shandilya Gauhati University,
angana.ght@gmail.com, saptashandilya@gmail.com

4. Specialization: Finance

Course Name: Banking (Major 1)
Credit: 4
Total Marks: 100
3rd Semester

Existing based syllabus: UGCBCS

Course Level: 300 to 399

UNIT-I (12 classes) (20 Marks)

Introduction: Bank-Meaning and functions, Origin and development of banking in India, Types of banks, Structure of commercial banks in India - public and private sector banks, Scheduled and Non-scheduled Banks; E-Banking- meaning, different types of services and products like ATM, debit and credit cards, phone banking, internet banking, EFT-RTGS and NEFT.

UNIT-II (12 classes) (20 Marks)

Banker –customer relationship; Definition of banker and customer, general relationship, rights and obligations of a banker, Garnishee order. Banking Ombudsman Scheme.

Customers' account with the banker- fixed deposit account, savings account, current account-opening and operation of savings and current account, account facilities available for NRIs, KYC Guidelines

Special types bank customers – minor, illiterate persons, joint account, partnership account, Joint Stock Company.

UNIT-III (12 classes) (20 Marks)

Employment of bank funds; Liquid assets- significance of liquidity in banking, cash balance, statutory reserve in the RBI; Loans and advances- principles of sound lending, types of credit, cash credit system, overdraft, loan system; Pledge, hypothecation and mortgage, collateral security.

UNIT-IV (12 classes) (20 Marks)

Negotiable Instruments- Definition, features, types of negotiable instruments, holder and holder in due course, payment in due course; endorsements- meaning, kinds; crossing of cheque- types, significance, payment, collection of cheque, precautions, material alterations, statutory protection to paying and collecting banker.

UNIT-V (12 classes) (20 Marks)

Banking Regulation Act; requirements as to minimum paid-up capital and reserves, constitution of Board of Directors, loans and advances, licensing of banking companies, accounts and audit, powers of the RBI, Banking Sector Reforms and Governance: prudential norms relating to capital adequacy, income recognition, asset classification.

SUGGESTED READINGS:

1. D.M. Mithani and E. Gordon, Banking and Financial System, Himalaya Publishing House.
2. D. Muraleadharn, Modern Banking, Prentice Hall of India, New Delhi.
3. Indian Institute of Banking and Finance, Principles of Banking, Macmillan.
4. K. C. Sekhar and L.Sekhar, Banking Theory and Finance, Vikas Publishing House.
5. P.N. Varshney, Banking Law & Practice, Sultan Chand & Sons
6. S.N. Maheswari & S.K. Maheswari, Banking Law & Practice, Kalyani Publishers
7. S. Natarajan and R. Parameswaram, Indian Banking, Sultan Chand & Sons.

Course objective: To provide students with a comprehensive understanding of banking principles, practices, and operations in the context of the financial system.

Learning outcome: By the end of the course, students will be able to analyze banking functions, evaluate risk management strategies, and comprehend the regulatory framework governing banking operations.

No. of Contact Classes: 60
Designer Name: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: Entrepreneurship (Major 2)
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 300 to 399

Contents:

Unit 1: Introduction to Entrepreneurship

Concepts, traits, determinants and importance of entrepreneurship; Creative behavior; Evolution of entrepreneurship- theories and thoughts, Entrepreneurial eco-system, entrepreneurship and economic development, barriers to entrepreneurship, Dimensions of entrepreneurship, entrepreneurship vs. intrapreneurship (15 Lectures) (25 Marks)

Unit 2: Entrepreneurship and Micro, Small and Medium Enterprises

Role of business houses and family business in India; The contemporary role models in Indian business: their values, business philosophy and behavioural orientations; Conflict in family business and its resolution. (15 Lectures) (25 Marks)

Unit 3: Public and private partnership in business, support and sustainability of entrepreneurship. Requirement, availability and access to finance, marketing assistance, technology, and industrial accommodation, The concept, role and functions of business incubators, Mobilising resources for start-up -angel investors, venture capital and private equity fund. (15 Lectures) (25 Marks)

Unit 4: Sources of business ideas and tests of feasibility.

Significance of writing the business plan/ project proposal; Contents of business plan/ project proposal; Designing business processes, location, layout, operation, planning & control; preparation of project report (various aspects of the project report such as size of investment, nature of product, market potential may be covered); Project submission/ presentation and appraisal thereof by external agencies, such as financial/non-financial institutions

(15 Lectures) (25 Marks)

Suggested Readings:

21. Kuratko and Rao, *Entrepreneurship: A South Asian Perspective,* Cengage Learning.
22. Robert Hisrich, Michael Peters, Dean Shepherd, *Entrepreneurship,* McGraw-Hill Education
23. Desai, Vasant. *Dynamics of Entrepreneurial Development and Management*. Mumbai, Himalaya Publishing House.
24. Dollinger, Mare J. *Entrepreneurship: Strategies and Resources*. Illinois, Irwin.
25. Holt, David H. *Entrepreneurship: New Venture Creation*. Prentice-Hall of India, New Delhi.
26. Plsek, Paul E. *Creativity, Innovation and Quality*. (Eastern Economic Edition), New Delhi: Prentice-Hall of India. ISBN-81-203-1690-8.
27. Singh, Nagendra P. *Emerging Trends in Entrepreneurship Development*. New Delhi: ASEED.
28. SS Khanka, *Entrepreneurial Development,* S. Chand & Co, Delhi.
29. K Ramachandran, *Entrepreneurship Development,* McGraw-Hill Education
30. SIDBI Reports on Small Scale Industries Sector.

Note: Latest edition of text books may be used.

Course objective: To enable students to understand the key concepts, processes, and challenges involved in starting and managing a business venture.

Learning outcome: Students will be able to develop a comprehensive business plan, assess market opportunities, and apply entrepreneurial strategies to successfully launch and grow a business.

No. of Contact Classes: 60

Name of the Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

Course Name: BUSINESS LAWS (Major 3)

Credit: 4

Total Marks: 100

Existing based syllabus: UGCBCS

Course Level: 300 to 399

Contents

Unit 1: The Indian Contract Act, 1872: General Principle of Law of Contract

Contact- meaning, characteristics and kinds

- a. Essentials of a valid contract - Offer and acceptance, consideration, contractual capacity, free consent, legality of objects.
- b. Void agreements
- c. Discharge of a contract – modes of discharge, breach and remedies against breach of contract.
- d. Contingent contracts
- e. Quasi – contracts **(12 Classes) (20 Marks)**

Unit 2: The Indian Contract Act, 1872: Specific Contract

- x) Contract of Indemnity and Guarantee
- y) Contract of Bailment
- z) Contract of Agency **(12 Classes) (20 Marks)**

Unit 3: The Sale of Goods Act, 1930

- aa) Contract of sale, meaning and difference between sale and agreement to sell.
- bb) Conditions and warranties
- cc) Transfer of ownership in goods including sale by a non-owner
- dd) Performance of contract of sale
- ee) Unpaid seller – meaning, rights of an unpaid seller against the goods and the buyer.

(12 Classes) (20 Marks)

Unit 4: Partnership Laws

E) The Partnership Act, 1932

- a. Nature and Characteristics of Partnership
- b. Registration of a Partnership Firms
- c. Types of Partners
- d. Rights and Duties of Partners
- e. Implied Authority of a Partner
- f. Incoming and outgoing Partners
- g. Mode of Dissolution of Partnership

F) The Limited Liability Partnership Act, 2008

- ff) Salient Features of LLP
- gg) Differences between LLP and Partnership, LLP and Company
- hh) LLP Agreement,
- ii) Partners and Designated Partners
- jj) Incorporation Document
- kk) Incorporation by Registration
- ll) Partners and their Relationship **(12 Classes) (20 Marks)**

Unit 5 (A): The Negotiable Instruments Act 1881

Meaning, Characteristics, and Types of Negotiable Instruments : Promissory Note, Bill of Exchange, Cheque

- mm) Holder and Holder in Due Course, Privileges of Holder in Due Course.
- nn) Negotiation: Types of Endorsements
- oo) Crossing of Cheque
- pp) Bouncing of Cheque

5(B): Right to Information Act 2005: Important definitions, object, scope, obligation of public authorities under the act; rights for obtaining information; disposal of request, information commission, appeal and penalties. **(12 Classes) (20 Marks)**

Suggested Readings:

11. M.C. Kuchhal, and Vivek Kuchhal, *Business Law*, Vikas Publishing House, New Delhi.
12. Avtar Singh, *Business Law*, Eastern Book Company, Lucknow.
13. Ravinder Kumar, *Legal Aspects of Business*, Cengage Learning
14. SN Maheshwari and SK Maheshwari, *Business Law*, National Publishing House, New Delhi.
15. Aggarwal S K, *Business Law*, Galgotia Publishers Company, New Delhi.
16. Bhushan Kumar Goyal and Jain Kinneri, *Business Laws*, International Book House
17. Sushma Arora, *Business Laws*, Taxmann Pulications.
18. Akhileshwar Pathak, *Legal Aspects of Business*, McGraw Hill Education, 6th ed.
19. P C Tulsian and Bharat Tulsian, *Business Law*, McGraw Hill Education
20. Sharma, J.P. and Sunaina Kanojia, *Business Laws*, Ane Books Pvt. Ltd., New Delhi

Note: Latest edition of text books may be used.

Name of the Designer: Department of Commerce, commerce@gauhati.ac.in
Course objective: To gain knowledge of the branches of law which relate to business transactions, certain corporate bodies and related matters.
Course Outcome: On completion of this course, learners will be able to: appreciate the relevance of business law to individuals and businesses and law in an economic and social context.

No. of Contact Classes: 60
Name of the Designer: Prof. Aparajeeta Borkakoty, Gauhati University, apara_jeeta@yahoo.com

Course Name: Fundamentals of Financial Management (Major 4)

4th Semester
Credit: 4
Marks: 100

Existing based syllabus: UGCBCS
Course Level: 400 to 499

CONTENTS

Unit 1: Introduction

Nature, scope and objective of Financial Management, Time value of money, Risk and return (including Capital Asset Pricing Model), Valuation of securities – Bonds and Equities
(12 Classes) (20 Marks)

Unit 2: Investment Decisions

The Capital Budgeting Process, Cash flow Estimation, Payback Period Method, Accounting Rate of Return, Net Present Value (NPV), Net Terminal Value, Internal Rate of Return (IRR), Profitability Index, Capital budgeting under Risk – Certainty Equivalent Approach and Risk-Adjusted Discount Rate. (12 Classes) (20 Marks)

Unit 3: Financing Decisions

Cost of Capital and Financing Decision: Sources of long-term financing Estimation of components of cost of capital. Methods for Calculating cost of equity capital, Cost of Retained Earnings, Cost of Debt and Cost of Preference Capital, Weighted Average cost of capital (WACC) and Marginal cost of capital. Capital structure –Theories of Capital Structure (Net Income, Net Operating Income, MM Hypothesis, Traditional Approach). Operating and financial leverage; Determinants of capital structure (12 Classes) (20 Marks)

Unit 4: Dividend Decisions

Theories for Relevance and irrelevance of dividend decision for corporate valuation; Cash and stock dividends; Dividend policies in practice (12 Classes) (20 Marks)

Unit 5: Working Capital Decisions

Concepts of working capital, the risk-return trade off, sources of short-term finance, working capital estimation, cash management, receivables management, inventory management and payables management. (12 Classes) (20 Marks)

Note:

7. In addition the students will work on Spreadsheet for doing basic calculations in finance (Unit 2 and 3 above) and hence can be used for giving students subject related assignments for their internal assessment.

8. There shall be 4 Credit Hrs. for Lectures + one Credit hr. (Two Practical Periods per week per batch) for Practical Lab + one credit Hr for Tutorials (per group)

9. Latest edition of text books may be used.

Suggested Readings

1. James C. Van Horne and Sanjay Dhamija, *Financial Management and Policy*, Pearson Education
2. Levy H. and M. Sarnat . *Principles of Financial Management*. Pearson Education
3. Brigham and Houston, *Fundamentals of Financial Management,* Cengage Learning
4. Khan and Jain. *Basic Financial Management*, McGraw Hill Education
5. Prasanna Chandra, *Fundamentals of Financial Management*. McGraw Hill Education
6. Singh, J.K. *Financial Management- text and Problems*. Dhanpat Rai and Company, Delhi.
7. Rustagi, R.P. *Fundamentals of Financial Management*. Taxmann Publication Pvt. Ltd.

Course Objective: The objective of the Fundamentals of Financial Management course is to provide students with a comprehensive understanding of the basic principles and concepts of financial management in order to make sound financial decisions.

Learning Outcomes:

1. Students will gain knowledge of financial analysis techniques and be able to interpret financial statements to evaluate the financial health of a company.
2. Students will develop the skills to assess investment opportunities, calculate the cost of capital, and make informed capital budgeting decisions.

No. of Contact Classes: 60

Name of the Designer: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: Financial Market Operations (Major 5)

Credit: 4

Total Marks: 100

4th Semester

Existing based syllabus: UGCBCS

Course Level: 400 to 499

Unit 1: Financial Market Operations (15 Classes) (25 Marks)

Review of Financial System; Need for issue of financial instruments, Money Market and Constituents, their features and issue procedure; Debt Market Instruments- Bonds and Issuance of Bonds, Types of Bonds, Features of Bonds, Issue procedure; Equity Instruments- Types of equities, Pricing and Calculations, Listing and Issue procedure.

Unit 2: Stock Market Operations (12 Classes) (20 Marks)

Stock Market- Nature and Scope, Functions of Stock Market, History of Stock Exchanges in India- BSE, NSE and OTCEI, Trading Mechanism and Settlement, Brokers/Members- Qualifications, Duties and Responsibilities; Stock Indices and Usages; Depositories- their role and functions, NSDL and CSDL.

Unit 3: Derivatives Market Operations (15 Classes) (25 Marks)

Meaning, Types and Usages, OTC Derivatives- Forwards and Swaps, Exchange Traded Derivatives- Futures and Options, Functions of Derivative Exchanges, Major Derivative Exchanges, Trading Mechanism and settlement, Open Investment and Trading Volume.

Unit 4: Operation Management (10 Classes) (15 Marks)

Structure of Investment Company - Front Office, Middle Office, Back Office/Operations; Operations Relationship - Clients - external and internal, Retail Clients, Institutional Clients, Counterparties and Suppliers; Banks and other intermediaries, Market Regulators and Associations.

Unit 5: Data Management (08Classes) (15 Marks)

Data Management- Significance of Data Management, Reference data and Types of Reference Data, Approaches to Data Management, Data Processing, Data Requirements- Securities, Counterparties and Customers, Settlement Data, Data Storage.

Suggested Readings:

1. Indian Financial System , Bharati V Pathak, Pearson
2. Indian Financial System , V Desai, Himalaya Publishing House
3. Financial Institutions and Markets, L M Bhole, Tata Mc Graw Hill
4. Financial Market Operations, Keith Dickinson, Wiley.
5. Financial Market operations, I M Sahai, SBPD Publishing.
6. The Basics of Finance, P P Drake and F J Fabbozi, Wiley.

Course objective: To introduce students to the functioning of financial markets and the operations involved in trading securities and financial instruments.

Learning outcome: By the end of the course, students will be able to understand financial market structures, analyze trading mechanisms, and apply financial market operations concepts in investment decision-making.

No. of Contact Classes: 60
Designer Name: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: Insurance (Major 6)
Credit: 4
Total Marks: 100
4th Semester

Existing based syllabus: UGCBCS
Course Level: 400 to 499

UNIT-I: Introduction (10 classes) (15 Marks)

Definition & Nature of insurance; origin & development of insurance, history of insurance in India, kinds of insurance, principles of insurance, importance of insurance, insurance and wagering agreement.

UNIT-II; Life Insurance (10 classes) (15 Marks)

Definition of life insurance, features, benefits of life insurance, procedure for taking life insurance policy, kinds of life insurance policy, nomination, assignment and surrender value, revival of lapsed policy, settlement of claims at death and maturity, items of revenue heads in life insurance company.

UNIT-III; General Insurance (10 classes) (20 Marks)

Development of general insurance in India, Fire insurance- need, procedure of taking fire insurance policy, procedure of settlement of claims under fire insurance, double insurance, re-insurance; marine insurance- types of marine insurance policy, settlement of claims in marine insurance; miscellaneous insurance- motor insurance, personal accident insurance, livestock insurance, crop insurance, employees liabilities insurance, burglary insurance, preparation of revenue account of fire, land, marine insurance company.

UNIT-IV; Insurance Organizations (10 classes) (15 Marks)

Organizational structure- public sector insurance organizations in India, LICI, objectives and achievements, GIC- mission, organization, functions, private sector insurance organizations in India, insurance ombudsman.

UNIT-V; Insurance Intermediaries (10 classes) (15 Marks)

Insurance Agent; meaning, procedure for becoming and insurance agent, functions of an insurance agent, rights of an insurance agent, termination of an insurance agent, essentials for successful insurance salesman.

Surveyors and loss assessors, brokers, third party administrators, bank assurance.

UNIT-VI: Insurance legislation in India (10 classes) (20 Marks)

Brief history of insurance legislation in India, Insurance Act-1938, amendments, Life Insurance Corporation of India Act 1956, General Insurance Nationalizations Act- 1972, IRDA Act 1999, eligibility, registration and capital requirements of insurance companies, duties, powers and functions of the IRDA, operations of IRDA.

Suggested Books/Readings:

1. Principles of Insurance and Risk Management Alkamittal, S.l. Gupta, Sultan Chand & Sons.
2. Insurance and Risk Management, Dr. P.K. Gupta, Himalaya Publishing House.
3. Insurance Principles and Practice, M.N. Mishra, S.B. Mishra, S. Chand.
4. Introduction to Risk Management and Insurance Marks S. Dortman, Pearson Education.
5. Principles and Practice of Insurance M.Motihar, Sharda Pustal Bhawan, Allahabad**.**
6. Insurance –Principles and Practice –Indrajit Singh, Rakesh Katyal, Sanjay Arora –Kalyani Publishers.
7. Fundamentals of Insurance –Principles and Practice –Dr. S. Sikidar, Dr. P.K. Nath, Dr. G. Nath –Abhilekh, Guwahati.
8. Principles and Practice of Insurance –G.S. panda –Kalyani Publishers.
9. IRDA Act. 1999.
10. Principles & Practice of Insurance, Insurance Institute of India, Mumbai.

Course objective: To develop students' understanding of insurance principles, products, and risk management techniques.

Learning outcome: By the end of the course, students will be able to analyze insurance concepts, evaluate insurance products, and apply risk assessment and mitigation strategies in insurance-related scenarios.

No. of Contact Classes: 60

Designer Name: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: Cost and Management Accounting (Major 7)

Credit: 4

Total Marks: 100

Existing based syllabus: UGCBCS

Course Level: 400 to 499

Unit - I : Cost Accounting: Preliminaries (12 Classes) (20 Marks)

Meaning of cost, costing and cost accounting; objectives and functions of cost accounting; costing as an aid to management; cost concepts and classification, Relationship between cost accounting and financial accounting; Cost accounting and Management Accounting; Methods and Techniques of costing; Concept of cost audit; Preparation of cost sheet.

Unit - II : Accounting for Material, Labour and Overhead (12 Classes) (20 Marks)

Material control concept and techniques; E.O.Q. ABC Analysis and VED Analysis.

Labour cost control procedures; labour turnover; idle time and over time; methods of wage payment - time and piece rates.

Importance and classification of overhead; Factory administrative and selling overheads; allocation and apportionment of overhead; Absorption of overhead - under and over absorption. (Simple application)

Unit -III: Management Accounting: Preliminaries (12 Classes) (20 Marks)

Meaning and objectives of Management Accounting; Decision situation and Role of Management Accountant; Management accounting Techniques: Ratio analysis - Meaning ofRatio and Ratio analysis; uses, significance and limitations of Ratio analysis; Activity Ratios, Liquidity Ratios, Profitability Ratios and Solvency ratios;

Unit - IV: Marginal Costing and Budget & Budgetary Control (12 Classes) (20 Marks)

Meaning of marginal costing, Assumptions of marginal costing, managerial applications of marginal costing, Advantages and disadvantages of marginal costing; Cost- Volume- Profit Analysis and Break Even analysis (simple Applications),.

Meaning of Budget and Budgetary control; Classification of budgets according to time, function and flexibility; Master budget, Preparation of Flexible Budget and Cash Budget; Performance Budget and Zero Based Budgeting

Unit - V: Standard Costing and Variance Analysis (12 Classes) (20 Marks)

Meaning of Standard Cost & Standard Costing; Advantages of standard costing; Standard costing Vs. Budgetary control; Variance analysis; Classification and computation of variance (Simple application)

Suggested readings:

1. Management and Cost Accounting - Shashi K. Gupta & R. K. Sharma, Kalyani Publishers.
2. Arora M. N. - Cost Accounting Principles & Practices; Vikas, New Delhi.
3. Jain S. P. & Narang K. L. - Cost Accounting; Kalyani, New Delhi.
4. Khan M. Y. & Jain P. K. - Management Accounting, Tata Mcgrow Hill.

Course Objective: The objective of the Cost and Management Accounting course is to provide students with the knowledge and skills to effectively collect, analyze, and interpret financial and non-financial information for managerial decision-making and control within an organization.

Learning Outcomes:

1. Students will be able to apply cost accounting techniques to determine product costs, analyze cost behavior, and make informed decisions regarding pricing, product mix, and cost control.
2. Students will develop the skills to design and implement management accounting systems, including budgeting, variance analysis, and performance measurement, to support planning, control, and decision-making processes in organizations.

No. of Contact Classes: 60

Name of the Designer: Prof. Prashanta Sharma, Gauhati University, prs@gauhati.ac.in

Course Name: Indian Economy (Major 8)

Credit: 4

Total Marks: 100

5th Semester

Existing based syllabus: UGCBCS

Course Level: 500 to 599

Unit I: Basic Issues in Economic Growth and Development: Concept and Measures of economic growth and Development; determinants of economic development, Human Development Index, Kautilya 's Arthashastra and economic development **(12 Classes) (20 Marks)**

Unit II:Overview of Indian economy: India as a developing economy, India as a mixed economy, India as a dualistic economy, India as a federal economy, evolutionof Indian Planning from Planning Commission to Niti Aayog-, Monetary and Fiscal policies with their implications on economy **(12 Classes) (20 Marks)**

Unit III:Agriculture Sector: Agrarian growth and performance in different phases of policy regimes , Crop pattern , Green Revolution ; White and Yellow Revolution , land reforms in India, cooperative farming in India , tribal agricultural practices , production of other allied sectors like horticulture fisheries and aquaculture , livestock and animal husbandry , Food Security Issues , Agricultural Marketing, Policy initiatives of the Government of India for the development of agricultural sector. **(12 Classes) (20 Marks)**

Unit IV: Industrial Sector: Phases of Industrialization – the rate and pattern of industrial growth across alternative policy regimes(Industrial Policy 1948, IP Resolution 1956, Industrial Licensing Policy , New Industrial Policy 1991); MSMEs –role and challenges , Public sector – its role, performance and reforms; industrial sickness, disinvestment , privatization, Public Private Partnership ; Role of Foreign capital , Structural Changes and Performance of India's Foreign Trade and Balance of Payments;; Export policies and performance; India and the WTO, Industrialization in North Easter Region- Types of industries, industrial policies, Act East policy, Cross Border Trade, Border Area Development, Institutions – NEDFI, DONER, NEC **(12 Classes) (20 Marks)**

Unit V: Service Sector: service sector and its role in Indian economy, contribution to national Income, employment and exports revenue, Indias's service revolution,'Digital India Mission' issues and challenges for India's service sector growth **(12 Classes) (20 Marks)**

Suggested Readings:

1. Mishra and Puri, Indian Economy, Himalaya Paublishing House
2. P.K. Dhar , Indian Economy –Its Growing Dimensions , Kalyani Publishers
3. Gaurav Dutt and KPM Sundarum, Indian Economy, S. Chand & Company.
4. Bhagwati, J. and Desai, P. India: Planning for industrialization, OUP, Ch 2.
5. Uma Kapila (2021) , Indian Economy – Performance and Policies , Academic Foundation , New Delhi
6. Vinay G.B(2019) Indian Economy , Oxford University Press

Course Objective: The objective of the Indian Economy course is to provide students with an in-depth understanding of the key economic principles, policies, and factors that shape the Indian economy, enabling them to analyze and interpret its dynamics and challenges.

Learning Outcomes:
1. Students will gain knowledge of the major macroeconomic indicators, such as GDP growth, inflation, and unemployment, and understand how these factors impact the overall performance of the Indian economy.
2. Students will develop the ability to analyze the structure and composition of the Indian economy, including its sectors, such as agriculture, industry, and services, and comprehend the role of each sector in the overall economic growth.
3. Students will be able to identify and evaluate the various economic policies implemented by the government, such as fiscal policy, monetary policy, and trade policy, and assess their impact on the Indian economy.
4. Students will understand the significance of demographic trends, population dynamics,

No. of Contact Classes: 60
Name of the Designer: Department of Commerce, Gauhati University, commerce@gauhati.ac.in

Course Name: Micro Finance (Major 9)
Credit: 4
Total Marks: 100
5th Semester

Existing based syllabus: UGCBCS
Course Level: 500 to 599

Unit I: Micro Finance - Meaning and Concept, Nature and Scope, Objectives of micro finance, micro finance and micro credit, Evolution and characteristics of micro finance, Benefits of micro finance, Development of micro finance in India. (12 classes) (20 Marks)

Unit II: Micro finance Institutions- Structure of micro finance institutions, various models of micro finance institutions and their functions, sources of fund, credit delivery mechanism for micro credit, Non-financial services and MFIs. (12 classes) (20 Marks)

Unit III: Micro finance in India- Indian financial sector- financial inclusion, micro finance movement in India, demand for and supply of micro financial services, Role of NABARD for micro finance, Problems and Prospects of MF in India. (12 classes) (20 Marks)

Unit IV: Management of MFIs- Fund Management, Various types of risk in MFIs and their management, Performance Management- measurement of operational efficiency and productivity, Impact Assessment and Social Assessment of MFIs. (12 classes) (20 Marks)

Unit V: Legal and Regulatory Framework for Micro Finance, Need for Regulation of MF and MFIs, Various Laws governing MF activities in India, The Cooperative society Act., The RBI Act, The Banking Regulation Act, The Micro Finance Institutions (Development and Regulation) Bill 2012. (12 classes) (20 Marks)

Suggested Books:

1. Micro Finance: Perspectives and Operations, IIBF, Macmillan, 2009.
2. Micro Finance-Redefining the Future, V. Somnath, Excel Books.
3. Fundamentals of Micro Finance, D.Das and R Tiwari, Global Publishing House, Guwahati (India).
4. Understanding Micro Finance, D. Panda, Wiley India Pvt. Ltd., 2009.
5. The Economics of Microfinance, Armendr Z, Beatriz, Morduch and Jonathan, PHI.
6. Micro Finance: Impacts and Insight, Rajgopalan S and Nirali Parikh, ICFAI Press.

Course Objective: The objective of the microfinance course is to provide students with a comprehensive understanding of the principles, practices, and impact of microfinance in promoting financial inclusion and alleviating poverty.

Learning Outcomes: By the end of the course, students will be able to analyze the role of microfinance institutions, design and evaluate microfinance programs, understand the challenges and opportunities in microfinance operations, and apply innovative approaches to expand access to financial services for underserved populations.

No. of Contact Classes: 60
Designer Name: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: Financial Services (Major 10)
Credit: 4
Total Marks: 100
5th Semester

Existing based syllabus: UGCBCS
Course Level: 500 to 599

UNIT I: (12 classes) (20 Marks)

Financial Services –meaning and nature- features –evolution –providers and users –classification –fund based financial services –non fund based financial services.

UNIT II: (12 classes) (20 Marks)

Leasing and Hire purchase –concept and evolution –features –types of leasing and Hire purchase –advantages –distinction between leasing and Hire purchase –leasing companies in India.

UNIT III: (12 classes) (20 Marks)

Merchant Banking meaning; nature and scope –functions –evolution of merchant banking and growth in India

UNIT IV: (12 classes) (20 Marks)

Mutual funds –meaning and characteristics; advantages –Forms of MF –Types –working mechanism of Mutual Funds

UNIT V: (12 classes) (20 Marks)

Innovations in financial services –venture capital; depository system, broking and portfolio management services.

Suggested Readings:

1. Financial Markets & Financial Services by Vasant Desai, Himalaya Publishing House.
2. Financial Services, M.Y. Khan, Tata McGraw Hill.
3. Bharati Pathak: Indian Financial System, Pearson Education, New Delhi.
4. L.M. Bhole: Financial Markets & Tata McGraw Hill, New Delhi.

Course objective: To familiarize students with various financial services and their role in facilitating financial intermediation and meeting customer needs.

Learning outcome: By the end of the course, students will be able to assess different financial services, understand customer requirements, and develop strategies for delivering effective financial solutions.

No. of Contact Classes: 60
Designer Name: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: International Business (Major 12)
6th Semester
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 600 to 699

Unit 1: **(12 Classes) (20 Marks)**

g. Introduction to International Business: Globalisation and its importance in world economy; Impact of globalization; International business vs. domestic business: Complexities of international business; Modes of entry into international business.

h. International Business Environment: National and foreign environments and their components - economic, cultural and political-legal environments

Unit –II **(12 Classes) (20 Marks)**

g. Theories of International Trade – an overview (Classical Theories, Product Life Cycle theory, Theory of National Competitive Advantage); Commercial Policy Instruments - tariff and non-tariff measures – difference in Impact on trade, types of tariff and non tariff barriers (Subsidy, Quota and Embargo in detail) ; Balance of payment account and its components.

h. International Organizations and Arrangements: WTO – Its objectives, principles, organizational structure and functioning; An overview of other organizations – UNCTAD,; Commodity and other trading agreements (OPEC).

Unit –III **(12 Classes) (20 Marks)**

g. Regional Economic Co-operation: Forms of regional groupings; Integration efforts among countries in Europe, North America and Asia (NAFTA, EU , ASEAN and SAARC) .

h. International Financial Environment: International financial system and institutions (IMF and World Bank – Objectives and Functions) ; Foreign exchange markets and risk management; Foreign investments - types and flows; Foreign investment in Indian perspective

Unit –IV **(12 Classes) (20 Marks)**

g. Organisational structure for international business operations; International business negotiations.

h. Developments and Issues in International Business: Outsourcing and its potentials for India; Role of IT in international business; International business and ecological considerations.

Unit –V **(12 Classes) (20 Marks)**

g. Foreign Trade Promotion Measures and Organizations in India; Special economic zones (SEZs) and export oriented units (EOUs), ; Measures for promoting foreign investments into and from India; Indian joint ventures and acquisitions abroad.

h. Financing of foreign trade and payment terms – sources of trade finance (Banks, factoring, forfaiting, Banker's Acceptance and Corporate Guarantee) and forms of payment (Cash in advance, Letter of Credit, Documentary Collection, Open Account)

Suggested Readings:

25. Charles W.L. Hill and Arun Kumar Jain, International Business. New Delhi: McGraw Hill Education
26. Daniels John, D. Lee H. Radenbaugh and David P. Sullivan. International Business. Pearson Education
27. Johnson, Derbe., and Colin Turner. International Business - Themes & Issues in the Modern Global Economy. London: Roultedge.
28. Sumati Varma, International Business, Pearson Education.
29. Cherunilam, Francis. International Business: Text and Cases. PHI Learning
30. Michael R. Czinkota. et al. International Business. Fortforth: The Dryden Press.
31. Bennett, Roger. International Business. Pearson Education.
32. Peng and Srivastav, Global Business, Cengage Learning

Course objective: To provide students with a comprehensive understanding of the theories, practices, and challenges involved in conducting business across national borders.

Learning outcome: By the end of the course, students will be able to analyze and evaluate the impact of globalization on international business, demonstrate knowledge of cross-cultural management strategies, and develop effective decision-making skills for international trade and investment.

No. of Contact Classes: 60

Name of the Designer: Department of Commerce, Gauhati University, commerce@gauhati.ac.in

Course Name: Operations Research in Business (Major 13)

Credit: 4

Total Marks: 100

Existing based syllabus: UGCBCS

Course Level: 600 to 699

Unit I: Introduction to Operation Research: Evolution of Operation Research , Nature and characteristics of O.R , phases of O.R, methodology of O.R, Operation research model, role of computer in Operation **Research.** **(12 Classes) (20 Marks)**

Unit II: Linear Programming : Concept of Linear Programming, Uses and limitations of Linear Programming, Formulation of L.P problems, Concept of slack variable, Procedure of Graphical Method, Simplex Method (solutions of L.P.P. upto 3 iterations) Maximization Problems. (Simple problems related to commerce and business) **(12 Classes) (20 Marks)**

Unit III: Inventory Control , concepts and benefits of inventory control, Different types of costs in inventory system , Formulation and solution of Economic order quantity (EOQ) model, selective inventory control techniques (ABC Analysis and VED Analysis) **(12 Classes) (20 Marks)**

Unit IV: Study of Replacement: Replacement Problem, Replacement of items whose maintenance cost increases with time and the value of money remains same during the period, Replacement of items whose maintenance cost increases with time and the value of money also changes with time, selection of best item (machine) amongst two. **(12 Classes) (20 Marks)**

Unit V: : Project Management:, basic differences between PERT and CPM, phases of project management, PERT / CPM network, rules for network construction , critical path analysis, Float of an Activity and Event , Critical Path, project scheduling with uncertain activity times (only simple numerical examples are needed) **(12 Classes) (20 Marks)**

Recommended books :

19. Operations Research 9th Edition, Kantiswarup, Gupta P.K. & Sultan Chand & Sons Manmohan Operations Research – An introduction 6th Edition , Taha H.A., Hall of India
20. Operations Research Techniques for Management 7th Edition, Kapoor V.K., Sultan Chand & Sons
21. Operations Research 9th Edition, Kanti Swarup, Gupta P.K. & Sultan Chand & Sons
22. Operations Research : Theory and Applications 4th Edition , J.K Sharma

Course objective: To introduce students to the principles and techniques of operations research and their application in solving complex business problems.

Learning outcome: By the end of the course, students will be able to apply quantitative models and optimization techniques to analyze business operations, make informed decisions, and improve overall efficiency and effectiveness in a variety of operational contexts.

No. of Contact Classes: 60
Name of the Designer: Dr. Mahuya Deb, Gauhati University, mahuya8@gmail.com

Course Name: Treasury & Risk Management (Major 14)
Credit: 4
Total Marks: 100
6th Semester

Existing based syllabus: UGCBCS
Course Level: 600 to 699

Unit 1: Overview of Financial Markets (15 Classes) (25 Marks)
Money Market- Instruments of Money Market, REPOS, Types of Interest Rate Quotations; Fixed Income Securities, Capital Market Securities; Derivative Market; Foreign Exchange Market- Nature and Scope, Structure of Foreign Exchange Market, Players in the Forex market, Spot and Forward mechanism, Swaps, outright deals and their operations.

Unit 2: Treasury Management (15 Classes) (25 Marks)
Meaning, Objectives, Significance, Functions and Scope of Treasury Management, Relationship between Treasury Management and Financial Management; Role and Responsibilities of Chief Finance Officer/Treasurer, Tools of Treasury Management; Internal Treasury, Risk Analysis- Interest Rate Risk, Value at Risk and Forex Risk; Integrated Treasury Managemnt- Cost Centre and Profit Centre.

Unit 3: Control and Regulation of Treasury Functions (15 Classes) (25 Marks)
Internal Control, Regulation, Supervision and Control of Treasury Operations, Internal and External Audit, Role of RBI, Role of IT in Treasury Management- Negotiated Dealing System, Trading Platforms/systems, Straight Through Process, Settlement and Custody, Accounting Valuation and Elimination of Exposures.

Unit 4: Risk Management (15 Classes) (25 Marks)
Meaning of Risk, Different types of Risks, Risk Management Process, Risk Measurement and Control- Risk calculation, Risk Exposure Analysis, Risk Management Techniques, Asset Liability Management; Risk Management in Banks.

Suggested Readings:

1. Treasury Management, Steve M. Bragg, Wiley.
2. Treasury and Risk Management in Banks, IIBF, Taxmann.
3. Fundamentals of Risk Management, Paul Hopkin, IRM
4. Risk Management in Banks, S Singh and Yogesh Singh, Excel Books.
5. Risk Management, IIBF, Macmillan.

Course objective: To equip students with the knowledge and skills necessary to manage treasury functions and mitigate financial risks within an organization.

Learning outcome: By the end of the course, students will be able to understand treasury management practices, assess financial risks, develop risk management strategies, and utilize financial instruments for hedging and risk mitigation.

No. of Contact Classes: 60
Designer Name: Prof. S.K. Mahapatra, Gauhati University, skm27gu@gmail.com

Course Name: Marketing of Services (Major 15)
Credit: 4
Total Marks: 100

Existing based syllabus: UGCBCS
Course Level: 600 to 699

Unit: I (15 classes) (25 Marks)
Introduction; Service Sector, growth of services, state of services, nature and characteristics of services, challenges of intangibility, need for marketing.

Unit: II (15 classes) (25 Marks)
Service marketing mix; product, price, place, promotion; service distribution strategy,Franchising, participants, service process.

Unit: III (15 classes) (25 Marks)
Service system and customer behaviour; front office, back office operation system, service delivery system, need to know customer, customer as a decision maker.

Unit: IV (15 classes) (25 Marks)
Service decision process; need for new services, information search, service evaluation, pre and post purchase behaviour, Marketing of Health Services, Tourism, Insurance & Banking.

Suggested Books:
Services Marketing- K. Rama Mohana Rao, Pearson Education, New Delhi
Textbook of Marketing of Services: The Indian Experience- NimitChowdhary,Macmillan Publishers India
Service Marketing, Text & Cases, Harsh Verma, Pearson.
Service Marketing, People, Technology, Strategy- Lovelock, Wirtz, Chatterjee, Pearson.
Service Marketing, Integrating Customer Focus Across the firm, Zeithaml, Bitner,Gremler, Pandit.

Course objective: To provide students with a comprehensive understanding of the unique characteristics and challenges of marketing services and develop their ability to design and implement effective marketing strategies for service-based businesses.

Learning outcome: By the end of the course, students will be able to analyze service marketing environments, develop service marketing plans, apply service-specific marketing techniques, and effectively promote and manage service offerings to meet customer needs and preferences.

No. of Contact Classes: 60
Designer Name: Dr. Angana Borah, Dr. Saptadweepa Shandilya Gauhati University, angana.ght@gmail.com, saptashandilya@gmail.com

SCIENCE

Four-year Undergraduate Programme
Subject: Botany
Semester: First
Course Name: ***Plant and Microbial Diversity***
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 100-199, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Origin of life:** Theories of the Origin of Life, Concept of Kingdoms, and Tree of Life	3	4
Unit 2	**Bacteria and Viruses:** Bacteria: General features, cell structure, reproduction, conjugation, transformation, and transduction; introduction to Archaebacteria Viruses: General features, replication, reproduction (Lytic and Lysogenic life cycles), RNA virus (TMV), DNA virus (Cauliflower Mosaic Virus).	8	10
Unit 3	**Algae:** General features, cell structure, range of thallus structure, reproduction, and classification; a brief account on *Nostoc*, *Oedogonium*, and *Chara*	6	10
Unit 4	**Fungi & Lichens:** General features, distribution of fungi and its current status in the living world, reproduction, and classification (Anisworth, 1973); a brief account of *Mucor*, *Ascobolus*, and *Agaricus*; a brief account on lichens: structure, types, and economic importance	7	12
Unit 5	**Bryophytes and Pteridophytes:** Bryophytes: General features, adaptation to land habits, classification, and evolutionary trends; a brief account on *Marchantia* and *Polytrichum* Pteridophytes: General features, classification, reproduction, evolutionary trends (stellar evolution), and affinities; a brief account on *Lycopodium*, *Selaginella*, and *Pteris*	10	12
Unit 6	**Gymnosperms and Angiosperms:** Gymnosperms: General features, classification, reproduction, evolutionary trends, and affinities; a brief account on *Cycas*, and *Gnetum*	11	12

	Angiosperms: General features, Concept of an artificial, natural, and phylogenetic system of classification. Floral parts and inflorescence; Brief accounts on Lamiaceae and Orchidaceae		
PRACTICAL [Credit: 01]			
1. Study of structure of TMV and Bacteriophage (electron micrographs/models). 2. Study of morphology of *Nostoc*, *Oedogonium*, *Chara* (Temporary preparation of slides). 3. Study of *Mucor*, *Ascobolus, Agaricus* (Temporary preparation of slides) 4. Study of vegetative and reproductive parts of *Marchantia* and *Polytrichum*(preparation of slides). 5. Study of *Lycopodium/ Selaginella* (morphology, strobilus, and spores), *Adiantum/ Pteris* (morphology). 6. Study of *Cycas*/ *Pinus* and *Gnetum* (morphology, leaf/ needle, megasporophyll and microsporophyll) 7. Study of leaf venations in dicots and monocots (at least two specimens each) 8. Study of different types of inflorescences and fruits.		30	40

Reading list:

1. Bhatnagar SP, Moitra A (1996) Gymnosperms. New Delhi, Delhi: New Age International (P) Ltd Publishers.
2. Campbell NA, Reece JB (2008) Biology, 8th edition, Pearson Benjamin Cummings, San Francisco.
3. Evert RF, Eichhorn SE (2012) Raven Biology of Plants, 8th edition, New York, NY: W.H. Freeman and Company.
4. Ingrouille M, Eddie B (2006) Plants: Evolution and Diversity. Cambridge University Press.
5. Kumar HD (1999) Introductory Phycology, 2nd edition. Delhi, Delhi: Affiliated East-West. Press Pvt. Ltd.
6. Parihar NS (1991) An Introduction to Embryophyta. Vol. II. Pteridophytes. Prayagraj: U.P.: Central Book Depot.
7. Pelczar MJ (2001) Microbiology, 5th edition. New Delhi, Delhi: Tata McGraw-Hill Co.
8. Puri P (1985) Bryophytes. New Delhi, Delhi, Atma Ram and Sons.
9. Sethi IK, Walia SK (2018) Text book of Fungi and Their Allies. 2nd Edition, Med tech Publishers, Delhi.
10. Singh G (2019) Plant Systematics: An Integrated Approach. 4th edition. CRC Press, Taylor and Francis Group.

11. Singh V, Pandey PC, Jain DK (2001) A Text Book of Botany. Meerut, UP: Rastogi and Co.
12. Tortora GJ, Funke BR, Case CL (2007) Microbiology. San Francisco, U.S.A: Pearson Benjamin Cummings.
13. Vashishta PC, Sinha AK, Kumar A (2010) Pteridophyta. New Delhi, Delhi: S. Chand & Co Ltd.
14. Webster J, Weber R (2007) Introduction to Fungi. Cambridge, Cambridge University Press.

Graduate Attributes

Course Objective:

This paper will explain the origin of life, the diversity of Bacteria, Viruses, Algae, Fungi & Lichen, Bryophytes, Pteridophytes, Gymnosperms, and Angiosperms on the planet, and how they may be related to each other. The emphasis will also be on the hands-on approach and laboratory techniques for identification of the plant and microbial groups using various morphological features.

Learning outcome:

On successful completion of the course, students will have:

1. Knowledge with the concept of different kingdoms and the theories behind how life began.
2. Basic understanding of the characteristics, distribution, classification, reproduction, and current status of various microbial and plant communities.
3. Good understanding of virus, algae, fungus, bryophyte, and pteridophyte cell structures, dicotyledonous and monocotyledonous leaf venation patterns, and inflorescence and fruit features.
4. Knowledge to identify various groups of organisms in the laboratory through morphological analysis.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Second
Course Name: ***Cell Biology and Biomolecules***
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 100-199, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Introduction to cell:** Cell as a unit of structure and function; Characteristics of prokaryotic and eukaryotic cells; Origin of eukaryotic cell (Endosymbiotic theory); Cytoskeleton, Cell division: Phases of eukaryotic cell cycle, mitosis and meiosis; Regulation of cell cycle.	8	12
Unit 2	**Cell wall and plasma membrane:** Chemistry, structure and function of Plant cell wall. Overview of membrane function; fluid mosaic model; Chemical composition of membranes; Membrane transport – Passive, active and facilitated transport.	6	12
Unit 3	**Cell organelles:** Nucleus: Structure-nuclear envelope, Organization of chromatin, Nucleolus, Ribosome, Chloroplast, Mitochondria, Peroxisomes, Endoplasmic Reticulum, Golgi Apparatus, and Lysosomes.	9	8
Unit 4	**Carbohydrates and Lipids:** Carbohydrates: Nomenclature and classification. Lipids: Definition and major classes of storage and structural lipids; Structure, properties and functions of Essential fatty acids.	9	8
Unit 5	**Aminoacids and Proteins:** Structure and classification of amino acids; Levels of protein structure (primary, secondary, tertiary, and quarternary); Protein denaturation and biological roles of proteins.	8	10
Unit 6	**Nucleic acids:** Structure of nitrogenous bases; Structure and function of nucleotides; Types of nucleic acids; Structure of A, B, Z types of DNA;	5	10

	Types of RNA.		
PRACTICAL [Credit: 01]			
1. Qualitative tests for carbohydrates, reducing sugars, non-reducing sugars, lipids and proteins. 2. Study of plant cell structure with the help of epidermal peel mount of Onion/ *Rhoeo*/ *Crinum*. 3. Demonstration of the phenomenon of protoplasmic streaming in *Hydrilla* and *Vallisnaria*leaf. 4. Counting the cells per unit volume with the help of haemocytometer. (Yeast/ pollen grains). 5. Cytochemical staining of: DNA- Feulgen and cell wall in the epidermal peel of onion using Periodic Schiff's (PAS) staining technique. 6. Study different stages of mitosis and meiosis.		30	40

Reading list:

1. Berg JM, Tymoczko JL and Stryer L (2011) Biochemistry, W.H. Freeman and Company.
2. Campbell MK (2012) Biochemistry, 7th Edition. Published by Cengage Learning
3. Campbell PN, Smith AD (2011) Biochemistry Illustrated, 4th Edition, Published by Churchill Livingstone.
4. Cooper GM, Hausman RE (2009) The Cell: A Molecular Approach. 5th edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.
5. Hardin J, Becker G, Skliensmith LJ (2012) Becker's World of the Cell, Pearson EducationInc. U.S.A. 8th Edition.
6. Karp G (2010) Cell Biology, John Wiley & Sons, U.S.A. 6th Edition.
7. Nelson DL, Cox MM (2008) Lehninger Principles of Biochemistry, 5th Edition, W.H. Freeman and Company.
8. Tymoczko JL, Berg JM and Stryer L (2012) Biochemistry: A short course, 2nd Edition, W.H. Freeman.

Graduate Attributes

Course Objective:

This paper will explain biomolecules, the basic building blocks of living organisms, with a focus on their structural organization, molecule properties, biological roles, and functions. The emphasis will be on the relationship between the structure and function of various biomolecules at the chemical level with a biological perspective, as well as a hands-on approach and laboratory techniques.

Learning outcome:

On successful completion of the course, students will be:

1. Able to obtain knowledge of structure, classification, and physicochemical properties of biomolecules and enzymes.
2. Detailed knowledge of the structure, properties, and functions of a cell and its components.
3. Acquainted with practical knowledge of properties of cell and cell membranes, DNA staining techniques, and microscopy of the plant cell.
4. Able to identify various biomolecules in the laboratory by qualitative tests of biomolecules.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Third
Course Name: ***Laboratory and Field Techniques in Plant Science***
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 200-299, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Laboratorysafetyandgoodpractices:** General laboratory safety: dos and don’ts, lab safety measures, code of conduct in laboratory, safe handling of chemicals, glass apparatus, instruments, electrical appliances; First aid practices (acid spills, burns and other injuries), safety symbols, classes/ grades of chemicals, Laboratorywastemanagement: radioactive, hazardouschemicalsandbiologicalwastes.	8	8
Unit 2	**Handling and maintenanceofinstruments:** Weighingbalance,pipettesandmicropipettes,magnetic stirrer,autoclave,laminarairflow,pH and conductivity meter(calibrationanduse),Incubator (static and shaker),Luxmeter, hemocytometer, micrometer, spectrophotometer, Agarose gel electrophoresis unit, SDS PAGEunit,centrifuge,distillationunit.	8	12
Unit 3	**Measurementsandcalculations:** Units of measurements, conversion from one unit to another, Weighing,calculations:scientificnotations,powers,logarithmandfractions ; measurement of volumes ofliquids.	4	8
Unit 4	**Solutions and Buffers:** Preparation of solutions: stock solution, standard solution. Types of solutions: Normal, Molar, Molal, Percentage, ppm, ppb. Dilution and dilution factors, Acids, Bases, adjustment of pH, Buffers - phosphate, Tris- HCl and Citratebuffer.	6	8
Unit 5	**Microscopy and Culture Techniques:** Microscopes: working principles and types (Light and Electron microscopes), sampleandslidepreparation: fixation, staining, mounting, preservation(for light and electron microscopy). Basicculturemedia(NA, NB, PDA, MS), selective and differential media, Culturetechniques:plating(streak,spread&pour),serial dilution.	8	12

Unit 6	**Biostatistics, computingand field skills:** Datatypes-primaryandsecondary,methodsofdatacollection,sample and samplingmethods-meritsanddemerits;technicalandbiologicalreplicates; Tabulation and presentation of data, Descriptive statistics - Mean,Median,Mode, Variance,StandardDeviation,Standarderror,CoefficientofVariation, MS-Word,PowerPoint,Excel, concept on biologicaldatabases. Collection, Identification, Preparation and Preservation of Herbarium andMuseum specimens.	11	12
PRACTICAL [Credit: 01]			
	1. Preparation of solutions- molar, molal, normal, percentage, stock solution and dilution 2. Measurement of pH of solutions using pH meter/ pH strip and preparation of buffers (Phosphate /citrate buffer) 3. Working with instruments - Centrifuge, autoclave, laminar air flow, hot air oven, incubator, light microscope, spectrophotometer/colorimeter, 4. Slide preparation and staining of plant materials. 5. Determination of cell/spore size using micrometer. 6. Preparation of PDA/NA medium for growth and maintenance of fungal/bacterial cultures. 7. Calculation of mean, mode, median, standard deviation using data set. 8. Drawing of tables, graphs and to carry out statistical calculation using MicrosoftExcel. 9. Preparation of herbarium specimen: Collection, processing, mounting, and labelling of plant specimen.	30	40

Reading list:

1. Bisen PS (2014) Laboratory Protocols in Applied Life Sciences, 1st Edition. CRC Press.
2. Danniel WW (1987) Biostatistics. New York, NY: John Wiley Sons.
3. Evert RF, Eichhorn SE, Perry JB (2012) Laboratory Topics in Botany. W.H. Freeman and Company.
4. Jones AM, Reed R, Weyers J (2016) Practical Skills in Biology, 6th Edition, Pearson
5. Mann SP (2016) Introductory Statistics, 9th edition. Hoboken NJ, John Wiley and Sons Inc.
6. Mesh MS, Kebede-Westhead E (2012) Essential Laboratory Skills for Biosciences. John Wiley & Sons, Ltd.

7. Mu P, Plummer DT (2001) Introduction to practical biochemistry. Tata McGraw- Hill Education.
8. Zar ZH (2010) Biostatistical Analysis, 5th Edition, Pearson Prentice Hall, New Jersey, USA.

Graduate Attributes

Course Objective:

This paper will provide basic knowledge and understanding of good laboratory practices, laboratory waste management, understanding hazards and risks to ensure a safe laboratory environment, measurements, units, and common mathematical calculations, sampling and data collection, and instrument operation and maintenance.

Learning outcome:

On successful completion of the course, students will be:

1. Able tolearnfundamentalskillsimportantforperforminglaboratoryandfieldexperiments.
2. Able to prepare,analysisofdataandinterpretationofresults.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Fourth
Course Name: ***Mycology and Phytopathology***
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 200-299, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Introduction to Fungi:** General characteristics of fungi; hyphal forms; Cell and Cell wall composition; Nutrition; Origin of fungi; Classification of Fungi (Alexopoulos, 1962 & Ainsworth, 1973); General characteristics of Myxomycota and Eumycota; Symbiotic fungi (Lichen & Mycorrhiza): Structural organization and types.	10	10
Unit 2	**Lower Fungi: Mastigomycotina&Zygomycotina:** Characteristic features; Reproduction; Heterothallism; Life cycle with reference to *Synchytrium, Phytophthora* and *Mucor*	6	8
Unit 3	**Higher fungi: Ascomycotina&Basidiomycotina:** Characteristic features; Reproduction; Different fruiting bodies; Life cycle with reference to *Aspergillus, Peziza, Puccinia* and *Agaricus*	6	12
Unit 4	**Fungi Imperfecti: Deuteromycotina:** General characteristics; Thallus organization; Reproduction; Heterokaryosis & Parasexuality; Classification with special reference to *Alternaria* and *Colletotrichum*	5	8
Unit 5	**Phytopathology:** Concept of plant disease; Symptoms of plant diseases; Etiology and disease cycle; Host-pathogens interaction; Control of plant diseases and quarantine; Bacterial diseases - Citrus canker and angular leaf spot of cotton. Viral diseases - Tobacco Mosaic viruses, vein clearing. Fungal diseases - Early blight of potato, Black stem rust of wheat, White rust of crucifers	10	12
Unit 6	**Applied Mycology:** Role of fungi in biotechnology; food industry (Flavour & texture,	8	10

	Fermentation, Organic acids & Enzymes); Pharmaceutical (Secondary metabolites); Agriculture (Biofertilizers & Biological control); Mushroom cultivation; Medical mycology.		
PRACTICAL [Credit: 01]			
	1. Study of vegetative and reproductive structures of Mastigomycotina (*Phytophthora*) and Zygomycotina (*Mucor/Rhizopus*) by temporary mounts and through permanent slides. 2. Study of vegetative and reproductive structures of Ascomycotina (*Aspergillus* and *Penicillium*/*Peziza*) and Basidiomyctina (*Agaricus* and *Puccinia*) by temporary mounts and through permanent slides. 3. Study of vegetative and reproductive structures of Deuteromycotina (*Alternaria* and *Colletotrichum/ Fusarium*) by temporary mounts and through permanent slides; Study of thallus and reproductive structures of lichen and mycorrhiza through permanent slides/ photographs. 4. Study of symptoms of locally available plant diseases caused by fungi, bacteria, and virus by preparation of disease album and bottle specimens. 5. Applied mycology: Photographs/report onfungi used in medicine, fungi used as biological control agents, fungi used in industry, fungi causing human infections	30	40

Reading list:

1. Agrios GN (1997) Plant Pathology, 4thedition, Academic Press, U.K.
2. Alexopoulos CJ, Mims CW, Blackwell M (1996) Introductory Mycology, John Wiley & Sons (Asia) Singapore. 4th edition.
3. GanguleeHC, KarAK. College Botany, Vol. II., New Central Book Agency, Kolkata.
4. Hait G (2022) A Textbook of Plant Pathology: Principles and Diseases. Global Net Publication, India.
5. HaitG, BhattacharyaK, GhoshAK (2011) Text Book of Botany, Vol. I & II., New Central Book Agency, Kolkata.
6. MitraJN, MitraD, ChowdhuryS. Studies in Botany. Vol. I., Moulik Library, Kolkata.
7. Pandey BP (2020) Plant Pathology - Pathogen and plant disease. S. Chand and Company Limited, New Delhi, India.
8. Sethi IK, Walia SK (2011) Text book of Fungi and Their Allies, Macmillan Publishers India Ltd.
9. Sharma PD (2011) Plant Pathology, Rastogi Publication, Meerut, India.
10. Webster J, Weber R (2007) Introduction to Fungi, Cambridge University Press, Cambridge. 3rd edition.

Graduate Attributes

Course Objective:

This paper will explain the general characteristics and reproductive procedures of fungi from different groups such as Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina, and Deuteromycotina. The paper will also focus on the basic idea of host-pathogen interaction during disease development, along with symptomology and the disease cycle of common fungal, bacterial, and viral diseases. Furthermore, the role of fungi in various biotechnological aspects, pharmaceutics, and agriculture will be highlighted.

Learning outcome:

On successful completion of the course, students will have:

1. Knowledge on general features of fungi and their classification
2. Knowledge on different classes of fungi, symbiotic fungi, and their characteristics
3. Knowledge on the application of fungi in different fields
4. Knowledge of plant pathogens and some important plant diseases
5. Practical knowledge on different classes of fungi based on their morphological and reproductive features
6. Practical knowledge on morphology, anatomical features of symbiotic fungi and locally available important plant pathogens.
7. Understanding biotechnological applications of fungi in industry, agriculture, and medicine.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Fourth
Course Name: ***Morphology and Anatomy of Angiosperms***
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 200-299, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Introduction to Plant Morphology and Anatomy:** Morphology of inflorescence, stamens and carpel, fruit; Telome theory, phyllode theory; Role of morphology in plant classification. Plant anatomy: Application in systematics, forensics and pharmacognosy.	6	10
Unit 2	**Tissue and Tissue Systems:** Classification of tissues; Simple and complex tissue, Tissue systems, Pits and plasmodesmata; Wall ingrowths and transfer cells, Types of vascular bundles; Endodermis, exodermis and origin of lateral root. Hydathodes, cavities, lithocysts and laticifers; Ergastic substances.	7	8
Unit 3	**Structure and Development of Plant Body:** Internal organization of plant body: Development of plant body: Polarity, Cytodifferentiation and organogenesis during embryogenic development. Origin and development of leaves; Structure of dicot and monocot stem, root and leaf; Kranz anatomy.	5	8
Unit 4	**Apical meristems:** Concept of organization of shoot apex (Apical cell theory, Histogen theory, Tunica Corpus theory); Organization of root apex (Apical cell theory, Histogen theory, Korper-Kappe theory); Quiescent centre; Root cap.	11	14
Unit 5	**Vascular Cambium and Wood:** Structure, function and seasonal activity of cambium; Secondary growth in stem and root. Sapwood and heartwood; Ring and diffuse porous wood; Early and late wood, tyloses; Dendrochronology. Development and composition of periderm,	11	12

	rhytidome and lenticels.		
Unit 6	**Adaptive and Protective Systems:** Epidermis, cuticle, epicuticular waxes, trichomes (uni-and multicellular, glandular and nonglandular, two examples of each), stomata (classification); Adcrustation and incrustation; Anatomical adaptations of xerophytes and hydrophytes.	5	8
PRACTICAL [Credit: 01]			
1. Study of special types of inflorescences – Cyathium, Hypanthodium, Verticillaster, Hypanthium. 2. Study of special types of fruits- Spurious fruits (*Dillenia*); Aggregate fruits (Custard apple, *Michelia*, Periwinkles, *Polyalthia*); Multiple fruits (Pineapple, Jack fruits). 3. Study of anatomical details through permanent slides/temporary stain mounts / macerations / museum specimens with the help of suitable examples. 4. Apical meristem of root, shoot and vascular cambium (permanent slides/ photographs) 5. Epidermal system: cell types, stomata types; trichomes: non-glandular and glandular. 6. Root anatomy: monocot and dicot 7. Stem: monocot, dicot - primary and secondary growth; periderm; lenticels. 8. Leaf: isobilateral, dorsiventral, C4 leaves (Kranz anatomy). 9. Adaptive Anatomy: xerophytes, hydrophytes. 10. Secretory tissues: cavities, lithocysts and laticifers.		30	40

Reading list:

1. Dickison WC (2000) Integrative Plant Anatomy. Harcourt Academic Press, USA.
2. Evert RF (2006) Esau's Plant Anatomy: Meristems, Cells, and Tissues of the Plant Body: Their Structure, Function and Development. John Wiley and Sons, Inc.
3. Fahn A (1974) Plant Anatomy. Pergmon Press, USA.
4. Mauseth JD (1988). Plant Anatomy. The Benjammin/Cummings Publisher, USA.

Graduate Attributes

Course Objective:

This paper will explain the detailed account on the morphological and anatomical features of Angiosperms.

Learning outcome:

1. Knowledge on morphology of angiosperms and developmental biology of plant body.
2. Knowledge on structural and anatomical organization of tissue system in plants and their classification.
3. Practical knowledge on inflorescences and fruits of angiosperms.
4. Practical knowledge on anatomical features of plant body parts.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Fourth
Course Name: ***Microbiology***
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 200-299, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Introduction to microbial world:** History of development of Microbiology as a subject, Germ theory of diseases, Koch postulates, Major groups of microorganisms, Mode of nutrition and metabolic diversity in microbes, Growth and growth curves, Ecological importance of microorganisms.	6	6
Unit 2	**Viruses:** Characteristics of viruses, viroids and prions; Biomolecules and genetic materials of viruses; Baltimore system of classification; Morphological structure of TMV and Corona viruses; Life cycle and reproduction of bacteriophage; Replication of viral RNA and DNA; Viral diseases of common plants and animals	8	10
Unit 3	**Bacteria:** General characteristics of bacteria, shapes and sizes, ultra-cellular structure, major groups of bacteria with their general characteristics; Actinomycetes, Mycoplasma and Rickettsiae; growth and nutrition, reproduction – binary fission and endospore formation, horizontal gene transfer and genetic recombination in bacteria (conjugation, transformation and transduction). Examples of agriculturally and industrially important bacteria.	8	12
Unit 4	**Environmental Microbiology:** Microorganisms in different habitats: Air, soil and water; Soil microorganisms and their role in soil health; Role of microorganisms in biogeochemical cycles (C, N, P and S); Microorganisms in extreme environments (cold desert, hot water spring, marine water, hydrothermal vent, aquifers)	8	8
Unit 5	**Pathogenic microorganisms and Host Immunity:**	8	12

	Bacterial pathogens causing diseases in plants, animals and humans; fungal pathogens causing diseases in agriculturally important crops; host-pathogen interactions; pathogenesis; disease symptoms; host defence mechanisms; Host immunity - immune responses against pathogens; types of immunity; humoral and cell mediated immunity; hypersensitivity and autoimmunity; concept of Rh antigens.		
Unit 6	**Applied Microbiology:** Application of microorganisms in food industries for food fermentation and SCP production; in agriculture for biofertilizer, biopesticides, biocompost production; in pharmaceuticals for insulin and antibiotics production; in industries for alcohol and organic acid productions; citric acid and acetic acid; in genetic engineering for GMO development and other research purposes; in space and oil exploration and in pollution and waste management.	7	12
PRACTICAL [Credit: 01]			
1. Slide preparation and Gram staining of bacteria (urd bacteria, nodule bacteria) 2. Slide preparation and study of *Nostoc*, *Anabaena*, *Mucor*, *Rhizopus*, *Aspergillus*, *Penicillium*, *Colletotrichum*, *Cladosporium* 3. Pure culture isolation of soil bacteria/fungi through serial dilution plating and subsequent sub-culturing methods, population estimation by CFU and haemocytometer. 4. Measurement of microbial cells/spores with the help of micrometers or inbuilt software in microscopic camera. 5. Study on symptoms of plant viral diseases 6. Endospore staining of soil bacteria with malachite green 7. 7. Collection and study of diseases caused by virus, bacteria and fungi in crop plants		30	40

Reading list:

1. Aneja KR, Jain P, Aneza R (2021) A Textbook of Basic and Applied Microbiology. New Age International Publisher.

2. Aneja KR (2022) Experiments in Microbiology, Plant Pathology, Tissue Culture and Microbial Biotechnology. New Age International Publisher
3. Bhattacharya IK, Bhattacharya RN (2017) Fundamentals of Microbiology.
4. Pelczar MJ (2001) Microbiology, 5th edition, Tata McGraw-Hill Co, New Delhi.
5. Sharma PD (2009) Microbiology. latest edition, Rastogi Publication, Meerut.
6. Singh RS (2017) Plant Diseases.
7. Wiley JM, Sherwood LM and Woolverton CJ (2013) Prescott's Microbiology. McGraw Hill International.

Graduate Attributes

Course Objective:

1. To give concise knowledge on basic microbiology
2. To give practical knowledge on handling of microorganisms
3. To inculcate knowledge on usefulness of microorganisms for sustainable development

Learning outcome:

1. Knowledge on microbial diversity and distribution in different habitats
2. Knowledge on ecological and economic importance of microorganisms in our day-to-day life
3. Knowledge on growth, reproduction and life cycles of viruses and microorganisms
4. Knowledge on genetic recombination of bacteria
5. Practical knowledge on microscopy, slide preparation, staining and morphological study of microorganisms
6. Knowledge on pathogenic microorganisms, host-pathogen interaction, and immunity
7. Practical knowledge on isolation and pure culture of bacteria/fungi from soil samples

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Fourth
Course Name: *Plant Resources and Economic Botany*
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 200-299, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Origin of Cultivated Plants:** Centres of Origin, their importance with reference to Vavilov's work. Introductions, domestication, and loss of crop genetic diversity; evolution of new crops/varieties, importance of germplasm diversity and conservation. Classification of plant resources on the basis of their uses.	6	8
Unit 2	**Food and Food Adjuncts:** Cereals and millets: Rice and wheat (origin, morphology, processing, post-harvest management & uses); Brief account of millets and their climatic and nutritional importance. Legumes: Origin, morphology, cultivation, uses and commercial importance of Chick pea, Pigeon pea and fodder legumes. Importance of legumes to man and ecosystem. Spices: Listing of important spices, their family and part used. Economic importance with special reference to Assam. Study of fennel, saffron, clove and black pepper. Beverages: Tea, Coffee (morphology, processing, cultivation, Types & uses).	12	14
Unit 3	**Plants and Plant Products of Industrial Value:** Oils and Fats: General description, classification, extraction, their uses and health implications groundnut, coconut, soybean, and mustard. Essential Oils: General account, extraction methods, comparison with fatty oils & their uses. Non edible oil yielding trees and importance as biofuel. Sugar and starches: Morphology, new varieties and processing of sugarcane, products and by-products	12	14

	of sugarcane industry. Potato: morphology, propagation, post-harvest management, uses of potato and starches. Natural Rubber**:** Para-rubber: tapping, processing and uses. Fibres: Classification based on the origin of fibres; Cotton, Coir and Jute (morphology, extraction and uses).		
Unit 4	**Drug-yielding plants:** Therapeutic and habit-forming drugs with special reference to C*inchona, Digitalis, Aloe vera* and *Cannabis*; Tobacco (Morphology, processing, uses and health hazards).	5	8
Unit 5	**Forest Products:** Forest and forest products. Timber and Non-Timber Forest Products (NTFP), Forest types of Assam and their conservation strategies; Community forestry.	5	8
Unit 6	**Ethnobotany Hours:**Definition, concept and scope; relevance of ethnobotany in the present context; Traditional knowledge and IPR.	5	8
PRACTICAL [Credit: 01]			
	1. Cereals: Study of useful parts: Rice/Bean (habit sketch, study of paddy and grain, starch grain, micro-chemical test). 2. Legumes: Bean, (habit, fruit, seed structure, micro-chemical tests). 3. Beverages: Tea (plant specimen, tea leaves). 4. Oils and fats: Coconut and Mustard, Groundnut, 5. Rubber:Specimen, photograph/model of tapping, samples of rubber products. 6. Test for alkaloids: Neem, *Vinca rosea*. 7. Fibre-yielding plants: Cotton (specimen, whole mount of seed to show lint and fuzz; whole mount of fibre and test for cellulose), Jute (specimen, transverse section of stem, test for lignin).	30	40

Reading list:

1. Chrispeels MJ, Sadava DE (1994) Plants, Genes and Agriculture. Jones & Bartlett Publishers.
2. Gonsalves J (2010) Economic Botany and Ethnobotany. Mittal Publications, New Delhi, India.
3. Hill AF (1972) Economic Botany: A Textbook of Useful Plants and Plant Products. Tata McGraw-Hill, New Delhi, India.
4. Jain SK, Mudgal V (1999) A Hand Book of Ethnobotany. Bishen Singh Mahendra Pal Singh, Dehra Dun, India.
5. Kochhar SL (2012) Economic Botany in Tropics, MacMillan & Co. New Delhi, India.
6. Samba Murty AVSS, Subramanyam NS (1989) A Textbook of Economic Botany. Wiley Eastern Limited, New Delhi.
7. Wickens GE (2001) Economic Botany: Principles & Practices. Kluwer Academic Publishers, The Netherlands.
8. Wickens GE (2006) Economic Botany Principles and Practices, Springer India, New Delhi.

Graduate Attributes

Course Objective:

This paper will provide an understanding of major introduced plant species, concept of centre of origin and their importance, domestication of crops and loss of genetic diversity, evolution of new crops /varieties. This paper will also provide knowledge on germ plasm diversity, importance of ethnobotany and economic importance of various plants.

Learning outcome:

On successful completion of the course, students will:

1. Know the centre of origin, domestication, and loss of genetic diversity
2. Understand the evolution of new crops /varieties
3. Know about the germplasm diversity
4. Understand the economic values of various plant species.
5. Understand the importance of ethnobotany in the present context.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Fifth
Course Name: ***Genetics***
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Mendelian genetics and its extension:** Mendelism: History; Principles of inheritance; Chromosome theory of inheritance; Autosomes and sex chromosomes; Probability and pedigree analysis; Incomplete dominance and codominance; Multiple alleles, Lethal alleles, Epistasis, Pleiotropy, Recessive and Dominant traits, Penetrance and Expressivity, Numericals; Polygenic inheritance.	13	14
Unit 2	**Extrachromosomal Inheritance:** Chloroplast mutation: Variegation in Four o'clock plant; Mitochondrial inheritance in yeast; Maternal effects-shell coiling in snail; Infective heredity-Kappa particles in *Paramecium*	4	6
Unit 3	**Linkage, crossing over and chromosome mapping:** Linkage and crossing over-Cytological basis of crossing over; Recombination frequency, two factor and three factor crosses; Interference and coincidence; Numerical based on gene mapping; Sex Linkage.	8	10
Unit 4	**Variation in chromosome number and structure:** Deletion, Duplication, Inversion, Translocation, Position effect, Euploidy and Aneuploidy.	6	8
Unit 5	**Fine structure of gene and Gene mutations:** Classical vs molecular concepts of gene; Ciston, Racon, Muton, rII locus; Types of mutations; Molecular basis of Mutations; Mutagens – physical and chemical (Base analogs, deaminating, alkylating and intercalating agents); Detection of mutations: ClB method. Role of Transposons in mutation. DNA repair mechanisms	10	12

Unit 6	**Unit 6. Population and Evolutionary Genetics:** Allele frequencies, Genotype frequencies, Hardy-Weinberg Law, role of natural selection, mutation, genetic drift. Genetic variation and Speciation.	4	10
PRACTICAL [Credit: 01]			
	1. Mendel's laws through seed ratios. 2. Chromosome mapping using point test cross data. 3. Incomplete dominance and gene interaction through seed ratios (9:7, 9:6:1, 13:3, 15:1,12:3:1, 9:3:4). 4. Permanent Slides showing Translocation Ring, Photograph showing Laggards and Inversion Bridge.	30	40

Reading list:

1. Gardner EJ, Simmons MJ, Snustad DP (2015) Principles of Genetics, John Wiley & sons, India. 8th edition.
2. Griffiths AJF, Wessler SR, Carroll SB, Doebley J (2010) Introduction to Genetic Analysis. W. H. Freeman and Co., U.S.A. 10th edition.
3. Klug WS, Cummings MR, Spencer CA (2012) Concepts of Genetics. Benjamin Cummings, U.S.A. 10th edition.
4. Snustad DP, Simmons MJ (2010) Principles of Genetics, John Wiley & Sons Inc., India. 5th edition.

Graduate Attributes

Course Objective:

To gain knowledge on classical and modern concepts of genetics.

Learning outcome:

1. Knowledge of Mendelian and non- Mendelian inheritance in organisms.
2. Knowledge of gene and chromosomal mutations
3. Knowledge of basic concepts of population and evolutionary genetics
4. Ability to work out problems related to Mendel's experiments, Chromosome mapping and gene interaction

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,

Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Fifth
Course Name: ***Molecular Biology***
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Nucleic acids: Carriers of genetic information:** Historical perspective; DNA as the carrier of genetic information (Griffith's, Hershey & Chase, Avery, McLeod & McCarty, Fraenkel-Conrat's experiment.	3	4
Unit 2	**The Structures of DNA and RNA / Genetic Material:** DNA Structure: Miescher to Watson and Crick- historic perspective, DNA structure, Salient features of double helix, denaturation and renaturation, cot curves; Organization of DNA-Prokaryotes, Viruses, Eukaryotes. Organelle DNA - mitochondria and chloroplast DNA. The Nucleosome Chromatin structure- Euchromatin, Heterochromatin- Constitutive and Facultative heterochromatin.	8	12
Unit 3	**The replication of DNA, Central dogma and genetic code:** Chemistry of DNA synthesis (Kornberg's discovery); General principles – bidirectional, semi- conservative and semi discontinuous replication, RNA priming; Various models of DNA replication, including rolling circle, θ (theta) mode of replication, replication of linear ds-DNA; Enzymes involved in DNA replication. Key experiments establishing-The Central Dogma (Adaptor hypothesis and discovery of mRNA template), Genetic code (deciphering & salient features)	10	12
Unit 4	**Transcription:** Transcription in prokaryotes and eukaryotes. Principles of transcriptional regulation; Prokaryotes: Regulation of lactose metabolism and tryptophan synthesis in *E.coli*. Eukaryotes: transcription factors, heat shock proteins, steroids	10	12

	and peptide hormones; Gene silencing.		
Unit 5	**Processing and modification of RNA:** Split genes-concept of introns and exons, removal of introns, spliceosome machinery, splicing pathways, group I and group II intron splicing, alternative splicing eukaryotic mRNA processing (5’ cap, 3’ poly A tail); Ribozymes; RNA editing and mRNA transport.	7	10
Unit 6	**Translation:** Ribosome structure and assembly, mRNA; Charging of tRNA, aminoacyl tRNA synthetases; Various steps in protein synthesis, proteins involved in initiation, elongation and termination of polypeptides; Fidelity of translation; Inhibitors of protein synthesis; Post-translational modifications of proteins.	7	10
PRACTICAL [Credit: 01]			
1. DNA isolation from any plant material. 2. DNA estimation by diphenylamine reagent/UV Spectrophotometry (Demonstration). 3. Study of DNA replication mechanisms through photographs (Rolling circle, Theta replication and semi-discontinuous replication). 4. Study of structures of prokaryotic RNA polymerase and eukaryotic RNA polymerase II through photographs. 5. Study of the following through photographs: Assembly of Spliceosome machinery; Splicing mechanism in group I & group II introns; Ribozyme and Alternative splicing.		30	40

Reading list:

1. Griffiths AJF, Wessler SR, Carroll SB, Doebley J (2010) Introduction to Genetic Analysis. W. H. Freeman and Co., U.S.A. 10th edition.
2. Klug WS, Cummings MR, Spencer CA (2009) Concepts of Genetics. Benjamin Cummings. U.S.A. 9th edition.
3. Russell PJ (2010) iGenetics - A Molecular Approach. Benjamin Cummings, U.S.A. 3rd edition.
4. Snustad DP, Simmons MJ (2010) Principles of Genetics. John Wiley and Sons Inc., U.S.A. 5th edition.
5. Watson JD, Baker TA, Bell SP, Gann A, Levine M, Losick R (2007) Molecular Biology of the Gene, Pearson Benjamin Cummings, CSHL Press, New York, U.S.A. 6th edition.

Graduate Attributes

Course Objective:

To have detailed knowledge of DNA, RNA and central dogma of molecular biology

Learning outcome:

1. Knowledge of structure, organization, and replication mechanism of DNA
2. Detailed knowledge of central dogma, mechanism of transcription and processing of different types of RNA
3. Knowledge of genetic code, molecular mechanisms associated with various steps in protein synthesis and post translational modifications
4. Ability to isolate genomic DNA from plant samples

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Fifth
Course Name: ***Plant Ecology, Phytogeography and Climate Change***
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Ecology and Ecosystem:** Ecology: Basic concepts, Levels of organization, Inter-relationships between the living world and the environment. Ecosystem: Structure, functions, and types, trophic organisation, food chains and food webs, ecological pyramids, homeostasis.	8	8
Unit 2	**Ecological Factors:** Climatic, Edaphic and Biotic Factors, Factorial interactions, Plant adaptation to environmental factors (light, temperature, wind, and fire); autotrophy, heterotrophy; symbiosis, commensalism, ammensalism, parasitism, parasitoidism. Aquatic ecology- concept.	8	8
Unit 3	**Population ecology:** Population characteristics, Growth curve, Lotka-Volterra model, population regulation, *r* and *k*-selection. Types of ecological speciation, Ecological equivalents.	7	12
Unit 4	**Plant communities:** Plant Community: Basic concept, types, characters (analytical and synthetic), Dynamics: succession – processes, types, models; climax concepts, Habitat and Niche: concept &types.	7	12
Unit 5	**Functional Ecology:** Principles and models of energy flow; Production and productivity; Ecological efficiencies; Ecological energetics; Biogeochemical cycles (C, N and P) and water cycle.	7	10
Unit 6	**Phytogeography and Climate Change:** Principles; Continental drift; Theory of tolerance; Endemism; Brief description of major terrestrial biomes (one each from tropical, temperate & tundra);	8	10

	Phytogeographical division of India;Vegetation types of NE India with special reference to Assam. Climate change: Basic concepts; global warming, causes and consequences (Rise in Sea levels, Glacier melting, Biodiversity Loss), Adaptation, Mitigation, Global and National Efforts, Concept on Sustainable Development, Sustainable Development Goals (SDGs).		
PRACTICAL [Credit: 01]			
1. Determination of minimal quadrat size and number for the study of herbaceous vegetation in the college campus by species area curve method (species to be listed). 2. Quantitative analysis of herbaceous vegetation for density and abundance in the college campus. 3. Quantitative analysis of herbaceous vegetation in the college campus for frequency and comparison with Raunkiaer's frequency distribution law. 4. Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/hygrometer, rain gauge and lux meter. 5. Analysis for carbonates, chlorides, nitrates, sulphates, organic matter and base deficiency from two soil samples by rapid field tests. 6. Determination of dissolved oxygen of water samples from polluted and unpolluted sources. a) Study of morphological adaptations of hydrophytes and xerophytes (four each). b) Study of biotic interactions of the following: Stem parasite, Root parasite, Epiphytes, Predation (Insectivorous plants). 7. Local field visit to nearby areas to familiarise students with various plant communities. 8. Soil respiration study in two agricultural systems to determine the CO_2 evolution.		30	40

Reading list:

1. Ambasht and Ambasht (2002) A text book of Plant Ecology. CBS publisher and Distributors.
2. Bhattacharya K, Ghosh AK, HaitG (2017) A Text Book of Botany. New Central Book Agency (P), Kolkata, India.
3. Bowmen WD, Hacker SD, Cain ML (2018) Ecology, Oxford University Press.
4. Deka U, Dutta T (2022) Plant Ecology and Phytogeography. Asian Humanitities Press, Guwahati, Assam.
5. KapurP, GovilSR (2000, 2007). Experimental Plant Ecology. CBS Publishers and Distributors, New Delhi (India).
6. Kormondy EJ (1996) Concepts of ecology. PHI Learning Pvt. Ltd., Delhi, India. 4th edition.
7. Misra R (1968, Reprinted in 2019). Ecology Workbook. Scientific Publishers (India), Jodhpur
8. OdumEP (2005) Fundamentals of ecology. Cengage Learning India Pvt. Ltd., New Delhi. 5th edition.
9. Raj M, Deka H (2022) Plant Ecology and Phytogeography. Ashok Book Stall, Guwahati, Assam.
10. Sharma PD (2010) Ecology and Environment. Rastogi Publications, Meerut, India. 8th edition.
11. Smith TM, Smith RL (2015) Elements of ecology. Pearson publishers., London. 9th Edition
12. StilingPD (1996) Ecology: theories and applications (Vol. 4). Upper Saddle River: Prentice Hall.
13. Verma PS, Agarwal VK (2003) Environmental Biology-Principles of Ecology. S Chand & Company Ltd. Ramnagar, New delhi-110055.
14. Wilkinson DM (2007) Fundamental Processes in Ecology: An Earth Systems Approach. Oxford University Press. U.S.A.

Graduate Attributes

Course Objective:

This course will provide an understanding on ecology and ecosystems, biotic and abiotic interactions, ecosystem processes, terrestrial and aquatic environment, population and community interactions, plant distribution and effect of climate change on natural environment. Emphasis will be given on the hands-on approach, field, and laboratory techniques.

Learning outcome:

On successful completion of the course, students will:

1. Understand the concept of ecology, ecosystems, and importance of factors.
2. Understand the population, community, biodiversity, and conservation strategies.
3. Understand the concept of phytogeography, endemism, and floristic distributions.
4. Understand the science of climate change and sustainable developmentstrategies
5. Know the adaptation and mitigation against climate change-induced phenomena.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Fifth
Course Name: *Plant Systematics*
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Significance of Plant systematics:** Introduction to systematics; Plant identification, Classification, Nomenclature. Evidences from palynology, cytology, phytochemistry and molecular data. Functions and importance of Herbarium and botanical garden; Important herbaria and botanical gardens of the world and India; Virtual herbarium; Categories and taxonomic hierarchy; Concept of taxa (family, genus, species).	8	8
Unit 2	**Botanical nomenclature:** History, Principles and Rules (ICN); Ranks and names; Typification, Author citation, Effective and Valid publication, Rejection of names, Principle of priority and its limitations.	5	8
Unit 3	**Systems of classification:** Major contributions of Theophrastus, Bauhin, Tournefort, Linnaeus, Adanson, de Candolle, Bessey, Hutchinson, Takhtajan and Cronquist; Classification systems of Bentham and Hooker, Engler and Prantl, Takhtajan; Brief account of Angiosperm Phylogeny Group (APG) classification.	9	12
Unit 4	**Numerical taxonomy and cladistics:** OTUs, characters, character weighting and coding; Cluster analysis; Phenograms & Cladograms (definitions and differences).	6	8
Unit 5	**Phylogeny of Angiosperms:** Terms and concepts (primitive and advanced, homology and analogy, parallelism and convergence, monophyly, Paraphyly, polyphyly and clades). Origin and evolution of angiosperms; Co-evolution of angiosperms and animals; Methods of illustrating	6	10

	evolutionary relationship (phylogenetic tree, cladogram).		
Unit 6	**Angiospermic Families:** Detail study of the following families: Magnoliaceae, Fabaceae, Asteraceae, Solanaceae, Acanthaceae, Lamiaceae, Euphorbiaceae, Orchidaceae, Musaceae, Zingiberaceae, Poaceae.	11	14
PRACTICAL [Credit: 01]			
1. Study of vegetative and floral characters of locally available angiospermic plants belonging to the following families (Description, V.S. flower, section of ovary, floral diagram/s, floral formula/e and systematic position according to Bentham & Hooker's system of classification): Fabaceae, Solanaceae, Acanthaceae, Lamiaceae, Euphorbiaceae, Musaceae, Orchidaceae. 2. Field visits to familiarise students with vegetation of an area and identification of plant species / Visit to Academic or Research Institutions. 3. Mounting of properly dried and pressed specimens of at least 10 (ten) wild plant species with herbarium labels (to be submitted with the record book).		30	40

Reading list:

1. Jeffrey C (1982) An Introduction to Plant Taxonomy. Cambridge University Press, Cambridge.
2. Judd WS, Campbell CS, Kellogg EA, Stevens PF (2002) Plant Systematics-A Phylogenetic Approach. Sinauer Associates Inc., U.S.A. 2nd edition.
3. Mitra JN (1988) An Introduction to Systematic Botany and Ecology. The World Press Private Ltd. Calcutta.
4. Mondal AK (2009) Advanced Plant Taxonomy. New Central Book Agency (P) Ltd.
5. Naik VN (1984) Taxonomy of Angiosperms. Tata Mc Graw-Hill.
6. Pandey BP (2018) A Textbook of Botany: Angiosperm. S. Chand Publishing, 7361, Ram Nagar, Qutab Road, New Delhi-110055.
7. Simpson MG (2006) Plant Systematics. Elsevier Academic Press.
8. Singh G (2012) Plant Systematics: Theory and Practice. Oxford & IBH Pvt. Ltd., New Delhi. 3rd edition.

Graduate Attributes

Course Objective:

This paper will provide an understanding of knowledge on plant systematics, basic understanding of plant identification, classification systems and plant nomenclature, significance of systematics in different fields/branches of botany, phylogenetic and evolutionary relationships of angiosperms. The paper will also focus on knowledge about herbaria and botanical gardens in India and abroad and their significant role in plant identification.

Learning outcome:

On successful completion of the course, students will be:

1. Able to obtain knowledge on plant identification and classification systems, plant nomenclature.
2. Detailed knowledge of the phylogenetic and evolutionary relationships of angiosperms.
3. Able to obtain knowledge on various herbaria and botanical gardens in India and abroad, their role in plant systematics.
4. Acquainted with practical knowledge on vegetative and reproductive structures of angiosperms.
5. Acquainted students with practical knowledge on vegetation of an area.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Sixth
Course Name: ***Reproductive Biology of Angiosperm***
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Introduction to reproductive biology of Angiosperms:** History (contributions of G.B. Amici, W. Hofmeister, E. Strasburger, S.G. Nawaschin, P. Maheshwari, B.M. Johri, W.A. Jensen, J. Heslop-Harrison) and scope.	4	4
Unit 2	**Reproductive development:** Induction of flowering; flower as a modified determinate shoot. Flower development: genetic and molecular aspects.	4	6
Unit 3	**Anther and pollen biology:** Anther wall: Structure and functions, microsporogenesis, callose deposition and its significance. Micro-gametogenesis; Pollen wall structure, MGU (male germ unit) structure; Palynology and scope (a brief account); NPC system; Pollen wall proteins; Pollen viability, storage and germination; Abnormal features: Pseudomonads, polyads, massulae, pollinia.	10	14
Unit 4	**Ovule:** Structure; Types; Special structures–endothelium, obturator, aril, caruncle and hypostase; Female gametophyte- megasporogenesis (monosporic, bisporic and tetrasporic) and megagametogenesis (details of *Polygonum* type); Organization and ultrastructure of mature embryo sac.	6	10
Unit 5	**Pollination and fertilization:** Pollination types and significance; adaptations; structure of stigma and style; path of pollen tube in pistil; double fertilization. Basic concept of Self incompatibility (interspecific, intraspecific, homomorphic, heteromorphic, GSI and SSI); Methods to overcome self- incompatibility: mixed pollination, bud	12	12

	pollination, stub pollination; Intra-ovarian and *in vitro* pollination; Modification of stigma surface, parasexual hybridization; Cybrids, *in vitro* fertilization.		
Unit 6	**Embryo, Endosperm and Seed:** Structure and types; General pattern of development of dicot and monocot embryo and endosperm; Suspensor: structure and functions; Embryo-endosperm relationship; Nutrition of embryo; Unusual features; Embryo development in *Paeonia*. Seed structure, importance, and dispersal mechanisms. Polyembryony and apomixis: Introduction; Classification; Causes and applications.	9	14
PRACTICAL [Credit: 01]			
1. **Anther:** Wall and its ontogeny; Tapetum (amoeboid and glandular); MMC, spore tetrads, uninucleate, bi-celled and dehisced anther stages through slides/micrographs, male germ unit (MGU) through photographs and schematic representation. 2. **Pollen grains:** Fresh and acetolyzed showing ornamentation and aperture, psuedomonads, polyads, pollinia (slides/photographs, fresh material), ultrastructure of pollen wall(micrograph); Pollen viability: Tetrazolium test for germination: Calculation of percentage germination in different media using hanging drop method. 3. **Ovule:** Types-anatropous, orthotropous, amphitropous/ campylotropous, circinotropous, unitegmic, bitegmic; Tenuinucellate and crassinucellate; Special structures: Endothelium, obturator, hypostase, caruncle and aril (permanent slides/specimens/photographs). 4. **Female gametophyte through permanent slides/ photographs:** Types, ultrastructure of mature egg apparatus. 5. Intra-ovarian pollination; Test tube pollination through photographs. 6. **Endosperm:** Dissections of developing seeds for endosperm with free-nuclear haustoria. 7. **Embryogenesis:** Study of development of dicot embryo through permanent slides; dissection of developing seeds for embryos at various developmental stages.		30	40

Reading list:

1. Bhattacharya M, Bhattacharya. (2012). A Textbook of Palynology: Basic and Applied. New Central Book Agency (P) Ltd. Guwahati.
2. Bhojwani SS, Bhatnagar SP (2011) The Embryology of Angiosperms, Vikas Publishing House. Delhi. 5th edition.
3. Johri BM (1984) Embryology of Angiosperms, Springer-Verlag, Netherlands.
4. Raghavan V (2000) Developmental Biology of Flowering plants, Springer, Netherlands.
5. Shivanna KR (2003) Pollen Biology and Biotechnology. Oxford and IBH Publishing Co. Pvt. Ltd. Delhi.

Graduate Attributes

Course Objective:

This paper will explain the detailed accounts on reproductive and developmental characteristics of Angiosperm.

Learning outcome:

1. Knowledge on detailed morphological andreproductive structures of angiosperm.
2. Knowledge on embryology and embryological abnormalities in angiosperms.
3. Practical knowledge on developmental biology of embryo and endosperms.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Sixth
Course Name: ***Plant Physiology***
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Plant-water relations:** Water Potential and its components; Water absorption by roots: aquaporins; Pathway of water movement: symplast, apoplast, transmembrane pathways; Ascent of sap: Mechanisms, cohesion-tension theory, root pressure, guttation; Transpiration: Factors affecting transpiration, anti-transpirants, mechanism of stomatal movement.	5	8
Unit 2	**Mineral nutrition and nutrient uptake:** Criteria for essentiality of mineral elements, macro and micronutrients, nutrient solutions for plant growth experiments, roles of essential elements, mineral deficiency symptoms, chelating agents, Ion antagonism and toxicity. Soil as a nutrient reservoir; Transport of ions across cell membrane: Passive and active absorption, electrochemical gradient, facilitated diffusion, carrier systems, proton ATPase pump and ion flux, uniport, symport, antiport, co-transport.	10	10
Unit 3	**Translocation of organic solutes:** Phloem as the path of organic solute translocation: Experimental evidences, Mechanisms of solute transport, Pressure-Flow Model and Munch's hypothesis, Phloem loading and unloading, Source - sink relationship.	4	8
Unit 4	**Plant growth regulators (PGRs):** Discovery, chemical nature (basic structure), bioassay and physiological roles of Auxins, Gibberellins, Cytokinins, Abscisic acid, Ethylene, Brassinosteroids and Jasmonic acid; Synthetic PGRs; Application of PGRs in agriculture and horticulture.	10	14

Unit 5	**Physiology of flowering and seed dormancy:** Photoperiodism: SDPs and LDPs, flowering stimulus, florigen concept; Vernalization; Photoreceptors: Phytochrome, crytochrome and phototropin; Discovery, chemical nature, mechanism of action, role in photomorphogenesis, low energy responses (LER) and high irradiance responses (HIR); Seed dormancy: Significances, causes of dormancy, mechanisms to break dormancy.	8	12
Unit 6	**Plant stress physiology:** Abiotic and biotic stress: Plants' responses to drought, water logging, salinity, heavy metals, freezing, heat stress and pathogen attack. Oxidative stress: Generation of reactive oxygen species (ROS); Effect of ROS on metabolism; ROS detoxification mechanisms in plants; Stress mitigation strategies (Enzymatic and non-enzymatic).	8	8
PRACTICAL [Credit: 01]			
	1. Determination of osmotic potential of plant cell sap by the method of plasmolysis. 2. Determination of water potential of given tissue (e.g., potato tuber) by weight method. 3. Study of the effect of sunlight on the rate of transpiration in excised twig/leaf. 4. Calculation of stomatal index and stomatal frequency from the two surfaces of leaves of mesophyte/ xerophyte. 5. Effect of carbon dioxide concentration on the rate of photosynthesis. 6. To study the effect of different concentrations of IAA on Gram/Pea/Moong root (IAA Bioassay). 7. Determination of seed germination percentage in different physical conditions (Demonstration) 8. To demonstrate water stress by application of PEG/ water withdrawal in germinating seeds /growing plants (Demonstration) 9. Fruit ripening/Rooting from cuttings (Demonstration).	30	40

Reading list:

1. Bajracharya D (1999) Experiments in Plant Physiology-A Laboratory Manual. Narosa Publishing House, New Delhi.
2. Bhatla SC, Lal MA (2018) Plant Physiology, Development and Metabolism. Springer Nature Singapore Pte Ltd.

3. Devlin RM (2017) Outline of Plant Physiology. Medtech: Scientific International Pvt. Ltd.
4. Devlin RM, Witham FH, Blaydes DF (2017) Devlin's Exercises in Plant Physiology. Medtech: Scientific international Pvt. Ltd.
5. Hopkins WG, Huner A (2008) Introduction to Plant Physiology (4th edition). John Wiley and Sons. U.S.A.
6. Kochhar SL, Gujral SK (2021) Plant Physiology: Theory and Applications (2nd edition). Cambridge University Press.
7. Malik CP, Srivastava (2015) Text Book of Plant Physiology. Kalyani Publishers, New Delhi.
8. Salisbury FB, Ross CW (2004) Plant Physiology (4th edition). Cengage Learning India Pvt. Ltd., New Delhi, India.
9. Taiz L, Zeiger E, MØller IM, Murphy A (2015) Plant Physiology and Development (6th edition). Sinauer Associates Inc. USA.

Graduate Attributes

Course Objective:

Students will be able to learn the plant and water relation and thus will be able to elucidate the crucial role of water in diverse physiological functions of plants, by studying this paper. The paper will also highlight the importance of mineral elements in plant physiology and various mechanisms applied to uptake mineral elements by plants. It will provide the basic idea of pathways and mechanisms of translocation of organic solutes synthesised in plant. Furthermore, this paper will explain the role and mechanisms of action of various plant growth regulators as well as physiology of flowering and dormancy of seeds. Additionally, the paper will also focus on the different abiotic and biotic stresses encountered by the plants in their environment as well as various stress mitigation strategies employed by plants to overcome the effects of stress.

Learning outcome:

1. Knowledge on mechanisms of water, minerals, and nutrient absorption of plants
2. Knowledge on roles of plant hormones and mechanism of flowering in plants
3. Practical knowledge on effects of growth regulators on plant parts
4. Practical knowledge on determination of osmotic and water potential

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Sixth
Course Name: ***Plant Metabolism and Biochemistry***
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Concepts of metabolism:** Introduction, anabolic and catabolic pathways, regulation of metabolism, role of regulatory enzymes; classification, nomenclature, and importance of enzyme; Concept of coenzyme, apoenzyme and prosthetic group; Enzyme inhibition (allosteric, covalent modulation); Isozymes.	6	8
Unit 2	**Carbon assimilation:** Role of photosynthetic pigments (chlorophylls and accessory pigments), antenna molecules and reaction centers, photochemical reactions, photosynthetic electron transport, PSI, PSII, Q-cycle, CO_2 reduction: C3, C4-pathways, Crassulacean acid metabolism; Photorespiration.	8	12
Unit 3	**Carbon oxidation and ATP Synthesis:** Glycolysis and its regulation, oxidative decarboxylation of pyruvate, TCA cycle and regulation, amphibolic role, anaplerotic reactions, mitochondrial electron transport, oxidative phosphorylation, cyanide-resistant respiration, pentose phosphate pathway; Factors affecting respiration; ATP synthesis: substrate level phosphorylation, chemiosmotic mechanism, ATP synthase, Boyer's conformational model, Racker's experiment, Jagendorf'sexperiment, role of uncouplers.	10	12
Unit 4	**Carbohydrate, Lipid and Nitrogen metabolism:** Synthesis and catabolism of sucrose, starch and cellulose, Synthesis and breakdown of triglycerides, β-oxidation, glyoxylate cycle, gluconeogenesis and its role in mobilisation of lipids during seed germination, α-oxidation. Nitrogen assimilation: biological nitrogen fixation (examples of legumes and non-legumes), biochemistry of nitrogen	12	14

	fixation, ammonia assimilation and transamination.		
Unit 5	**Mechanisms of Signal Transduction:** Receptor-ligand interactions, Second messenger concept, Calcium-calmodulin, MAP kinase cascade, two-component system.	5	8
Unit 6	**Secondary Metabolites:** Shikimate Pathway: Role in biosynthesis of secondary metabolites; Biosynthesis and physiological roles of terpenes, phenols and nitrogenous compounds.	4	6
PRACTICAL [Credit: 01]			
1. Chemical separation of photosynthetic pigments by solvent method/paper chromatography 2. Estimation of sugar content by DNSA method 3. Determination of titratable acid number (TAN) in plant materials 4. Quantification of chlorophyll a, b and total chlorophyll and determination of chlorophyll a/b ratio 5. Estimation of phenol/tannin/flavonoid by colorimetric method 6. Estimation of protein in plant sample by Lowry's method/Biuret method 7. Separation of amino acids by paper chromatography 8. Demonstration of Thin layer chromatography (TLC)/Column chromatography 9. To compare the rate of respiration by Ganong's respirometer in different parts of plant (Demonstration)		30	40

Reading list:

1. Cox MM, Nelson DL (2017) Principles of Biochemistry (7th Edition). WH Freeman & Co., Newyork.
2. Goodwin TW, Mercer EI (2005) Introduction to Plant Biochemistry. CBS Publishers and Distributors Pvt. Ltd., New Delhi.
3. Jain J L, Jain S, Jain N (2016) Fundamentals of Biochemistry (7th edition). S Chand & Co. PVT. Ltd., New Delhi, India;
4. Palmer T, Bonner P (2008) Enzymes: Biochemistry, Biotechnology, Clinical Chemistry. East West Press Pvt. Ltd., New Delhi;
5. Plummer D (2017) An Introduction to Practical Biochemistry (3rd edition). McGraw Hill Education, New Delhi, India
6. Sadasivam A, Manickam S (2022) Biochemical Methods (4th edition). New Age International Pvt. Ltd.
7. Satyanarayana U, Chakrapani U (2021) Biochemistry (6th edition). Elsevier;
8. Voet D, Voet JG, Pratt CW (2018) Principles of Biochemistry (5th edition). J Wiley & Sons, Singapore Pte. Ltd.

Graduate Attributes

Course Objective:

Students will be acquainted with the elaborate concept of plant metabolism and biochemical pathways, by studying this paper. The paper will highlight the carbon assimilation pathways as well as carbon oxidation and ATP synthesis mechanisms in plant body. It will provide the detailed idea of pathways and mechanisms of carbohydrate, lipid, and nitrogen metabolism in plants. Furthermore, this paper will explain the various aspects and cascades of signal transduction mechanism. Additionally, the paper will also focus on the biosynthesis and physiological roles of secondary metabolites in plants.

Learning outcome:

1. Knowledge in basic understanding of plant metabolism and their regulation
2. Knowledge in concepts of carbon assimilation, oxidation, ATP synthesis
3. Knowledge in basic concepts of carbohydrate, Lipid and Nitrogen metabolism
4. Knowledge in basic concepts of signal transduction
5. Practical knowledge in separation of pigments, estimation of sugars, rate of respiration.
6. Ability to perform experiments on chromatographic techniques, spectrophotometric analysis.

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Botany
Semester: Sixth
Course Name: ***Applied Plant Biology***
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Plant Tissue Culture:** Historical perspective; Composition of media; Nutrient and hormone requirements (role of vitamins and hormones); Totipotency; Organogenesis; Embryogenesis (somatic and zygotic); Protoplast isolation, culture and fusion.	8	10
Unit 2	**Application of tissue culture:** Micropropagation, androgenesis, virus elimination, secondary metabolite production, haploids, triploids and hybrids; Cryopreservation; Germplasm conservation.	4	6
Unit 3	**Recombinant DNA technology:** Restriction Endonucleases (History, Types I-IV, biological role and application); Restriction Mapping (Linear and Circular); Cloning Vectors: Prokaryotic (pUC 18 and pUC19, pBR322, Ti plasmid, BAC); Lambda phage, M13 phagemid, Cosmid, Shuttle vector; Eukaryotic Vectors (YAC).	8	10
Unit 4	**Gene Cloning:** Recombinant DNA, Bacterial Transformation and selection of recombinant clones, PCR- mediated gene cloning; Gene Construct; construction of genomic and cDNA libraries, screening DNA libraries to obtain gene of interest by genetic selection; complementation, colony hybridization; PCR	9	12
Unit 5	**Methods of gene transfer:** *Agrobacterium*-mediated, Direct gene transfer by Electroporation, Microinjection, Microprojectile bombardment; Selection of transgenics - selectable marker and reporter genes (Luciferase, GUS, GFP).	6	10

Unit 6	**Applications of genetic engineering:** Pest resistant (Bt-cotton); herbicide resistant plants (Round Up Ready soybean); Transgenic crops with improved quality traits (FlavrSavr tomato, Golden rice); Improved horticultural varieties (Moondust carnations); Role of transgenics in bioremediation (Superbug).	10	12
PRACTICAL [Credit: 01]			
1. (a) Preparation of MS medium. (b) Demonstration of *in vitro* sterilization and inoculation methods using leaf and nodal explants of any plant species. 2. Study of anther, embryo and endosperm culture, micropropagation, somatic embryogenesis & artificial seeds through photographs. 3. Isolation of protoplasts. 4. Construction of restriction map of circular and linear DNA from the data provided. 5. Study of methods of gene transfer through photographs: Agrobacterium-mediated, direct gene transfer by electroporation, microinjection, microprojectile bombardment. 6. Study of steps of genetic engineering for production of Bt cotton, Golden rice, FlavrSavr tomato through photographs. 7. Isolation of plasmid DNA. 8. Restriction digestion and gel electrophoresis of plasmid DNA.		30	40

Reading list:

1. Bhojwani SS, Bhatnagar SP (2011) The Embryology of Angiosperms. Vikas Publication House Pvt. Ltd., New Delhi. 5th edition.
2. Bhojwani SS, Razdan MK (1996) Plant Tissue Culture: Theory and Practice. Elsevier Science Amsterdam. The Netherlands.
3. Ganguli P (2001) Intellectual Property Rights: Unleashing the Knowledge Economy. New Delhi: Tata McGraw-Hill Pub.
4. Glick BR, Pasternak JJ (2003) Molecular Biotechnology- Principles and Applications of recombinant DNA. ASM Press, Washington.
5. Kuhse H (2010) Bioethics: An Anthology. Malden, MA: Blackwell.
6. Snustad DP, Simmons MJ (2010) Principles of Genetics. John Wiley and Sons, U.K.
7. Stewart CNJr (2008) Plant Biotechnology & Genetics: Principles, Techniques and Applications. John Wiley & Sons Inc. U.S.A.

Graduate Attributes

Course Objective:

To gain knowledge on plant tissue culture, recombinant DNA technology and applications of genetic engineering techniques.

Learning outcome:

1. Knowledge of various methods of Plant tissue culture and their application
2. Knowledge of gene cloning, recombinant DNA technology and various methods of gene transfer in plants
3. Knowledge of the application of genetic engineering techniques for agriculture.
4. Ability to demonstrate tissue culture technique; isolate plasmid DNA and to carry out DNA manipulation using restriction enzymes

Theory Credit: 03

Practical Credit: 01

No. of Required Classes: 75 (Theory: 45; Practical: 30)

No. of Contact Classes: 75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Environmental Science

a. Four Year Undergraduate Programme
b. Subject: **Environmental Science**
c. Semester: **First**
d. Course Name: **Introduction to Environmental Science**
e. Existing Base Syllabus: **Class XII Science**
f. Course level: **100-199**
g. Syllabus:

Unit	Contents
Unit I: Introduction	Concept, scope and interdisciplinary nature of Environmental Science; The Global environment and its segments; Structure and composition of atmosphere, hydrosphere, lithosphere and biosphere; Weather and climate, environmental significance; Major climatic zones of the world and India Environmental Ethics, constitutional provisions for environmental protection in India
Unit II: Environmental Earth-science-I	Concept and Scope of Earth Sciences; Rock types – igneous, metamorphic and sedimentary, Landforms: Types and development; Soil and its formation; Plate-tectonics, Concept of folds and faults; Mass-wasting; Erosion, Transportation and deposition of earth's materials by running water, wind and glaciers; Erosion –types, causes and consequences; Gully formation; Glaciers, Mass balance, Recession of Himalayan glacier
Unit III: Ecology and Environmental Biology-I	Ecosystems – concept, types, structural and functional aspects; Dynamic nature of ecosystems: Energy flow in ecosystems, Models of Energy flow, Productivity of an ecosystem, food chains, food web, trophic levels, Ecological pyramids – pyramids of numbers, pyramids of biomass, pyramids of energy; Ecological Succession Biodiversity: Concept, definitions and values; Bio diversity hot spots; Origin of India's flora & fauna Biogeochemical cycle; Microbes in air, water and soil environment; Environment and Health
Unit IV: Environmental Chemistry	Concept and scope of Environmental Chemistry; acid-base reactions, pH and pOH, ionic product of water, common ion effect, buffer solutions, solubility and solubility product, hydrolysis, oxidation and reduction, Chemical Kinetics, Thermodynamics, Chemical properties of composition of water, soil and atmosphere and their environmental significance; concept of green chemistry

Unit-V: Global Environmental Issues and movements	Green House effect and Global warming, Ozone layer depletion; Acid rain, Deforestation and loss of bio-diversity Climate change and climate change adaptation Environmental movements (national and international)- Chipko, Apikko, Narmada Bachao Andolan, Tehri Dam conflict;Save Ganga movement; Mega Dams in NE India and its Consequences; International conferences and agreement on environment, Concept of sustainable development, MDGs & SDGs

h. Reading list:
   1 Daniel D. Chiras (2010): Environmental Science, eight editions, Jones & Bartlett,
   2 G. M. Masters (2004): Introduction to Environmental Science and Engineering (2nd Ed.), Pearson Education Pvt. Ltd.
   3 S. C. Santra (2011): Environmental Science, New Central Book Agency
   4 Michael Allaby(2000): Basics of Environmental Science (2nd Ed.), Taylor & Francis.
   5 A. R. W. Jackson and J. M. Jackson (1998): Environmental Science – The natural environment and human impact Longman
   6 Miller (1997): Environmental Science (6thed), Wadsworth Pub. Co.
   7 Eugene Odum (2004): Fundamentals of Ecology
   8 S. E. Manahan (2005): Environmental Chemistry (8th), CRC Press
   9 B.K. Sharma (2007): Environmental Chemistry, Goel Publishing House, Meerut, India
   10 James E. Girard (2013): Principles of Environmental Chemistry, Jones &Bartlett
   11 Keller (2012): Introduction to Environmental Geology, 5th Edition; Pearson
   12 K. S. Valdiya (1987): Environmental Geology; Tata McGraw-Hill
   13 Krishnamurthy (2004): An advanced textbook on Biodiversity: Principles and Practice, Oxford & IHB Publishing Co.
   14 12. K. V. Krishnamurthy (2017): Textbook of Biodiversity, CRC Press LLC

i. Graduate Attributes
   I. Course Objective: The course objective is to develop an understanding of the basic concepts of environmental sciences so that the learner can scientifically and objectively evaluate the environmental phenomenon, issues and problems both at local and global level. This will also enable the learner to reflect critically on their own roles and responsibilities as citizens, consumers and environmental actors within a complex interconnected world.
   II. Learning Outcome: Understanding the concepts and methods of environmental sciences and their application in environmental problem solving.
   - ➢ Appreciate the Earth science issues and the links between human and natural systems.
   - ➢ Understanding the various types of ecosystem and their structure and composition. It will enable them to appreciate the structure and functioning of the overall biosphere
   - ➢ Understand the basic chemical concepts that are required to further explain the composition and properties of natural water, soil and air and be able to appreciate

the various pathways of chemical elements and compounds that cause pollution of these environmental compartments.

- Appreciate the various global environmental issues including climate change and the various national and global movements associated with environmental conservation.

j. Theory Credit: **3**
k. Practical Credit:**1**
l. No. of Required Classes: **60**
m. No. of Contact Classes: **45**
n. No. of Non-Contact Classes:**15**
o. Particulars of Course Designer :

  - Dr. Pallavi Sharma, Assistant Professor, Department of Environmental Science, GU, pallavi.sharma@gauhati.ac.in, 9859182234

Environmental Science

a. Four Year Undergraduate Programme
b. Subject: **Environmental Science**
c. Semester: **Second**
d. Course Name: **Foundation in Environmental Science**
e. Existing Base Syllabus: **Class XII Science**
f. Course level: **100-199**
g. Syllabus:

Unit	**Contents**
Unit I: Environmental Earth-science-II	Measurement of weather parameters, variations in weather parameters, data analysis and interpretation, Extreme weather conditions; Climatic controls, Climatic extremes - environmental implications Atmospheric Processes: Global distribution of solar energy, Heat balance of the earth- atmosphere system, Earth as a heat engine; Fundamentals of Meteorology Atmospheric thermodynamics – equation of state of dry and moist air, specific heats and application of laws of thermodynamics, thermodynamic process; Climate classification and climate of different land-use Determining factors of climate, Effects of topography,
Unit II: Ecology and Environmental Biology-II	Classification of biomes – Tundra, Taiga, Grassland, Desert, Evergreen and deciduous forests, Tropical rain forests and their characteristics, Classification of Aquatic Habitats – Fresh water and marine (Wetlands, Rivers, Inter-tidal Estuaries; Mangroves)- their characteristics. Definition and concept of community, Characteristics of community, Composition, origin and Development of a community, Community structure, dominance, stratification; Community interdependence, Ecotone, Edge effect and Ecological Niche, Ecological habitat. Introduction and principles of ecotoxicology, Types of toxic substances; Environmental Diseases-Water, Soil & Air related
Unit III: Environmental Chemistry II	Chemistry of Environmental Trace Elements (e.g F, Pb, As, Hg, Cd etc.), chemical speciation & Fractionation; Chemical and photochemical reactions in the atmosphere - formation of smog, PAN, oxygen and ozone chemistry; Catalytic decomposition; process of ozone,

	Water and Air quality monitoring parameters – physical, chemical and biological; Physico-chemical properties of soil – texture, bulk density, permeability; cation exchange capacity, pH, macro- and micro-nutrients
Unit IV: Environmental Statistics and data analysis	Environmental Variables, Environmental data collection and presentations; Parameter and statistics; Basic Statistics - frequency distribution, Measures of Central Tendency and Dispersion, Moments, Skewness and Kurtosis, Population, sample and census, Different techniques of sampling – simple random sampling, stratified random sampling, systematic sampling; Relative advantages and disadvantages of different techniques; Scatter diagram and simple correlation, Concept of Regression.
Unit-V: Energy and Environment	Energy use pattern in different parts of the world and its impact on the environment; Energy use pattern in India; Sources of energy and their classification; Energy forms and transformation; Global energy balance; Fossil fuels; Bio-energy; Solar and Wind Energy; Nuclear energy, Geothermal and Hydrothermal energy

h. Reading list:
   1 Daniel D. Chiras (2010): Environmental Science, eight editions, Jones & Bartlett,
   2 G. M. Masters (2004): Introduction to Environmental Science and Engineering (2nd Ed.), Pearson Education Pvt. Ltd.
   3 S. C. Santra (2011): Environmental Science, New Central Book Agency
   4 Michael Allaby(2000): Basics of Environmental Science (2nd Ed.), Taylor & Francis.
   5 A. R. W. Jackson and J. M. Jackson (1998): Environmental Science – The natural environment and human impact Longman
   6 Miller (1997): Environmental Science (6thed), Wadsworth Pub. Co.
   7 Eugene Odum (2004): Fundamentals of Ecology
   8 S. E. Manahan (2005): Environmental Chemistry (8th), CRC Press
   9 B.K. Sharma (2007): Environmental Chemistry, Goel Publishing House, Meerut, India
   10 James E. Girard (2013): Principles of Environmental Chemistry, Jones &Bartlett
   11 Keller (2012): Introduction to Environmental Geology, 5th Edition; Pearson
   12 K. S. Valdiya (1987): Environmental Geology; Tata McGraw-Hill

i. Graduate Attributes
   I. Course Objective: The course objective is to develop an understanding of the basic concepts of environmental sciences so that the learner can scientifically and objectively evaluate the environmental phenomenon, issues and problems both at local and global level. This will also enable the learner to reflect critically on their own roles and responsibilities as citizens, consumers and environmental actors within a complex interconnected world.
   II. Learning Outcome: This course will enable the students to

- Understand the basic concepts related to meteorology including differentiating between weather and climate and describing the atmospheric processes
- Understanding the various types of ecosystem and their structure and composition. It will enable them to appreciate the structure and functioning of the overall biosphere
- Understand the chemical composition and properties of natural water, soil and air and be able to appreciate the various pathways of chemical elements and compounds that cause pollution of these environmental compartments.
- The students will get a brief overview of the pollution monitoring methods
- Understand the basic concepts of application of statistical theories and methods in environmental analyses
- Appreciate the various forms and sources of energy used across the world and the environmental implications of their extraction and

j. Theory Credit: **3**
k. Practical Credit: **1**
l. No. of Required Classes: **60**
m. No. of Contact Classes: **45**
n. No. of Non-Contact Classes:**15**
o. Particulars of Course Designer :

- Prof.(retd) H.P.Sarma, Department of Environmental Science, GU, hpsarma1957@gmail.com, 9864045328
- Prof(retd) Dulal C Goswami, Department of Environmental Science, GU, dulal.goswami4@gmail.com, 9435199258

Environmental Science

a. Four Year Undergraduate Programme
b. Subject: **Environmental Science**
c. Semester: **Third**
d. Course Name: **Intermediate Environmental Science**
e. Existing Base Syllabus: **Core Papers 1 and 2 of Environmental Science**
f. Course level: **200-299**
g. Syllabus:

Unit	**Contents**
Unit I: Environmental Earth-science-III	General circulation and wind systems; Cyclones and anticyclones; Air masses - source, modification and classification; Fronts and weather systems; Monsoons, El-Nino, La-Nina, ENSO; Scales in meteorology. variation of air temperature, humidity and wind; Climate of India and NE India; Earth's Geodynamic Processes: Concept of foliation, lineation, drag folds, cleavage and joints and faults; Major Subduction and Spreading zones in the world; Formation of tectonic earthquakes; Environmental changes due to Earthquakes, Volcanoes and Tsunami. Hydrologic cycle and hydrologic budget; Inventory of Earth's water; Drainage basin; Watershed management – Concept, objectives, planning and measures
Unit II: Ecology and Environmental Biology-III	Population growth - growth curves, life curves, age structure, function and equilibrium; Population regulation; Factors of population regulation Concept of limiting factors, Laws of limiting factors; Combined concept of limiting factors; Species Interactions (positive and negative); Earth's carrying capacity; Bio geochemical cycles: Oxygen cycle, Carbon cycle Carbon source and Sink, carbon flux, Ocean-Atmosphere exchange, Nitrogen cycle, Sulphur cycle, phosphorous cycle Vector borne diseases - Different kinds of Vectors, Habitat of vectors, Environmental parameters affecting growth and development of vectors; Study of Diseases: Asbestosis, Silicosis Arsenicosis, Fluorosis, Asthma, Allergy, Malaria, Japanese Encephalitis, Filariasis, Itai-Itai

Unit III: Environmental Chemistry III	Noise Pollution: Basic properties of sound waves – loudness and intensity levels, decibel; Sources of Noise Pollution –Measurement and analysis of sound, Effects of Noise pollution on Human health; Measures to control noise pollution Thermal pollution: causes, sources, effects and control measures. Oil pollution: Causes, sources, effects and control Radiation Pollution: Radioactive decay; Biological impact and health hazards associated with radiation, Units of radioactivity and radiation dose; Protection against ionizing isotopes Radioactive waste disposal.
Unit IV: Environmental Geo-informatics	Basic concept of Environmental Geoinformatics: Remote sensing – history & development, definition, concept and principles; Elements involved in remote sensing, electromagnetic spectrum, energy sources, energy interactions with earth surface features & atmosphere, atmospheric windows Remote Sensing Platforms and Sensors: Multispectral and Hyperspectral sensors, Satellite orbits, IRS satellites Introduction to GIS – definition, concept and history of developments in the field of GIS, GIS Components, GIS data types: Spatial (Raster and Vector) & Non-spatial, Definition and concepts, Types of maps, Map scale, Map and Globe, Co- ordinate systems, Map projections, Geo-referencing Application of GIS in Environmental Monitoring
Unit-V: Natural Hazards and Disaster Management	Definition - Hazard, vulnerability and risk; Resilience and Disaster, Types of Hazards-Natural and man-made hazards; Flood, Seismic hazards, Landslide, Erosion causes and consequences with special reference to NE India. Disaster cycle and Management. Strategies for mitigation – warning system, forecasting, Emergency Preparedness, Education and Training Activities, Planning for Rescue and Relief works

h. Reading list:

1 Daniel D. Chiras (2010): Environmental Science, eight editions, Jones & Bartlett,
2 G. M. Masters (2004): Introduction to Environmental Science and Engineering (2nd Ed.), Pearson Education Pvt. Ltd.
3 S. C. Santra (2011): Environmental Science, New Central Book Agency
4 Michael Allaby(2000): Basics of Environmental Science (2nd Ed.), Taylor & Francis.
5 A. R. W. Jackson and J. M. Jackson (1998): Environmental Science – The natural environment and human impact Longman
6 Miller (1997): Environmental Science (6thed), Wadsworth Pub. Co.
7 Eugene Odum (2004): Fundamentals of Ecology

8 S. E. Manahan (2005): Environmental Chemistry (8th), CRC Press
9 B.K. Sharma (2007): Environmental Chemistry, Goel Publishing House, Meerut, India
10 James E. Girard (2013): Principles of Environmental Chemistry, Jones &Bartlett
11 Keller (2012): Introduction to Environmental Geology, 5th Edition; Pearson
12 K. S. Valdiya (1987): Environmental Geology; Tata McGraw-Hill

i. Graduate Attributes

I. Course Objective: The course objective is to develop an understanding of the basic concepts of environmental sciences so that the learner can scientifically and objectively evaluate the environmental phenomenon, issues and problems both at local and global level. This will also enable the learner to reflect critically on their own roles and responsibilities as citizens, consumers and environmental actors within a complex interconnected world.

II. Learning Outcome: This course will enable the students to

- Understand the concepts related to meteorology including the atmospheric processes related to monsoon, climatic classifications and with special reference to NE India
- Understand the basic concepts of hydrological cycle and concepts related to watershed management
- Understanding the various ecological concepts related to population studies, biogeochemistry and environmental health issues
- Understand the concepts of noise, radiation and thermal pollution in the context of industrial growth and their monitoring methods
- Understand the basic concepts of geoinformatics and its application in environmental sciences
- Appreciate the various forms natural hazards occurring across the world and their environmental implications with special reference to NE India and the grasp the basic concepts in disaster management.

j. Theory Credit: **3**
k. Practical Credit: **1**
l. No. of Required Classes: **60**
m. No. of Contact Classes: **45**
n. No. of Non-Contact Classes:**15**
o. Particulars of Course Designer :

- Dr. Minakshi Bora, Assistant professor, Department of Environmental Science, GU, minakshi18@gmail.com, 9101127945
- Dr. Pallavi Sharma, Assistant Professor, Department of Environmental Science, GU, pallavi.sharma@gauhati.ac.in, 9859182234
- Prof(retd) Dulal C Goswami, Department of Environmental Science, GU, dulal.goswami4@gmail.com, 9435199258
- Prof (retd) S. Kalita, Department of Environmental Science, GU, skalita53@gmail.com, 9435148264

Environmental Science

a. Four Year Undergraduate Programme
b. Subject: **Environmental Science**
c. Semester: **Fourth**
d. Course Name: **Forestry and Forest Management**
e. Existing Base Syllabus: **Class XII in Science**
f. Course level: **200-299**
g. Syllabus:

Unit	Contents
Unit I: Forest Ecology and Ethnobotany	Definition, basic concept and importance of forest ecology; Forest communities: Vegetation analysis, biomass, net primary productivity, litter fall, forest floor mass and nutrient cycling; physiology in stress environments (drought, water logging salinity and alkalinity); Definition and concept of Ethnobotany; Role of Ethnobotany in Indian Systems of Medicine; Ayurveda and Unani; Factors affecting action and toxicity of drug plants and their chemical constituents.
Unit II: Silviculture and Silvicultural systems	Definition, Concept & Importance of Silviculture; Types of Silvicultural systems; Silviculture of some economically important trees of India such as Teak, Eucalyptus and Tarmarid
Unit III: Forest Mensuration and Utilization	Forest Mensuration-Definition, Objectives of Measurement, Measurement of trees (Diameter or Girth, Height, Form & Volume)Units of Measurement and Instruments used Environmentally sound forest harvesting practices; logging and extraction techniques and principles, transportation system, storage and sale; Need and importance of wood seasoning and preservation; General principles of seasoning; Utilization of plantation wood; problems and possibilities
Unit-IV: Forest Management	Definition and scope, management of private forest vis-a-vis public forests, objects of management; Legislations related to forest management in India: Forest policies and Laws; Sustainable Forest management strategies
Unit V: Participatory Forest Management	Agroforestry: scope and necessity; Agro forestry systems under different agro-ecological zones; selection of species and role of multipurpose trees and NTFPs Social/Urban Forestry: objectives, scope and necessity; peoples participation. JFM - principles, objectives, methodology, scope, benefits and role of NGOs

	Tribology: Definition and concept; Tribal scene in India; cultural tradition, customs, ethos and participation in forestry programmes.

h. Reading list:
   1. Parthiban et al., (2016): Forestry- A Subjective Guide for IFS Aspirants
   2. Parthiban et al., (2015): Objective Forestry: For all competitive Examinations
   3. Prabhu and Manikandan (2021): Indian Forestry A Breakthrough Approach To Forest Service, 8th Edition
   4. Objective Silviculture And Agroforestry by Behera Suryakanta and Nalini Kumar Panda

i. Graduate Attributes
   I. Course Objective:
      - To teach students the science and skill of producing, maintaining, using, preserving, and restoring forests and related resources for human and environmental benefit.
      - The curriculum aims to teach students specialized topics such as Quantitative Techniques, Forest Mensuration, Management Information System, and Supply Chain Management, among others.

   II. Learning Outcome: This course will enable the students to
      - The course will demonstrate knowledge of forest ecology and silviculture principles to understand how forests and forested watersheds respond to natural disturbances or management activities. The students will also have a gist of the traditional/tribal methods of forest management.

j. Theory Credit: **3**

k. Practical Credit: **1**

l. No. of Required Classes: **60**

m. No. of Contact Classes: **45**

n. No. of Non-Contact Classes:**15**

o. Particulars of Course Designer :
   - Dr. Minakshi Bora, Assistant professor, Department of Environmental Science, GU, minakshi18@gmail.com, 9101127945
   - Dr. Pallavi Sharma, Assistant Professor, Department of Environmental Science, GU, pallavi.sharma@gauhati.ac.in, 9859182234
   - Prof. Partha Pratim Baruah; Dept. of Botany, Gauhati University; ppbaruah@gauhati.ac.in; 7896748848
   - Prof. Jogen Chandra Kalita; Dept. of Zoology, Gauhati University; jogenck@gauhati.ac.in; 9435083544

Environmental Science

a. Four Year Undergraduate Programme
b. Subject: **Environmental Science**
c. Semester: **Fourth**
d. Course Name: **Energy and Environment**
e. Existing Base Syllabus: **Class XII in Science**
f. Course level: **200-299**
g. Syllabus:

Unit-I: Introduction Human energy requirement	Energy use pattern in different parts of the world and its impact on the environment; Energy use pattern in India; Sources of energy and their classification; Energy forms and transformation Sun as source of energy: Source of sun's energy, Solar spectrum, solar radiation – absorption, reflection, scattering and diffusion in the atmosphere, Albedo, Global energy balance.
Unit-II: Fossil Fuels	Fossil fuels – classification, composition, physicochemical characteristics; Energy content of coal, petroleum and natural gas; Formation, reserves, exploration/ mining and uses of Coal, Oil and Natural gas; Environmental problems associated with exploration/mining, processing, transportation and uses
Unit-III: Bio-energy	Biomass composition and types; Conversion processes – pyrolysis, charcoal production, compression, gasification and liquefaction; Energy plantation; Biogas – production and uses, anaerobic digestion; Environmental constrains; Energy from solid Wastes - Sources, types, energy production.
Unit-IV: Solar and Wind Energy Solar Energy	Harnessing of solar energy, Solar collectors and concentrators, Solar thermal energy, Solar electricity generation, Solar heaters, dryers, and cookers; Photovoltaics Wind Energy - Wind power, Harnessing of wind energy, Power generation – wind mills, concentrators, wind characteristics and siting, environmental considerations.
Unit-V: Nuclear energy, Geothermal and Hydrothermal energy	Fission and fusion, Nuclear fuels, – Mining and processing of Uranium – concentration, refining, enrichment, Nuclear reactors and radioactive waste; Environmental implications Harnessing of geothermal energy – problems and prospect; Geothermal energy prospect in India Hydrothermal energy; Tidal and wave energy, Problems and prospects.

h. Reading list:

1 R. Toossi (2009): Energy and the Environment: Sources, Technologies, and Impacts; VarVe Publishers
2 M. André and Z. Samaras (Ed) (2016): Energy and Environment, ISTE, Limited
3 V. C. Nelson (2011): Introduction to Renewable Energy, CRC Press

4 R. Ehrlich (2013): Renewable Energy: A First Course; CRC Press
5 D. Mukherjee (2004): Fundamentals of Renewable Energy Systems, New Age
6 S. K. Agarwal (2003): Nuclear Energy – Principles, practice and prospects; APH Publishing Corporation.

i. Graduate Attributes

I. Course Objective:

- Students will be able to explain the purpose of electrical energy, identify different forms of energy, and define, explain, and list forms of kinetic and potential energy. Facilitate economic integration and cooperation and promote sustainable development.
- Reduce energy and carbon intensities.
- Minimize the impact of the energy sector on the environment from source to use.
- Ensure that energy production, conversion and use is cost competitive.

II. Learning Outcome: This course will enable the students to

- Energy is essential to life and all living organisms. The sun, directly or indirectly, is the source of all the energy available on Earth. Our energy choices and decisions impact Earth's natural systems in ways we may not be aware of, so it is essential that we choose our energy sources carefully.

j. Theory Credit: **3**
k. Practical Credit: **1**
l. No. of Required Classes: **60**
m. No. of Contact Classes: **45**
n. No. of Non-Contact Classes:**15**
o. Particulars of Course Designer :

- Dr. Pallavi Sharma, Assistant Professor, Department of Environmental Science, GU, pallavi.sharma@gauhati.ac.in, 9859182234
- Dr. Minakshi Bora, Assistant professor, Department of Environmental Science, GU, minakshi18@gmail.com, 9101127945
- Prof (retd) S. Kalita, Department of Environmental Science, GU, skalita53@gmail.com, 9435148264
- Prof. Ajay Kalamdahd, Department of Civil Engineering. IIT Guwahati. kajay@iitg.ac.in , 9678621395

Environmental Science

a. Four Year Undergraduate Programme
b. Subject: **Environmental Science**
c. Semester: **Fourth**
d. Course Name: **Environmental Sampling and Survey Techniques**
e. Existing Base Syllabus: **Core 1, Core 2 and Core 3 papers of Environmental Science**
f. Course level: **200-299**
g. Syllabus:

Unit	Content
Unit I: Introduction	Basics of sampling: Concept of sample survey and census, advantages of sample survey over census, errors in sample survey
Unit II: Sampling Methods	Sampling Methods and Environmental Sampling: General guideline, Sampling types, standard methods, sampling equipments, determination of sample size, environmental sampling of soil and water, sampling of air pollution parameters, biological sampling
Unit III: Understanding Survey	Understanding Sample Survey- definition, map scales, linear measurements, classifications, and various stages in a sample survey
Unit IV: Survey Instruments	Modern Surveying Instruments: Instruments used in modern Survey for the environment parameters, Types of curves- transition curve, vertical curve, map projections, classification of projections.
Unit V: Geoinformatics and survey	Remote Sensing Techniques: Introduction, basic principles in brief, Sensors, GIS and uses, GPS, Data model, photogrammetric surveying

h. Reading list:

1 Wayne R. Ott (1994): Environmental Statistics and Data Analysis, Lewis Publishers
2 Vic Barnett (2005): Environmental Statistics: Methods and Applications, John Wiley & Sons Ltd.
3 S. C. Gupta and V. K. Kapoor (2007): Fundamentals of Mathematical Statistics; S. Chand & Co.
4 Aslam Mahmood (1998): Statistical Methods in Geographical Studies; Rajesh Publications, New Delhi
5 J. Medhi (1992): Statistical Methods : An Introductory Text : New Age International Ltd. Publishers

i. Graduate Attributes
   I. Course Objective:
      - The paper attempts to teach the students about different methods and techniques of statistics which are relevant to environmental data analysis.
   II. Learning Outcome:
      - The students would learn how to handle and analyze environmental data sets for drawing statistical inference and decision making through this paper.

j. Theory Credit: **3**
k. Practical Credit: **1**
l. No. of Required Classes: **60**
m. No. of Contact Classes: **45**
n. No. of Non-Contact Classes:**15**
o. Particulars of Course Designer :
   - Prof (retd) S. Kalita, Department of Environmental Science, GU, skalita53@gmail.com, 9435148264
   - Dr. Minakshi Bora, Assistant professor, Department of Environmental Science, GU, minakshi18@gmail.com, 9101127945

Environmental Science

a. Four Year Undergraduate Programme
b. Subject: **Environmental Science**
c. Semester: **Fourth**
d. Course Name: **Environmental Pollution: Monitoring and Control Technologies**
e. Existing Base Syllabus: **Class XII Chemistry**
f. Course level: **200-299**
g. Syllabus:

Unit	Contents
Unit-I: Introduction	Definition and sources of pollution; Different types of pollution and their global, regional and local aspects
Unit-II: Air Pollution	Types and sources of air pollutants; Transport of pollutants, Dispersion models; Effects of air pollutants on flora and fauna; Sinks of atmospheric gases: Firework pollution – composition/ingredients, monitoring strategies, Effect of air pollution on human health
Unit-III: Water Pollution	Sources of water and their contamination; Types of pollutants, Sources of pollutants – domestic wastes, organic debris, agricultural wastes, pesticides; Industrial effluents - pulp and paper mills, oil exploration and refinery, petrochemicals, iron and steel industries; Eutrophication – causes and effects and control measures. Effect of water pollution on human health.
Unit-IV: Noise Pollution	Noise Pollution: Basic properties of sound waves – loudness and intensity levels, decibel; Sources of Noise Pollution –Measurement and analysis of sound, Effects of Noise pollution on Human health; Measures to control noise pollution - Absorbing materials, barrier materials, damping materials, acoustical enclosures, Reactive silencers and filters; Active noise control methods.
Unit-V: Thermal, Marine Pollution and Radioactive	Thermal pollution: Definition and sources, Chemical and biological effects of thermal pollution, Thermal pollution from power plants and their control. Oil pollution and marine ecology, sources of oil pollution, factors effecting fate of oil after spillage, spreading, evaporation, emulsification, dispersion. Radiation Pollution: Radioactive decay; Biological impact and health hazards associated with radiation, Units of radioactivity and radiation dose; Protection against ionizing isotopes Radioactive waste disposal.

h. Reading list:

1 **C.S. Rao (2018)** Environmental Pollution Control Engineering; 3rd Edition; New Age International
2 **H. Koren (1980)** Handbook of Environmental Health and Safety – principle and practices (Vol. I & II); Lewis Publishers

3 **Manahan, Stanley. E. (1997)** Environmental Science and Technology, Lewis Publication.
4 **Marquita K. Hill (2004)** Understanding Environmental Pollution: A Primer; Cambridge University Press
5 **P Aarne Vesilind J. Jeffrey, Peirce Ruth, F. Weiner (1990**) Environmental Pollution and Control, 8th Edition; Butterworth-Heinemann
6 **Maiti, S.K.,** Handbook of methods in Environmental Studies, Vol. I & II, ABD Publ.
7 **APHA (1984)** Standard Methods for examination of water and wastewater. American Public Health Association, 12th Ed.
8 **Trivedy, R.K., & Goel, P.K.,** Chemical & Biological Methods for Water Pollution Studies, Environmental Publ.

i. Graduate Attributes

I. Course Objective:

- This course is aimed at developing student knowledge & skills on environmental pollution control and management. The course is focused on the assessment & management of impacts of different types of pollution on human society and critical appraisal of environmental engineering approaches to manage risks and mitigate pollution.

II. Learning Outcome: On completion of the course the student is expected to be able to:

- Appreciate underlying processes that causes environmental pollution and the methods used to assess & manage risks of pollution on human society
- Critically evaluate environmental engineering-based systems of pollution monitoring, control & management
- Understand the various national and international systems and standards of environmental management including various pollution control legislation & policies

j. Theory Credit: **3**
k. Practical Credit: **1**
l. No. of Required Classes: **60**
m. No. of Contact Classes: **45**
n. No. of Non-Contact Classes:**15**
o. Particulars of Course Designer :

- Prof.(retd) H.P.Sarma, Department of Environmental Science, GU, hpsarma1957@gmail.com, 9864045328
- Dr. Pallavi Sharma, Assistant Professor, Department of Environmental Science, GU, pallavi.sharma@gauhati.ac.in, 9859182234

Environmental Science

a. Four Year Undergraduate Programme
b. Subject: **Environmental Science**
c. Semester: **Fifth**
d. Course Name: **Analytical Methods for Environmental Monitoring**
e. Existing Base Syllabus: **Core 1, Core 2 and Core 3 papers of Environmental Science**
f. Course level: **300-399**
g. Syllabus:

Unit	Contents
Unit-I: Sampling and Sample preparation	Sampling of Air, Water and Soil; Sampling equipments; Preparation of sample for trace metal analysis in water air and soil: Dissolution techniques and microwave digestion
Unit-II: Methods for water and soil analysis	Physiochemical parameters – Definition and determination of Conductivity, pH, DO, BOD,COD; Measuring instruments used for determination of Physiochemical parameters
Unit-III: Analysis of Metal Ions	Colorimetry and Spectrophotometry – theory and instrumentation; Theory, instrumentation and application of Atomic Absorption Spectrometry, Flame Emission Spectrometry and Inductively Coupled Plasma Mass Emission Spectrometry
Unit-IV: Separation Techniques	Principle and process of solvent extraction, Extraction reagents and Practical applications; Chromatography – principle and application of thin layer and ion exchange chromatography
Unit-V: HPLC, GCGC-MS, and IC	Principle, instrumentation and applicationsof Gas Chromatography and High-Performance Liquid Chromatography, Principle and applicationof Ion-chromatography, GC-MS

h. Reading list:

1 Rafi Ahmad, Frank Taylor, Michael Cartwright (2001): Analytical Methods for Environmental Monitoring, Prentice Hall
2 Roger N. Reeve (2002): Introduction to Environmental Analysis, John Willy & Sons
3 Mahmood Barbooti (2015): Environmental Applications of Instrumental Chemical Analysis, CRC press
4 A. E. Greenberg, A. D. Eaton; APHA, AWWA, WEF: Standard Methods for Examination of water and waste water
5 C. N. Sawyer, P. L. McCarty and G. F. Parkin: Chemistry for Environmental Engineering and Science
6 H. H. Rupa and H. Krist; Laboratory Manual for the Examination of Water, Waste water and soil; V C H Publication

i. Graduate Attributes

I. Course Objective:
   - The course is designed to develop sampling and analytical skills of the students which are required in environmental monitoring
   - The students will be exposed to various standard protocols used in environmental monitoring
   - Understand the biomonitoring of the environment
   - Learn the sampling techniques and sample preservation
   - Determine the analytical techniques that are required to collect samples for a variety of contaminants/pollutants.

II. Learning Outcome:
   - Understand the basic terminologies related to environmental contaminations, monitoring, pollutants and ecosystems.
   - Apply environmental sampling techniques in practice for water, soil, sediment and air
   - Classify and categorize sources and types of pollution

j. Theory Credit: **3**
k. Practical Credit: **1**
l. No. of Required Classes: **60**
m. No. of Contact Classes: **45**
n. No. of Non-Contact Classes: **15**
o. Particulars of Course Designer :
   - Prof.(retd) H.P.Sarma, Department of Environmental Science, GU, hpsarma1957@gmail.com, 9864045328
   - Dr. Pallavi Sharma, Assistant Professor, Department of Environmental Science, GU, pallavi.sharma@gauhati.ac.in, 9859182234

Environmental Science

a. Four Year Undergraduate Programme
b. Subject: **Environmental Science**
c. Semester: **Fifth**
d. Course Name: **Ecosystem Dynamics, Global Change & Ecological Restoration**
e. Existing Base Syllabus: **Core papers of Environmental Science**
f. Course level: **300-399**
g. Syllabus:

Unit	**Contents**
Unit-I: Ecosystem Dynamics-I	System-like properties of Ecosystem; Application of concept of Systems and System Models in population and ecosystem studies; System Stability and Change - Cause and Effect; Interactions among the living and non-living entities of ecosystem; complexity of interactions; Ecological energetics: Laws of Thermodynamics and their ecological significance; Flow of matter and energy through an ecosystem; hierarchy and integrative levels of organization; feedback loops and regulatory processes; Linear and Non-linear development of ecosystems
Unit II: Ecosystem Dynamics-II	Ecosystem Functions and Services; Ecosystem's resilience to change; Ecological Threshold; Productivity of ecosystems Role of humans in ecosystems; Human needs and biodiversity; Trade-offs between conservation and development goals; Concept of Social-ecological system(SES); Social-ecological systems framework and sustainability
Unit-III: Population Dynamics	Populations within ecosystems; Attributes of Populations; Interactions; Population regulation; Role of different species – role of ecosystem engineers, keystone species, and indicator species; Habitat Partitioning; Concept of Niche; role of species in shaping their ecosystems; Adaptation of species to their environments; Concept of population stability and change; Impact of the addition or loss of a species on an ecosystem; Models in population ecology: Structured and Unstructured models of population growth; Meta-population dynamics; Population Viability analysis; Competition and Predation models; Harvest models; Life history and Life history traits.
Unit-IV: Ecosystem and Global Change	Temporal Dynamics - Inter-annual versus long-term fluctuations in ecosystem processes; disturbance cycles and the successional process; Landscape Heterogeneity and Ecosystem Dynamics - Spatial variation in ecosystem patterns and processes; concepts of state-factors and interactive controls; patch dynamics on the landscape; movement of plants and animals; human land-use change;

	Consequences of human-alterations of global biogeochemical cycling

Unit-V: Ecological Restoration	Defining Ecological Restoration; Principles of ecosystem restoration – Guiding Principles and Ecological Principles; Reference ecosystems;
	Terrestrial - Wildlife Habitat Restoration, Species Reintroduction;
	Invasive species management;
	Aquatic Ecosystem Restoration – Streams and Wetlands;
	Fire and Forest Restoration; Revegetation;
	Bio-cultural approaches to Conservation and Restoration; Traditional Knowledge and Community Engagement in restoration;
	Methods and principles in Restoration planning.

h. Reading list:

1 **Folke, Carl, Thomas Hahn, Per Olsson, and Jon Norberg (2005)** ADAPTIVE GOVERNANCE OF SOCIAL-ECOLOGICAL SYSTEMS. Annual Review of Environment and Resources 30 (1): 441-473.

2 **Ostrom, Elinor. (2009)** A General Framework for Analyzing Sustainability of SocialEcological Systems. Science 325 (5939): 419-422.

3 **Epstein, Graham, et al.** "Missing ecology: integrating ecological perspectives with the social ecological system framework. International Journal of the Commons 7.2 (2013): 432-453

4 **Partelow, Stefan (2018)** A Review of the Social-Ecological Systems Framework: Applications, Methods, Modifications, and Challenges. Ecology and Society 23(4)

5 **Folke, C. (2016)**. Resilience (Republished). Ecology and Society 21(4):44. https://doi.org/10.5751/ES-09088-210444

6 **Schlesinger, W.H., E.S. Bernhardt (2013)**. Biogeochemistry: An Analysis of Global Change, Academic Press (Elsevier), San Diego, 3rd Edition, 688 pp

7 **D.A. Falk, M.A. Palmer and J.B. Zedler (2016)** Foundations of Restoration Ecology. SECOND EDITION. Island Press. N

i. Graduate Attributes

I. Course Objective:

- The course builds further on the students' knowledge and experiences from earlier courses in ecology and aims at conveying an independent and evidence-based working method for a future professional career and in research, with sustainable development as the overarching aim. The course focuses on how current ecological theory describes the interplay among organisms and their environment and how this knowledge can be applied to analyzing and solving ecological problems such as conservation of ecological communities, sustainable harvesting of populations and regulation of ecosystem processes. The main emphasis is on the dynamics of consumer-resource interactions and spatial processes and their influence on ecological, as well as evolutionary, processes at the population, community and ecosystem levels.

II. Learning Outcome: On completion of the course, the student should be able to -

- explain important ecological processes, principles and concepts, as well as evaluate and critically report on theories and scientific results in population, community and ecosystem ecology

- broadly explain structure and function of ecosystems and interactions between them from a systems perspective, and justify the use of systems approach as a basis for nature conservation, environmental protection and management
- construct and analyze population and ecosystem models with graphical and numerical methods
- explain and distinguish between different forms of anthropogenic influence on ecosystems
- independently plan, justify and carry out sampling and analysis for monitoring and evaluate the results
- Develop skill sets and perspectives that are necessary for application of ‘resilience thinking’ to contemporary resource management.

j. Theory Credit: **3**
k. Practical Credit: **1**
l. No. of Required Classes: **60**
m. No. of Contact Classes: **45**
n. No. of Non-Contact Classes: **15**
o. Particulars of Course Designer :

- Dr. Pallavi Sharma, Assistant Professor, Department of Environmental Science, GU, pallavi.sharma@gauhati.ac.in, 9859182234
- Dr. Minakshi Bora, Assistant professor, Department of Environmental Science, GU, minakshi18@gmail.com, 9101127945
- Prof. Partha Pratim Baruah; Dept. of Botany, Gauhati University; ppbaruah@gauhati.ac.in; 7896748848
- Prof. Jogen Chandra Kalita; Dept. of Zoology, Gauhati University; jogenck@gauhati.ac.in; 9435083544

Environmental Science

a. Four Year Undergraduate Programme
b. Subject: **Environmental Science**
c. Semester: **Fifth**
d. Course Name: **Eco-hydrology and Watershed Management**
e. Existing Base Syllabus: **Class XII Science and Core papers of Environmental Science**
f. Course level: **300-399**
g. Syllabus:

Unit	Contents
Unit I: Introduction	Hydrologic cycle and hydrologic budget; Inventory of Earth's water; Global Water Balance Drainage basin – characteristics; Stream classification; Stream ordering: Horton & Strahler method Watershed management – Concept, objectives, planning and measures
Unit II: Precipitation	Mechanism, forms and types of precipitation; Measurement of precipitation - rain gauge, radar, satellite; Estimation of areal average precipitation; Precipitation characteristics in India –with special reference to Northeast India;
Unit III: Water Abstraction	Different process of water abstraction in a basin**;** Evaporation and evapotranspiration - Mechanism, Measurement & Factors affecting evaporation and transpiration; Infiltration and percolation - Infiltration capacity of soil, Factors influencing infiltration capacity; Methods of determining infiltration capacity
Unit IV: Runoff and Stream flow	Factors affecting runoff – climatic & physiographic; Stream flow measurement – stage and discharge; Stage-discharge relationship - rating curves and their determination; Stream flow hydrograph – elements, analysis, flow separation Unit hydrograph – concept, assumption, construction, limitations and uses
Unit-V: Ground water and Wetland Hydrology	Definition – soil moisture, Water table, Aquifers; Geology of aquifers; Environmental influences on ground water - fluctuations due to evapotranspiration, fluctuations due to meteorological phenomena, urbanization; Ground water recharging and rain water harvesting Wetlands – definition, classification & environmental significance

h. Reading list:
1 Elementary hydrology: V. P. Singh,
2 Hydrology – Principles, analysis and design: H. M. Raghunath,
3 Elements of water resource engineering: K. N. Duggal and J. P. Soni,
4 Applied Hydrology: Chow
5 Integrated watershed management: Rajora

6. River Basin Morphology: Devi
7. Applied Hydrology-Murtreja
8. Engineering Hydrology: K. Subramanya
9. Elementary Engineering Hydrology: M. J. Deodhar
10. Engineering Hydrology-C.S.P. Ojha, R. Berndtsson and P. Bhuyan
11. Integrated Watershed Management: E. Beheim, G.S.Rajwar, M.J.Haigh and J. Krecek

i. Graduate Attributes

I. Course Objective:

- Aim of this course is to make aware the students regarding the ecological aspects of hydrology so that their knowledge can be used for watershed management practices for the proper use of water resource available in a basin.

II. Learning Outcome:

- Provide a background in the theory of hydrological processes and their measurement
- Apply science and engineering fundamentals to solve current problems and to anticipate, mitigate and prevent future problems in the area of water resources management
- The students would develop an ability to manipulate hydrological data and undertake widely-used data analysis
- The students can define the key components of a functioning groundwater, can determine the main aquifer properties – permeability, transmissivity and storage by identifying geological formations capable of storing and transporting groundwater
- The students would be able to apply different methods and importance of rain water harvesting

j. Theory Credit: **3**

k. Practical Credit: **1**

l. No. of Required Classes: **60**

m. No. of Contact Classes: **45**

n. No. of Non-Contact Classes: **15**

o. Particulars of Course Designer :

- Prof(retd) Dulal C Goswami, Department of Environmental Science, GU, dulal.goswami4@gmail.com, 9435199258
- Dr. Minakshi Bora, Assistant professor, Department of Environmental Science, GU, minakshi18@gmail.com, 9101127945

Environmental Science

a. Four Year Undergraduate Programme
b. Subject: **Environmental Science**
c. Semester: **Fifth**
d. Course Name: **Environmental Health and Ecotoxicology**
e. Existing Base Syllabus: **Core papers of Environmental Science**
f. Course level: **300-399**
g. Syllabus:

Unit-I: Overview of Environmental Health and Diseases	Health and Diseases, Environmental factors and health, Public exposure to industrial pollution, Occupational Health Hazards, Health problem due to industrial dust, heat, chemicals, noise, toxic gases and heavy metals; Health hazard in agriculture - Pesticides and environment, Pesticides and human health. Environmental Diseases – Asbestosis, Silicosis, Asthma, Fluorosis and Arsenicosis
Unit-II: Eco-toxicology and Toxicants	Introduction to ecotoxicology, Principles of toxicology, Types of toxic substances - degradable and non-degradable; Influence of different factors on the effects of toxicity, Exposure types, Exposure pattern, Dose, Interaction within chemicals Toxicants in the Environment, their sources and entry roots; Transport of toxicants by air and water; Environmental Fate Models, Transport through food chain - bio-accumulation and bio-magnification
Unit-III: Man and Environmental Toxins	Routes of toxicants to human body – entrythrough inhalation, skin absorption, indigestion and injection; Absorption and Translocation of Toxic agents, Fate of the Toxic agent after Absorption, Accumulation of the toxic agent in Biological systems, Response to toxin exposures –Dose response Curve; Lethal and sub-lethal doses; Dose-Response relationships between chemical and biological reactions. Analysis of NOEL, LD 50, LC 50 and MLD; Biotransformation of Toxic Agents-Stage I and Stage II Reactions, Detoxification in human body - detoxification mechanisms, organs of detoxification
Unit-IV: Environment and Vector borne	Different kinds of Vectors, Habitat of vectors, Environmental parameters affecting growth and development of vectors, Control technique of vectors population; Vector borne diseases - Malaria, Kalaazar; Dengue, Japanese

Diseases	Encephalitis,Covid 19.
Unit-V: Environmental Health Hazard and Risk Assessment	Hazard and risk, Biological, chemical, physical and psychological health hazard; Health risk assessment and management, Bioconcentration Factor, Numerical related to Chronic Daily Intake, Exposure Risk and Margin of Safety, Therapeutic Margin, Selective toxicity

h. Reading list:

1 D. W Moeller and D. W Moeller (2009): Environmental Health, (3rd Edition), HarvardUniversity Press

2 Friis (2018): Essentials of Environmental Health, Jones & Bartlett Learning

3 H. Koren and M. S. Bisesi (2002): Handbook of Environmental Health, 4thEdn. (Vol. I & II),Taylor & Francis

4 I. C. Shaw and J. Chadwick (1998): Principles of Environmental Toxicology; Taylor&Francis ltd

5 Ming-Ho Yu, H. Tsunoda and M. Tsunoda (2016): Environmental Toxicology: Biologicaland Health Effects of Pollutants (3rdedn), CRC Press

6 L. G. Cockerham, B. S. Shane (1993): Basic Environmental Toxicology. CRC Press

7 Monroe T. Morgan and D. B. Barnett (2003): Environmental Health; Thomson/Wadsworth

i. Graduate Attributes

I. Course Objective:

- The main objective of the course is to give the students knowledge and skills that allow an overall assessment of the fate of foreign chemicals in the environment and of their effects on biological system. Moreover, the conceptual framework introduced during the course in toxicology will be further developed and use in practical applications.

II. Learning Outcome: On completion of the course, the student should be able to:

- describe sources and fates of chemicals in the environment
- present and explain mechanisms for adverse effects of chemicals
- estimate the risk for adverse effects of a chemical on different biological systems based on knowledge about the toxicity, degradability, and bioavailability of the chemical
- able to conduct Risk assessment study for different toxicants in the environment

j. Theory Credit: **3**

k. Practical Credit: **1**

l. No. of Required Classes: **60**
m. No. of Contact Classes: **45**
n. No. of Non-Contact Classes: **15**
o. Particulars of Course Designer :

- Dr. Pallavi Sharma, Assistant Professor, Department of Environmental Science, GU, pallavi.sharma@gauhati.ac.in, 9859182234
- Prof(retd) Dulal C Goswami, Department of Environmental Science, GU, dulal.goswami4@gmail.com, 9435199258
- Prof (retd) S. Kalita, Department of Environmental Science, GU, skalita53@gmail.com, 9435148264

Environmental Science

a. Four Year Undergraduate Programme
b. Subject: **Environmental Science**
c. Semester: **Sixth**
d. Course Name: **Environmental Hazards and their Mitigation**
e. Existing Base Syllabus: **Core papers of Environmental Science**
f. Course level: **300-399**
g. Syllabus:

Unit	Contents
Unit I: Introduction	Definition - Hazard, vulnerability and risk; Types of Hazards-Natural and man-made hazards; Strategies for mitigation – warning system, forecasting, Emergency Preparedness, Education and Training Activities, Planning for Rescue and Relief works
Unit II: Geophysical Hazards: Seismic Hazards & Landslide Hazards	Origin and severity of earthquakes; Effects of earthquakes; Risk evaluation, seismic hazards and its zonation in India, Coping with seismic hazards; Tsunami – their origin, nature and impact on coastal areas Slope instability and Landslide hazard; Causes – destabilizing forces; Mass movement types; Atterberg limits; Subsidence and swelling of ground; Landslides in NE India
Unit III: Flood hazard and its management	Definition - Floods, Floodplains and Flood-Prone Areas; Causes, nature and frequency of flooding; Environmental effects of flooding; Flood mitigation and management Floods in NE India; Flood hazard management in NE – Structural and Non-structural Measures
Unit IV: Meteorological Hazards	Desertification & Drought–Causes, Types, Distribution and Management Cyclones – their nature and genesis; Nor'westers; Weather associated with cyclones
Unit-V: Man-made Hazards	Hazards due to dams and reservoirs; Hazards due to nuclear power plant; Industrial hazards; Occupational hazards; Mitigation measures for man-made hazards

h. Reading list:
  1 Floods – A geographical perspective: R. Ward
  2 Natural Hazards – Local, National, Global: G. F. White

3 Handbook of Applied Hydrology: V.T. Chow
4 Satellite Remote Sensing Technology for Natural Hazards Preparedness and Emergency
5 Response Planning: G. Morgan
6 Elementary seismology: C. F. Richter
7 Geodynamics of Northeastern India and the adjoining region: D. R. Nandy
8 Introduction to Seismology: P. M. Shearer
9 Principles of Seismology: A. Udias
10 Fundamentals of Geophysics: W. Lowrie
11 Environmental geo-hazards (Vol. I & II): K. K. Sharma, S. K. Bandooni and V. S. Negi
12 Environmental Hazards: S. N. Prasad

i. Graduate Attributes

I. Course Objective:

- Indian subcontinent, especially the N.E region is highly exposed to natural hazards like earthquake, floods, droughts, landslides, soil erosion, cyclones etc. and so the students should be educated with the in-depth knowledge about these hazards and their mitigation measures.

II. Learning Outcome:

- The course addresses the full range of hazardous events from extreme geological, hydrological, atmospheric and biological events, such as earthquakes, floods, storms and epidemics, to technological failures and malfunctions, such as industrial explosions, fires and toxic material releases. This course would highlight issues of human exposure, vulnerability, awareness, response and risk. The role of hazards in affecting development, and issues of efficiency, social justice and sustainability would also be explored in the course.

j. Theory Credit: **3**
k. Practical Credit: **1**
l. No. of Required Classes: **60**
m. No. of Contact Classes: **45**
n. No. of Non-Contact Classes: **15**
o. Particulars of Course Designer :

- Dr. Minakshi Bora, Assistant Prof. Dept. of Environmental Science, GU, minakshi18@gauhati.ac.in, 9101127945
- Prof (retd) S. Kalita; Dept. of Environmental Science, GU; skalita53@gmail.com; 9435148264
- Prof. Bhagawat Pran Duarah; Dept. of Geological Sciences, Gauhati University; bpduarah@gauhati.ac.in; 9864324036

Environmental Science

a. Four Year Undergraduate Programme
b. Subject: **Environmental Science**
c. Semester: **Sixth**
d. Course Name: **Environmental Meteorology**
e. Existing Base Syllabus: **Core papers of Environmental Science**
f. Course level: **300-399**
g. Syllabus:

Unit	Content
Unit I: Introduction	Definition and scope of meteorology, Meteorological Parameters - Units, Data interpretation and analysis, Atmospheric variables – pressure, temperature, density and humidity, Solar radiation and Heat balance of the Earth-Atmosphere System
Unit II Atmosphere	Atmospheric layers and their characteristics, Atmospheric gases and particles, SPM
Unit III: Atmospheric Thermodynamics	– Gas Laws, Equation of state of dry and moist air, Specific heats and application of laws of thermodynamics, Thermodynamic process; Temperature lapse rate and inversion; Hydrostatic balance and atmospheric stability; Planetary boundary layer – variation of air temperature, Humidity and wind; Diffusion and Turbulence, Mixing height
Unit IV: Atmospheric processes	– Wind circulation and different types of winds, Cyclone and Anticyclones – associated weather phenomenon; Cloud formation and its mechanism; Precipitation types, Spatial distribution of precipitation – effect of topographic barriers, Evaporation and Evapo-transpiration; Air masses- formation and their sources, ENSO, El Nino, La Nina
Unit V: Weather and Climate:	Concept of weather and Climate, weather elements, Measurements of weather parameters, Instruments for measurements of weather parameters, climatic extremes - Environmental implications, IPCC, UNFCCC, Climate change and NE India, Global impacts of climate change, Climate; agriculture and industry

h. Reading list:

1 The atmosphere (2^{nd} edition): Richard A. Anthese, Hans A. Panofsky, John J. chair, Albert Rango.
2 Climatology (2^{nd} edition) : an atmospheric Science: John E Oliver, John J. Hidore
3 General climatology (2003): Howard J. Critchfield
4 Fundamentals Of Meteorology 2021 Edition: Spiridonov V., Springer
5 Meteorology: An Introduction to Weather, Climate, and the Environment: C. Donald Ahrens, Robert Henson

i. Graduate Attributes
  I. Course Objective:
    - This paper attempts to teach various meteorological phenomenon's related to our environment
  II. Learning Outcome:
    - Meteorology is a very essential subject to understand the day to day weather events. This paper will let the students know about the wind circulation of earth atmosphere system and related weather phenomenon and climatic events which are very essential now a day's owing to the effects of global warming and climate change

j. Theory Credit: **3**
k. Practical Credit: **1**
l. No. of Required Classes: **60**
m. No. of Contact Classes: **45**
n. No. of Non-Contact Classes: **15**
o. Particulars of Course Designer :
  - Prof(retd) Dulal C Goswami, Department of Environmental Science, GU, dulal.goswami4@gmail.com, 9435199258
  - Prof (retd) S. Kalita; Dept. of Environmental Science, GU; skalita53@gmail.com; 9435148264

Environmental Science

a. Four Year Undergraduate Programme
b. Subject: **Environmental Science**
c. Semester: **Sixth**
d. Course Name: **Environmental Law and Management**
e. Existing Base Syllabus: **Core papers of Environmental Science**
f. Course level: **300-399**
g. Syllabus:

Units	**Contents**
Unit I: Important national policies	National environmental policy, 2006; National Forest policy, 1894, 1952 and 1988; National water policy 2002 and other policies e.g., National biotechnology policy, National agricultural policy etc.
Unit II: Environmental legislation	Legal definitions (environmental pollution, natural resource, biodiversity, forest, sustainable development); The Indian Forest Act 1927; The Wildlife (Protection) Act 1972; The Water (Prevention and Control of Pollution) Act 1974; The Forests (Conservation) Act 1980; The Air (Prevention and Control of Pollution) Act 1981; The Environment (Protection) Act 1986; Motor Vehicle Act 1988; The Public Liability Insurance Act 1991; Noise Pollution (Regulation and Control) Rules 2000; The Biological Diversity Act 2002; The Schedule Tribes and other Traditional Dwellers (Recognition of Forests Rights) Act 2006; The National Green Tribunal Act 2010; Wetland (Conservation and Management) Rules, 2017; Legal control of Public liability insurance-Act 1991
Unit III: International laws and policy	Role of UN authorities in protection of Global Environment, Nairobi Declaration, Vienna Convention, Basal convention, Stockholm Conference 1972; United Nations Conference on Environment and Development 1992; Rio de Janeiro (Rio Declaration, Agenda 21); Montreal Protocol, 1987; Kyoto Protocol 1997; Copenhagen and Paris summits; Ramsar convention; Copenhagen Summit, 2009
Unit-IV: Legal control of Waste	Environmental management: Concept and scope; Environment management Systems (EMS) and approaches; Management of Solid waste (Municipal, Bio medical, Hazardous, E waste): Municipal Solid Wastes (Management & Handling) Rules, 2000; Hazardous and Other Wastes (Management and Transboundary Movement) Amendment Rules, 2022; Bio-Medical Waste Management (Second Amendment) Rules, 2019; E-Waste (Management) Rules, 2022; Plastic Waste Management (Second Amendment) Rules, 2022. Swachh Bharat Abhiyan guidelines (Gramin & Urban)
Unit V: Environmental Audit & Case studies	Environmental Audit; Coverage – GOI Notification on Environmental Audit – Benefits to Industry; Report to industry, public and the governments, International and Indian Environmental Audit Scenario, Green Economy, Green funding, Environmental management system (EMS): Carbon Trading/ Emission/Trading, Carbon Tax, Tax shift- green taxes, Environmental Certification, Green technology, Eco-labeling; International trade and environment; Trade Related Intellectual Properties (TRIPs), Intellectual Property Rights (IPRs); Carbon Footprint (Personal/Business), Carbon Market, National Green Tribunal: Aditya N Prasad vs. Union of India & Others; Ganga Tanneries Case: M.C. Mehta vs. Union of India 1988; environmental education case: M.C. Mehta vs. Union of India, WP 860/1991

h. Reading list:

1 Anonymous (1997) The Indian Forest Act, 1927 along with forest conservation act, 1980. Natraj Publisher's Dehradun.
2 Divan, S. and Rosencranz, A. (2002) Environmental Law and Policy in India (2nd edn.). Oxford.
3 Eccleston, C. H. (2011): Environmental Impact Assessment. Taylor & Francis.
4 Sustainable development (Vol. I & II): N. L. Gupta and K. K. Gurjar (ed); Rawat Publications
5 Environmental management: G. N. Pandey; Vikash Publishing House
6 Environmental management: H. M. Saxena; Rawat Publications
7 Environmental Law and Policy in India: S. Divan & A. Rosencranz; Oxford University Press
8 Environmental Management – Physio-ecological facets (Vol. I & II): Rai, Mohapatra & Goel (ed); Rawat Publications
9 Environmental Management in India Vol. I & II): R. K. Sapru; Ashish Publishing House

i. Graduate Attributes
   I. Course Objective:
      i. To explain the role of law, policy and institutions in the conservation and management of natural resources as well as pollution control
      ii. To introduce the laws and policies both at the national and international level relating to environment
      iii. To equip the students with the skills needed for interpreting laws, policies and judicial decisions
   II. Learning Outcome:
      i. Be familiar with the laws, policies and institutions in the field of environment.
      ii. Acquire the skills needed for interpreting laws, policies and judicial decisions in a holistic perspective.
      iii. Also acquire the ability to evaluate the role of law and policy in conservation and management of natural resources and prevention of pollution.

j. Theory Credit: **3**
k. Practical Credit: **1**
l. No. of Required Classes: **60**
m. No. of Contact Classes: **45**
n. No. of Non-Contact Classes: **15**
o. Particulars of Course Designer :

- Dr. Pallavi Sharma, Assistant Professor, Department of Environmental Science, GU, pallavi.sharma@gauhati.ac.in, 9859182234
- Dr. Minakshi Bora, Assistant professor, Department of Environmental Science, GU, minakshi18@gmail.com, 9101127945
- Prof(retd) Dulal C Goswami, Department of Environmental Science, GU, dulal.goswami4@gmail.com, 9435199258
- Prof (retd) S. Kalita, Department of Environmental Science, GU, skalita53@gmail.com, 9435148264

Environmental Science

a. Four Year Undergraduate Programme
b. Subject: **Environmental Science**
c. Semester: **Sixth**
d. Course Name: **Advances in Environmental Geoinformatics**
e. Existing Base Syllabus: **Core papers of Environmental Science**
f. Course level: **300-399**
g. Syllabus:

Unit	Contents
Unit I: Aerial Photography	Fundamentals of photogrammetry; Aerial cameras; Planning of aerial photography; Concept of vertical, tilted and oblique photography; Stereoscopy and Principle of stereo-photography; Stereoscopic Parallax and measurement of height & slope; Application of Aerial Photography in Environmental studies with special reference to Unmanned Aerial Vehicles (UAVs)
Unit II: Global Positioning System	Basic principle of GPS; Information provided by GPS; GPS segments; NAVSTAR system; Indian indigenous GPS; Differential GPS; Indian indigenous GPS system: NavIC; Applications of GPS in Environmental studies
Unit III: Map Projection	Cartography: Definition and concepts, Types of maps, Map scale, Map and Globe; Map Projection concepts; Necessity of Map Projection; Defining different spheroids for accurate mapping; Datums; Global Reference System; Projected Coordinate systems; Properties of map projections, Projection Types; Choosing a map projection; New series of SOI, Image rectification and Georeferencing
Unit IV: GIS based environmental modelling	Basic concept and principle of environmental modeling; GIS based hydrological/watershed model, air pollution dispersion model, urban planning, natural resource mapping, forest degradation studies, GIS based noise mapping; use of remote sensing and GIS in wildlife conservational modeling and planning.
Unit III: Spatial Data Analysis	Logical operations, general arithmetic operations, general statistical operations, geometric operations, query and report generation from attribute data, geometric data search and retrieval, complex operations of attribute data, classification reclassification, integrated geometry and attributes, overlay, buffer zones, raster data overlay, integrated data analysis

h. Reading list:

1 B. Bhatta (2013): Research Methods in Remote Sensing
2 B. Bhatta (2020): Remote Sensing and GIS; 3rd edition
3 J. R. Jensen (2007): Remote Sensing of the Environment – An earth resource perspective; Pearson Education
4 Martin (2003): Geographic Information Systems; Routledge
5 Heywood (2010): An Introduction to GIS; Pearson
6 Yadav (1997): Remote S sensing in Land Evaluation; Rajesh Pub
7 N. K. Agarwal (2004): Essentials of GPS; Spatial Networks Pvt. Ltd., Hyderabad

i. Graduate Attributes

I. Course Objective: The course is designed to fulfill the following objectives

- To provide exposure to students in gaining knowledge on concepts and applications leading to modeling of earth resources management using Remote Sensing
- To acquire skills in storing, managing digital data for planning and development
- It aims at providing basic photogrammetry concept, procedures and processing task.

II. Learning Outcome:

- The students on the completion of this course would be able to understand the basics of terrestrial and satellite digital photogrammetry.
- They will be able to identify and communicate concepts of data model and modeling which is vital in any environmental analysis.
- Acquire skills in handling instruments, tools, techniques and modeling while using Remote Sensing Technology

j. Theory Credit: **3**
k. Practical Credit: **1**
l. No. of Required Classes: **60**
m. No. of Contact Classes: **45**
n. No. of Non-Contact Classes: **15**
o. Particulars of Course Designer :

- Dr. Minakshi Bora, Assistant professor, Department of Environmental Science, GU, minakshi18@gmail.com, 9101127945
- Prof. Dhrubajyoti Saharia, Department of Geography, Gauahti University, dhruvajyoti@gauhati.ac.in, 9864137971
- Prof Sarat Phukan, Department of Geological Science, Gauahti University, saratphukan@gauhati.ac.in, 7002041539

Syllabus for

Four-year Undergraduate Programme

Geography

Syllabus as per NEP 2020

Course effective from academic year 2023-24

GAUHATI UNIVERSITY
Guwahati-781014

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Department of Geography
Gauhati University

Syllabus as per NEP 2020

Approved as per UGCCS in Geography held on 22-03-2023

Four-year Undergraduate Programme

Subject: Geography
Semester: I

Course Name: Introduction to Physical Geography
(Compulsory)

Course Level: Foundation & Introductory

100 Marks (Theory =80 Marks, Internal Assessment = 20 Marks)

Theory (4 Credits, 80 marks, 60 classes of one-hour duration)

Unit I: Evolution and growth of Physical geography
Growth of nature-centric geography; evolution and trend of Physical Geography as a study of earth process systems; meaning, scope and nature of Physical Geography; branches of Physical Geography; Physical geography and its interdisciplinary nature.

Unit II: Geomorphology
Meaning, scope and significance of geomorphological studies. fundamental concepts in geomorphology: catastrophism, uniformitarianism, and Davisian concept of landform development.

Unit III: Climatology
Meaning, scope and significance of climatological studies. fundamental concepts in Climatology: insolation and heat budget, temperature, pressure and precipitation relationship; pressure and windsystems.

Unit IV: Oceanography
Meaning, scope and significance of oceanographic studies; fundamental concepts in oceanography: origin of ocean basins, the origin of ocean currents, temperature and salinity relationship.

Unit V: Biogeography
Meaning, Scope and Significance of biogeographic studies; fundamental concepts in Biogeography:biosphere, ecology, Ecosystem, biodiversity

Reading List

1. Strahler, A., and Strahler, A. (2007). Physical geography. John Wiley & Sons.
2. Bloom, A. L., and Bloom, A. L. (1998). Geomorphology: a systematic analysis of late Cenozoic landforms (No. 551.41 B5.). Upper Saddle River: Prentice Hall.
3. Waugh, D. (2000). Geography: An integrated approach. Nelson Thornes.
4. Kale, V.S. and Gupta, A. (2001) Introduction to Geomorphology. Orient Longman, NewDelhi.
5. Selby, M.J. (2005) Earth's Changing Surface: An Introduction to Geomorphology. ClarendonPress
6. Thornbury, W. (1968). Principles of Geomorphology.- John Wiley and Sons, 394 p. NewYork.
7. Siddhartha, K. (2018): Oceanography, A brief Introduction, Kitab Mahal
8. Howard, J. Critchfield: General Climatology, 2008, Pearson
9. Lal, D.S.(2022) Climatology, Sarda Pustak Bhaban
10. C.Barry Cox, Peter D. Moore, (2000), Biogeography, John Wiley and Sons Ltd

Course Objective:

- Explain the basic concepts and principles of physical geography.
- Identify the major processes that shape the Earth's physical environment.
- Analyze how physical geography processes impact human activities and development
- Apply critical thinking skills to analyze and solve problems related to physical geography

Learning outcome:

- To introduce students to the principles of physical geography and their applications.
- To enable students to develop a deep understanding of the processes that drive physicalgeography.
- To enable students to apply the principles of physical geography to practical real-world situations.

Theory Credit : Four (4)
Practical Credit : Zero (0)

No. of Required Classes : 60
No. of Contact Classes : 40
No. of Non-Contact Classes : 20

Particulars of Course Designer (Department of Geography, Gauhati University, geography@gauhati.ac.in)

Four-year Undergraduate Programme

Subject: Geography

Semester: II

Course Name: Introduction to Human Geography
(Compulsory)

Course Level: Foundation & Introductory

100 Marks (Theory =80 Marks, Internal Assessment = 20 Marks)

Theory (4 Credits, 80 marks, 60 classes of one-hour duration)

Unit I:
Defining the field of human geography and its development: Meaning and scope; Place of man in the study of geography; Nature of human geography and its relation with other social sciences; Changing definitions and trend of development of human geography.

Unit II:
Concept of man-environment relationship in human geography: Determinism, Possibilism, Neo- determinism and Cultural Determinism.

Unit III:
Schools of human geography: Human Ecology, Landscape and Locational Analysis.

Unit IV:
Man and environment relationship: Changing man-environment relationship through ages; Impact of environment on man in different geographical conditions; Impact of man and its activities on environment in different parts of the world; Urbanization and environment in different global contexts.

Unit V:
Man and culture: Concept of ethnicity and race; Global patterns of the racial composition of the population and associated characteristics of major racial groups; Rural and urban environments and associated socio-economic practices.

Reading List

1. Johnston, R. et. al. (2008). The Dictionary of Human Geography, Blackwell Publication.
2. Jordan-Bychkov et al. (2006) The Human Mosaic: A Thematic Introduction to Cultural Geography. W. H. Freeman and Company, NewYork.
3. Hussain, Majid (2012). Human Geography. Rawat Publications, Jaipur.
4. Gregory, D. 1978. Ideology, Science and Human Geography, London, Hutchinson.
5. James, M.R. and Bacon, R.S. 1990. The Cultural Landscape: An Introduction

to Human Geography, Prentice Hall.
6. Leong, G.C. and Morgan, G.C. 1992. Human and Economic Geography, Oxford University Press.
7. Fellmann, J.D., Getis, A. and Getis, J. 1999. Human Geography: Landscapes of Human Activities, WCB McGraw-Hill.
8. Jones, E. 1972. Human Geography, Chatto and Windus, London.
9. Broek, J.O.M. and Webb, J.W., 1969. A Geography of Mankind, Taylor and Francis.

Course Objective:

- Students will be able to identify and describe the fundamental concepts, theories, and approaches of human geography.
- Students will be able to apply the skills of analysis and interpretation to a range of geographical phenomena.
- Students will be able to recognize the significance of human geography in addressing contemporary world issues and challenges.

Learning outcome:

- To understand the basic concepts, theories, and approaches of human geography.
- To develop the skills required to analyze and interpret geographical phenomena
- To appreciate the importance of human geography in understanding contemporary world issues and challenges.

Theory Credit : Four (4)
Practical Credit : Zero (0)

No. of Required Classes : 60
No. of Contact Classes : 40
No. of Non-Contact Classes : 20

Particulars of Course Designer (Department of Geography, Gauhati University, geography@gauhati.ac.in

Four-year Undergraduate Programme

Subject: Geography

Semester: III

Course Name: Geography as a Spatial Science

(Compulsory)

Course Level: Intermediate

100 Marks (Theory =80 Marks, Internal Assessment = 20 Marks)

Theory (4 Credits, 80 marks, 60 classes of one-hour duration)

Unit I:

Defining the field of Geography: Study of the earth as the home of man; Place of geography in relation to natural and social sciences; the changing definitions of geography and its multi- disciplinary nature.

Unit II:

Geography as a spatial science and spatial concepts in geography: Concept of space, place, territory, and region; Geographic space (Absolute Space and Relative Space); Spatial Processes and Patterns (only basic concept) – Spatial distribution, Spatial concentration, Spatial organization, Spatial relationship.

Unit III:

Basic Approaches in Geography: Systematic and Regional; Ideographic and Nomothetic; Pure and Applied.

Unit IV:

Spatial Analysis in Geography: Concept of location; Concept of point, line, and area patterns.

Unit V:

Scientific Approaches in Geography: Inductive and Deductive methods; Harvey's modes of explanations in Geography (only basic concept): Cognitive, Morphometric, Cause and effect, Temporal, Functional and System analysis.

Reading List

1. Abler, R.., Adams, J. and Gould, P.P., 1971: Spatial Organization: The Geographers' Viewof the World, Prentice-Hall, Englewood Cliff.
2. Ackerman, E.A., et al, 1965: The Science of Geography, Washington D.C., National Academyof Science/ National Research Council Pub. No. 1277.
3. Adhikari, Sudeepta, 2015: Fundamentals of Geographical Thought, Orient

Blackswan Pvt.Ltd., New Delhi.

4. Chorley, Richard, J. and Haggett, Peter (eds), 1967: Models in Geography, Methuen, London.
5. Chorley, Richard, J., 1973: Directions in Geography, Methuen, London.
6. Dikshit, R.D., 1994: The Art and Science of Geography, Prentice Hall of India, New Delhi.
7. Haggett, P., 2001: Geography: A Global Synthesis, Pearson Education, Essex, UK.
8. Hartshorne, R.,1939: The Nature of Geography, Association of American Geographers, Lan-caster, Penn.
9. Hartshorne, R.,1959: Perspective on the Nature of Geography, Rand Mckully, Chicago.
10. Harvey, D., 1969: Explanation in Geography, St. Martin's Press, New York, 1969.
11. Johnston, R.J. et al.(eds), 1986: The Dictionary of Human Geography, Oxford, Basil Black-well.

Course Objective:

- To introduce students to the fundamental concepts of geography as a spatial science.
- To provide students with a strong foundation in spatial data analysis and visualisation.
- To enable students to understand and critically analyse the spatial dimensions of a range of geographic processes.
- To equip students with the skills to develop and apply spatial models and technologies to solve geographic problems.

Learning outcome:

- Understanding of the basic concepts of geography as a spatial science.
- Understanding of the methods of spatial analysis and their application in analysing geographic processes.
- Ability to critically analyse the spatial dimensions of a range of geographic processes.

Theory Credit : Four (4)
Practical Credit : Zero (0)

No. of Required Classes : 60
No. of Contact Classes : 40
No. of Non-Contact Classes : 20

Particulars of Course Designer (Department of Geography, Gauhati University, geography@gauhati.ac.in

Four-year Undergraduate Programme

Subject: Geography

Semester: IV

Course Name: Geomorphology

(Compulsory)

Course Level: Intermediate

100 Marks (Theory =60 Marks, Practical = 20 Marks, Internal Assessment = 20 Marks)

Part I: Theory (3 Credits, 60 marks, 45 classes of one-hour duration)

Unit I:
History and Development of Geomorphic Ideas, Recent Trends in Geomorphology, Post-modern Geomorphology

Unit II:
Branches of Geomorphology and their Significance: Theoretical and Applied Geomorphology, Major branches- Structural, Fluvial, Glacial, Arid, Environmental and Paleogeomorphology.

Unit III:
Structure and Composition of the Earth: Earth Crust and Interior, Rocks and Minerals

Unit IV:
Fundamental Concepts and Theories of Geomorphology: System Concept- Steady State, Dynamic Equilibrium, Mountain Building Theories of Kober and Holmes, Continental Drift, Plate tectonicsand Isostasy.

Unit V:
Geomorphic Processes and Resultant Landforms: Endogenetic and Exogenetic Processes, Ideas of Penck and L C King, Fluvial, Glacial and Aeolian Processes and Resultant Landforms, Slope Forming Processes.

Part II: Practical (1 credit, 20 Marks, 15 Classes of two-hour duration)

Unit I: Practical works (16 marks)two questions of 8 marks each

1. Study of Topographical Maps: Topographical map content and numbering system, the General interpretation of toposheets in respect of physical characteristics. (3 Assignments)
2. Profile Drawing (serial, superimposed, projected and composite (3 Assignments)
3. Preparation of Slope Map / Relative Relief Map: Wentworth's method and Smith's method. (3 Assignments)

4. Delineation of drainage basin and drainage network, construction of cross and long profiles, stream ordering by Horton and Strahler's method (6 Assignments)

5. Interpretation of Geological map and Construction of cross –section (Two geological maps including one with interruptions) showing different sedimentary beds. (2 Assignments)

Unit II: Practical Note Book and viva-Voce (4 marks)

1. Evaluation of Practical Notebook (2 marks)
2. Viva-Voce (2 marks)

Reading List

1. Bloom, Arther L. (1978): Geomorphology- A Systematic Analysis of Late Cenozoic Land-forms, Prentice Hall, Englewood Cliffs, N.J.
2. Charlton, R. (2008) : Fundamentals of Fluvial Geomorphology, Routledge, USA and Canada.
3. Chorley, Richard J (1972): Spatial Analysis in Geomorphology, Harper and Row Publishers,New York, London.
4. Chorley, Richard J (ed) (1969): Water, Earth and Man, Methuen & Co.London.
5. Cooke, R.U and Warren, A. (1973): Geomorphology in Deserts, Bats ford, London
6. Crickmay, C.H. (1974): Works of River, The McMillan Press Ltd, London.
7. Davidson-Arnott , R., Bauer, B. and Houser, C. (2019): Introduction to Coastal Processesand Geomorphology, Cambridge University Press.
8. Derbishire, E. (ed) (1976): Geomorphology and Climate, Wiley, London
9. Dury, G.H. (1959): The Face of the Earth, Penguin Books.
10. Embelton, C. and Thorns, J. (1979): Processes in Geomorphology, Arnold Heinemann.
11. . Gabler, R.E., Pettersen, J.F. and Trapasso, L.M. (2007): Essentials of Physical Geography,Thomson Brooks, USA.
12. Gregory, K.J. (1985): The Nature of Physical Geography, Edward Arnold, London.
13. Gutierrez, M. (2018): Geomorphology, CRC Press.
14. Heckmann, T. and Morche, D. (ed) (2019): Geomorphology of Proglacial Systems, Springer.
15. Huggett, R.J. (2018): Fundamentals of Geomorphology, 4th Edition, T F India and Rout-ledge.
16. Hails, J.R. (ed) (1978): Applied Geomorphology, Elsevier Scientific Publishing Co., Oxford,New York.
17. Kale, V.S. (2023): Processes, Products and Cycles of Tectonic Geomorphology, Elsevier.
18. Leopold, L.B., Wolman M.G. and Miller, J.P. (1964): Fluvial Processes in Geomorphology,Freeman, San Francisco.
19. Morisawa, M.M. (ed) (1981): Fluvial Geomorphology, George Allen & Unwin, London.
20. Morisawa, M.M. (1985): River Forms and Process, Longman, London and New York.
21. Pitty, A.F. (1971): Introduction to Geomorphology, Barnes and Nobel, New York.

22. Richards, K. (1982: Rivers: Forms and Process in Alluvial Channels, The Blackburn Press, USA.
23. Sharma, H.S. (1982): Perspectives in Geomorphology, Vols I to IV, Concept, New Delhi.
24. Strahler, A.N. (2013): Introducing Physical Geography, 6th Edition, Wiley India Pvt. Ltd, New Delhi.
25. Thornbury, W.D. (1969): Principles of Geomorphology, Wiley International Edition.
26. Thomas, David S.G. and Goudie, A. (2000): The Dictionary of Physical Geography, Blackwell publishing.
27. Wohl, E. (2020): Rivers in the Landscape, Wiley Blackwell.

Course Objective:

- To provide a general idea about the topographic and surficial characteristics of the earth's surface to the students.
- To make students aware of the forms and patterns of diverse landforms in different physical settings of the earth.
- To make students skilled for applying geomorphic knowledge and techniques for investigating geomorphic processes and the resultant landforms.

Learning outcome:

- This course will help students to understand the evolution and development of various land- forms and the associated geomorphic processes in different geo-environmental settings.
- It enables students to apply geomorphic knowledge and techniques to investigate different land features and the causes of their changes in spatiotemporal contexts.
- it will help students to get exposure to the theories and concepts related to the development of the earth and its relief features.

Theory Credit : Three (3)
Practical Credit : One (1)

No. of Required Classes : 60
No. of Contact Classes : 40
No. of Non-Contact Classes : 20

Particulars of Course Designer (Department of Geography, Gauhati University, geography@gauhati.ac.in

Four-year Undergraduate Programme

Subject: Geography

Semester: IV

Course Name: Population and Settlement Geography
(Optional)

Course Level: Intermediate

100 Marks (Theory =60 Marks, Practical = 20 Marks, Internal Assessment = 20 Marks)

Part I: Theory (3 Credits, 60 marks, 45 classes of one-hour duration)

Unit I: Population Geography

1. Defining the field of population geography and Population data: Meaning, emergence as a systematic branch of geography and significance; its relation with demography; Sources of population data and perspectives on Census of India publications (5 Classes)
2. Distribution and density of population: Factors influencing population distribution and density; global pattern of population distribution. (4 Classes)
3. Population Growth: Trend of global population growth; components of population growth–fertility, mortality and migration; push and pull factors of migration; spatial variations in population growth in the world. (8 Classes)
4. Theories of population growth: Malthusian Theory and Demographic Transition Theory. (3Classes)
5. Population composition and associated characteristic patterns in global contexts: Age-SexComposition; Rural-Urban Composition; Population ageing. (6 Classes)

Unit II: Settlement Geography

1. Defining the field of settlement of geography: Meaning and scope.
2. Rural and urban settlements: Factors influencing distribution pattern of settlements; Types of rural settlements; Morphology and Characteristics of rural and urban settlements. (7 Classes)
3. Concept of settlement hierarchy and urban fringe; Christaller's Central Place Theory. 4Classes)

Part II: Practical (1 credit, 20 Marks, 15 Classes of two-hour duration)

Unit 1: Practical Works (16 marks)(Two questions of 8 marks each)

1. Trend of population growth in Assam/N.E. India through line graph; Calculation and graphical representation of trend of decadal growth rates of population in Assam/N.E. India/India. (2 Exercises)
2. Choropleth map to show spatial pattern of decadal variation in population growth in Assam/N.E. India/India. (1 Exercise)

3. Choropleth map showing spatial pattern of population density in Assam/India. (1 Exercise)
4. Map showing spatial variation in social/religious/rural-urban composition of population in Assam/N.E. India using pie-graph. (1 Exercise)
5. Choropleth map showing spatial pattern of level of urbanization in Assam/N.E. India. (1 Exercise)
6. Flow cartogram showing direction and volume of migration into Assam/N.E. India from different parts of India. (1 Exercise)
7. Map showing distribution of towns and their varied population size with spheres in Assam/N.E.India. (1 Exercise)

Unit II: Practical Note-Book and Viva-voce (4 Marks)

1. Evaluation of Practical Note-Book (2 marks)
2. Viva-voce (2 marks)

Reading List

1. Barrett H. R., 1995: Population Geography, Oliver and Boyd.
2. Bhende A. and Kanitkar T., 2000: Principles of Population Studies, Himalaya Publishing House.
3. Chandna R. C. and Sidhu M. S., 1980: An Introduction to Population Geography, Kalyani Publishers.
4. Chandna R. C., 2014, Geography of Population: Concepts, Determinants and Patterns, Kalyani Publishers.
5. Clarke J. I., 1965: Population Geography, Pergamon Press, Oxford.
6. Jones, H. R., 2000: Population Geography, 3rd ed. Paul Chapman, London.
7. Lutz W., Warren C. S. and Scherbov S., 2004: The End of the World Population Growth inthe 21st Century, Earthscan.
8. Newbold, K. B., 2009: Population Geography: Tools and Issues, Rowman and LittlefieldPublishers.
9. Pacione, M., 1986: Population Geography: Progress and Prospect, Taylor and Francis.
10. Wilson, M. G. A., 1968: Population Geography, Nelson.
11. Panda, B. P. (1988): Janasankya Bhugol, M P Hindi Granth Academy,Bhopal.
12. Maurya, S. D. (2009) Jansankya Bhugol, ShardaPustakBhawan, Allahabad.
13. Chandna, R. C. (2006), Jansankhya Bhugol, Kalyani Publishers, Delhi.
14. Roy, D. (2015), Population Geography, Books and Allied (P) Ltd., Kolkata.
15. Ahmad, A., Noin, D. and Sharma, H.N. (eds), 1997, Demographic Transition: The ThirdWorld Scenario, Rawat Publications, Jaipur and New Delhi, 1997.
16. Money, D.C., 1972: Patterns of Settlement, Evan Brothers, London.
17. Peters, G.L. and Larkin, R.P., 1979: Population Geography: Problems, Concepts and-Prospects, Kendall/ Hunt Iowa.
18. Singh, R.L. and Singh, K.N., (eds), 1975: Readings in Rural Settlement Geography, BHU,Varanasi.
19. Singh, R.Y., 1994: Geography of Settlements, Rawat Publications, Jaipur and New Delhi.
20. Maurya, S. D., 2014: Settlement Geography, Sharda Pustak Bhawan, Allahabad.

Course Objective:

- This paper is a generic paper that intends to introduce students to the basic concepts of population and settlement geography and how the differential characteristics of population and settlement influence the overall development process of an area.
- It seeks to develop an understanding among students about the significance of population geography and settlement geography and their inter-relationship.

Learning outcome:

- The paper will be useful for students in developing ideas about spatio-temporal changes in the characteristics of population and settlement and the factors associated with them.
- The paper will be useful for students preparing for various competitive exams including civil services.

Theory Credit	: Three (3)
Practical Credit	: One (1)

No. of Required Classes	: 60
No. of Contact Classes	: 40
No. of Non-Contact Classes	: 20

Particulars of Course Designer (Department of Geography, Gauhati University, geography@gauhati.ac.in

Four-year Undergraduate Programme

Subject: Geography

Semester: IV

Course Name: Geography of India

(Optional)

Course Level: Intermediate

100 Marks (Theory =60 Marks, Practical = 20 Marks, Internal Assessment = 20 Marks)

Part I: Theory (3 Credits, 60 marks, 45 classes of one-hour duration)

Unit I:

India's location, areal extent and their significance; geopolitical and strategic importance, administrative divisions.

Unit II:

Physical setting: Physiographic divisions and their characteristics; River and water bodies, Climate and its seasonal and regional characteristics; soil types and their distribution; vegetation and its distribution.

Unit III:

Population: Trend of growth, spatial variation in growth and distribution; Age and sex composition; Linguistic and religious composition.

Unit IV:

Trend of Socio-economic development: literacy and education; health status and health care facilities; transport and communication systems; trade relations (export and import; development policies)

Unit V:

Agricultural and Industrial sector: Regional distribution and production patterns of rice, wheat, and millet. Distribution and production patterns of iron and steel, cotton textiles and fertilizers; overall Industrial development scenario in the country: distribution and production scenerio of Coal, Petroleum, Gas, hydro-power, potentiality of solar, wind, and nuclear power generation.

Part II: Practical (1 credit, 20 Marks, 15 Classes of two-hour duration)

Unit I: Practical Works (10 marks)(Two questions of 5 marks each)

1. Trend of population growth and growth rates in India since 1901 using Census data (Source: censusindia.gov.in). (2 assignments)
2. Choropleth mapping to show spatial variation in decennial population growth rate and literacyrate in India. (2 assignment)

3. Spatial variation in the patterns of the religious composition of the population in India and Social composition of the population (SC, ST, and General) using pie-graph. (2 assignments)
4. Trend of food grains production (Rice, Wheat, Maize, Barley, Jowar, and Bajra) in India since 1950-51 using band-graph. (1 assignment)
5. Mapping of the population distribution of India and analysis of its relationship with relief.(1 assignment)
6. Flow pattern of selected commodities in India using standard carto-statistical techniques. (1 assignment)

Unit II: Field Report (4 Marks)

1. Preparation of field report based on a field study of observational knowledge about the geographical perspective of any part of the country or from the parts of NE India under the guidance of teacher(s).

Unit III: Practical Note-Book, Field report and Viva-voce (4 Marks)

1. Evaluation of Practical Note-Book (2 marks)
2. Evaluation of field report (4 marks)
3. Viva-voce (2+2= 4 marks)

Reading List

1. Deshpande C. D., 1992: India: A Regional Interpretation, ICSSR, NewDelhi.
2. Johnson,B.L.C.,ed.2001.GeographicalDictionaryofIndia.VisionBooks,NewDelhi.
3. Mandal R. B. (ed.), 1990: Patterns of Regional Geography – An International Perspective.Vol. 3 –Indian perspective.
4. Sdyasuk Galina and P Sengupta (1967): Economic Regionalisation of India, Census of India
5. Sharma, T. C. 2003: India - Economic and Commercial Geography. Vikas Publ., New Delhi.
6. Singh R. L., 1971: India: A Regional Geography, National Geographical Society of India.
7. Singh, Jagdish 2003: India - A Comprehensive & Systematic Geography, Gyanodaya Prakashan,Gorakhpur.
8. Spate O. H. K. and Learmonth A. T. A., 1967: India and Pakistan: A General and Regional Geography, Methuen.
9. Tirtha, Ranjit 2002: Geography of India, Rawat Publs., Jaipur & New Delhi.
10. Pathak, C. R. 2003: Spatial Structure and Processes of Development in India. Regional Science Assoc.,Kolkata.
11. Tiwari, R.C. (2007) Geography of India. Prayag Pustak Bhawan,Allahabad.
12. Sharma, T.C. (2013) Economic Geography of India. Rawat Publication, Jaipur

Course Objective: This is a core paper that intends to introduce students to India as a geographical entity. It seeks to develop new insights among students on the geographical dimensions of the country. A field study is incorporated to make the students understand the regional diversity of India with respect to its land, people, and economy.

Learning outcome:
- The paper will be useful for students in developing an understanding of Indian geographyand its various dimensions.
- It will also be useful for students preparing for various competitive examinations includingcivil services.

Theory Credit : Three (3)
Practical Credit : One (1)

No. of Required Classes : 60
No. of Contact Classes : 40
No. of Non-Contact Classes : 20

Particulars of Course Designer (Department of Geography, Gauhati University, geography@gauhati.ac.in

Four-year Undergraduate Programme

Subject: Geography

Semester: IV

Course Name: Cartographic Techniques

(Optional)

Course Level: Intermediate

100 Marks (Theory =60 Marks, Practical = 20 Marks, Internal Assessment = 20 Marks)

Part I: Theory (3 Credits, 60 marks, 45 classes of one-hour duration)

Unit I:
Cartography – Meaning, Development (Traditional and Modern Cartography) and Importance of Cartography in Geography.

Unit II:
Shape and size of the earth; coordinate system (latitude, (parallel) and longitude (meridian)).

Unit III:
Map: Characteristics, types, scale and content; Representation of point, line and area data in maps.

Unit IV:
Map Projections: Concept of Map Projection, Classification of Map Projection; principles of Constructing zenithal, conical and Cylindrical projections (basic idea), Choice of Map projection. with reference to an areal extent (whole world or any specific part) uses and limitations.

Unit V:
Thematic mapping: Concept and types; Isopleth and Choropleth mapping.

Part II: Practical (1 credit, 20 Marks, 15 Classes of two-hour duration)

Unit I: Practical Works (16 marks) (Two questions of 8 marks each)

1. Construction of graphical scale (linear, diagonal and comparative); conversion of map scale 6 Assignments
2. Construction of graticules of Zenithal Polar Gnomonic and Stereographic, Simple Conical with one standard parallel, Bonne's conical, and Gall's Stereographic Cylindrical projection along with their properties, uses and limitations. 5 Assignments
3. Preparation of thematic maps (choropleth, isopleths, band graph, pie diagram) for representing various physical and human geographic geographic data. 4 Assignments

Unit II: Practical Note-Book and Viva-voce (4 Marks)

1. Evaluation of Practical Note-Book (2 marks)
2. Viva-voce (2 marks)

Reading List

1. Anson, R. and Ormelling, F. J., 1994: International Cartographic Association: Basic Carto- graphic Vol., Pergaman Press.
2. Gupta, K.K. and Tyagi, V.C.,1992: Working with Map, Survey of India, DST, NewDelhi.
3. Misra, R.P. and Ramesh, A.,1989: Fundamentals of Cartography, Concept, New Delhi.
4. MonkhouseF.J.andWilkinsonH.R.,1973:MapsandDiagrams,Methuen,London.
5. Rhind D. W. and Taylor D. R. F., (eds.), 1989: Cartography: Past, Present and Future, Elsevier, International Cartographic Association.
6. Robinson, A.H., 2009: Elements of Cartography,John Wiley and Sons, NewYork.
7. Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers.
8. Sarkar, A. (2015): Practical Geography: A Systematic Approach. Orient Black Swan Private Ltd., New Delhi.
9. Singh, L.R., 2013: Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad.
10. Talukder, S., 2008: Introduction to Map Projections, EBH Publishers (India),Guwahati.

Course Objective: This course on Cartographic Techniques provides a general understanding of the field of cartography including its modern developments and importance in geographic study. It more particularly focuses on various types of map scale and their construction; principles of map projection and construction of selected few; and preparation of thematic maps through the representation of various geographical data using different cartographic techniques.

Learning outcome:

- Understanding the importance of various cartographic techniques in geographical study
- General understanding of map type, map scale and map content.
- An acquaintance of different cartographic techniques for the representation of various facets of physical and human geographic data of any area.

Theory Credit : Three (3)
Practical Credit : One (1)

No. of Required Classes : 60
No. of Contact Classes : 40
No. of Non-Contact Classes : 20

Particulars of Course Designer (Department of Geography, Gauhati University, geography@gauhati.ac.in

Four-year Undergraduate Programme

Subject: Geography

Semester: IV

Course Name: Disaster Management

(Optional)

Course Level: Intermediate

100 Marks (Theory =80 Marks, Internal Assessment = 20 Marks)

Theory (4 Credits, 80 marks, 60 classes of one-hour duration)

Unit I:

Disaster Management - Meaning and Definition; Definitions of Disaster and Hazards- Risks, Vulnerability, Resilience and their inter-relationship; Classification of Disasters –Natural and Human- induced; Geophysical, hydro-meteorological & manmade hazard and disasters, Causes and impacts of Disasters. Factors affecting Vulnerability – Economic – Political - Environmental and Social Contexts.

Unit II:

Disaster Management Cycle; Disaster Management Phases - Prevention and Preparedness – Mitigation - Response and Recovery; Community-Based Disaster Management - Roles and Responsibilities of Communities.

Unit III:

Hazard and Vulnerability Profile of India; Disaster-prone and vulnerable areas in India with emphasis on Cyclones, Earthquakes and Floods; Structural and Non-structural measures for Disaster Risk Reduction in Earthquake and flood Prone Areas.

Unit IV:

Disasters and Development - Impact of Development Projects - Dams, Embankments, Land-use changes on disaster genesis, Understanding differential Impacts of disasters on people of various tribes, Classes, Gender, Age, Location and Disability. Indigenous Knowledge and Disaster Management and Prevention with Reference to flood problem of Brahmaputra Valley.

Unit V:

Disaster management policies: Disaster management plans – components, National Disaster management policy and plan of India.

Reading List

1. Coppola, Damon (2011), Introduction to International Disaster Management, Elsevier ISBN:978-0-12-382174-4
2. Abbott, Patrick Leon (2008), Natural Disasters, McGraw-Hill, ISBN-13: 978-0072428650

3. Carresi A L, et al (2013) Disaster Management: International Lessons in Risk Reduction, Response and Recovery, Rutledge, U.K.
4. Carresi A L, et al (2013) Disaster Management: International Lessons in Risk Reduction, Response and Recovery, Routledge U.K.
5. Kurowa, Julio, Disaster Reduction: Living in harmony with nature Quebec or World, Peru,
6. Emdad Hague C, Mitigation of natural hazards and disasters: International perspectives, Springer, 2005.
7. Shaw Rajib and Krishnamurthy R R (2009) Disaster Management: Global Challenges and Local Solutions, Universities Press.
8. Kapoor Mukesh, (2009) Disaster Management, Universities Press.
9. Diwan Parang, (2010) A Manual on Disaster Management, Pentagon Press.

Course Objective:

- To understand the concepts of disasters and their management.
- To identify the different types of disasters.
- To evaluate the impact of disasters on society and the environment.
- To learn the various mitigation measures and techniques of disaster management.

Learning outcome:

- Students will be able to define different types of disasters and their impact on society and the environment.
- Students will be able to analyze the causes of disaster and their consequences.
- Students will be able to evaluate the role of different stakeholders in disaster management and response.
- Students will be able to develop mitigation plans for disaster-prone areas.

Theory Credit : Four (4)
Practical Credit : Zero (0)

No. of Required Classes : 60
No. of Contact Classes : 40
No. of Non-Contact Classes : 20

Particulars of Course Designer (Department of Geography, Gauhati University, geography@gauhati.ac.in

Four-year Undergraduate Programme

Subject: Geography

Semester: V

Course Name: Climatology, Biogeography and Oceanography

(Compulsory)

Course Level: Higher

100 Marks (Theory =60 Marks, Practical = 20 Marks, Internal Assessment = 20 Marks)

Part I: Theory (3 Credits, 60 marks, 45 classes of one-hour duration)

Unit I: Climatology

1. Atmospheric Composition and Structure; and their variation with altitude, latitude and season.
2. Atmospheric temperature; horizontal and vertical distribution of temperature.
3. General Circulation, Jet Streams
4. Atmospheric Moisture – Evaporation, Humidity, Condensation, Fog, Precipitation,
5. Climatic classification of Koppen and Trewartha; Monsoon - Mechanism of development, Distribution of monsoons, Trajectories and Irregularities, Effects of El-Nino, Walker oscillation.
6. Cyclones and anticyclones; Tropical Cyclones, anticyclones and Extra-Tropical Cyclones.
7. Air masses and Fronts: Characteristics, types, Origin and modification of air masses.
8. Techniques of weather forecasting: conventional and modern

Unit II: Biogeography

1. Role of physical and biological factors and distribution of plants and animals, Biomes and Biodiversity hotspots of the world.
2. Bio-energy cycles and food-chain
3. Concept of Bio-diversity; Conservation of forest and wildlife
4. Ecology and Ecosystem, Structure and functioning of the ecosystem
5. Soil as a component of the environment, soil formation process and factors, soil composition and horizon, Soil types and their distribution in India

Unit III: Oceanography

1. Submarine topography and configuration of Pacific, Atlantic and Indian Ocean floors.
2. Ocean temperature and salinity. Currents, tides, tsunamis. Ocean deposits. Coral reefs.

Part II: Practical (1 credit, 20 Marks, 15 Classes of two-hour duration)

Unit I: Practical Works (16 marks) (Two questions of 8 marks each)

1. Interpretation of Indian Weather map for Monsoon and non–monsoon seasons/months based on various weather symbols depicted on maps. (2Assignments)
2. Preparation of weather reports of Indian subcontinent by analyzing the weather satellite images of at least three consecutive days (e.g. INSAT 3D, NOAA satellite). (3 Assignments)
3. Preparation of rainfall-temperature graphs; hythergraph, climograph and ergograph taking data from India/N.E. India/Assam (3 Assignments)
4. Calculation of average annual rainfall and variability of annual rainfall and preparation of rainfall distribution and variability maps(using isopleths).(2 Assignments)
5. Mapping of protected areas (National park, biosphere reserve and wildlife sanctuary) of Assam/N.E.India/India. (3Assignments)
6. Mapping of phytogeographic and zoogeographic regions of the world.(2 Assignments)
7. Mapping of Biodiversity hotspots of the world. (1 Assignment)
8. Mapping of Soil types of Assam/N.E. India and Soil horizons. (2 Assignments)

Unit II: Practical Note-Book and Viva-voce (4 Marks)

1. Evaluation of Practical Note-Book (2 marks)
2. Viva-voce (2 marks)

Reading List

1. Barry R. G. and Carleton A. M., 2001: Synoptic and Dynamic Climatology, Routledge, UK.
2. Barry R. G. and Corley R. J., 1998: Atmosphere, Weather and Climate, Routledge, New York.
3. Critchfield H. J., 1987: General Climatology, Prentice-Hall of India,New Delhi
4. Lutgens F. K., Tarbuck E. J. and Tasa D., 2009: The Atmosphere: An Introduction to Meteorology, Prentice-Hall, Englewood Cliffs, New Jersey.
5. Oliver J. E. and Hidore J. J., 2002: Climatology: An Atmospheric Science, Pearson Education, NewDelhi.
6. TrewarthaG.T.andHorneL.H.,1980:An Introduction to Climate,McGraw-Hill.
7. Gupta L S(2000): Jalvayu Vigyan, Hindi Madhyam Karyanvay Nidishalya, Delhi VishwaVidhyalaya,Delhi
8. Lal, D S (2006): Jalvayu Vigyan, Prayag Pustak Bhavan, Allahabad
9. Vatal, M (1986): Bhautik Bhugol, Central Book Depot, Allahabad
10. Singh, S (2009): JalvayuVigyan, PrayagPustakBhawan,Allahabad
11. Raj, Manideep Soil and Biogeography, Kalyani Publishers.,
12. Cox, C.B., Moore, P.D. and Ladle, R., 2016. Biogeography: an ecological and evolutionary approach. John Wiley &Sons.

Course Objective: The main objective of the course is to sensitise the students towards global climatological, biogeographical and marine issues

Learning outcome: Students will acquaint themselves with the primary concepts of Climatological, biogeographical and oceanographic factors.

Theory Credit : Three (3)
Practical Credit : One (1)

No. of Required Classes : 60
No. of Contact Classes : 40
No. of Non-Contact Classes : 20

Particulars of Course Designer (Department of Geography, Gauhati University, geography@gauhati.ac.in

Four-year Undergraduate Programme

Subject: Geography

Semester: V

Course Name: Quantitative methods in Geography

(Optional)

Course Level: Higher

100 Marks (Theory =60 Marks, Practical = 20 Marks, Internal Assessment = 20 Marks)

Part I: Theory (3 Credits, 60 marks, 45 classes of one-hour duration)

Unit I:

Quantification and its significance in geographical study; advantages and limitations of quantitative methods in geography. (4classes)

Unit II:

Geographical Data: Nature, types and sources; scale of measurement (nominal, ordinal, interval and ratio). (4classes)

Unit III:

Measures of central tendency (mean, median and mode) and dispersion (range, quartile deviation, mean deviation, standard deviation and coefficient of variation) and their applications in geographical data analysis. (8classes)

Unit IV:

Sampling techniques: meaning of sampling and its need; types of sampling (simple random and stratified random). (6classes)

Unit V:

Time series analysis and its applications in geographical studies; Basic techniques of time series data analysis (semi-average, moving average and 1eastsquares).(6classes)

Unit VI:

Correlation and Regression Analysis: Meaning of correlation; Bi-variate coefficient of correlation (Spearman's rank correlation and Pearson's product-moment correlation); linear regression analysis;and their applications in geographical data ana1ysis.(12 classes)

Part II: Practical (1 credit, 20 Marks, 15 Classes of two-hour duration)

Unit I: Practical Works (16 marks) (Two questions of 8 marks each)

1. Tabulation/Grouping of geographical data for making frequency distribution table; Preparation of Histogram, Frequency Polygon and Frequency Curve. (1+1assignments)

2. Computation of mean, median and mode for ungrouped and grouped data relating to geo- graphical phenomena; Determination of median and mode using graphical methods; Determination of the 1ocation of spatia1 mean centre of sett1ements (using centrographic measure). (2+1+1 assignments)
3. Computation of the values of standard deviation and coefficient of variation of ungrouped and grouped data relating to some geographical phenomena (rainfall, landholding, income, production, etc) for comparison of distribution patterns. (1+1assignments)
4. Analysis of time series data of some geographical phenomena (rainfall, production, export value, import value, etc) using moving average and least squares methods. (2 assignments)
5. Computation of coefficient of correlation between two logically associated geographical phenomena using Spearman's rank correlation and Pearson's product-moment correlation formulae; Preparation of scatter diagram and fitting the line of linear regression of Y on X for any set of bi-variate data relating to meaningful geographical phenomena.

Unit II: Practical Note-Book and Viva-voce (4 Marks)

1. Evaluation of Practical Note-Book (2 marks)
2. Viva-voce (2 marks)

Reading List

1. Hammond P. and McCullagh P. S., 1978: Quantitative Techniques in Geography: An Intro- duction, Oxford University Press.
2. Sarkar, A. (2013) Quantitative Geography. techniques and presentations. Orient Black SwanPrivate Ltd., New Delhi.
3. Yeates M., 1974: An Introduction to Quantitative Analysis in Human Geography, McGrawHill, New York.
4. Mathews, J.A., 1987: Quantitative and Statistical Approaches to Geography: A PracticalManual Pergamon,Oxford.
5. Mahmood, A., 1999: Statistical Methods in Geographical Studies, Rajesh Publications,New Delhi.
6. Elhance, D.N., 1972: Fundamentals of statistics, KitabMaha1,A11ahabad
7. Monkhouse, F.J. Wilkinson, H.R., 1989: Maps Diagrams, B.I. Publications, New Delhi
8. Gregory, S., 1963: Statistical Methods and Geographers, Longman, London.

Course Objective: The paper Quantitative Methods in Geography throws light on the importance of data in geography.It deals with the methods and techniques of data collection, data tabulation, data interpretation and analysis through the application of some basic statistical measures. This paper provides an understanding of the pure and applied nature of geography along with the key elements in the discipline.

Learning outcome:

- Thorough understanding of the statistical methods and techniques used in geographical studies
- Understanding of tabulation, analysis and interpretation of geographical data.

Theory Credit : Three (3)
Practical Credit : One (1)

No. of Required Classes : 60
No. of Contact Classes : 40
No. of Non-Contact Classes : 20

Particulars of Course Designer (Department of Geography, Gauhati University, geography@gauhati.ac.in

Four-year Undergraduate Programme

Subject: Geography

Semester: V

Course Name: Social, Cultural and Political Geography

(Optional)

Course Level: Higher

100 Marks (Theory =60 Marks, Practical = 20 Marks, Internal Assessment = 20 Marks)

Part I: Theory (3 Credits, 60 marks, 45 classes of one-hour duration)

Unit I: Social Geography

1. Social Geography: Meaning and scope; its approaches; and contemporary trend of its development.
2. Concept and types of social space and social groups.
3. Social Well-being: Concept and Component: Housing, Health and Education; Concept of Human development and its measurements.
4. Contribution of race, religion, language and ethnicity in promoting diversity in India.
5. Social Geographies of inclusion and exclusion: Caste, class, gender and ethnicity.

Unit II: Cultural Geography

1. Meaning and scope of Cultural Geography and contemporary trend of its development
2. Types of culture: material and non-material
3. Concepts in cultural geography: Cultural diffusion, Cultural lag, cultural landscape, and cultural region.
4. Cultural ecology and folk geography; folk culture and rituals with special reference to Assam

Unit III: Political Geography

1. Political Geography: Nature, scope and recent trends; Approaches to its study.
2. Concept of state, nation, and nation-state; Attributes of State, frontiers and boundaries, buffer zones.
3. Concept of Geopolitics, Heartland and Rimland; Mackinder's Heartland Theory.
4. Concept of colonialism, neo-colonialism and lebensraum.
5. Geography and conflict: India-Pakistan; India-China, Russia-Ukraine.

Part II: Practical (1 credit, 20 Marks, 15 Classes of two-hour duration)

Unit I: Practical Works (16 marks) (Two questions of 8 marks each)

1. Level of Social well-being with the help of composite Z-score in India /North-East India. (1 Exercise)
2. Construction of Ternary Diagram representing the social composition of the population in India/North East India. (1 Exercise)
3. Sex disparity in literacy in India/North-East India using Sopher's Disparity Index. (1 Exercise)
4. Construction of a map of India highlighting the major conflict zones (2 Exercises), the states of North-East India during Pre and Post-Independence periods (up to the present). (3 Exercises) along the border with China and Interstate boundary disputes in NE India.
5. Sketch of traditional house types of some selected tribes of North-East Indian states.
6. Preparation of a short video documentary on a folk ritual of a selected community of Assam.

Unit II: Practical Note-Book and Viva-voce (4 Marks)

1. Evaluation of Practical Note-Book (2 marks)
2. Viva-voce (2 marks)

Reading List

Social Geography

1. Ahmad, A., 1999: Social Geography, Rawat Publications, Jaipur and New Delhi.
2. Ahmad, A., (ed), 1993: Social Structure and Regional development: A Social Geography Perspective, Rawat Publications, Jaipur.
3. Carter, John and Trevor, Jones. 1989: Social Geography: An Introduction to Contemporary Issues, Edward Arnold, London.
4. Eyles, J.: 'Social Geography', in Johnston, R.J., et al, The Dictionary of Human Geography.
5. Jones, E. and Eyles, J., 1977: An Introduction to Social Geography, Oxford University Press,Oxford and New York.
6. Jones, E,(ed), 1975: Readings in Social Geography, Oxford University Press, Oxford.
7. Sharma, H.N., 2000: 'Social Geography' in Singh, J. (ed.) Progress in Indian Geography(1996- 2000), INSA, New Delhi.
8. Smith, D.M., 1977: Human Geography: A Welfare Approach, Edward Arnold, London.
9. Sopher, D.E. (ed), 1980: An Exploration of India: Geographical Perspectives on Society andCulture, Longman, London.
10. Srinivas, M.N., 1986: India: Social Structure, Hindustan Publishing Corporation, Delhi.
11. Taher, M., 1994: An Introduction to Social Geography: Concept and Theories, NEIGS,Guwahati. 37

Cultural Geography

12. Crans, Mike, 1998: Cultural Geography, Routledge, London.
13. Dancan, J. and Ley, D. (eds), 1992: Place/Culture/Representation, Routledge, London.
14. Gritzer, Charion, F., 1984: 'The Scope of Cultural Geography', Journal of Geography, Volume65, pp.4-11.
15. Jackson, Richard.H.and Hudman, Lloyel. E., 1990: Cultural Geography, West PublishingCompany,New York.
16. Johnston, R.J., Gregory, Derek and Smith, David M. (eds), 1994: The Dictionary of HumanGeography, Blackwell, Oxford.
17. Jordan, T.G. and Rowntree, L.: The Human Mosaic: A Thematic Interpretation in CulturalGeography.
18. Noble, A.G. and Dutt, A.K. (eds), 1982: India: Cultural Pattern and Processes, West ViewPress /Boulder, Colorado.

Political Geography

19. Agnew, John A., Mamadouh, V.; Secor,A. and Sharp, J. 2015. The Wiley Blackwell Com-panion to Political Geography. Wiley-Blackwell.
20. Smith, Sara. 2020.Political Geography: A Critical Introduction, Wiley-Blackwell.
21. Dikshit, R.D. 2020. Political Geography: Politics of Place and Spatiality of Politics. Macmil-lan India.
22. Dwivedi, R L Misra,H N. 2019. Fundamentals of Political Geography. Surjeet Publications.

Course Objective: To appreciate the social and political dimensions of geographic phenomena. Understand how geography influences political issues and their spatial dimensions.

Learning outcome:

- This course will help equip the students to comprehend various social and political aspectsof phenomena and their interface within the realm of geography.
- The paper will be very useful for students preparing for various competitive examinationsincluding civil services.

Theory Credit : Three (3)
Practical Credit : One (1)

No. of Required Classes : 60
No. of Contact Classes : 40
No. of Non-Contact Classes : 20

Particulars of Course Designer (Department of Geography, Gauhati University, geography@gauhati.ac.in

Four-year Undergraduate Programme

Subject: Geography

Semester: V

Course Name: Economic and Resource Geography

(Optional)

Course Level: Higher

100 Marks (Theory =60 Marks, Practical = 20 Marks, Internal Assessment = 20 Marks)

Part I: Theory (3 Credits, 60 marks, 45 classes of one-hour duration)

Unit I:
Meaning, scope and Approaches of Economic Geography and Resources

Unit II:
Economic activity: meaning and classification; Production system: Role of land, labour and capital.

Unit III:
Agriculture sector: Factors influencing agriculture; types of agriculture; Von Thunen’s model of agricultural location; Factors influencing cultivation of wheat, rice, coffee and tea, and their distribution and production in different parts of the world.

Unit IV:
Manufacturing sector: Factors influencing industrial location; Weber’s theory of industrial location; Classification of industry; Factors, distribution and production of iron and steel, cotton textile and IT industries in the world; Special economic zones and technology parks

Unit V:
Transport system: Modes of transport, factors influencing transport development and role of trans-port in resource mobilization and economic development.

Unit VI:
Trade: Factors influencing trade in different countries of the world; Trade relations of India with USA, Russia and Japan.

Part II: Practical (1 credit, 20 Marks, 15 Classes of two-hour duration)

Unit I: Practical Works (16 marks) (Two questions of 8 marks each)

1. Trend of rice, wheat and iron & steel production in the world/USA/India using moving average and least squares methods. (4assignments)
2. Trend of production of wheat, rice, maize and barley in the world/USA using Band-graph.(2assignments)
3. Trend of balance of trade relations (export and import value) of India with USA, China andJapan in respect of major commodities using Bar-graph. (2 assignments)
4. Regional variation in fertilizer consumption and agricultural productivity in rice,

wheat and barley in selected countries of the world using Bar-graph. (1assignment)

5. Inter-state/Inter-nation volume of movement of selected commodities and Inter-city movement of traffic/bus in N.E. India through flow cartogram.(2assignments)

Unit II: Practical Note-Book and Viva-voce (4 Marks)

1. Evaluation of Practical Note-Book (2 marks)
2. Viva-voce (2 marks)

Reading List

1. Hartshorn, T.A. and Alexander J. W., 2004: Economic Geography, Prentice-Hall Inc., New Delhi
2. Coe N. M., Kelly P. F. and Yeung H. W., 2007: Economic Geography: A Contemporary Introduction, Wiley-Blackwell.
3. Hodder B.W. and Lee Roger,1974:Economic Geography, Taylor and Francis.
4. Combes P., Mayer T. and Thisse J. F., 2008: Economic Geography: The Integration of Regions and Nations, Princeton University Press.
5. Wheeler J. O., 1998: Economic Geography, Wiley..
6. Bagchi-Sen S. and Smith H. L., 2006: Economic Geography: Past, Present and Future, Taylor and Francis.
7. Willington D. E., 2008: Economic Geography, Husband Press.
8. Clark, Gordon L.; Feldman, M.P. and Gertler, M.S., eds. 2000: The Oxford
9. Saxena, H.M., 2013: Economic Geography, Rawat Publications, Jaipur.

Course Objective: This paper intends to introduce students to the principles of economic geography and associated patterns and processes of major economic activities in the world. It seeks to develop new in- sights among students on the relevance of economic geography and associated economic issues in contemporary times.

Learning outcome:

- The paper will be useful for students in developing ideas on how geographical aspects organize the economic space and will offer perspectives to students if they wish to pursue a research programme associated with economic perspectives.
- The paper will be useful for students preparing for UGC NET/SLET exams and other competitive exams including the civil services.

Theory Credit : Three (3)
Practical Credit : One (1)

No. of Required Classes : 60
No. of Contact Classes : 40
No. of Non-Contact Classes : 20

Particulars of Course Designer (Department of Geography, Gauhati University, geography@gauhati.ac.in

Four-year Undergraduate Programme

Subject: Geography

Semester: V

Course Name: Geography of Tourism

(Optional)

Course Level: Higher

100 Marks (Theory =60 Marks, Practical = 20 Marks, Internal Assessment = 20 Marks)

Part I: Theory (3 Credits, 60 marks, 45 classes of one-hour duration)

Unit I:

Nature and Scope: Concept of tourism and its relationship with Geography; Role of Intermediaries and suppliers; Geographical parameters of tourism as postulated by Robinson.

Unit II:

Types and forms of tourism: Nature Tourism (Eco-Tourism), Cultural Tourism, Adventure tourism, Medical Tourism, Pilgrimage; Sustainable Tourism; Meetings, Incentives, Conventions and Exhibitions (MICE)Tourism

Unit III:

Tourism attraction (resources), infrastructure and services: In the context of India and northeast India

Unit IV:

Recent Trends of Tourist flow: International and Domestic (India); Case studies of tourism development in different geographical contexts in India: Himalayas, Desert, North-East India and Coastal Areas.

Unit V:

Impact of Tourism on Economy, Environment and Society; National Tourism Policy, Tourism policy of northeastern states

Part II: Practical (1 credit, 20 Marks, 15 Classes of two-hour duration)

Unit I: Practical Works (16 marks) (Two questions of 8 marks each)

1. Trend of growth of tourist arrivals (International and domestic) in India/ Assam using moving average method (2 Assignments)

2. Trend of tourist arrivals in the northeastern states of India in comparison to a top ranking tourist arriving state of India using Band-graph. (2 Assignments)
3. Representation of the relationship among the rainfall, temperature and tourist arrival for any year or a specific period for any state of NE India by using the appropriate carto-statistical technique. (2 Assignments)
4. Preparation of a map of Assam to show important tourist destinations along with their road, railway and air connectivity. (2 Assignments)
5. Preparation of a tourist map of N.E. India showing the inflow of tourists (domestic and international) to major national parks and wildlife sanctuaries/ prepare a tracking map of an area of tourism interest using GPS (2 Assignments)
6. Preparation of a map of NE India showing the inflow of tourist destinations (viz. Pilgrimage, nature, historical, adventure, wildlife, ethno-cultural destinations) and describe their significance. (2 destinations)

Unit II: Practical Note-Book and Viva-voce (4 Marks)

1. Evaluation of Practical Note-Book (2 marks)
2. Viva-voce (2 marks)

Reading List

1. Bhattacharya, P. (2011): Tourism in Assam: Trend and Potentialities, Banimandia, Guwahati
2. Dhar, P.N. (2006) International Tourism: Emerging Challenges and Future Prospects. Kanishka, NewDelhi.
3. Hall, M. and Stephen, P. (2006) Geography of Tourism and Recreation – Environment, Place and Space, Routledge, London.
4. Kamra, K. K. and Chand, M. (2007) Basics of Tourism: Theory, Operation and Practise, Kanishka Publishers, Pune.
5. Page, S. J. (2011) Tourism Management: An Introduction, Butterworth-Heinemann- USA. Chapter2.
6. Raj, R. and Nigel, D. (2007) Morpeth Religious Tourism and Pilgrimage Festivals Management: An International perspective by, CABI, Cambridge,USA,www.cabi.org.
7. Tourism Recreation and Research Journal, Center for Tourism Research and Development, Lucknow
8. Singh Jagbir (2014) “Eco-Tourism” Published by - I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).
9. Market Research Division, Dept. of Tourism, Govt. of India, India Tourist Statistics (avail-able in PDF form), New Delhi
10. UNWTO: Tourism Barometer (available in their web portal to have a fresh glimpse of global tourism statistics/ other relevant sites may also be consulted).

Course Objective: This paper introduces the students to the field of tourism from a spatial perspective. It seeks to develop new insights among students on how tourism and allied activities are shaped by the geography of an area and also how such activities are responsible for shaping economic, social and environmental context from global to local levels.

Learning outcome: The paper will be useful for students in developing ideas on the sphere of tourism along with knowing how geographical factors determine tourism activities and how geographers seek to address issues of development and carrying capacities in various environmental contexts. It will also build skills among students to engage them to work with tourism at both managerial and planning levels of the sector.

Theory Credit : Three (3)
Practical Credit : One (1)

No. of Required Classes : 60
No. of Contact Classes : 40
No. of Non-Contact Classes : 20

Particulars of Course Designer (Department of Geography, Gauhati University, geography@gauhati.ac.in

Four-year Undergraduate Programme

Subject: Geography

Semester: VI

Course Name: Geography of Environment and Development

(Compulsory)

Course Level: Higher

100 Marks (Theory =60 Marks, Practical = 20 Marks, Internal Assessment = 20 Marks)

Part I: Theory (3 Credits, 60 marks, 45 classes of one-hour duration)

Unit I:
Environmental Geography: Nature, Scope and Significance; man-Environment Relationships, Historical progression, Adaptation in different Biomes

Unit II:
Major Environmental Problems: Pollution, Deforestation, Desertification, Global Warming, and Bio-Depletion; Hazard, Disaster, Risk and Vulnerability; Types of hazard/disaster (Natural and Man made).

Unit III:
Ecosystem: concept and types of ecosystem; functioning of ecosystem; Energy flow in ecosystem; bio-geochemical cycles; biosphere as an ecosystem.

Unit IV:
Environment and Development: ecology and equity, concept of environment and development; development processes: Nature and trend of development, sustainable development.

Unit V:
Thematic Issues in Environment Geography: The Population–Consumption–Technology Nexus Bio- diversity, Conservation, and Protected Areas, Water Resources and Fishing Livelihoods, Corporate ecological responsibility

Part II: Practical (1 credit, 20 Marks, 15 Classes of two-hour duration)

Unit I: Practical Works (16 marks) (Two questions of 8 marks each)

1. Exploring satellite imageries and topographic sheets to observe bank line change of Brahmaputra river from any selected stretch in three different time periods and preparation of map there from. (1 exercise) (Satellite images can be downloaded from https://earthexplorer.usgs.gov/
   Survey of India topographic sheets can be downloaded freely from

https://soinakshe.uk.gov.in/mtr/

2. Mapping of major wetlands in a district and computation of shape and size (area) based distribution. (1 exercise)
3. Preparation of a map of a nearby wetland and identify the changes in dimension, water level and encroachment it faced during the last one decade. Present your data in tabular form along with the map (field-based). (1 exercise)
4. Preparation of a long-term precipitation time series curve for any selected station of N.E. India using moving average method by downloading the annual rainfall data for any district/stationof Assam for at least 30 years (1 exercise)

Unit II: Practical Note-Book and Viva-voce (4 Marks)

1. Evaluation of Practical Note-Book (2 marks)
2. Viva-voce (2 marks)

Reading List

1. Chandna R. C., 2002: Environmental Geography, Kalyani, Ludhiana.
2. Cunninghum W. P. and Cunninghum M. A., 2004: Principals of Environmental Science: Inquiry and Applications, Tata Macgraw Hill, New Delhi.
3. Goudie A., 2001: The Nature of the Environment, Blackwell, Oxford.
4. Singh, R.B. (Eds.) (2009) Biogeography and Biodiversity. Rawat Publication, Jaipur
5. Miller G. T., 2004: Environmental Science: Working with the Earth, Thomson Brooks Cole, Singapore.
6. MoEF, 2006: National Environmental Policy-2006, Ministry of Environment and Forests, Government of India.
7. Singh, R.B. and Hietala, R. (Eds.) (2014) Livelihood security in Northwestern Himalaya: Case studies from changing socio-economic environments in Himachal Pradesh, India. Advances in Geographical and Environmental Studies, Springer
8. Odum, E. P. et al, 2005: Fundamentals of Ecology, Ceneage Learning India. 9. Singh S., 1997: Environmental Geography, Prayag Pustak Bhawan. Allahabad.
9. UNEP, 2007: Global Environment Outlook: GEO4: Environment For Development, United Nations Environment Programme.
10. Singh, M., Singh, R.B. and Hassan, M.I. (Eds.) (2014) Climate change and biodiversity: Proceedings of IGU Rohtak Conference, Volume 1. Advances in Geographical and Environmental Studies, Springer
11. Singh, R.B. (1998) Ecological Techniques and Approaches to Vulnerable Environment, NewDelhi, Oxford & IBH Pub..
12. Alcántara-Ayala, I. (2002). Geomorphology, natural hazards, vulnerability and prevention of natural disasters in developing countries. Geomorphology, 47(2-4), 107-124.
13. Goudie, A., Ayala, I. A. (2010). Geomorphological hazards and disaster prevention. Cam- bridge University Press.
14. https://www.undrr.org/publications
15. http://sdmassam.nic.in/dmp.htmlddmp 17.
16. https://ndma.gov.in/sites/default/files/PDF/DM$_a$ct2005.pdf http :

//sdmassam.nic.in/pdf /publication/un

Course Objective: This paper intends to introduce students to geography and environment interface. It seeks to develop insights among students on the relevance of environmental studies along with issues associated with its pollution, disaster and management of environmental problems

Learning outcome:

1. This paper will be useful for students in developing ideas on environmental issues includingdisasters that geographers need to address.
2. This paper will be useful for students preparing for different competitive exams including civil services along with enhancing services to society in addressing awareness levels towards the environment

Theory Credit : Three (3)
Practical Credit : One (1)

No. of Required Classes : 60
No. of Contact Classes : 40
No. of Non-Contact Classes : 20

Particulars of Course Designer (Department of Geography, Gauhati University, geography@gauhati.ac.in

Four-year Undergraduate Programme

Subject: Geography

Semester: VI

Course Name: Introduction to Remote Sensing andGIS

(Optional)

Course Level: Higher

100 Marks (Theory =60 Marks, Practical = 20 Marks, Internal Assessment = 20 Marks)

Part I: Theory (3 Credits, 60 marks, 45 classes of one-hour duration)

Unit I: Introduction to Remote Sensing

1. Remote Sensing: Definition and History of Development. (3 classes)
2. Principles of Remote Sensing System: Energy sources, EMR and its interaction with Atmosphere and Earth Features; Platform, Sensor and Resolutions; Aerial and Satellite Remote Sensing; Fundamentals of Photogrammetry.
3. Remote Sensing data products, sources and characteristics; Elements of Image Interpretation (Visual & Digital); Digital Image Processing: Image Enhancement and Classification (Supervised and Un-supervised). (6classes)
4. Application of Remote Sensing: Land, Vegetation and Water (3 classes)

Unit II: Introduction to GIS

1. Geographical Information System (GIS): Definition, Development, Components, and Functions; Open source GIS. (3 classes)
2. GIS Data Types & Structures: Spatial and Non-Spatial Data; Raster and Vector Data Structure, Database Management System (DBMS). (3 classes)
3. Data Layer Extraction and Spatial Analysis: Buffer, proximity and viewshed analysis; overlay analysis. (4 Classes)
4. Application of GIS in geographical studies (site/habitat suitability analysis, network analysis, flood damage estimation) (4 classes)

Part II: Practical (1 credit, 20 Marks, 15 Classes of two-hour duration)

Unit I: Practical Works (16 marks) (Two questions of 8 marks each)

1. Aerial photo interpretation and visual interpretation of satellite imagery and preparation of thematic maps. 2 assignments
2. Analysis of aerial photographs and satellite images: Determination of photo scale and object height from aerial photos (using a mirror stereoscope); Digital classification of satellite images:supervised and unsupervised. 3 assignments

3. Geo-referencing and Data layer creation: geometric correction, digitization of different layers using point, line and polygon, attribute data input and their thematic representation, Buffer analysis, Overlay analysis. (3 Assignments)

Unit II: Practical Note-Book and Viva-voce (4 Marks)

1. Evaluation of Practical Note-Book (2 marks)
2. Viva-voce (2 marks)

Reading List

1. Campbell J. B., 2007: Introduction to Remote Sensing, Guildford Press.
2. Jensen J. R., 2004: Introductory Digital Image Processing: A Remote Sensing Perspective, Prentice Hall.
3. Joseph, G. 2005: Fundamentals of Remote Sensing, United Press India.
4. Lillesand T. M., Kiefer R. W. and Chipman J. W., 2004: Remote Sensing and Image Interpretation, Wiley. (Wiley Student Edition).
5. Nag P. and Kudra, M., 1998: Digital Remote Sensing, Concept, New Delhi.
6. Rees W. G., 2001: Physical Principles of Remote Sensing, Cambridge University Press.
7. Singh R. B. and Murai S., 1998: Space-informatics for Sustainable Development, Oxford and IBH Pub.
8. Wolf P. R. and Dewitt B. A., 2000: Elements of Photogrammetry: With Applications in GIS, McGraw-Hill.
9. Sarkar, A. (2015): Practical Geography: A Systematic Approach. Orient Black Swan Private Ltd., New Delhi.
10. Chauniyal, D.D. (2010): Sudur Samvedanevam Bhogolik Suchana Pranali, Sharda Pustak Bhawan, Allahabad.
11. Burrough, P.A. and Mc Donnel, R.A., 1998: Principles of Geographical Information Systems, Oxford University Press.

Course Objective:

- This paper is a core paper that intends to introduce students to the interface of Remote Sensing and GIS
- It seeks to develop new insights among students on the relevance of geospatial studies within the field of geography.

Learning outcome:

- The paper remains useful for students in developing skills in spatial data analysis to pursue a research programme.
- Understanding the use of Different RS and GIS softwares

Theory Credit : Three (3)
Practical Credit : One (1)

No. of Required Classes : 60
No. of Contact Classes : 40
No. of Non-Contact Classes : 20

Particulars of Course Designer (Department of Geography, Gauhati University, geography@gauhati.ac.in

Four-year Undergraduate Programme

Subject: Geography

Semester: VI

Course Name: Surveying Techniques

(Optional)

Course Level: Higher

100 Marks (Theory =60 Marks, Practical = 20 Marks, Internal Assessment = 20 Marks)

Part I: Theory (3 Credits, 60 marks, 45 classes of one-hour duration)

Unit I:

Field surveying: Its meaning, types and significance in geography. (2 Classes)

Unit II:

Principles of surveying: plane and geodetic surveying; Principles of triangulation. (3Classes)

Unit III:

Principles and Techniques of surveying by Plane Table, Prismatic Compass, Theodolite, DumpyLevel and Total Station (8 Classes)

Unit IV:

Methods of radiation, intersection, traversing, contouring and leveling in surveying. (4Classes)

Unit V:

GPS: Basic concept, principles and utilities (3Classes)

Part II: Practical (1 credit, 20 Marks, 15 Classes of two-hour duration)

Unit I: Practical Works (16 marks) (Two questions of 8 marks each)

1. Preparation of a plan or a map of an area within the college campus or any suitable area using Plane Table (applying both radiation and intersection methods) (2 Assignments)
2. Open and Closed Traverse Surveying with Prismatic Compass: Preparation of plan alongwith adjustment of closing errors. (2 Assignments)
3. Closed Traverse Surveying with Theodolite: Plotting of data for preparation of a plan through computation of Reduced Bearing, Consecutive Co-ordinates and Independent Co- ordinates; Measurement of height of object/objects using Theodolite (2 Assignments)
4. Profile levelling and contouring in a selected area by Dumpy Level (2 Assignments)
5. Preparing a map of a short trail along with prominent features by using hand-held GPS and associated software/freeware. (2 Assignments)

Unit II: Practical Note-Book and Viva-voce (4 Marks)

1. Evaluation of Practical Note-Book (2 marks)
2. Viva-voce (2 marks)

Reading List

1. Campbell, J., 1984: Introductory Cartography, Prentice Hall Inc., Englewood Cliff.
2. Misra, R.P. and Ramesh, A., 1995: Fundamentals of Cartography, Concept Publishing Company, New Delhi.
3. Robinson, A.H., et al: Elements of Cartography, John Wiley Sons, New York. Raisz, E.: Principles of Cartography, McGraw Hills, London.
4. Kenetkar, T.P. and Kulkarni, S.U.: Surveying and Levelling, Vol. I II, Vidyarthi Gritha Prakashan, Pune.
5. Das, A.K. 2021: Pocket Size Handbook on Handling of GPS for Field Studies, GTAD and Aranyak, Guwahati (In PDF format).

Course Objective: This course on Surveying Techniques provides a general understanding of the field of surveying including the use of modern survey tools to enhance knowledge and skill for field-based geographic study. It focuses on various types of field survey instruments; principles of different types of ground surveying, and methods of carrying out surveys for the preparation of maps/plans for different spatial contexts.

Learning outcome:

- Understanding the importance of various field surveying techniques in geographical study
- General understanding of preparation techniques of different types of plans and map
- An acquaintance of different surveying tool and techniques for the representation of variousspatial objects/phenomena.

Theory Credit	: Three (3)
Practical Credit	: One (1)

No. of Required Classes	: 60
No. of Contact Classes	: 40
No. of Non-Contact Classes	: 20

Particulars of Course Designer (Department of Geography, Gauhati University, geography@gauhati.ac.in

Four-year Undergraduate Programme

Subject: Geography

Semester: VI

Course Name: Urban Geography

(Optional)

Course Level: Higher

100 Marks (Theory =60 Marks, Practical = 20 Marks, Internal Assessment = 20 Marks)

Part I: Theory (3 Credits, 60 marks, 45 classes of one-hour duration)

Unit I:
Urban Geography: Nature and scope; approaches and trends in urban geography; Origin and growth of towns in global and national contexts; Types and characteristics of towns; Functional classification of towns; Schemes of city classification (J.M. Houston's, G. Taylor's and L. Mumfordschemes). (12 classes)

Unit II:
Patterns of Urbanisation in Developed and developing countries; Components of Urbanization and urban population growth; Organization of urban space: Urban Morphology and land use structure; Theories of the internal structure of Towns: the Sector Theory of Homer and Hoyt, and the MultipleNuclei Theory of Harris and Ullman (10 classes)

Unit III:
Concept of city-region, urban agglomeration, urban sprawl, umland and periphery, rural-urban dichotomy and continuum, urban fringe, satellite town, new town, smart cities. (8 classes)

Unit IV:
Urban issues and problems: Housing, slums, civic amenities (transportation and drinking water), traffic congestion, pollution (air, land, water, noise), urban waste disposal and crime. (8 classes)

Unit V:
Urbanization and urban development planning in India: Trend and regional patterns of urbanization; national urban development policies and programmes; emerging urban issues in Delhi NCR, Mumbai and Guwahati. (7 classes)

Part II: Practical (1 credit, 20 Marks, 15 Classes of two-hour duration)

Unit I: Practical Works (16 marks) (Two questions of 8 marks each)

1. Plotting of million cities of India by using proportionate sphere method. (1 Exercise)
2. Map showing distribution of class I and II urban centres in Assam/NE India by using proportionate sphere method. (1 Exercise)
3. Determination of spatial mean centres of urban settlements using weighted (Population asweight) centrographic measure in Assam and NE India.(2 Exercises)
4. Calculation of distribution pattern of urban settlements in a District/State of N.E. Indiausing Nearest Neighbour Analysis. (1 Exercise)
5. Choropleth map showing spatial pattern of level of urbanization in Assam and N.E. India. (2 Exercises)
6. Determination of rank-size relationship of urban centres in Assam/N.E. India/India. (1 Exercise)
7. Urban population potential mapping based on selected urban centres of Assam/N.E. India.(1 Exercise)
8. Delineation of urban influence zones of selected urban centres of Assam/N.E. India usingReilly's breaking point formula. (1 Exercise)

Unit II: Practical Note-Book and Viva-voce (4 Marks)

1. Evaluation of Practical Note-Book (2 marks)
2. Viva-voce (2 marks)

Reading List

1. Bala, R. (1986): Urbanisation in India, Rawat, Jaipur.
2. Bansal, S.C. (2010): Urban Geography, Meenakshi Prakashan, Meerut.
3. Fyfe N. R. and Kenny J. T., 2005: The Urban Geography Reader, Routledge.
4. Graham S. and Marvin S., 2001: Splintering Urbanism: Networked Infrastructures,Technological Mobilitiesand the Urban Condition, Routledge.
5. Hall T., 2006: Urban Geography, Taylor and Francis.
6. Kaplan D. H., Wheeler J. O. and Holloway S. R., 2008: Urban Geography, John Wiley.
7. Knox P. L. and McCarthy L., 2005: Urbanization: An Introduction to Urban Geography, Pearson Prentice Hall New York.
8. Knox P. L. and Pinch S., 2006: Urban Social Geography: An Introduction, Prentice- Hall.
9. Kundu, A. (1992): Urban Development and Urban Research in India, Khanna Publication,New Delhi.
10. Nangia, S. (1976): Delhi Metropolitan Region: A Study in Settlement Geography, RajeshPublication, New Delhi.
11. Pacione M., 2009: Urban Geography: A Global Perspective, Taylor and Francis.
12. Ramachandran R (1989): Urbanisation and Urban Systems of India, Oxford University Press,New Delhi
13. Sassen S., 2001: The Global City: New York, London and Tokyo, Princeton University Press.
14. Siddhartha K and Mukherjee S, (1996): Cities, Urbanisation and Urban Systems, Transworldmedia and communication, New Delhi
15. Singh, R.B. (Eds.) (2001) Urban Sustainability in the Context of Global Change, SciencePub., Inc., Enfield (NH), USA and Oxford & IBH Pub., New Delhi.

16. Singh, R.B. (Ed.) (2015) Urban development, challenges, risks and resilience in Asian megacities Advances in Geographical and Environmental Studies, Springer.

Course Objective:

- This paper introduces the students to the field of urban geography and its major aspects.
- It seeks to develop new insights among students on the relevance of an urban geography and associated problems in a rapidly urbanizing world.

Learning outcome:

- The paper will be useful for students in developing ideas on how geographical factors organize urban spaces and how geographers seek to address various urban problems and issues.
- It will help build skills among students seeking advanced studies on urban development and planning.
- The paper will be useful for students preparing for various competitive examinations including civil services.

Theory Credit : Three (3)
Practical Credit : One (1)

No. of Required Classes : 60
No. of Contact Classes : 40
No. of Non-Contact Classes : 20

Particulars of Course Designer (Department of Geography, Gauhati University, geography@gauhati.ac.in

Four-year Undergraduate Programme

Subject: Geography

Semester: VI

Course Name: Geography of North East India

(Optional)

Course Level: Higher

100 Marks (Theory =60 Marks, Practical = 20 Marks, Internal Assessment = 20 Marks)

Part I: Theory (3 Credits, 60 marks, 45 classes of one-hour duration)

Unit I:

North-East India and its locational and strategic significance; Administrative divisions.; Physical setting: Physiographic divisions of NE India and their characteristics; Rivers and water bodies, Climate and its characteristics; forest cover; protected forest areas, soil types and their distribution.

Unit II:

Population: Trend of growth, variation in growth and distribution at state levels, ethnic composition; Age and sex composition; Linguistic and religious composition, literacy level, educational and healthcare infrastructures.

Unit III:

Production pattern and characteristics of agriculture in the region of rice, jute and tea at the state level; characteristics of shifting cultivation in the hill region; contemporary transformations in the agricultural sector including horticulture, Pisciculture etc.

Unit IV:

Agriculture and Industrial development scenario: Regional pattern of Industrial development, Distribution and production of coal, Petroleum and cement in the region; Potentiality of agro-based, handloom and handicraft industries in the region; problems of Industrial development in the region.

Unit V:

Transport, Communication system and trade: patterns of transport and communication systems (state level scenario); nature of trade in the region; problems and prospects of Act East policy towards improving the trade relations.

Part II: Practical (1 credit, 20 Marks, 15 Classes of two-hour duration)

Unit I: Practical Works (16 marks) (Two questions of 8 marks each)

1. Trend of population growth and growth rates in N.E. India since 1901 using Census data (Source: censusindia.gov.in). (2 assignments)
2. Choropleth mapping to show spatial variation in urbanization level in NE India. (1 assignment)
3. Spatial variation in the patterns of the religious composition of the population in NE India and Social composition of the population (SC, ST and General) in N.E. India using a carto-statistical tool (2 assignments)

4. Trend of food grains production (Rabi and Kharif crops) in Northeast India using band-graph. (1assignment)
5. Map showing the distribution of major tribal groups in North-East India. (1assignment)

Unit II: Practical Note-Book and Viva-voce (4 Marks)

1. Evaluation of Practical Note-Book (2 marks)
2. Viva-voce (2 marks)

Reading List

1. Bhagabati, A.K., Bora, A. K. and Kar, B.K.: Geography of Assam, Rajesh Publications, New Delhi.
2. Taher, M and Ahmed, P.: Geography of North East India, Mani Manik Prakash, Guwahati.
3. Das,M..M.:PeasantAgricultureinAssam,Inter–IndiaPublications,NewDelhi.
4. Gopal Krishnan, R : Geography of North East India
5. Bhattacharya, P.2006 : Trend in Tourism Potentiality, Bani Mandir,Guwahati
6. Bhagabati, A.K.(ed):Biodiversity of Assam, Eastern Book House, Guwahati
7. Bhattacharyya, N.N. : North East India, Rajesh Publication, New Delhi
8. Srivastava, S.C. : Demographic Profile of N.E. India, Mittal Publications.
9. Basic Statistics of NE Inda, NEC, Shillong (various issues- accessible in PDF format)
10. India tourist statistics, Ministry of Tourism, Govt. of India (various issues - accessible inPDF format)

Course Objective:

- This paper intends to introduce students to the northeastern parts of India having a special identityamidst the Indian Union.
- It seeks to develop new insights among students on the significance of geographical dimensions ofthe native region.
- A field study is incorporated to make the students understand meso-regional diversity in respect ofits land, people and economy.

Learning outcome:

- The paper will be useful for students in developing an understanding of native regional geography and its various unique dimensions.
- It will also be useful for students preparing for various competitive examinations includingcivil services.

Theory Credit : Three (3)
Practical Credit : One (1)

No. of Required Classes : 60
No. of Contact Classes : 40
No. of Non-Contact Classes : 20

Particulars of Course Designer (Department of Geography, Gauhati University, geography@gauhati.ac.in

a) **Four-year Undergraduate Programme**

b) **Subject:** Geology

c) **Semester:** First Semester

d) **Course name:** Earth Systems Science (ESS)

e) **Existing base syllabus:** UGC CBCS Syllabus for B. Sc. (Hons.) Geology
(https://www.ugc.gov.in/pdfnews/1853907_B.Sc.-Hons.-Geology.pdf)

f) **Course level:** 100-199

g) **Syllabus showing each unit against class number and marks :**

Unit no.	Unit content	No. of classes	Marks
Unit 1: **(Theory)**	**Understanding the earth as a system:** The earth- its origin and brief geological history; concept of time in geological studies- relative and absolute chronology; the Geological Time Scale. Concepts of uniformitarianism and catastrophism, laws of superposition and faunal succession. The earth system and its components/subsystems. Evolution of the earth's atmosphere and hydrosphere; Evolution of life through geological time-records and evidences Energy and mass balance at earth surface; rock weathering, chemical reactions in weathering processes, soil profile and soil types.	15	25
Unit 2: **(Theory)**	**The earth dynamics:** Basic concept of plate tectonics, origin of the ocean basins, continents and mountains. The earth's interior, geological processes that drives earthquakes and volcanoes. The electromagnetic field of the earth.	15	25

	Earth surface processes and forms- mass movement, fluvial, eolian and glacial processes, land-air-sea interaction, coastal processes		
Unit 3: **(Theory)**	**Atmosphere and hydrosphere:** Earth's heat budget, atmospheric circulation, Coriolis effect; Atmospheric chemistry and climatic changes. The hydrological, biogeochemical and carbon cycle; Properties of seawater, oceanic current system-surface and thermohaline circulation. Human as a forcing factor in the earth system	15	25
Unit 4: **(Practical)**	Study of topographic maps, topographic profiles Identification of landscape elements and description; Geomorphic features and their relationships with geological setting Study of fluvial landforms in satellite image, topographic maps and in a natural setting Study of soil profile of any specific area (Experiential) Introduction to data visualization tool (eg. MATLAB, python, GIS) and digital data formats Computational statistical analysis of climate datasets; Time series analysis, interpolation, estimating trend in weather/climate variables.	15 (Each class of two hours duration)	25

h) Reading list:

i) Anderson S R and Anderson Suzanne P. (2010), Geomorphology-the mechanics and chemistry of landscapes, Cambridge University Press, UK
ii) Critchfield, H. J. (2015), General Climatology, Pearson
iii) Duff, P. M. D., & Duff, D. (Eds.), (1993), Holmes' principles of physical geology. Taylor & Francis.
iv) Emiliani, C. (1992), Planet earth: cosmology, geology, and the evolution of life and environment. Cambridge University Press.
v) Moores E. M. and Twiss R J (1995), Tectonics, W H Freeman and Company, NY
vi) Ruddiman, W (2001), Earth's Climate- past and futures, W H Freeman and Company, NY
vii) Summerfield M. A. (1991), Global Geomoprhology-an introduction to the study of landforms, Prentice Hall
viii) Trujillo A. P and Thurman, H V (2011) Essentials of Oceanography, Prentice Hall

i) Graduate Attributes

i. Course Objective:

- To introduce the students to a holistic understanding of the earth as a system, its components and their mutual interactions.
- Expose the students at initial stage of undergraduate learning to the wider scope of studying the earth system from multidisciplinary perspective and its potential as an emerging interdisciplinary area of research.

ii. Learning outcome:

- Understand the interactions and dependencies of the elements of the earth system, the natural and anthropogenic forcing factors and contextualize how human interventions has been changing the balance of these elements.
- Establish the cause and effect relationship of earth surface processes and climate and, thereby understand the science behind natural disasters, contribute towards effective disaster management.
- Identify the landscape elements from spatial data-*viz.*, topographic maps, satellite images and relate them with natural world
- Carry out simple statistical analysis including trend analysis of meteorological parameters.

j) Theory Credit : 3

k) Practical Credit : 1

l) No. of Required Classes:60

m) No. of Contact Classes :45

n) No. of Non-Contact Classes:15

o) Particulars of Course Designer (Name, Institution, email id):

- Prof. Parag Phukon

Email: ppo16@gauhati.ac.in
Ph. 9435111560

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a) **Four-year Undergraduate Programme**
b) **Subject:** Geology
c) **Semester:** Second Semester
d) **Course name:** Rocks and rock forming minerals
e) **Existing base syllabus:** UGC CBCS Syllabus for B. Sc. (Hons.) Geology (https://www.ugc.gov.in/pdfnews/1853907_B.Sc.-Hons.-Geology.pdf)
f) **Course level:** 100-199
g) **Syllabus showing each unit against class number and marks**

Unit no.	Unit content	No. of classes	Marks
Unit 1: **(Theory)**	**Rocks:** Definition of rock, major rock types. **Minerals**: Definition, classification and physical properties of minerals. Physical properties and chemical composition of common rock forming minerals: quartz, orthoclase, microcline, plagioclase, hornblende, biotite, muscovite, hypersthene, olivine, calcite, dolomite, gypsum, pyrite, chlorite, garnet, kyanite, sillimanite, andalusite.	12	20
Unit 2: **(Theory)**	**Igneous and Metamorphic rocks:** Magma: Composition, origin and types Mode of occurrence; textures and structures; classification of igneous rocks based on textural, mineralogical and chemical criteria. General description of common rock types: granite, dolerite, gabbro, rhyolite, syenite, basalt, diorite and ultramafic rocks. Metamorphic rocks: Definition; factors or agents of	18	30

	metamorphism; types of Metamorphism; Grade of Metamorphism, Textures and Structures of Metamorphic rocks. General description of common rock types: slate, phyllite, schist, gneiss, quartzite, marble, amphibolites and granulites.		
Unit 3: (Theory)	**Sedimentary Rocks:** Introduction, Processes of formation of sedimentary rocks - sedimentary environment, deposition and diagenesis. clastic and nonclastic sediments. Structures of sedimentary rocks: A brief idea on sedimentary structures – bed forms and primary sedimentary structures Classification and composition of sedimentary rocks: sandstone, limestone and conglomerate.	15	25
Unit 4: (Practical)	Identification of following minerals in hand specimen: quartz, microcline, augite, hypersthene, hornblende, garnet, muscovite, biotite, enstatite, olivine, kyanite, sillimanite, staurolite, calcite, plagioclase, zeolites, clays, limonites, calcite, dolomite, gypsum and pyrite. Hand specimen study of the following rocks: Granite, granodiorite, gabbro, diorite, pegmatite, rhyolite, dolerite, basalt, dunite, peridotite, sandstone, shale, limestone, conglomerate, slate, phyllite, schists, gneiss, marble, quartzite, amphibolites and granulites. Identification of texture and structure in igneous, sedimentary and metamorphic rock in hand specimens. **Field Training and Viva Voce:** Students will be required to carry out 03 days field work in a suitable geological area to study the elementary	15 (Each class of two hours duration)	25 (15+10)

	aspects of field geology and submit a report. Based on the report a viva-voce examination will be held.		

h) Reading list:

i) Ehlers, E.G. & Blatt, H. (1999). *Petrology Igneous Sedimentary & Metamorphic*, CBS Publishers.
ii) Winter, J. D. (2014). *Principles of igneous and metamorphic petrology*. Pearson.
iii) Myron G. Best (2001). *Igneous and Metamorphic Petrology*,
iv) Collinson, J. D. & Thompson, D. B. (1988). *Sedimentary structures*, Unwin- Hyman, London
v) Sengupta S., *Introduction to Sedimentology*, Oxford & IBH Publishing Co.
vi) Sam Boggs, Jr. (2009). *Petrology of Sedimentary Rocks*, Cambridge Univ. Press
vii) Deer, W. A., Howie, R. A., & Zussman, J. (1992). *An introduction to the rock-forming minerals* (Vol. 696). London: Longman.

i) Graduate Attributes

i. Course Objective:

- to understand the components which constitutes the solid earth.
- to understand the basics of rocks and minerals of the earth.
- to know the definition, properties, structure, composition, types as well as occurrences of rocks and rock forming minerals.
- to gather knowledge on rocks and minerals as the fundamentals of earth sciences.

ii. Learning outcome: After completion of the course students will be able to:

- Identify common rock-forming minerals in hand specimens using diagnostic properties.
- Identify mineral constituents of rocks, their typical textural as well as structural features.
- Identify and classify rocks in the laboratories as well as in the field.

j) Theory Credit : 3
k) Practical Credit : 1
l) No. of Required Classes:60
m) No. of Contact Classes :50
n) No. of Non-Contact Classes: 10
o) Particulars of Course Designer (Name, Institution, email id):

Dr. Balen Bhagabaty
Email: b_bhagabaty@gauhati.ac.in
Ph. 8638261573

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a) **Four-year Undergraduate Programme**
b) **Subject:** Geology
c) **Semester:** Third Semester
d) **Course name:** Mineralogy and Thermodynamics in Geological Systems
e) **Existing base syllabus:** UGC CBCS Syllabus for B. Sc. (Hons.) Geology
(https://www.ugc.gov.in/pdfnews/1853907_B.Sc.-Hons.-Geology.pdf)
f) **Course level:** 100-199
g) **Syllabus showing each unit against class number and marks**

Unit no.	Unit content	No. of classes	Marks
Unit 1: (**Theory**)	Introduction: Ionic radii, Pauling's rules, radius ratio, coordination polyhedra, bonding in crystals. Crystal defects: point, line and planar defects. Periodicity and symmetry: Lattice, unit cell and motif, two- and three-dimensional lattice symmetries, point and space groups, crystal systems, stereographic projections. Mineral investigation methods: X-ray diffraction studies, Braggs law and its application in crystal identification using XRD.	15	25
Unit 2: (**Theory**)	Physical and Optical properties of minerals: Colour, density, piezoelectricity and pyroelectricity, polarization, birefringence, pleochroism, anisotropy, optical indicatrix, uniaxial and biaxial minerals, optic sign. Crystal growth and transformations: Crystal nucleation and growth, crystal habit, twinning, isomorphism and polymorphism, solid solution, exsolution, introduction to phase diagrams.	15	25

	Classification and properties (physical and optical) of common rock forming silicates: feldspar, garnet, olivine, mica, pyroxene and amphibole.		
Unit 3: (**Theory**)	Laws of thermodynamics, intensive and extensive thermodynamic variables, state variables, chemical potential, Gibbs Free Energy, enthalpy, entropy, activity and activity coefficient, Clausius-Clapeyron equation, Gibbs-Duhem equation. Ideal and non-ideal solution behaviour and equilibrium constant, fundamentals of geothermobarometry. Introduction to thermodynamics of aqueous solutions: Ionic activity and activity coefficients in dilute solutions, the Mean Salt method and Debye-Huckel method	15	25
Unit 4: **(Practical)**	Observation and documentation of symmetry of crystals. Optic sign determination of the minerals. Identification of minerals in thin sections based on their characteristic optical properties (olivine, augite, garnet, andalusite, sillimanite, kyanite, staurolite, tourmaline, actinolite, tremolite, hornblende, muscovite, biotite, chlorite, quartz, orthoclase, microcline, plagioclase, calcite, apatite). Preparation of samples for XRD analyses and interpretation of XRD data for mineral identification.	15 (Each class of two hours duration)	25

h) Reading list:

i) Putnis, A., (1992). Introduction to mineral sciences. Cambridge: Cambridge University Press.
ii) Deer, W. A., Howie, R. A., & Zussman, J. (1992). An introduction to the rock-forming minerals (Vol. 696). London: Longman.
iii) Ganguly, J., (2008). Thermodynamics in earth and planetary Sciences. Berlin Heidelberg: Springer-Verlag

i) Graduate Attributes

i. Course Objective:

- to introduce the fundamentals of mineral sciences including understanding of crystal structures and attributes, processes of mineral growth and transformations and, properties and compositions of the common rock forming minerals.
- to expose the students to the basics of thermodynamics applied in earth sciences, which will prepare the students well to study subsequent courses on petrology.

ii. Learning outcome: After completion of the course students will be able to:

- gather comprehensive knowledge on the most vital attributes of the minerals including crystallographic aspects, compositions, optical properties and the thermodynamic principles that govern their formation and stability.
- Identify and differentiate minerals which would inculcate a key skill in the students as a geologist.

j) Theory Credit : 3
k) Practical Credit : 1
l) No. of Required Classes:60
m) No. of Contact Classes :50
n) No. of Non-Contact Classes: 10
o) Particulars of Course Designer (Name, Institution, email id):

Dr. Pranjit Hazarika
Department of Geological Sciences
Gauhati University

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a) Four-year Undergraduate Programme
b) Subject: Geology
c) Semester: Fourth Semester
d) Course name: Structural Geology
e) Existing base syllabus: UGC CBCS Syllabus for B. Sc. (Hons.) Geology (https://www.ugc.gov.in/pdfnews/1853907_B.Sc.-Hons.-Geology.pdf)
f) Course level: 200-299
g) Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks
Unit 1: (**Theory**)	**Structural Elements:** Planar and linear structures; concept of strike, dip, rake/pitch, trend and plunge; penetrative and non-penetrative structures; primary and secondary structures and their recognition; outcrop patterns; effects of topography on different structures; concept of stereographic projections and its use in structural geology; stereographic projections of planar and linear structures. Unconformity: Types and recognition of unconformity. **Stress and strain:** Concept of stress; types of stress, magnitude and units; stress at a point; Mohr diagram and its use in presentation of two-dimensional stress. Concept of strain: Strain in two and three dimensions. Types of strain; relation of stress and strain, strain ellipse and strain ellipsoid; Flinn and Ramsay diagram of presentation of strain; strain ellipse and strain ellipsoids and their geological significance; pure shear and simple shear. Concept of deformation in rocks: Brittle and ductile deformations; progressive deformation.	15	25
Unit 2: (**Theory**)	**Foliation and Lineation:** Morphological classification of foliation and lineation; tectonic significance of foliation and lineation. **Faults and Fractures:** Basic idea of fault and fault zone; geometric and genetic classification of faults; criteria for recognition of faults; Geologic/geomorphic criteria for recognition of faults; Anderson's dynamic analysis of faulting; fault rocks; classification of fault rocks; brittle fault rocks. Basic idea of shear zone: Mylonites; shear sense indicators; classification of shear zone.	15	25
Unit 3: (**Theory**)	**Folds:** Fold and folding; fold morphology and geometry of folds; classification of folds; elementary idea on mechanism of folding; buckling, flexure slip and flexure flow folds, shear folds; small-scale structures associated with folds; relation of foliation and lineation with folds. **Boudinage and boudins:** Pinch-and-swell structure and boudins; geometry of boudins; types of boudins; use of boudinage structures as kinematic indicators.	15	25

	Fracture and joint: Different types of fractures; feature on fracture surface; relationships of fractures to other structures.		
Unit 4: **(Practical)**	Stereographic projections of planes and lines; true dip and apparent dip problems, 3-point problems, fold problems, fault problems and their solutions with stereographic projection methods; basic idea of topographic contours. Interpretation of topographic maps; block diagrams: Presentation of homoclinal strata, fold and faults in block diagrams. Interpretation of geological maps with unconformity, fault, fold and igneous bodies; construction of profile cross sections.	15 (Each class of two hours duration)	25

h) Reading list:

i) Billings, M. P. (1987). Structural Geology, 4th edition. Prentice-Hall.
ii) Davis, G.R. (1984). Structural Geology of Rocks and Region. John Wiley
iii) Fossen, H. (2010). Structural Geology. Cambridge University Press.
iv) Ghosh, S.K. (1993) Fundamentals and Modern Development of Structural Geology. Pergamon Press.
v) Marshak, S. and Mitra, G. (1988). Basic Methods in Structural Geology. Prentice Hall.
vi) Pollard, D.D. (2005) Fundamental of Structural Geology. Cambridge University Press.
vii) Ragan, D.M. (2009). Structural Geology: an introduction to geometrical techniques (4th Ed). Cambridge University Press (For Practical).
viii) Ramsay, J.G. (1967). Folding and Fracturing of Rocks. Mc-Graw Hill, New York.
ix) Twiss, R.J. and Moores, E.M. (2007) Structural Geology. Second Edition. W. H. Freeman and Company.

i) Graduate Attributes

i. Course Objective:

- To introduce fundamental concepts of Structural Geology and its use in Earth Sciences.
- To introduce Structural Geology as the basics of Geodynamics and Engineering Geology.
- To groom the students as field geologists to work in different construction and mining activities as well as in research.

ii. Learning outcome: After completion of the course students will be able to

- identify the structural elements and their geometries which will lead to the attributes with their possible causes of development.

- apply the concepts of structural geology in the field of Geodynamics and Engineering Geology.
- prepare geological maps, cross sections and their interpretation.

j. **Theory Credit** : 3
k. **Practical Credit** : 1
l. **No. of Required Classes: 60**
m. **No. of Contact Classes :50**
n. **No. of Non-Contact Classes: 15**
o. **Particulars of Course Designer (Name, Institution, email id):**
Dr. Surajit Misra
Email: misrasurajit@gmail.com
Ph. 8967224866

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a) **Four-year Undergraduate Programme**
b) **Subject:** Geology
c) **Semester:** Fourth Semester
d) **Course name:** Geodynamics and global tectonics
e) **Existing base syllabus:** M. Sc. Geology syllabus, Gauhati University
f) **Course level:** 200-299
g) **Syllabus showing each unit against class number and marks**

Unit no.	Unit content	No. of classes	Marks
Unit 1: **(Theory)**	**Plate tectonics -** Tectonic plates, evolution of the theory of plate tectonics, plate tectonics and seismicity; Benioff zone and Benioff zone earthquakes; Seismic belts, sea floor spreading and mid oceanic ridges, ring of fire; Global plate dynamics, interaction along collisional plate margins; Mantle plume and hotspot.	15	25
Unit 2: **(Theory)**	**Seismology -** introductory terminology and basic principles, crustal phases, travel time and magnitude of earthquake; Seismic gap; Seismic waves, Snell's law, travel - time curve, seismic phases, velocity model, b-value; Palaeoseismology and paleoseismological	15	25

	signatures; Earthquake measuring scale - M, Mb, Ms, Mw, MM scales.		
Unit 3: **(Theory)**	**Seismic hazard -** prediction and seismic hazard management, Peaked Ground Acceleration (PGA) and Peaked Ground Velocity (PGV), seismogenic active fault. Great Earthquakes of the world. **Internal structure of the Earth -** Earthquake as a tool to know the internal structure of the earth.	15	25
Unit 4: **(Practical)**	Identification of seismic phases from seismogram, determination of epicenter, determination of magnitude of earthquake and PGA value. Fault plane solution. Identification and interpretation of co-seismic paleoseismological data.	15	25

h) Reading list:

i) Plate Tectonics, Stephen M. Tomecek, Science Foundations, 2009.
ii) Plate Tectonics and Crustal Evolution, Kent C. Condie, Butterworth Heinemann, 1997.
iii) Microearthquake Seismology and Seismotectonics of South Asia, J. R. Kayal, Springer, 2008.
iv) Introduction to Seismology, Peter M. Shearer, Cambridge University Press, 2009.
v) Paleoseismology, James P. Mc Calpin (Ed), Academic Press, 2009.
vi) The Making of India Geodynamic Evolution, KS Valdiya, Springer, 2015.

i) Graduate Attributes

i. Course Objective:

- To introduce the students to basic understanding of the earth crust, tectonic plates and their movements and resultant effects.
- To introduce seismic waves, their properties and application of these properties to measure the size of the earthquakes to measure their energy, damage capability.
- To introduce the signatures of past earthquakes preserved in sediments and their identification.
- To introduce the students to understand the severity of earthquakes taking global examples of Great Earthquakes and earthquake mitigative measures.

ii. **Learning outcome:** After completion of the course students will be able to

- know the dynamic nature of the earth and be able to interpret seismic data and locating earthquake epicentre.
- know how earthquake occur and be able to identify potential sites of earthquake hazards.
- understand the earthquake waves phases and their uses to know the internal structure of the earth.
- be able to apply the knowledge gained from plates collisions in understanding earth processes.
- understand considerations required for seismic safety in constructing buildings, bridges, etc.
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j. **Theory Credit** **:** 3
k. **Practical Credit** **:** 1
l. **No. of Required Classes:60**
m. **No. of Contact Classes :50**
n. **No. of Non-Contact Classes:10**
o. **Particulars of Course Designer (Name, Institution, email id):**

Prof. Bhagawat Pran Duarah
Email: bpduarag@gauhati.ac.in
Ph. 9864324036

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a) **Four-year Undergraduate Programme**
b) **Subject:** Geology
c) **Semester:** Fourth Semester
d) **Course name:** Engineering Geology
e) **Existing base syllabus:** Gauhati University, UG CBCS (2020) syllabus
Gauhati University, M.Sc.(Geology) CBCS(2016)
f) **Course level:** 200-299
g) **Syllabus showing each unit against class number and marks**

Unit no.	Unit content	No. of classes	Marks
Unit 1: **(Theory)**	**Geological Materials and their Properties:** roles and responsibilities of engineering geologist.	15	25

	physical and chemical characterization of earth material, Moisture content, void ratio, porosity, permeability, degree of saturation, unit weight, density, specific gravity, strength (compressive, shear and tensile), deformability. Atterberg's Limits and consistency of soil, Indian Standard Soil Classification System. Elementary knowledge about soil compaction, compressibility and consolidation, Liquefaction.		
Unit 2: (**Theory**)	**Geological Masses and their Properties:** Discontinuities, their types and characteristics (roughness, wall strength, aperture and infill, persistence, orientation, spacing, shear strength). Relation of rock strength with geological structures. Weathering of geological masses. Rock quality designation (RQD), Rock Mass Classification (RMR) system of Bieniawski, Q-system of Barton, Slope Stability Probability Classification (SSPC). Excavation and Quarrying. Core Logging. Improvement of Rock Mass properties (Grouting, Rock Bolting, Anchoring).	15	25
Unit 3: (**Theory**)	**Geology and Engineering Structures:** Dams, Tunnels and Slope Stability. Classification and terminologies. Types of stress affecting dams, tunnels and slopes. Geological and geophysical investigations associated with construction of dams, tunnels and stability of slopes. Dam foundation, abutment and reservoir problems. Seepage and leakage. Ground water problems. Methods of tunnel excavation, New Austrian Tunneling Method (NATM). Introductory idea about slope stability analysis. Bishops Method, Janbu's Method. Kinematic analysis of Rock Slopes.	15	25

Unit 4: **(Practical)**	Practicals on geological investigations for tunnel, dam and road. Determination of moisture content and unit weight of soil. Determination of consistency limits of soil by Casagrande Method or Cone Penetration Method. Determination of Rock Quality Designation (RQD) in field outcrops or core-samples. Kinematic analysis of rock slope stability.	15 (Each class of two hours duration)	25

h) Reading list:

i) Principles of Engineering Geology and Geotechnics by Krynine and Judd. CBS Publishers.

ii) Engineering Geology by Duggal, Pandey and Rawal. McGraw Hill Education (India) Pvt. Ltd.

iii) Geotechnical Engineering (Soil Mechanics) by Ramamurthy and Sitharam, S.Chand and Company.

iv) Soil Mechanics and Foundations by Punmia, Jain and Jain. Laxmi Publications.

v) Basic and Applied Soil Mechanics by Gopal Ranjan and Rao. New Age International Publishers.

vi) Modern Geotechnical Engineering by Alam Singh. CBS Publishers.

vii) Rock Slope Engineering, Civil Applications by Duncan C. Wyllie. CRC Press.

i) Graduate Attributes

ii. Course Objective:

- Comprehensive use of engineering geological practice in design and construction of civil engineering structures and other associated infrastructure development.

iii. Learning outcome: After completion of the course students will be able to

- Trained personnel with adequate knowledge on the engineering properties of soils and rocks.
- Adequate skills for conducting geotechnical studies in the field as well as in the laboratory.
- Scope of employment as a geotechnical laboratory scientist, engineering geologist, site geologist.

j) Theory Credit **:** 3

k) Practical Credit **:** 1

l) No. of Required Classes: 60

- m) **No. of Contact Classes :50**
- n) **No. of Non-Contact Classes: 10**
- o) **Particulars of Course Designer (Name, Institution, email id):**

Dr. Jayanta Jivan Laskar
Email : jlaskar@gauhati.ac.in
Phone : 9864025590

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- a) **Four-year Undergraduate Programme**
- b) **Subject:** Geology
- c) **Semester:** Fourth Semester
- d) **Course name:** Hydrogeology
- e) **Existing base syllabus:** UGC CBCS Syllabus for B. Sc. (Hons.) Geology (https://www.ugc.gov.in/pdfnews/1853907_B.Sc.-Hons.-Geology.pdf)
- f) **Course level:** 200-299
- g) **Syllabus showing each unit against class number and marks**

Unit no.	Unit content	No. of classes	Marks
Unit 1: (**Theory**)	**Introduction and Basic Concepts:** Definition of hydrology and hydrogeology; Hydrologic cycle - precipitation, evapotranspiration, run-off, infiltration and subsurface movement of water; Concept of Residence Time Subsurface distribution of water, vadose water and groundwater Aquifer Parameters - Occurrence of groundwater openings in rocks, types of openings; Porosity, Permeability and Void Ratio; Specific Storage, Transmissivity, Storativity, Specific Yield and Specific Retention. Aquifers - their types and classification; aquiclude, aquitard and aquifuge; Groundwater Recharge and Discharge	15	25

	Occurrence of groundwater in igneous, metamorphic, sedimentary rocks and in unconsolidated sediments.		
Unit 2: (**Theory**)	**Groundwater Flow and Well Hydraulics:** Ground Water movement; Darcy's law - its range of validity and limitation; Hydraulic Conductivity Basic Principles of Well Hydraulics- Drawdown and Cone of Depression. Elementary concepts related to equilibrium and non-equilibrium conditions for water flow to a well in confined and unconfined aquifers. Methods of Construction of Shallow Wells; Methods of Drilling Surface and subsurface investigation of ground water. Surface-based geophysical groundwater exploration methods - Electrical and Seismic Methods, Introduction to Subsurface Borehole Logging Methods	15	25
Unit 3: (**Theory**)	**Groundwater Management:** Physical and chemical characteristics of groundwater; Chemical classification of groundwater; Quality criteria for drinking, irrigation, and industrial uses of groundwater. Ground water levels and fluctuations - secular, seasonal and diurnal variation. Factors governing ground water level fluctuation. Fresh and salt water relationship in coastal area; Control of sea water intrusion. Ground water assessment, development and management; Concept of ground water	15	25

	reserve - static and dynamic reserve, Safe yield and overdraft; Conjunctive use, Rainwater Harvesting and Artificial Recharge of Groundwater		
Unit 4: **(Practical)**	Numerical problems on groundwater flow and aquifer properties. Hydrogeomorphological mapping and their interpretations. Preparation and interpretation of depth to water table map, piezometric surface map Graphical representation of hydrochemical data (chemical quality map and diagrams, Stiff Plot, Piper Trilinear diagram) Estimation of ground water reserves	15 (Each class of two hours duration)	25

h) Reading list:

i) Fetter, C.W. (2001) Applied Hydrogeology, 4th Edition, CBS Publishers and Distributors, New Delhi
ii) Karanth K.R. (1987) Groundwater: Assessment, Development and Management, Tata McGraw-Hill Pub. Co. Ltd
iii) Raghunath, H.M. (2007) Ground Water, 3rd Edition. New Age International Publishers
iv) Todd, D.K. and Mays, L.W. (2005) Groundwater Hydrology, 3rd Edition. John Wiley & Sons
v) Todd, D. K. (2006) Groundwater Hydrology, 2nd Edition., John Wiley & Sons, New York

i) Graduate Attributes

i. Course Objective:

- To provide students with a comprehensive understanding about the fundamentals of Hydrogeology
- The objective is to give students a sound understanding of the occurrence, distribution and movement of groundwater

ii. Learning outcome: After completion of the course students will be able to

- understand the fundamental principles of water cycle processes viz. evapotranspiration, condensation, precipitation, runoff, stream flow, percolation, groundwater flow, hydrosphere-biosphere/human interactions.
- application of Darcy's law in hydrology.
- characterize aquifer properties and their effects on groundwater flow.
- analyze different types and factors of groundwater fluctuation.
- select a site for a groundwater well and recognize suitable method for drilling the well.
- interpret hydrogeological data for the predictions about past and future change of hydrological conditions.

j) **Theory Credit** : 3
k) **Practical Credit** : 1
l) **No. of Required Classes: 60**
m) **No. of Contact Classes: 50**
n) **No. of Non-Contact Classes: 10**
o) **Particulars of Course Designer (Name, Institution, email id):**

Dr. Runti Choudhury
Email.runti@gauhati.ac.in
Phone: 9957567537

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a) **Four-year Undergraduate Programme**
b) **Subject:** Geology
c) **Semester:** Fifth Semester
d) **Course name:** Igneous Petrology
e) **Existing base syllabus:** UGC CBCS Syllabus for B. Sc. (Hons.) Geology (https://www.ugc.gov.in/pdfnews/1853907_B.Sc.-Hons.-Geology.pdf)
f) **Course level:** 300-399
g) **Syllabus showing each unit against class number and marks**

Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1: **(Theory)**	Magma, their generation in crust and mantle. Magma chamber processes, magma convection, igneous cumulates, batch melting and Rayleigh fractionation, liquid immiscibility, pneumatolitic action,	15	25

	magmatic assimilation and mixing of magmas. Present day magmatism and global tectonic processes. Magmatism in the oceanic domains (MORB, OIB). Magmatism along the plate margins (Island arcs, continental arcs). Plume magmatism and hot spots.		
Unit 2: (**Theory**)	Phase equilibria study in igneous systems: binary systems (eutectic system, peritectic system and alkali feldspar solid solution system), ternary systems (eutectic system, peritectic system, system for more than one solid solution) and quaternary silicate systems with reference to petrogenesis. Role of volatiles H_2O and CO_2 in petrogenesis. Geochemical criteria of igneous rocks: chemical analyses, major, trace and isotopic composition of igneous rocks in context of petrogenesis. Geochemical criteria for identification of tectonic settings of igneous rocks.	15	25
Unit 3: (**Theory**)	Petrology and petrogenesis of major igneous rock types: granitoids, ultramafic rocks (komatiite, kimberlite, lamproites), alkaline rocks, ophiolites, carbonatites, continental flood basalts (Deccan trap, Sylhet trap), anorthosite and layered igneous complex.	15	25
Unit 4: **(Practical)**	Mineralogical, textural and petrogenetic study of important igneous rocks in thin sections - granite, rhyolite, syenite, trachyte, diorite, andesite, anorthosite, gabbro, dolerite, basalt, dunite, peridotite.	15 (Each class of two hours duration)	25

	Classification of igneous rocks using geochemical data: TAS, QAP, AFM. Use of geochemical data in determination of tectonic settings of igneous rocks.		

h) Reading list:

- i) John D. Winter, .D. (2001). An Introduction to Igneous and Metamorphic Petrology. Prentice Hall Inc
- ii) Loren A. Raymond (2002). Petrology: The study of Igneous, Sedimentary and Metamorphic rocks. Mc Graw Hill .New York
- iii) Bose M.K. 1997. Igneous Petrology. World Press
- iv) Cox, K.G. Bel, J.D. and Pankthrust, R.J. 2002. The interpretation of Igneous rocks. Allen and Unwin, London
- v) Pankthrust, (2000). Igneous and Metamorphic rocks. Prentice Hall.
- vi) Phillpots, A.R., and Ague, S.J., (2009). Principles of igneous and metamorphic petrology (2nd Edn.) Cambridge.
- vii) Hugh Rollinson (2007) Using geochemical data – evaluation, presentation and interpretation. 2 ndEdition. Publisher Longman Scientific & Technical.

i) Graduate Attributes

i. Course Objective:

- This course is to introduce in-depth knowledge about the magma generation, origin and evolution of igneous rocks in diverse tectonic environments.
- The petrogenesis of igneous rocks can be very well demonstrated in the light of modern phase equilibria and geochemical characteristics.

ii. Learning outcome: After completion of the course students will be able to

- understand the process of magma generation, evolution and volcanism.
- know the mechanism of different igneous rocks formation and their relation with plate tectonics.

j) Theory Credit : 3

k) Practical Credit : 1

l) No. of Required Classes: 60

m) No. of Contact Classes: 50

n) No. of Non-Contact Classes: 10

o) Particulars of Course Designer (Name, Institution, email id):

Dr. Balen Bhagabaty

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Ph. No. 8638261573

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a) **Four-year Undergraduate Programme**
b) **Subject:** Geology
c) **Semester:** Fifth Semester
d) **Course name:** Sedimentary Geology
e) **Existing base syllabus:** B. Sc and M. Sc. Geology syllabus, Gauhati University
f) **Course level:** 300-399
g) **Syllabus showing each unit against class number and marks**

Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1: (**Theory**)	Origin of sediments, physical and chemical weathering, texture of sedimentary rocks. Granulometric analysis and interpretation, sediment transport and sedimentary structures.	15	25
Unit 2: (**Theory**)	Sedimentary environments - classification of sedimentary environments, physical and chemical parameters of depositional environments; sedimentary basins - classification of sedimentary basins, sedimentation and tectonics (tectonic control of sedimentation, plate tectonics and sediment accumulations, sedimentation as a geochemical process.	15	25
Unit 3: (**Theory**)	Classification of sedimentary rocks – clastic and nonclastic; mineralogy of the clastic sediments, Diagenesis, cementation and lithification; lithofacies and lithofacies assemblage, provenance determination using heavy minerals, quartz, feldspars and rock fragments; carbonate rocks - controls of carbonate deposition, components and classification of limestone, dolomite and dolomitization.	15	25
Unit 4:	Sedimentary rocks in hand specimen.	15	25

(Practical)	Thin section petrography of sandstones and limestone. Study of sedimentary structures in hand specimen. Granulometric analysis and their interpretation. Paleocurrent analysis.	(Each class of two hours duration)	

h) **Reading list:**

- i) Tucker, M. E. (2006). Sedimentary Petrology, Blackwell Publishing.
  Collinson, J. D. & Thompson, D. B. (1988). Sedimentary structures, Unwin-Hyman,London
- ii) Nichols, G. (2009). Sedimentology and Stratigraphy Second Edition. Wiley Blackwell
- iii) Sengupta S., Introduction to Sedimentology, Oxford & IBH Publishing Co.
- iv) Sam Boggs, Jr. (2009). Petrology of Sedimentary Rocks, Cambridge Univ. Press
- v) Applied Sedimentology, by Richard C. Selley, Academic Press, 521pp.

i) **Graduate Attributes**

i. **Course Objective:**

- To introduce the students to basic understanding of sedimentary process.
- To introduce the different depositional environment, depositional basins, their processes and dynamics.
- To introduce the classification of important sedimentary rocks and the diagenetic and lithification processes.

ii. **Learning outcome:** After completion of the course students will be able to

- the sedimentary rock forming processes and identify sedimentary textures and structures.
- sedimentary basin evolutionary processes.
- the economic importance of sedimentary rocks.

j) **Theory Credit** **:** 3
k) **Practical Credit** **:** 1
l) **No. of Required Classes: 60**
m) **No. of Contact Classes: 50**
n) **No. of Non-Contact Classes: 10**
o) **Particulars of Course Designer (Name, Institution, email id):**

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a) **Four-year Undergraduate Programme**

b) **Subject:** Geology

c) **Semester:** Fifth Semester

d) **Course name:** Metamorphic Petrology

e) **Existing base syllabus:** UGC CBCS Syllabus for B. Sc. (Hons.) Geology (https://www.ugc.gov.in/pdfnews/1853907_B.Sc.-Hons.-Geology.pdf)

f) **Course level:** 300-399

g) **Syllabus showing each unit against class number and marks**

Unit no.	Unit content	No. of classes	Marks
Unit 1: (**Theory**)	Geothermal gradient, sources of plate tectonic metamorphic heat for crustal metamorphism, crustal thickening processes; Textural and chemical equilibrium in regional metamorphism, solid-solid reaction, continuous and discontinuous metamorphic reaction; metamorphic zones; concept of metamorphic facies and facies series; contact metamorphism and its assemblages.	15	25
Unit 2: (**Theory**)	Mineral assemblages and their graphical representation: ACF, AKF, AFM and compositional phase diagrams; Relationship between metamorphism and deformation; Regional orogenic metamorphic textures (tectonites, foliation, lineation, mechanism of tectonite development, poly-deformed and poly-metamorphic rocks); replacement textures.	15	25
Unit 3: (**Theory**)	Geothermobarometry, cation exchange and Net transfer reactions, P-T-t path of metamorphism, reaction rim and their role in reconstructing P-T-t history of metamorphism; Metamorphism of mafic rocks, ultramafic rocks, pelitic sediments and calcareous rocks and the metamorphic reactions involved.	15	25

	Metasomatism, and role of fluids in metamorphism.		
Unit 4: **(Practical)**	Mineralogical characteristic study of low, medium and high grade metamorphic rocks in thin section. Study of textural characteristics and mineral reactions in metamorphic rocks. Graphic plots of mineral and rock compositions in ACF, AKF and AFM diagram, and their interpretations. PT estimation in metamorphic assemblages.	15 (Each class of two hours duration)	25

h) Reading list:

i) Yardley, B W D. (1990). An introduction to metamorphic petrology. ELBS publication.
ii) Bucher K. and Martin F. 2002. Petrogenesis of Metamorphic rocks. Springer-Verlag Publication.
iii) Best, M.G. (2002). Igneous and metamorphic petrology. Wiley publication.
iv) Vernon R. H. and Clarke G. L. 2008. Principles of metamorphic Petrology. Cambridge publication.
v) Spears F. (1993). Metamorphic Phase Equilibria and Pressure-Temperature-Time Paths. AGU publication
vi) Winter, J.D. (2001). An Introduction to Igneous and Metamorphic Petrology. Prentice Hall Inc.
vii) Bucher, K. and Martin, F. (2002): Petrogenesis of Metamorphic Rocks (7Rev. Ed.), Springer–Verlag.

i) Graduate Attributes

i. Course Objective:

- This course is to understand the mineralogical and textural transformations in solid state.
- It provides knowledge on reactions involved under different pressures and temperature regimes, and their implication on understanding the metamorphic evolutionary history and geodynamics of mobile belts thorough time.

ii. Learning outcome: After completion of the course students will be able to

- understand the dynamic processes of the earth that have affected the preexisting igneous and sedimentary rocks.
- identify equilibrium mineral assemblages through textural and mineralogical observations

- correlate mineral assemblages and texture for tectonic and geodynamic interpretations.

j) **Theory Credit** : 3
k) **Practical Credit** : 1
l) **No. of Required Classes: 60**
m) **No. of Contact Classes: 50**
n) **No. of Non-Contact Classes: 10**
o) **Particulars of Course Designer (Name, Institution, email id):**

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a) **Four-year Undergraduate Programme**
b) **Subject:** Geology
c) **Semester:** Fifth Semester
d) **Course name:** Palaeontology
e) **Existing base syllabus:** UGC CBCS Syllabus for B. Sc. (Hons.) Geology (https://www.ugc.gov.in/pdfnews/1853907_B.Sc.-Hons.-Geology.pdf)

f) **Course level:** 300-399
g) **Syllabus showing each unit against class number and marks**

Unit no.	Unit content	No. of classes	Marks
Unit 1: (**Theory**)	Paleontology - definition, subdivisions and scope, its relationship with other branches of science; Fossils – definition and kinds (body and trace fossils), taphonomy, conditions and processes of fossilization, modes of preservation of fossils; Species - concept with special reference to palaeontology, naming of fossil, taxonomic hierarchy; Elementary idea about the origin of life, theory of organic evolution and life through geological time.	15	25

Unit 2: **(Theory)**	Elementary knowledge and palaeontological significance of the important invertebrate animal groups - Mollusca (class – Gastropoda, Cephalopoda, Bivalvia), Brachiopoda, Echinodermata (class - Echinoidea), Arthropoda (class - Trilobita), Hemichordata (Graptolites), Cnidaria (corals). Elementary knowledge about the origin of vertebrates and major steps in vertebrate evolution; Mesozoic reptiles with special reference to origin, diversity and extinction of dinosaurs; Evolution of horse and intercontinental migrations; human evolution.	15	25
Unit 3: **(Theory)**	Introduction to Palaeobotany, Gondwana Flora, Introduction to Ichnology; Application of fossils in stratigraphy, index fossils, biozones and biostratigraphic correlation; Role of fossils in sequence stratigraphy; Fossils and palaeoenvironmental analysis; Fossils and palaeoecological analysis; Fossils and palaeogeography, paleobiogeography, dispersals and barriers.	15	25
Unit 4: **(Practical)**	Study of fossil hand specimens showing various modes of preservation; Study of diagnostic morphological characters, systematic position, stratigraphic position and age of common fossils – Gastropoda, Cephalopoda, Bivalvia, Brachiopoda, Echinoidea, Trilobita, corals and plant fossils, preparation of biostratigraphic zones.	15 (Each class of two hours duration)	25

h) Reading list:

i) Raup, D. M., Stanley, S. M., Freeman, W. H. (1971). Principles of Paleontology

ii) Clarkson, E. N. K. (2012). Invertebrate paleontology and evolution, 4th Edition by Blackwell Publishing.

iii) Benton, M. (2009). Vertebrate paleontology. John Wiley & Sons.

iv) Shukla, A. C., & Misra, S. P. (1975). Essentials of paleobotany. Vikas Publisher
v) Armstrong, H. A., & Brasier, M.D. (2005). Microfossils. Blackwell Publishing
vi) Cowe, R. 1994. History of life. Blackwell Scientific Publications
vii) Jones, R.W. 2006. Applied palaeontology. Cambridge : Cambridge University Press
viii) Jain P.C. and Anantharaman M.S. 2022-23 Palaeontology (Palaeobiology) Evolution & Animal Distribution), Vishal Publishing Co.

i) Graduate Attributes

i. **Course Objective:**

- To accustom about the basics of palaeontology including fossil, conditions and processes of fossilization.
- To know about origin of life and evolutionary history of the organic world.
- To know about anatomy and morphology of some common fossils.
- To aware about uses of fossils for geological understanding and interpretations including palaeobiogeography, palaeoecology, palaeogeography etc.

ii. Learning outcome: After completion of the course students will be able to

- recognise fossils and describe their characteristic morphologies for taxonomic categorization.
- apply the palaeontological knowledge for knowing chronostratigraphic position and depositional conditions of sedimentary rocks.
- use palaeontological data for understanding basinal history of a certain sedimentary basin which may enable to know the economic prospects of sedimentary deposits.
- do geological studies about palaenvironmental changes through time and space which may enable them for future preparedness in regard to changing scenario of earth's climate.

j) Theory Credit : 3
k) Practical Credit : 1
l) No. of Required Classes: 60
m) No. of Contact Classes: 50
n) No. of Non-Contact Classes: 10
o) Particulars of Course Designer (Name, Institution, email id):

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- Dr. Hrishikesh Baruah
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  Ph. 9864030992

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a) **Four-year Undergraduate Programme**

b) **Subject:** Geology

c) **Semester:** Sixth Semester

d) **Course name:** Ore Geology

e) **Existing base syllabus:** UGC CBCS Syllabus for B. Sc. (Hons.) Geology (https://www.ugc.gov.in/pdfnews/1853907_B.Sc.-Hons.-Geology.pdf)

f) **Course level:** 300-399

g) **Syllabus showing each unit against class number and marks**

Unit no.	Unit content	No. of classes	Marks
Unit 1: (**Theory**)	**Terminologies, textures and paragenesis:** Terminologies - Ore, gangue, grade, tonnage, Clarke's value, resource and reserve. Ore textures and paragenesis: lode-ore, vein-type ore, stockwork, stratiform and stratabound ores, syngenetic and epigenetic ore, controls of ore localization, sources of hydrothermal fluid, types of hydrothermal alteration and representative assemblages.	15	25
Unit 2: (**Theory**)	**Genesis of ore deposits with Indian examples:** Ores in mafic/ultramafic association and their genesis: mechanism of formation of chromite ores, liquid immiscibility and mineralization of Cu-Ni sulfides and platinum group elements (PGE), carbonatites and associated mineralization Ores in felsic association: Porphyry Cu-Au, Cu-Mo, Sn-W deposits, Iron-oxide copper gold (IOCG) deposits, epithermal deposits, pegmatites and associated mineralization Skarns, submarine exhalative deposits (SEDEX and MVT), banded iron formations (BIF), bedded manganese deposits, placer deposits	15	25
Unit 3: (**Theory**)	**Ore genetic studies:** Sulphur phase equilibria (Fe-S system, Fe-As-S system, Fe-Cu-S system, Fe-Zn-S system and Fe-Ni-S system),	15	25

	thermobarometry of ore deposits (arsenopyrite thermometry and sphalerite barometry), application of stable isotopes (sulphur, carbon, oxygen and boron) and fluid inclusions in ore deposit studies Plate tectonics and global ore localization, ore mineralization through geological time		
Unit 4: **(Practical)**	Identification of ore/industrial minerals in hand specimen. Identification of ore minerals (opaques) under reflected light microscope: chromite, galena, sphalerite, arsenopyrite, pyrite, pyrrhotite, chalcopyrite, covellite, chalcocite, bornite, pentlandite, magnetite, hematite, ilmenite, goethite. Genetic interpretation of ore minerals from their textures and structures in hand specimens.	15 (Each class of two hours duration)	25

h) Reading list:

i) Robb, L., (2020). Introduction to ore-forming processes. John Wiley & Sons.
ii) Mukherjee, A., (1999). Ore deposits: a holistic approach. New Delhi: Allied Publishers.
iii) Evans, A.M., (2009). Ore Geology and Industrial Minerals: An Introduction.
1. John Wiley & S ons.
iv) Jensen, M.L. and Bateman, A.M.- Economic Mineral deposits. Jhon Wiley &Sons.
v) Pirajno, F. Hydrothermal Mineral Deposits
vi) Banerjee, D.K. Mineral resources of India.
vii) Prasad, U. Economic Geology (Economic Mineral Deposits). CBS Publisheres & Distributors.

i) Graduate Attributes

i. Course Objective:

- This course is to introduce the students to the science of formation of different types of ore deposits.
- This course will further expose the students to the diverse kinds of ore deposits found in India, their genesis and economic significance.
- The course will prepare the students with a better understanding of various earth processes which form ore deposits and their geographical distribution.

ii. Learning outcome: After completion of the course students will be able to

- comprehend the various processes of ore formation, their types, geological and geographical distribution and their economic significance.
- identify various ore assemblages in hand specimen and under optical microscope which would upskill a student as a mine and/or exploration geologist.
- relate various earth processes to ore genesis.

j) **Theory Credit** : 3
k) **Practical Credit** : 1
l) **No. of Required Classes: 60**
m) **No. of Contact Classes: 50**
n) **No. of Non-Contact Classes: 10**
o) **Particulars of Course Designer (Name, Institution, email id):**

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a) **Four-year Undergraduate Programme**
b) **Subject:** Geology
c) **Semester:** Sixth Semester
d) **Course name:** Principles of Stratigraphy and Indian
e) **Existing base syllabus:** UGC CBCS Syllabus for B. Sc. (Hons.) Geology (https://www.ugc.gov.in/pdfnews/1853907_B.Sc.-Hons.-Geology.pdf)
f) **Course level:** 300-399
g) **Syllabus showing each unit against class number and marks**

Unit no.	Unit content	No. of classes	Marks
Unit 1: **(Theory)**	**Principles of Stratigraphy** Stratigraphy and its relation to sedimentation, Geological time scale, concept of relative and absolute chronology, codes of stratigraphic nomenclature in India, North American codes of stratigraphic nomenclature; vertical and lateral stratigraphic relationship, principles of stratigraphic correlation – lithostratigraphic, biostratigraphic, chemostratigraphic, magnetostratigraphic correlation.	15	25

	Concepts of seismo-stratigraphy and sequence-stratigraphy Concept of paleogeographic reconstruction.		
Unit 2: (**Theory**)	**Cratons and Mobile Belts of India** Distribution of Cratons and Mobile Belts of the Indian Sub-continent. Description of litho-stratigraphy, age, structure and metamorphism in the Dharwar Province, Singhbhum-Orissa Province. Proterozoic Basins of India - Brief idea about their distribution, lithological and structural characteristics. Lithostratigraphic, structural and tectonic evolution of the Cuddapah, Vindhyan and Shillong Basins.	15	25
Unit 3: (**Theory**)	**Indian Palaeozoics** Palaeozoics of Kashmir and Spiti-Zanskar basin. Marine Palaeozoics in Peninsular India – their distribution, litho-stratigraphic characteristics and fossil content. **Indian Mesozoic** Distribuition, lithology and the fossil content with special reference to Triassic of Spiti, Jurassic of Kutch and cretaceous of Cauvery Basin and north east India. Gondwana deposits of Peninsular India - sedimentation, marine intercalation, palaeoclimate and economic importance. The Deccan Traps and associated inter-, intra-, infra- trappean beds, Rajmahal Traps and Sylhet Traps. **Indian Cenozoic** Stratigraphy and economic importance of Assam Arakan Basin, stratigraphy and vertebrate palaeontology of Siwalik Basin.	15	25

Unit 4: **(Practical)**	Study of important Indian rocks in hand-specimen, in thin section and their diagnostic features. Study of geological maps of geologically important areas of India. Facies maps (sand - shale ratio map; carbonate – sand - shale ratio map); structure contour map, isopach map preparation and their interpretation for basin configuration.	15 (Each class of two hours duration)	25

h) Reading list:

i) Stratigraphic Principles and Practices – JW. Weller, Universal Book Stall, Delhi
ii) Principles of Sedimentology and stratigraphy – Sam Boggs Jr. Pearson Prentice Hall
iii) Principle of sedimentary basin analysis – A.D. Miall, Springer
iv) Geology of India and Burma – M. S. Krishnan, CBS Publisher & Distributor
v) Precambrian Geology of India – S. M. Naqvi & J. J. W. Rogers, Oxford University Press
vi) Geology of India Vol.-1 and Vol.-2 by Ramakrishnan and Vaidyanadhan. Geological Society of India, Bangalore.
vii) Fundamentals of Historical Geology and Stratigraphy of India – R. Kumar, New Age International Publishers
viii) Indian Precambrian – B.S. Paliwal, Scientific Publications (India) Jodhpur

i) Graduate Attributes

i. Course Objective:

- To understand the principles governing the spatial and temporal distribution of different types of strata during geologic time.
- To examine the type, age, occurrence, lithological & structural characteristics, and economic importance of different types of rocks and their mutual inter-relationships found in Peninsular and Extra-Peninsular India.

ii. Learning outcome: After completion of the course students will be able to

- understand the concept of geological time, the principles and practices of studying sedimentation and stratigraphy, correlation of stratigraphic columns of different regions and sedimentary basin evolution.
- understand the distribution of stratigraphic units of Indian subcontinent and their correlation.

j) Theory Credit : 3
k) Practical Credit : 1
l) No. of Required Classes: 60
m) No. of Contact Classes: 50

n) No. of Non-Contact Classes: 10

o) Particulars of Course Designer (Name, Institution, email id):

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a) Four-year Undergraduate Programme

b) Subject: Geology

c) Semester: Sixth Semester

d) Course name: Geoexploration

e) Existing base syllabus: Integrated M.Sc. syllabi of Pondicherry University and Delhi University

f) Course level: 300-399

g) Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks
Unit 1: (**Theory**)	**Geological and Geochemical exploration** Principles of mineral exploration, Prospecting and exploration-conceptualization, methodology and stages; Selection of sites; Sampling, subsurface sampling including pitting, trenching and drilling, core and non-core drilling, planning of bore holes and location of boreholes on ground. Principles and methods of geochemical prospecting, pathfinders and indicator elements in rocks and soils. Mobility of elements. Primary and secondary dispersion patterns, geochemical anomalies and their interpretation.	15	25

Unit 2: (**Theory**)	**Geophysical exploration** Introduction to geophysical methods of exploration and their applications. Principles of gravity, magnetic, resistivity, induced polarization, electromagnetic and seismic methods; data reduction, anomalies, geological interpretation; well logging techniques – Resistivity, SP, Gamma, Sonic and their applications.	15	25
Unit 3: (**Theory**)	**Reserve estimation** Ore reserve and types, principles of reserve estimation, geostatistical and statistical methods of reserve estimation, computer application in ore reserve estimation	15	25
Unit 4: **(Practical)**	Map exercises on use of geological and geochemical prospecting criteria. Well log interpretation. Various methods of ore reserve estimation.	15 (Each class of two hours duration)	25

h) Reading list:

i) McKinstry, H.E. (1962). Mining Geology (2nd Ed.) Asia Publishing House.
ii) Clark, G.B. (1967). Elements of Mining. 3rd Ed. John Wiley & Sons.
iii) Arogyaswami, R.P.N. (1996). Courses in Mining Geology. 4th Ed. Oxford-IBH.
iv) Moon, C.J., Whateley, M.K.G. and Evans, A.M. 2006. Introduction to mineral exploration, 2nd edition. Blackwell Publishing Ltd. Oxford.
v) Robinson, E.S. and Coruh, C. (1988). Basic Exploration Geophysics, John Wiley & Sons,
vi) Peters, W.C. 1978. Exploration and mining geology. John Wiley & Sons, New York.
vii) Rose, A.W., Hawkes, H.E. & Webb, J.S. (1979). Geochemistry in mineral exploration, Academic Press, London.
viii) Levinson, A.A. (1974). Introduction to exploration geochemistry. Applied Publication Co., Calgary.
ix) Dorbin, M.B. Introduction to geophysical prospecting.
x) Ramachandra Rao. Geophysical prospecting for geologists.

i) Graduate Attributes

i. Course Objective:

- The course is intended for introducing the techniques and methods of exploration for mineral deposits and different properties and structures of crustal rocks.
- The course will also introduce the students with the methods of estimation of mineral reserves.
- A special objective of this course is to impart knowledge on interpretation of geophysical logs, and problem solving skills on map based data of different geophysical, geological and geochemical methods.

ii. **Learning outcome:** After completion of the course students will be able to

- Understand principles and methods of prospecting and exploration for economic georesources.
- Acquire knowledge to work as exploration geologist.

j) Theory Credit : 3
k) Practical Credit : 1
l) No. of Required Classes: 60
m) No. of Contact Classes: 50
n) No. of Non-Contact Classes: 10
o) Particulars of Course Designer (Name, Institution, email id):

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a) Four-year Undergraduate Programme
b) Subject: Geology
c) Semester: Sixth Semester
d) Course name: Fuel Geology
e) Existing base syllabus: UGC CBCS Syllabus for B. Sc. (Hons.) Geology (https://www.ugc.gov.in/pdfnews/1853907_B.Sc.-Hons.-Geology.pdf)
f) Course level: 300-399
g) Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks
Unit 1: **(Theory)**	**Coal** Origin of coal - Carbon cycle; origin of peat swamps through geological ages - evolution of flora, climate, paleogeography and tectonics; peatification and coalification; Chemical composition of coal - proximate analysis and ultimate analysis.	15	25

	Coal petrography - Evolution of coal petrography, lithotypes in coal, maceral concept and its classification, origin of macerals. Coal as fuel - Coal classification and grading, utilization of coal- combustion, carbonization, gasification, liquefaction, coal as source rock for petroleum, distribution of coal in India.		
Unit 2: (**Theory**)	**Petroleum** Origin of petroleum - conditions controlling primary production and accumulation of organic matters in sedimentary rocks, geological distribution of petroleum, kerogens and its classification, evolution of kerogens. Petroleum system – Definition, its components and processes, source rocks and its characterization, reservoir rocks and their classification, seal rocks and overburden rock, processes associated with formation of petroleum reserves - trap formation, types of petroleum traps, processes associated with generation, expulsion, migration and accumulation of petroleum, plate tectonics and global distribution of petroleum.	15	25
Unit 3: (**Theory**)	**Other fuels** Gas hydrates - its distribution, complexities associated with exploitation of gas hydrates, shale oil and gas - tight reservoirs, hydrofracturing and production of shale oil and gas, Coal Bed Methane (CBM) - formation and properties of CBM, production of CBM, nuclear fuels - types, geological distribution, exploration for nuclear fuels.	15	25
Unit 4: **(Practical)**	Study of hand specimens of coal; identification of lithotypes in coal; determination of calorific value from results of proximate and ultimate analyses of coal.	15 (Each class of	25

	Determination of kerogen types using Van Krevelen diagram; estimation of petroleum reserves; Section correlation and identification of hydrocarbon prospects. Panel and Fence diagrams.	two hours duration)	

h) Reading list:

i) Thomas, L (2002). Coal Geology. Willey.

ii) Chandra D. (2007). Chandra's Textbook on applied coal petrology. Jijnasa Publishing House.

iii) Shelly R. C. and Sonnenbergm, S. A. (2022). Elements of Petroleum geology: 4th Edition, Academic Press.

iv) Bjorlykke, K. (1989). Sedimentology and petroleum geology. Springer-Verlag. 5. Beaumont, E. A. and Foster, N. H. (2000). AAPG Treatise of Petroleum Geology: Exploring for Oil and Gas Traps. AAPG.

v) Bahardori, A. and Zendehboudi, S. (2016). Shale Oil and Gas Handbook: Theory, Technologies, and Challenges. Gulf Professional Publishing.

vi) Thakur, P., Schatzel, S., Aminian, K., Rodvelt, G., Mosser, M. and D'Amico, J. (2020). Coal Bed Methane: theory and applications. Elsevier.

vii) Aswathanarayana, U. (1986). Principles of Nuclear Geology. Balkema.

i) Graduate Attributes

i. **Course Objective:**

- To introduce the students with the geological processes that are responsible for origin and accumulation of hydrocarbon deposits in the earht's crust.
- To understand the methods of exploration and characterization (chemical and petrographical) of the hydrocarbons (coal and petroleum) that occur in the earth's crust.
- To introduce the students with the fundamental aspects of alternative fuels, e.g., gas hydrates, CBM and nuclear fuels.

ii. Learning outcome: After completion of the course students will be able to

- Processes associated with origin and accumulation of hydrocarbons in the geological system.
- Methods in organic geochemistry and petrolgraphy.
- Classification and utilization of coals.
- Petroleum system, exploration of petroleum in sedimentary basin and criteria in identifying source, reservoir, seal rock and overburden rock and processes related to trap formation, and migration and accumulation of petroleum.
- Methods of determination of petroleum reserves.

- Basic aspects geology of alternative fuels like shale gas/oil, CBM, gas hydrates and nuclear fuels.

j) **Theory Credit** **:** 3
k) **Practical Credit** **:** 1
l) **No. of Required Classes: 60**
m) **No. of Contact Classes: 50**
n) **No. of Non-Contact Classes: 10**
o) **Particulars of Course Designer (Name, Institution, email id):**

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Email: saratphukan@gauhati.ac.in
Ph. 9954709901

FOUR YEAR UNDERGRADUATE PROGRAMME

SUBJECT: MATHEMATICS

SEMESTER-I

Classical Algebra

Total Marks: 100 (Theory 80, Internal Assessment 20)
No. of Credits: 4

Base syllabus: MAT-HG-2016/MAT-RC-2016: Algebra (UG CBCS)

Course Level: 100-199

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites: Mathematics in 10+2 or equivalent standard.

Course Objectives: The primary objective of this course is to introduce the basic tools of complex numbers, theory of equations, matrices and matrix method of solution of homogeneous linear equations up to four variables.

Course Learning Outcomes: This course will enable the students to:

- Employ De Moivre's theorem in a number of applications to solve numerical problems.
- Learn the basic concepts of exponential, logarithmic and hyperbolic functions of complex numbers.
- Learn how to find the nature of the roots of a given polynomial equation by Descartes' rule , also learn about symmetric functions of the roots for cubic and biquadratic equations.
- Learn how to solve cubic and biquadratic equations.
- Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix. Finding inverse and rank of a matrix.

Unit 1:

Polar representation of complex number, De Moivre's theorem (both integral and rational index), Roots of complex numbers, n^{th} roots of unity, Application of De Moivre's Theorem, Exponential and logarithmic functions of complex numbers, Hyperbolic functions.

[1] Chapter 2 (Sections 2.7-2.13, 2.16)

(No. of classes: 20, Marks: 25)

Unit 2:

Algebraic equations: Deduction from Fundamental Theorem of Classical Algebra, Descartes' rule of signs, relation between roots and coefficients of a polynomial equation of degree n, symmetric functions of roots, Transformation of equations, Cardon's method of solution of a cubic equation, Euler's method of solution of a biquadratic equation.

[1] Chapter 5; Theorem 5.1.1, Theorem 5.2.1, Section 5.3 - 5.6, 5.11,5.12.

(No. of classes: 20, Marks: 30)

Unit 3:

Matrix Algebra, Addition, Transposition, Symmetry, Multiplication of matrices and their properties, Matrix inversion and properties, Row Echelon form and Rank of a matrix, Reduced row Echelon form, Consistency of linear systems, Solutions of system of homogeneous linear equations with number of equations and unknowns up to four.

[2] Chapter 3 (Sections 3.2, 3.5, and 3.7) Chapter 2 (Sections 2.1 to 2.4)

(No. of classes: 20, Marks: 25)

Text Books:

1. Mappa, S.K., Higher Algebra (Classical), Revised 8th Edition, 2011, Levant Books.

2. Meyer, Carl D. (2000). Matrix Analysis and Applied Linear Algebra. Society for Industrial and Applied Mathematics (Siam).

Reference Books:

1. Dickson, Leonard Eugene (2009). First Course in The Theory of Equations. The Project Gutenberg eBook (http://www.gutenberg.org/ebooks/29785)

2. Gilbert, William J., & Vanstone, Scott A. (1993). Classical Algebra (3rd ed.). Waterloo Mathematics Foundation, Canada.

3. Titu Andreescu and Dorin Andrica, Complex Numbers from A to Z, Birkhauser,2006.

Course Designers: 1. Dr. Hemen Dutta. Dept.of Mathematics, Gauhati University.

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SEMESTER-II
Calculus

Total Marks: 100 (Theory 80, Internal Assessment 20)
No. of Credits: 4
Each unit carries equal credit

Base syllabus: MAT-HG-1016/ MAT-RC-1016: Calculus (UG CBCS)
Course Level: 100-199
No. of Contact classes: 60
No. of Non-Contact classes: 0
Prerequisites: Class XII Level Mathematics

Course Objectives: Calculus is referred as 'Mathematics of change' and is concerned with describing the precise way in which changes in one variable relate to the changes in another. Through this course, students can understand the quantitative change in the behaviour of the variables and apply them on the problems related to the environment.

Course Learning Outcomes: The students who take this course will be able to:

- Understand continuity and differentiability in terms of limits.
- Describe asymptotic behavior in terms of limits involving infinity.
- Understand the importance of mean value theorems.

Unit 1: Limits and continuity of a function including different approaches, Properties of continuous functions including Intermediate value theorem.

[1] Chapter 1

(No. of classes: 15, Marks: 20)

Unit 2: (a) Differentiability, Successive differentiation, Leibnitz theorem, Recursion formulae for higher derivatives.

(b) Reduction formulae, derivations and illustrations of reduction formulae of the type $\int \sin^n x\, dx$, $\int \cos^n x\, dx$, $\int \tan^n x\, dx$, $\int \sec^n x\, dx$, $\int (\log x)^n\, dx$, $\int \sin^n x \cos^m x\, dx$.

[2] Chapter 5(for part (a))

[3] Chapter 4 (4.1-4.6) (only for part (b))

(No. of classes: 15, Marks: 20)

Unit 3: Rolle's theorem, Lagrange's mean value theorem with geometrical interpretations and simple applications, Maclaurin and Taylor polynomials and their sigma notations. Taylor's formula with remainder, Introduction to Maclaurin and Taylor series.

[1] Chapter 9 (Sections 9.8 and 9.9 (without 'convergence' part))

[2] Chapter 6

(No. of classes: 15, Marks: 20)

Unit 4: Functions of two or more variables, Partial differentiation up to second order, Euler's theorem on homogeneous functions

[1] Chapter 13 (Sections 13.1 and 13.3)

[2] Chapter 10(10.81)

(No. of classes: 15, Marks: 20)

Text books:

[1] Anton, Howard, Bivens, Irl, & Davis, Stephen (2013). Calculus (10th ed.). John Wiley & Sons Singapore Pte. Ltd. Reprint (2016) by Wiley India Pvt. Ltd. Delhi

[2] Shanti Narayan and P.K. Mittal, Differential Calculus, S. Chand, 2005

[3] Shanti Narayan and P.K. Mittal, Integral Calculus, S. Chand, 2007.

Reference book:

[1] Thomas, Jr. George B., Weir, Maurice D., & Hass, Joel (2014). Thomas' Calculus (13th ed). Pearson Education, Delhi. Indian Reprint 2017.

Course Designers:

1. Dr. Debasish Bhattacharjee, Department of Mathematics, Gauhati University,
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SEMESTER-III

Ordinary Differential Equations

Total Marks: 100 (Theory 80, Internal Assessment 20)

No. of Credits: 4

Each unit carries equal credit

Base syllabus: MAT-HG-3016/MAT-RC-3016: Differential Equations (UG CBCS)

Course Level: 200-299

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites: Class XII Mathematics

Course Objectives: The main objective of this course is to introduce the students to the exciting world of differential equations and their solutions methods.

Course Learning Outcomes: The course will enable the students to:

- Learn basics of 1st order ordinary differential equations and 2nd order linear differential equations
- Learn different techniques for solving the differential equations

Unit 1: **First Order Ordinary Differential Equations**

Classification of differential equations; their origin and application. Solutions. First order exact differential equation. Integrating factors, Rules to find an integrating factor.

[1] Chapter 1(Sections 1.1and 1.2) Chapter 2 (Sections 2.1, 2.2 and 2.4)

Linear equations and Bernoulli equations. Basic theory of higher order linear differential equations. Solving differential equation by reducing its order. Wronskian and its properties.

[1] Chapter 2 (Section 2.3), Chapter 4 (Sections 4.1 and 4.6)

(No. of classes: 30, Marks: 40)

Unit 2: Second Order Linear Differential Equations

Linear homogenous equations with constant coefficients. Linear non- homogenous equations; the method of undetermined coefficients, the method of Variation of Parameters. The Cauchy-Euler equations.

[1] Chapter 4 (Sections 4.2, 4.3, 4.4 and 4.5)

(No. of classes: 30, Marks: 40)

Text Book:

[1] Ross, Shepley L. (1984). Differential Equations (3rd Ed.), John Wiley & Sons,Inc.

Reference Book:

1.Kreyszig, Erwin (2011). Advanced Engineering Mathematics(10th ed.).John Wiley & Sons, Inc. Wiley India Edition 2015.

Course Designers:

1. Dr. U. J. Das, Dept. of Mathematics, Gauhati University
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2. Dr. Arun Chaliha, Dept. of Mathematics, Biswanath College
Phone No. 9435506224, Email ID: arunchaliha@gmail.com

SEMESTER-IV

Paper-I

Real analysis

Total Marks: 100 (Theory 80, Internal Assessment 20)

No. of Credits: 4

Base syllabus: MAT-HG-4016/ MAT-RC-4016: Real Analysis (UG CBCS)

Course Level: 200-299

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites: Class XII level Mathematics

Course Objective: The course will develop a deep and rigorous understanding of real line R andof defining terms to prove the results about convergence and divergence of sequences and series of real numbers. These concepts have wide range of applications in real life scenario.

Course Learning Out comes: This course will enable the students to:

- Understand many properties of the real line R, including completeness and Archimedean properties.
- Learn to define sequences in terms of functions from N to a subset of R.
- Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence.
- Apply limit comparison tests for convergence, the ratio, root, Raabe's, integral tests for convergence of an infinite series of real numbers.
- Alternating series and absolute convergence of an infinite series of real numbers.

UNIT 1: Algebraic and order properties of R, absolute value and real line, bounded sets, supremum and infimum, completeness property of R, the Archimedean property, the density theorem, intervals, nested interval theorem, uncountability of R.

[1] Chapter 2

(No of classes: 10, Marks: 15)

UNIT 2: Real sequences, limit of a sequence, convergent sequence, bounded sequence, limit theorems, monotone sequences, monotone convergence theorem, subsequences, monotone subsequence theorem, Bolzano Weierstrass theorem for sequences, Cauchy sequences, Cauchy's convergence criterion, properties of divergence sequences.

[1] Chapter 3

(No of classes: 25, Marks: 30)

UNIT 3: Infinite series, convergence and divergence of infinite series, Cauchy criterion, Tests for convergence: comparison test, limit comparison test, ratio test, root test, integral test, Raabes's test, Absolute convergence, rearrangement theorem, alternating series, Leibniz test, conditional (non-absolute) convergence.

[1] Chapter 3: Section: 3.7, Chapter 9: Sections: 9.1-9.3.

(No of classes: 25, Marks: 35)

Text Book:

1. R.G. Bartle and D.R. Sherbert, *Introduction to Real Analysis*, 3rd Ed., John Wiley and Sons, 2002.

Reference Books:

1. Gerald G. Bilodeau, Paul R. Thie, G.E. Keough, *An Introduction to Analysis,* Jones &Bartlett, Second Edition, 2010.
2. A. Kumar and S. Kumaresan, *Basic Course in Real Analysis*, CRC Press, 2014.
3. K.A. Ross, *Elementary Analysis*: *The Theory of Calculus*, Undergraduate Texts in Mathematics, Springer (SIE), Indian reprint, 2004.

Course Designers: 1. Prof. Bipan Hazarika, Department of Mathematics, Gauhati University
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SEMESTER-IV

Paper-II

Complex Analysis (with practical)

Total Marks: 100

(Theory: 60, Practical 20, Internal Assessment: 20)

No. of Credits: 4 (Theory 3, Practical 1)

Base syllabus: MAT-HC-5016: Complex Analysis (including practical)

Course Level: 200-299

No. of Contact classes: 75 (15×3+30×1)

No. of Non-Contact classes: 0

Prerequisites: Knowledge on

- complex number system as the extension of real number system
- Algebra of complex numbers.
- Properties of complex number.
- Modulus, argument and geometrical representation of complex numbers

Course Objectives: The main objective of this course is to develop a deep understanding of the complex plane together with various related concepts. These concepts have wide applicability in different aspects.

Course Learning Outcomes: The completion of the course will enable the students to:

- Learn the significance of differentiability of complex functions leading to the understanding of Cauchy−Riemannequations.
- Learn some elementary functions and valuate the contour integrals.
- Understand the role of Cauchy−Goursat theorem and the Cauchy integral formula

UNIT 1: Functions of complex variable, mappings, limits, theorems on limits, limits involving point at infinity, continuity. Derivatives, rules for differentiation, Cauchy-Riemann equations, sufficient conditions for differentiability, polar co-ordinates.

[1]: Chapter 2 (Section 13, 14, 15, 16, 17, 18, 19, 20, 21, 22,23,24)

(No. of classes: 10, Marks: 15)

UNIT 2: Analytic functions, examples of analytic functions, harmonic function. The exponential function, Logarithmic function, examples, branches and derivatives of logarithms,some identities involving logarithms, the power function. trigonometric function, zeros and singularities of trigonometric functions derivatives of functions, definite integrals of functions.

[1]: Chapter 2 (Sections 25, 26,27), Chapter 3 (Sections 30, 31,32,33,34, 35,36,37,38), Chapter 4 (Section 41,42)

(No. of classes: 15, Marks: 15)

UNIT 3: Contours, Contour integrals and its examples, upper bounds for moduli of contour integrals, antiderivatives, proof of antiderivative theorem.

[1]: Chapter 4 (Section 43, 44, 45,47, 48, 49)

(No. of classes: 10, Marks: 15)

UNIT 4: Cauchy-Goursat theorem, simply connected domains, multiply connected domains, Cauchy integral formula, extension of Cauchy integral formula, Liouville's theorem and the fundamental theorem of algebra.

[1]: Chapter 4 (Sections 50, 52, 53,54, 55, 58)

(No. of classes: 10, Marks: 15)

LAB WORK TO BE PERFORMED ON A COMPUTER

(MODELING OF THE FOLLOWING PROBLEMS USING MATLAB/ MATHEMATICA/ MAPLE etc.)

1. Declaring a complex number and graphical representation. e.g. Z1 =3 + 4i, Z2 = 4 – 7i
2. Program to discuss the algebra of complex numbers, e.g.,

Z1 =3 + 4i, Z2 = 4 – 7i, then find Z1 + Z2, Z1 - Z2, Z1 * Z2 and Z1 / Z2

3. To find conjugate, modulus and phase angle of an array of complex numbers.

e.g.Z = [2+ 3i, 4-2i, 6+11i, 2-5i]

4. To compute the integral over a straight line path between the two specified end points.

e. g., $\oint$ Sin$z$ d, along the contour C which is a straight line path from -1+ i to 2 - i.

5. To perform contour integration., e.g.,

(i) $\oint(z^2 - 2z + 1)dz$ along the Contour C given by $x = y^2 + 1$; $-2 \leq y \leq 2$.

(ii) $\oint(z^3 + 2z^2 + 1)dz$ along the contour C given by $x^2 + y^2 = 1$, which can be parameterized by x = cos (t), y = sin (t) for $0 \leq y \leq 2\pi$.

6. To plot the complex functions and analyze the graph. e.g.,

f(z) = z, iz, z^2, z^3, e^z and $(z^4-1)^{1/4}$, etc

(No. of practical classes: 30, Marks: 20)

Text Book:

1. James Ward Brown and Ruel V. Churchill, Complex Variables and Applications (Ninth Edition), McGraw-Hill Indian Edition, 2021.

Reference Book:

1. Joseph Bak and Donald J. Newman, *Complex analysis* (2nd Edition), Undergraduate Texts in Mathematics,Springer-Verlag New York, Inc., New York, 1997.
2. M.R. Spiegel, *Complex Variables*. Schaum's Outlines series, McGraw Hill Education, 2017

Course Designers:

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SEMESTER-IV

Paper-III

Analytical Geometry

Total Marks: 100 (Theory 80, Internal Assessment 20)

No. of Credits: 4 (Each unit carries equal credit)

Base syllabus: MAT-HG-1026: Analytical Geometry (UG CBCS)

Course Level: 200-299

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites: Class XII Mathematics

Course Objectives: The primary objective of this course is to introduce some basic tools of two-dimensional and three-dimensional coordinate systems and also to familiarise the use of Vector Algebra in Coordinate Geometry.

Course Learning Outcomes: This course will enable the students to:

- transform coordinate systems
- learn about pair of straight lines
- have a clear understanding of the conic sections and related properties
- recognise three dimensional surfaces represented by equations of the second degree
- learn two different systems of coordinates which are very useful to define the position of a point in space
- acquire basic concepts of Vector Algebra and understand the use of geometric view of vectors in Coordinate Geometry.

UNIT 1: Transformation of coordinates, invariants under orthogonal transformations, pair of straight lines.

[1] Chapter 1 (Section 1.3), Chapter 2, Chapter 3

(No. of classes: 15, Marks: 20)

UNIT 2: Parabola, parametric coordinates, tangent and normal, ellipse and its conjugate diameters with properties, hyperbola and its asymptotes, General conics: tangent, condition of tangency, pole and polar, centre of a conic, equation of pair of tangents, reduction to standard forms, central conics, equation of the axes, and length of the axes, polar equation of a conic, tangent and normal, and properties.

[1] Chapters 4, 5, 6, 7, 9 (upto Section 9.43)

(No. of classes: 15, Marks: 20)

UNIT 3: Quadric surfaces: Sphere, Cylinder and Cone. Cylindrical and spherical polar coordinates.

[1] Chapter 6 (Section 6.1 – 6.3), Chapter 12

(No. of classes: 15, Marks: 20)

UNIT 4: Rectangular coordinates in 3-space, Vector viewed geometrically, Vectors in coordinates system, Vectors determined by length and angle, Dot product, Cross product and their geometrical properties, Triple product, Parametric equations of lines in 2-space and 3-space.

[2] Chapter 11 (Section 11.1 - 11.5)

(No. of classes: 15, Marks: 20)

Text Books:

1. R.M. Khan, Analytical Geometry of two and three dimensions and Vector Analysis. New Central Book Agency, 2012.
2. Anton, Howard, Bivens, Irl, & Davis, Stephen (2013), Calculus (10th ed.). John Wiley & Sons, Singapore Reprint (2016) by Wiley India Pvt. Ltd., Delhi.

Reference Book:

1. R.J.T. Bell, Coordinate Solid Geometry, Macmillan, 1983.
2. E.H. Askwith, The Analytical Geometry of the Conic Sections, Nabu Press (27 February 2012)
3. B. Das, Analytical Geometry and Vector Analysis, Orient Book Company, Kolkata -700007

Course Designers:

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SEMESTER-IV

Paper-IV

Number Theory

Total Marks: 100 (Theory 80, Internal Assessment 20)

No. of Credits: 4

Base syllabus: MAT-HE-5016: Number Theory (UG CBCS)

Course Level: 200-299

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites: Mathematics in senior secondary school or equivalent standard.

Course Objectives:

The primary objective of this course is to develop students' understanding of integers, with a focus on their properties and representations, as well as their understanding of number theoretic analysis.

Course Learning Outcomes: On successful completion of the course students will be able to:

- Explain division algorithm, Euclid’s algorithms and greatest common divisor.
- Explain the concepts of congruences, linear congruences .
- Explore the Chinese Remainder theorem to solve simultaneous linear congruences.
- Explain Fermat’s theorem and Wilson’s theorem.
- Solve a range of problems in number theory
- Apply mathematical ideas and concepts within the context of number theory.
- Communicate number theoretic techniques to a mathematical audience.

Unit 1: Well-Ordering Principle of integers, Archimedian property, First principle of finite induction, Second principle of finite induction, The division algorithm of integers, The greatest common divisor, The Euclidean algorithm, The Diophantine equation $ax+by=c$, Fundamental Theorem of Arithmetic, The sieve of Eratosthenes, The Goldbach Conjecture.

[1] Chapter 1 (Sections 1.1), Chapter2 (sections 2.2 -- 2.5), Chapter3.

(No of classes:20, Marks:25)

Unit 2: Congruence modulo of a fixed positive integer, Basic properties of congruences, Binary and decimal representation of integers, Linear congruences, Chinese Remainder Theorem, Fermat's Little Theorem, pseudoprimes, Wilson's Theorem.

[1] Chapter 4 (Sections 4.2-4.4) Chapter5 (Sections: 5.2, 5.3).

(No of classes: 20, Marks: 25)

Unit 3: Number Theoretic Functions: The sum and number of divisors of a positive integer, Multiplicative functions, Mobius function, The Mobius inversion Formula, The greatest integer function, Euler's Phi-Function, Euler's Theorem, Properties of Euler's Phi function.

[1] Chapter 6 (Sections 6.1-6.3), Chapter 7 (Sections 7..2 to 7.4) .

(No of classes:20, Marks:30)

Text Books:

1. David M. Burton, *Elementary Number Theory*, 7th Edition, McGraw Hill Education (India) private limited. 2012.

Reference Books:

1. G.A. Jones and J. Mary Jones, *Elementary Number Theory*. Undergraduate Mathematics Series (SUMS) , 2005.
2. Neville Robinns, *Beginning Number Theory*. 2nd Ed., Narosa Publishing House Pvt. Ltd. Delhi-2007
3. K.C. Chowdhury, *A First Course in Number Theory*, Asian Books Publications- 2012.

Course Designers:

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SEMESTER-V

Paper-I

Abstract Algebra

Total Marks: 100 (Theory 80, Internal Assessment 20)

No. of Credits: 4

Each unit carries equal credit

Base syllabus: MAT-HC-3026: Group Theory-I (UG CBCS)

Course Level: 300-399

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites: Mathematics in senior secondary school or equivalent standard.

Course Objectives: The primary objective of this course is to introduce abstract mathematical objects, viz. groups, rings and fields and study their properties. It is also focussed to study the consequences of these mathematical structures.

Course Learning Outcomes: On successful completion of the course students will be able to:

- Recognize the mathematical objects called group, ring and fields.
- Link the fundamental concepts of groups and symmetries of geometrical objects.
- Explain the significance of the notion of Permutation groups, cosets, cyclic groups, normal subgroups, factor groups.
- Analyse consequences of Lagrange's theorem and Fermat's Little theorem.
- Describe structure preserving mappings between groups and their consequences.
- Describe the fundamental concepts in ring theory such as of the subrings, integral domains, ideals, factor rings and fields.

Unit 1: Definition and examples of groups, Elementary properties of groups, Symmetries of a square, Dihedral groups, order of a group, Order of an element in a group, Subgroups, Subgroup Tests, Subgroup generated by an element of a group, Centre of a group, Centralizer of an element in a group, Cyclic groups, Properties of cyclic groups, Fundamental theorem of cyclic groups.

[1] Chapter 1 to Chapter 4.

(No. of classes: 15, Marks: 20)

Unit 2: Permutations, Permutation group, Properties of permutations, Even and odd permutations, Alternating groups, Cosets, Properties of cosets, Lagrange's Theorem, Fermat's Little Theorem, Normal subgroups, Factor groups.

[1] Chapter 5 (up to theorem 5.7), Chapter 7 (up to theorem 7.2), Chapter 9 (up to theorem 9.2)

(No. of classes: 15, Marks: 20)

Unit 3: Isomorphism of groups, Cayley's Theorem, Properties of isomorphism, Group homomorphism, Kernal of a group homomorphism, Properties of group homomorphism, First isomorphism Theorem of groups.

[1] Chapter 6 (up to theorem 6.3), Chapter 10 (up to theorem 10.4).

(No. of classes: 15, Marks: 20)

Unit 4: Rings, Examples of rings, Properties of rings, Subrings, Zero-Divisors in a ring, Integral domains, Fields, Characteristic of a ring, Ideals, Ideal Test, Factor rings, Prime ideals and maximal ideals of a ring.

[1] Chapter 12 to Chapter 14.

(No. of classes: 15, Marks: 20)

Text Books:

1. Gallian Joseph A., *Contemporary Abstract Algebra* (8th Edition) , Cengage Learning India Private limited, Delhi, Fourth impression, 2015.

Online link: https://ict.iitk.ac.in/wp-content/uploads/CS203-Mathematics-for-Computer-Science-III-Gallian.pdf

Reference Books:

1. David S. Dummit and Richard M. Foote*, Abstract Algebra* (2nd Edition) , John Wiley and Sons (Asia) Pvt. Ltd. , Singapore, 2003.
2. John B. Fraleigh, *A First course in Abstract Algebra*, 7th Edition, Pearson, 2002.
3. G. Santhanam. *Algebra,* Narosa Publishing House, 2017.

Course Designers:

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SEMESTER-V

Paper-II

Multivariate Calculus

Total Marks: 100 (Theory 80, Internal Assessment 20)
No. of Credits: 4
(Each unit carries equal credits)
(Use of Scientific calculator is allowed)

Base syllabus: MAT-HC-4016: Multivariate Calculus (UG CBCS)
Course Level: 300-399
No. of Contact classes: 60
No. of Non-Contact classes: 0
Prerequisites: Knowledge on the following topics:

- Functions of single variable, limit, continuity, differentiability and extrema of single variable functions.
- Knowledge of Integration
- Vector valued functions, dot and cross product of vectors.

Course Objectives: To understand the extension of the studies of single variable differential and integral calculus to functions of two or more independent variables. Also, the emphasis will be on the use of Computer Algebra Systems by which these concepts may be analyzed and visualized to have a better understanding. This course will facilitate to becomeaware of applications of multivariable calculus tools in physics, economics, optimization, and understanding the architecture of curves and surfaces in plane and space etc.

Course Learning Outcomes: This course will enable the students to:

- Learn the conceptual variations when advancing in calculus from one variable to multivariable discussion.
- Understand the maximization and minimization of multivariable functions subject to the given constraints on variables.
- Learn about inter-relationship amongst the line integral, double and triple integral formulations.
- Familiarize with Green's, Stokes' and Gauss divergence theorems

UNIT 1: Functions of several variables, Level curves and surfaces, Limits and continuity, Partial differentiation, Higher order partial derivative, Chain rule, Directional derivatives, The gradient, Maximal property of the gradient.

[1] Chapter 11 [(Sections 11.1, 11.2, 11.3, 11.5, Section 11.6 (upto page 592)]

(No. of classes: 15, Marks: 20)

UNIT 2: Extrema of functions of two variables, Method of Lagrange multipliers, Constrained optimization problems; Definition of vector field, Divergence and curl.

[1] Chapter 11 [Section 11.7 (up to page 605), Section 11.8 (pages 610-614)], Chapter13 (Section 13.1)

(No. of classes: 15, Marks: 20)

UNIT 3: Double integration over rectangular and nonrectangular regions, Double integrals in polar coordinates, Triple integral over a parallelepiped and solid regions, Volume by triple integrals.

[1] Chapter 12 (Sections 12.1-12.4)

(No. of classes: 15, Marks: 20)

UNIT 4: Line integrals, Applications of line integrals**:** Mass and Work, Fundamental theorem for line integrals, Conservative vector fields, Green's theorem, Area as a line integral; Surface integrals, Stokes' theorem, The Gauss divergence theorem.

[1] Chapter 13 [(Sections 13.2, 13.3), Section 13.4 (pages 712 to 716), Section 13.5 (pages 723 to 726) Section 13.6 (pages 733 to 737), Section 13.7 (pages 742 to 745)]

(No. of classes: 15, Marks: 20)

Text book:

[1] Strauss, Monty J.,Bradley, Gerald L.,& Smith, Karl J.(2007). *Calculus* (3rd ed.).Dorling Kindersley (India) Pvt. Ltd. (Pearson Education). Delhi. Indian Reprint 2011

Reference Books:

1. Marsden, J.E., Tromba, A., & Weinstein,A.(2004).*Basic Multivariable Calculus*.Springer (SIE). First Indian Reprint.
2. G.B. Thomas and R.L. Finney, Calculus, 9th Ed., Pearson Education, Delhi, 2005.
3. James Stewart, Multivariable Calculus, Concepts and Contexts, 2nd Ed., Brooks /Cole, Thomson Learning, USA,2001.

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SEMESTER-V

Paper-III

Theory of Real Functions

Total Marks: 100 (Theory 80, Internal Assessment 20)

No. of Credits: 4

Base syllabus: MAT-HC-3016: Theory of Real Functions (UG CBCS)
Course Level: 300-399
No. of Contact classes: 60
No. of Non-Contact classes: 0
Prerequisites: Class XII level Mathematics

Course Objective: The primary objective of this course is to study limit point of set and limit of a function. The discussion on continuous functions and differentiability with some related theorems will also be focused in this course.

Course Learning Outcomes: This course will enable the students to:

- Have a rigorous understanding of the concept of limit of a function.
- Learn about continuity and uniform continuity of functions defined on intervals.
- Understand geometrical properties of continuous functions on closed and bounded intervals.
- Learn extensively about the concept of differentiability using limits, leading to a better understanding for applications.
- Know about applications of mean value theorems and Taylor's theorem

UNIT 1: Cluster point or limit point of a set, limits of a function (ε-δ approach), sequential criterion for limits, divergence criteria, limit theorems, one sided limits, infinite limits and limits at infinity.

[1] Chapter 4

(No. of classes: 15, Marks: 20)

UNIT 2: Continuous functions, sequential criterion for continuity and discontinuity, algebra of continuous functions, continuous functions on intervals, maximum-minimum theorem, intermediate value theorem, location of roots theorem, preservation of intervals theorem, uniform continuity, uniform continuity theorem, monotone and inverse functions.

[1] Chapter 5 (5.1 to 5.6)

(No. of classes: 15, Marks: 30)

UNIT 3: Differentiability of a function at a point and in an interval, Caratheodory's theorem, chain rule, derivative of inverse function, Rolle's theorem, mean value theorem, Darboux's theorem, Cauchy mean value theorem, Taylor's theorem and applications to inequalities, Taylor's series expansions of exponential and trigonometric functions, ln(1+x), 1/(ax+b) and $(1+x)^n$.

[1] Chapter 6, and Taylor series as in Section 6.4.

(No. of classes: 30, Marks: 30)

Text Book:

1. R.G. Bartle and D.R. Sherbert, *Introduction to Real Analysis*, 3rd Ed., John Wiley and Sons, 2002.

Reference Books:

1. Ajit Kumar and S. Kumaresan, *A Basic Course in Real Analysis*, CRC Press, Indian Ed. 2014.
2. K.A. Ross, *Elementary Analysis: The Theory of Calculus*, Springer, 2004.
3. Mattuck, *Introduction to Analysis*, Prentice Hall, 1999.
4. S.R.Ghorpade and B.V.Limaye, *A Course in Calculus and Real Analysis*, Springer, 2006.

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SEMESTER-V

Paper-IV

Numerical Analysis (with practical)

Total Marks: 100

(Theory: 60, Practical 20, Internal Assessment: 20)
No. of Credits: 4 (Theory 3, Practical 1)
(Use of Scientific calculator is allowed)

Base syllabus: MAT-HG-4026: Numerical Analysis (UG CBCS)

Course Level: 300-399

No. of Contact classes: 75 (15×3+30×1)

No. of Non-Contact classes: 0

Prerequisites: Class XII level Mathematics, Knowledge on computer software and programming

Course Objectives: To comprehend various computational techniques to find approximate value for possible root(s) of non-algebraic equations, to find the approximate solutions of system of linear equations and Quadratic equations.

Course Learning Outcomes: The course will enable the students to:

- Learn some numerical methods to find the zeroes of nonlinear functions of a single variable and solution of asystem of linear equations, up to a certain given level of precision.
- Know about iterative and non-iterative methods to solve system of linear equations
- Know interpolation techniques to compute the values for a tabulated function at points not in the table.
- Integrate a definite integral that cannot be done analytically
- Find numerical differentiation of functional values
- Solve differential equations that cannot be solved by analytical methods

Unit 1: Gaussian elimination method (with row pivoting), Gauss-Jordan method; Iterative methods**:** Jacobi method, Gauss-Seidel method; Interpolation**:** Lagrange form, Newton form, Finite difference operators, Gregory-Newton forward and backward difference interpolations, Piecewise polynomial interpolation (Linear and Quadratic).

[1] Chapter 3(Sections 3.1, and3.2),Chapter 6(Sections 6.1,and 6.2) Chapter 8(Section8.1, Section8.3 (8.3.1, and8.3.2)

[2] Chapter 3(Sections 3.2, and 3.4) Chapter 4(Section 4.2) Chapter 4(Sections 4.3,and 4.4)

[1]Chapter 18 (Sections18.1to18.3)

(No. of classes: 20, Marks: 30)

Unit 2: Numerical differentiation**:** First and second order derivatives; Numerical integration**:** Trapezoid rule, Simpson's rule; Extrapolation methods**:** Richardson extrapolation, Romberg integration; Ordinary differential equation**:** Euler's method, Modified Euler's methods **(**Heun and Mid-point).

[2] Chapter 11 [Sections 11.1(11.1.1,11.1.2,11.1.4), and11.2(11.2.1,11.2.2,11.2.4)]

[1] Chapter 22 (Sections22.1, and 22.2,22.3)

(No. of classes: 25, Marks: 30)

***Practical / Lab work to be performed on a compute*r:**

Use of computer aided software (CAS), for example *Matlab/Mathematica/Maple* etc., for developing the following numerical programs:

(i) Lagrange's interpolation method

(ii) Newton's interpolation method

(iii) To calculate forward and backward differences

(iv) Trapezoidal rule

(v) Simpson's rule

Note: For any of the CAS *Matlab/Mathematica/Maple* etc., Data types-simple data types, floating data types, character data types, arithmetic operators and operator precedence, variables and constant declarations, expressions, input/output, relational operators, logical operators and logical expressions, control statements and loop statements, arrays should be introduced to the students.

(No. of practical classes: 30, Marks: 20)

Text Books:

[1] Chapra, Steven C.(2018).*Applied Numerical Methods with* MATLAB *for Engineers and* Scientists (4th ed.) Mc Graw-Hill Education.

[2] Fausett, Laurene V. (2009). *Applied Numerical Analysis Using* MATLAB. Pearson. India

[3] Jain, M.K., Iyengar, S.R.K., & Jain R.K.(2012). *Numerical Methods for Scientific and Engineering Computation* (6th ed.). New Age International Publishers. Delhi.

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SEMESTER-VI

Paper-I

Linear Algebra

Total Marks: 100 (Theory 80, Internal Assessment 20)

No. of Credits: 4

Each unit carries equal credit

Base syllabus: MAT-HC-5026: Linear Algebra (UG CBCS)

Course Level: 300-399

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites for the paper: Senior Secondary School Mathematics or equivalent

Course Objectives: The objective of this course is to introduce the students with the fundamental theory of linear spaces and also emphasizes the application of techniques using the adjoint of linear operator and minimal solutions to systems of linear equations.

Course Learning Outcomes: This course will enable the students to:

- Learn about linear spaces and their general properties, linear dependence and linear independence of vectors, bases and dimensions of vector spaces
- Basic concepts of linear transformations, dimension theorem, matrix representations of linear transformations, and the change of coordinate matrix.
- Compute the characteristic polynomial, eigenvalues, eigenvectors and eigenspaces, as well as the geometric and the algebraic multiplicities of an eigenvalue and apply the basic diagonalization result.
- Compute inner products and determine orthogonality on vector spaces including Gram-Schmidt orthogonalization to obtain orthonormal basis.

Unit 1: Definition and examples of vector spaces, general properties of vector spaces, Definition and examples of subspaces, subspace criterions and algebra of subspaces, null space and column space of a matrix, Linear transformations, Kernel and range of a linear transformation.

[1]: Chapter 4 (Sections 4.1-4.2), [2] : Chapter 4

(No. of classes: 15, Marks: 20)

Unit 2:, Linear combinations of vectors, linearly dependent and independent sets, bases of vector spaces, coordinate systems, dimension of a vector space, ranks, change of basis.

[1]: Chapter 4 (Sections 4.3-4.7), [2] : Chapter 5

(No. of classes: 15, Marks: 20)

Unit 3: Eigenvectors and eigenvalues of a matrix, The Characteristic equation, Diagonalization, eigenvector of a linear transformation, Complex eigenvalues. Invariant subspaces and Cayley-Hamilton Theorem.

[1]: Chapter 5 (Sections 5.1-5.5), [2]: Chapter 9, [3]: Chapter 5 (Sections 5.4)

(No. of classes: 15, Marks: 20)

Unit 4: Inner products, Length and orthogonality, orthogonal sets, orthogonal projections, The Gram-Schmidt process, Inner product spaces.

[1]: Chapter 6 (Sections 6.1-6.4, 6.7), [2]: Chapter 12

(No. of classes: 15, Marks: 20)

Text Books:

1. David C. Lay, *Linear Algebra and its Applications*, 3rd Edition, Pearson Education, Asia, Indian Reprint, 2007
2. Seymour Lipschutz, *Theory and Problems of Linear Algebra*, Schaum's Outline Series, McGraw-Hill Book Company, Singapore
3. Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence, *Linear Algebra*, 4th Edition, Prentice Hall of India Pvt. Ltd., New Delhi, 2004.

Reference Books:

1. S. Kumaresan, *Linear Algebra- A Geometric Approach*, Prentice Hall of India, 2017
2. Gilbert Strang, Linear Algebra and its Applications, Thomson, 2007
3. G. Schay, Introduction to Linear Algebra, Narosa, 1997

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SEMESTER-VI

Paper-II

Partial Differential Equations (with practical)

Total Marks: 100

(Theory: 60, Practical 20, Internal Assessment: 20)
No. of Credits: 4 (Theory 3, Practical 1)

Base syllabus: MAT-HC-6026: Partial Differential Equations (including practical) (UG CBCS)
Course Level: 300-399
No. of Contact classes: 75 (15×3+30×1)
No. of Non-Contact classes: 0
Prerequisites: Class XII level Mathematics, Knowledge on computer software

Course Objectives: The main objectives of this course are to teach students to form and solve partial differential equations and use them in solving some physical problems.

Course Learning Outcomes: The course will enable the students to:

- Formulate, classify and transform first order PDEs into canonical form.
- Learn about method of characteristics and separation of variables to solve first order PDE's.
- Classify and solve second order linear PDEs.
- Learn about Cauchy problem for second order PDE and homogeneous and non-homogeneous wave equations.
- Apply the method of separation of variables for solving many well-known second-order PDEs.

Unit 1: Introduction, Classification, Construction of first order partial differential equations (PDE). Cauchy's problem for first order equations, linear equations of the first order, Integral surfaces passing through a given curve, Nonlinear partial differential equations of the first order, Cauchy's method of characteristics, Charpit's method. Solutions satisfying given conditions, Jacobi's method.

[1] Chapter 2 (Sections 2.1 to 2.3), [2] Chapter 2 (Section 3, 4,5, 7,8,10,12, 13)

(No. of classes: 15, Marks: 20)

Unit 2: Canonical form of first order PDE, Method of separation of variables for first order PDE.

[1] Chapter 2 (Sections 2.6 and 2.7)

(No. of classes: 15, Marks: 20)

Unit 3: Reduction to canonical forms, Equations with constant coefficients, General solution.

[1] Chapter 4 (Sections 4.1 to 4.5), [2] Chapter 3 (Sections 4, 5)

(No. of classes: 15, Marks: 20)

Practical /Lab work to be performed in a Computer Lab:

Modelling of the following similar problems using Mathematica /MATLAB/ Maple/ Maxima/ Scilab etc.

1. Solution of Cauchy problem for first order PDE.
2. Plotting the characteristics for the first order PDE.
3. Plot the integral surfaces of a given first order PDE with initial data.

4. Solution of wave equation $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$ for any two of the following associated conditions:

(a) $u(x,0) = \phi(x);\ u(x,0) = \psi(x), x \in R; t > 0$

(b) $u(x,0) = \phi(x);\ u_t(x,0) = \psi(x);\ \ u(0,t) = 0, x > 0; t > 0$

(c) $u(x,0) = \phi(x);\ u_t(x,0) = \psi(x);\ \ u_x(0,t) = 0, x > 0; t > 0$

(d) $u(x,0) = \phi(x);\ u_t(x,0) = \psi(x);\ \ u(0,t) = 0, u(l,t) = 0; x > 0; t > 0$

5. Solving systems of ordinary differential equations.

6. Solution of one-Dimensional heat equation $u_t = k\, u_{xx}$, for a homogeneous rod of length l.
That is - solve the IBVP:

$$\begin{gathered} u_t = k\, u_{xx}, \qquad 0 < x < l, \qquad t > 0 \\ u(0,t) = 0, \qquad u(l,t) = 0, \qquad t \ge 0 \\ u(0,t) = f(x), \ \ 0 \le x \le l \end{gathered}$$

(No. of practical classes: 30, Marks: 20)

Text Book:

1. Tyn Myint-U and Lokenath Debnath**,** *Linear Partial Differential Equation for Scientists and Engineers*, Springer, Indian reprint, 2006.
2. Sneddon, I. N. (2006). *Elements of Partial Differential Equations*, Dover Publications. Indian Reprint.

Reference Book:

1. Stavroulakis, Ioannis P &Tersian, Stepan A. (2004). *Partial Differential Equations*: *An Introduction with Mathematica and* MAPLE (2nd ed.). World Scientific.
2. M. D. Raisinghania, Advanced Differential Equations, S. Chand & Company LTD.

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SEMESTER-VI

Paper-III

Metric Spaces

Total Marks: 100 (Theory 80, Internal Assessment 20)

No. of Credits: 4

Base syllabus: MAT-HC-6016: Riemann Integration and Metric Spaces (UG CBCS)

Course Level: 300-399

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites for the paper: Senior Secondary School Mathematics or equivalent

Course Objectives: Up to this stage, students do study the concepts of analysis which evidently rely on the notion of distance. In this course, the objective is to develop the usual idea of distance into an abstract form on any set of objects, maintaining its inherent characteristics, and the resulting consequences.

Course Learning Outcomes: The course will enable the students to:

- Learn various natural and abstract formulations of distance on the sets of usual or unusual entities. Become aware one such formulations leading to metric spaces.
- Analyse how a theory advances from a particular frame to a general frame.
- Appreciate the mathematical understanding of various geometrical concepts, viz. Balls or connected sets etc. in an abstract setting.
- Learn about the two important topological properties of metric spaces, namely connectedness and compactness.

UNIT 1: Definition and examples of Metric spaces, sequences in metric spaces, Cauchy sequences, complete metric spaces. Open and closed balls, neighbourhood, open set, interior of a set. Limit point of a set, closed set, diameter of a set, Cantor's theorem. Subspaces, dense sets, separable spaces.

[1] Chapter 1, Sections: 1.1-1.4, Chapter 2, Sections: 2.1, 2.2, 2.3.12 - 2.3.16

(No. of classes: 15, Marks: 20)

UNIT 2: Continuity: Continuous mappings, sequential criterion and other characterizations of continuity. Uniform continuity. Homeomorphism, Equivalent metrics, Isometry. Contraction mappings.

[1] Chapter 3, Sections 3.1, 3.4, 3.5, 3.7 (upto 3.7.2)

(No. of classes: 15, Marks: 20)

UNIT 3: Connected metric spaces: Connectedness, connected subsets of real numbers, connectedness and continuous mappings, components. Compact metric spaces: bounded sets and compactness, other characterisations of compactness, continuous functions on compact spaces.

[1] Chapter 4, Sections 4.1, Chapter 5, Sections 5.1, 5.2, 5.3

(No. of classes: 30, Marks: 40)

Text Book:

1. Satish Shirali & Harikishan L. Vasudeva, Metric Spaces, Springer Verlag London (2006) (First Indian Reprint2009)

Reference Books:

1. S. Kumaresan, Topology of Metric Spaces, 2nd Ed., Narosa Publishing House, 2011.
2. G.F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hill, 2004.
3. Micheal O. Searcoid, Metric Spaces, Springer Publication, 2007

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SEMESTER-VI

Paper-IV

Mechanics

Total Marks: 100

(Theory: 80, Internal Assessment: 20)

No. of Credits: 4

Each unit carries equal credit

Base syllabus: MAT-HE-5026: Mechanics (UG CBCS)

Course Level: 300-399

No. of Contact classes: 60

No. of Non-Contact classes: 0

Prerequisites: Class XII level Mathematics

Course Objectives: The course aims at understanding the various concepts of physical quantities and the related motion of bodies under the action of forces.

Course Learning Outcomes: The course will enable the students to:

- Know about the concepts in statics such as moments, couples, equilibrium in both two and three dimensions.
- Understand the theory behind friction and center of gravity.
- Know about conservation of mechanical energy and work-energy equations.

- Learn about translational and rotational motion of rigid bodies.

UNIT1: Composition and resolution of forces, Parallelogram of forces, Triangle of forces, Converse of triangle of forces, Lami's Theorem, Parallel forces, Moment of a force about a point and an axis. Couple, Resultant of a system of forces. Equilibrium of coplanar forces. Friction, C.G of an arc, plane area, surface of revolution, solid of revolution.
[3] Chapter I-X
(No. of classes: 30, Marks: 40)

UNIT 2: Velocities and acceleration along radial and transverse directions and along tangential and normal directions, motion in a straight line under variable acceleration, simple harmonic motion and elastic string. Newton's law of motion. Work, Energy and momentum, Conservative forces-Potential energy, Impulsive forces, Motion in resisting medium.

[1] Chapter I Sections 1.1, 1.2,1.3, Chapter –2 Sections 2.1,2.2, Chapter 3 Sections 3.1.3.2, Chapter 4 Sections 4.1, Chapter 5Sections5.1,5.3,Chapter 6Sections6.1,6.3.
[2] Chapter 3(Sections:3.1,3.2,3.3,3.4).
(No. of classes: 30, Marks: 40)

Text Books:

1. S.L. Loney, An elementary treatise on the dynamics of a particle and of rigid bodies, Surjeet publications
2. F.Chorlton,TextbookofDynamics,CBS,Publications2nd Edition,1985
3. B.C. Das & B. N. Mukherjee, Statics, U. N. Dhur & Sons Pvt. Ltd.

Reference books:

1. M.R.Spiegel, Theoretical Mechanics, Schaum Series 2010.

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****

Four-year Undergraduate Programme
Subject: Microbiology
Semester: First
Course Name: ***Introduction to Microbiology and Microbial Diversity***
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 100-199, and subsequent level as per NEP structure

THEORY[Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**History of the Development of Microbiology:** Development of microbiology as a discipline, Spontaneous generation vs. biogenesis. Contributions of Anton van Leeuwenhoek, Louis Pasteur, Robert Koch, Joseph Lister, Alexander Fleming Role of microorganisms in fermentation, Germ theory of disease, Development of various microbiological techniques and golden era of microbiology, Development of the field of soil microbiology: Contributions of Martinus W. Beijerinck, Sergei N. Winogradsky, Selman A. Waksman Establishment of fields of medical microbiology and immunology through the work of Paul Ehrlich, Elie Metchnikoff, Edward Jenner	08	06
Unit 2	**Systems of Classification:** Binomial nomenclature, Whittaker's five kingdoms and Carl Woese's three domain classification systems and their utility. Differences between prokaryotic and eukaryotic microorganisms	05	10
Unit 3	**General characteristics of microorganisms:**Acellularmicroorganisms (Viruses, Viroids, Prions) and Cellularmicroorganisms (Bacteria, Algae, Fungi and Protozoa) with emphasis on distribution and occurrence, morphology, mode of reproduction and economic importance.	08	12
Unit 4	**Phycology and Mycology:**History of phycology with emphasis on the contributions of Indian scientists; General characteristics of algae including occurrence, thallus organization, algae cell ultrastructure, pigments, flagella, eyespot food reserves and vegetative, asexual and sexual reproduction. Different types of life cycles in algae with suitable examples: Haplobiontic, Haplontic, Diplontic, Diplobiontic and Diplohaplontic life cycles. Applications of algae in agriculture, industry, environment and food.	15	12

	Historical developments in the field of Mycology including significant contributions by eminent mycologists. General characteristics of fungi including habitat, distribution, nutritional requirements, fungal cell ultra- structure, thallus organization and aggregation, fungal wall structure and synthesis, asexual reproduction, sexual reproduction, heterokaryosis, heterothallism, and parasexual mechanisms. Economic importance of fungi, with examples in agriculture, the environment, industry, medicine, food, biodeterioration, and mycotoxins.		
Unit 5	**Protozoa:**General characteristics with special reference to *Amoeba, Paramecium, Plasmodium, Leishmania*, and *Giardia*	04	08
Unit 6	**An Overview of the Scope of Microbiology:**Recognize and classify various types of microorganisms based on their structure and function, Discuss the applications of microbiology in various industries, such as pharmaceuticals, food, and biofuels, Identify emerging trends and challenges in the field of microbiology and their implications for the future.	05	12
PRACTICAL [Credit: 01]			
	1. Microbiology Good Laboratory Practices and Biosafety. 2. To study the principles and applications of important instruments (Biological safety cabinets, autoclave, incubator, BOD incubator, hot air oven, light microscope, pH meter) used in the microbiology laboratory. 3. Preparation of culture media for bacterial cultivation 4. Sterilization of heat sensitive material by membrane filtration and assessment for sterility 5. Study of *Rhizopus, Penicillium*, and *Aspergillus* using temporary mounts 6. Study of *Spirogyra* and *Chlamydomonas*, *Volvox* using temporary mounts 7. Study of the following protozoans using permanent mounts/photographs: *Amoeba*, *Entamoeba*, *Paramecium* and *Plasmodium*	30	40

Reading list:

1. Tortora GJ, Funke BR and Case CL. (2008). Microbiology: An Introduction. 9th edition. Pearson Education
2. Madigan MT, Martinko JM, Dunlap PV and Clark DP. (2014). Brock Biology of Microorganisms. 14th edition. Pearson International Edition
3. Cappucino J and Sherman N. (2010). Microbiology: A Laboratory Manual. 9th edition. Pearson Education Limited.
4. Pandey BP. (2020). Plant Pathology – Pathogen and plant disease. S. Chand and Company Limited, New Delhi, India.
5. Wiley JM, Sherwood LM and Woolverton CJ. (2013) Prescott's Microbiology. 9th Edition. McGraw Hill International
6. Atlas RM. (1997). Principles of Microbiology. 2nd edition. W.M.T. Brown Publishers.
7. Pelczar MJ, Chan ECS and Krieg NR. (1993). Microbiology. 5th edition. McGraw Hill Book Company.
8. Stanier RY, Ingraham JL, Wheelis ML, and Painter PR. (2005). General Microbiology. 5th edition. McMillan

Graduate Attributes

Course Objective:

This paper will explain the basics of understanding the history of microbiology, including key contributions and the development of various subfields. It will comprehend different classification systems and differentiate between prokaryotic and eukaryotic microorganisms. Besides, focus will also be on the general characteristics of acellular and cellular microorganisms, including their distribution, morphology, reproduction, and economic importance; gain knowledge of phycology and mycology, including the history, characteristics, life cycles, and applications of algae and fungi; and also provide an understanding of the general characteristics of selected protozoa, such as *Amoeba, Paramecium, Plasmodium, Leishmania*, and *Giardia*; recognize and classify microorganisms based on structure and function; and discuss the applications and future challenges of microbiology in various industries.

Learning outcome:

1. Understanding the development of microbiology as a discipline and the contributions made by prominent scientists in this field.
2. Understanding of the characteristics of different groups of microorganisms, methods to organize or classify them, and basic tools to study them in the laboratory.
3. Understanding the useful and harmful activities of microorganisms
4. Practical knowledge of basic experiments to grow and study microorganisms in the laboratory.

Theory Credit:03

Practical Credit:01

No. of Required Classes:75 (Theory: 45; Practical: 30)

No. of Contact Classes:75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Microbiology
Semester: Two
Course Name: Cell Biology
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 100-199, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Structure and Organization of Cell:** Cell Organization – Eukaryotic (Plant and animal cells) and prokaryotic Plasma membrane: Structure and transport of small molecules Cell Wall: Eukaryotic cell wall, Extracellular matrix and cell matrix interactions, Cell-Cell Interactions - adhesion junctions, tight junctions, gap junctions, and plasmodesmata (only structural aspects) Mitochondria, chloroplasts and peroxisomes Cytoskeleton: Structure and organization of actin filaments, association of actin filaments with plasma membrane, cell surface protrusions, intermediate filaments, microtubules	12	10
Unit 2	**Nucleus:** Nuclear envelope, nuclear pore complex and nuclear lamina, Chromatin – Molecular organization; Nucleolus	04	06
Unit 3	**Protein Sorting and Transport:** Ribosomes, Endoplasmic Reticulum – Structure, targeting and insertion of proteins in the ER, protein folding, processing and quality control in ER, smooth ER and lipid synthesis, export of proteins and lipids Golgi Apparatus – Organization, protein glycosylation, protein sorting and export from Golgi Apparatus Lysosomes	09	12
Unit 4	**Cell Signaling:** Signaling molecules and their receptors, Function of cell surface receptors Pathways of intra- cellular receptors – Cyclic AMP pathway, cyclic GMP and MAP kinase pathway	07	12
Unit 5	**Cell Cycle, Cell Death and Cell Renewal:** Eukaryotic cell cycle and its regulation, Mitosis and Meiosis Programmed cell death, Stem cells,	08	10

	Embryonic stem cell, induced pluripotent stem cells		
Unit 6	**Cancer:** Development of cancer, causes and types, pathogenesis, therapy.	05	10
PRACTICAL [Credit: 01]			
1. Study a representative plant and animal cell by microscopy. 2. Study of the structure of cell organelles through electron micrographs 3. Cytochemical staining of DNA – Feulgen 4. Demonstration of the presence of mitochondria in striated muscle cells/ cheek epithelial cell using vital stain Janus Green B 5. Study of polyploidy in Onion root tip by colchicine treatment. 6. Identification and study of cancer cells by photomicrographs. 7. Study of different stages of Mitosis. 8. Study of different stages of Meiosis.		30	40

Reading list:

1. Hardin J, Bertoni G and Kleinsmith LJ. (2010). Becker's World of the Cell. 8th edition. Pearson.
2. Karp G. (2010) Cell and Molecular Biology: Concepts and Experiments. 6th edition. John Wiley & Sons. Inc.
3. De Robertis, EDP and De Robertis EMF. (2006). Cell and Molecular Biology. 8th edition. Lipincott Williams and Wilkins, Philadelphia.
4. Cooper, G.M. and Hausman, R.E. (2009). The Cell: A Molecular Approach. 5th Edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.

Graduate Attributes

Course Objective:

This paper aims to provide students with an understanding of the structure and organization of cells, including eukaryotic and prokaryotic cells. Students will learn about the plasma membrane, cell wall, and various cell-cell interactions, as well as the structure and function of organelles like mitochondria, chloroplasts, and peroxisomes. This paper will also explore the nucleus, protein sorting and transport, cell signaling pathways, and the cell cycle. Finally, students will study cell death, cell renewal, and the development and treatment of cancer.

Learning outcome:

1. Understanding the structural and functional aspects of different components of eukaryotic and prokaryotic cells

2. Understanding the folding and transport of proteins among cellular organelles
3. Understanding the role of different signal molecules and their receptors in cellular communication
4. Understanding the cell cycle, its regulation, and how errors in the cell cycle lead to cancer

Theory Credit: 03

Practical Credit: 01

No. of Required Classes:75 (Theory: 45; Practical: 30)

No. of Contact Classes:75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Microbiology
Semester: Three
Course Name: Microbial Biochemistry
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 200-299, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Bioenergetics:** First and second laws of Thermodynamics. Definitions of Gibbs Free Energy, enthalpy, and Entropy and mathematical relationship among them, Standard free energy change and equilibrium constant Coupled reactions and additive nature of standard free energy change, Energy rich compounds: Phosphoenolpyruvate, 1,3- Bisphosphoglycerate, Thioesters, ATP	08	08
Unit 2	**Carbohydrates:** Families of monosaccharides: aldoses and ketoses, trioses, tetroses, pentoses, and hexoses. Stereo isomerism of monosaccharides, epimers, mutarotation, and anomers of glucose. Furanose and pyranose forms of glucose and fructose, Haworth projection formulae for glucose; chair and boat forms of glucose, Sugar derivatives, glucosamine, galactosamine, muramic acid, N-acetyl neuraminic acid, Disaccharides; concept of reducing and non-reducing sugars, occurrence and Haworth projections of maltose, lactose, and sucrose, Polysaccharides, storage polysaccharides, starch and glycogen. Structural Polysaccharides, cellulose, peptidoglycan, and chitin	08	12
Unit 3	**Lipids:** Definition and major classes of storage and structural lipids. Storage lipids. Fatty acid structure and functions. Essential fatty acids. Triacylglycerols structure, functions, and properties. Saponification; Structural lipids. Phosphoglycerides: Building blocks, General structure, functions, and properties. Structure of phosphatidylethanolamine and phosphatidylcholine, Sphingolipids: building blocks, structure of sphingosine, ceramide. Special mention of sphingomyelins, cerebrosides and gangliosides, Lipid functions: cell signals, cofactors, prostaglandins, Introduction of lipid	08	10

	micelles, monolayers, bilayers		
Unit 4	**Proteins:** Functions of proteins, Primary structures of proteins: Amino acids, the building blocks of proteins. General formula of amino acid and concept of zwitterion. Titration curve of amino acid and its Significance, Classification, biochemical structure and notation of standard protein amino acids Ninhydrin reaction. Natural modifications of amino acids in proteins hydrolysine, cystine and hydroxyproline, Non-protein amino acids: Gramicidin, beta-alanine, D-alanine and D- glutamic acid Oligopeptides: Structure and functions of naturally occurring glutathione and insulin and synthetic aspartame, Secondary structure of proteins: Peptide unit and its salient features. The alpha helix, the beta pleated sheet and their occurrence in proteins, Tertiary and quaternary structures of proteins. Forces holding the polypeptide together. Human hemoglobin structure, Quaternary structures of proteins	10	12
Unit 5	**Enzymes:** Structure of enzyme: Apoenzyme and cofactors, prosthetic group-TPP, coenzyme, NAD, metal cofactors, Classification of enzymes, Mechanism of action of enzymes: active site, transition state complex and activation energy. Lock and key hypothesis, and Induced Fit hypothesis. Significance of hyperbolic, double reciprocal plots of enzyme activity, Km, and allosteric mechanism Definitions of terms – enzyme unit, specific activity and turnover number, Multienzyme complex: pyruvate dehydrogenase; isozyme: lactate dehydrogenase, Effect of pH and temperature on enzyme activity. Enzyme inhibition: competitive- sulfa drugs; non-competitive-heavy metal salts	08	12
Unit 6	**Vitamins:** Classification and characteristics with suitable examples, sources, and importance	03	06
PRACTICAL [Credit: 01]			
1. Properties of water, Concept of pH and buffers, preparation of buffers and Numerical problems to explain the concepts 2. Qualitative/Quantitative tests for carbohydrates,		30	40

reducing sugars, non-reducing sugars 3. Qualitative/Quantitative tests for lipids and proteins 4. Study of enzyme kinetics – calculation of V_{max}, K_m, K_{cat} values 5. Study effect of temperature, pH and Heavy metals on enzyme activity 6. Estimation of any one vitamin		

Reading list:

1. Campbell, MK (2012) Biochemistry, 7th ed., Published by Cengage Learning
2. Tymoczko JL, Berg JM and Stryer L (2012) Biochemistry: A short course, 2nd ed., W.H. Freeman
3. Berg JM, Tymoczko JL and Stryer L (2011) Biochemistry, W.H. Freeman and Company
4. Nelson DL and Cox MM (2008) Lehninger Principles of Biochemistry, 5th Edition., W.H. Freeman and Company.
5. Willey MJ, Sherwood, LM & Woolverton C J (2013) Prescott, Harley and Klein's Microbiology by. 9th Ed., McGrawHill
6. Voet, D. and Voet JG (2004) Biochemistry 3rd edition, John Wiley and Sons.

Graduate Attributes

Course Objective:

This paper will explain the principles of bioenergetics, including thermodynamics, Gibbs free energy, and energy-rich compounds, study carbohydrates, their classification, isomerism, sugar derivatives, and the structure and function of disaccharides and polysaccharides, explore lipids, their classification, structure, and function in storage and structural roles, as well as lipid micelles, monolayers, and bilayers, Learn about proteins, their functions, structures (primary, secondary, tertiary, and quaternary), amino acids, and peptide unit features, enzymes, their structures, classification, mechanisms of action, enzyme kinetics, and the effect of pH and temperature on enzyme activity; and gain knowledge about vitamins, their classification, characteristics, sources, and importance in human health.

Learning outcome:

1. Understanding of various biomolecules that are required for the development and functioning of a bacterial or microbial cell

2. Understanding the role of different types of carbohydrates and their role as structural and functional components such as energy generation and as storage food molecules for the bacterial cells

3. Understanding the multifarious functions of proteins; being able to calculate enzyme activity and other quantitative and qualitative parameters of enzyme kinetics; Also, knowledge about lipids and nucleic acids

4. Hands-on practical knowledge on buffer making, studying enzyme kinetics, and calculating Vmax, Km, and Kcat values

Theory Credit: 03

Practical Credit: 01

No. of Required Classes:75 (Theory: 45; Practical: 30)

No. of Contact Classes:75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Microbiology
Semester: Four
Course Name: Virology
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 200-299, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Nature and Properties of Viruses:** Introduction: Discovery of viruses, nature and definition of viruses, general properties, concept of viroid, virusoids, satellite viruses, and Prions. Theories of viral origin; Structure of Viruses: Capsid symmetry, enveloped and non-enveloped viruses Isolation and purification of viruses. Viral taxonomy: Classification and nomenclature of different groups of viruses	10	08
Unit 2	**Bacteriophages:** Diversity, classification, one step multiplication curve, lytic and lysogenic phages (lambda phage), concept of early and late proteins, regulation of transcription in lambda phage	06	12
Unit 3	**Viral Transmission, Salient features of viral nucleic acids and Replication:** Modes of viral transmission: Persistent, non-persistent, vertical and horizontal Salient features of viral Nucleic acid : Unusual bases (TMV,T4 phage), overlapping genes (ϕX174, Hepatitis B virus), alternate splicing (HIV), terminal redundancy (T4 phage), terminal cohesive ends (lambda phage), partial double stranded genomes (Hepatitis B), long terminal repeats (retrovirus), segmented (Influenza virus), and non-segmented genomes (picornavirus), capping and tailing (TMV) Viral multiplication and replication strategies: Interaction of viruses with cellular receptors and entry of viruses. Replication strategies of viruses as per Baltimore classification (ΦX 174, Retroviridae, Vaccinia, Picorna), Assembly, maturation, and release of virions	15	12
Unit 4	**Viruses and Cancer:** Introduction to oncogenic viruses; types of oncogenic DNA and RNA viruses: Concepts of oncogenes and proto-	06	10

	oncogenes		
Unit 5	**Prevention and control of viral diseases:** Antiviral compounds and their mode of action; Interferon and their mode of action; general principles of viral vaccination	04	08
Unit 6	**Applications of Virology:** Use of viral vectors in cloning and expression, Gene therapy and Phage display	04	10
PRACTICAL [Credit: 01]			
1. Study of the structure of important animal viruses (rhabdo, influenza, paramyxo hepatitis B and retroviruses) using electron micrographs 2. Study and identification of structure of important plant viruses (caulimo, Gemini, tobacco ringspot, cucumber mosaic and alpha-alpha mosaic viruses) using electron micrograph plates. 3. Isolation and enumeration of bacteriophages (PFU) from water/sewage sample using double agar layer technique 4. Study of cytopathic effects of viruses using photographs 5. Perform local lesion technique for assaying plant viruses.		30	40

Reading list:

1. Dimmock, NJ, Easton, AL, Leppard, KN (2007). Introduction to Modern Virology. 6th edition, Blackwell Publishing Ltd.
2. Carter J and Saunders V (2007). Virology: Principles and Applications. John Wiley and Sons.
3. Flint SJ, Enquist, LW, Krug, RM, Racaniello, VR, Skalka, AM (2004). Principles of Virology, Molecular biology, Pathogenesis and Control. 2nd edition. ASM press Washington DC
4. Levy JA, Conrat HF, Owens RA. (2000). Virology. 3rd edition. Prentice Hall publication, New Jersey
5. Wagner EK, Hewlett MJ. (2004). Basic Virology. 2nd edition. Blackwell Publishing.
6. Mathews. (2004). Plant Virology. Hull R. Academic Press, New York
7. Nayudu MV. (2008). Plant Viruses. Tata McGraw Hill, India
8. Bos L. (1999) Plant viruses-A text book of plant virology by. Backhuys Publishers
9. Versteeg J. (1985). A Color Atlas of Virology. Wolfe Medical Publication.

Graduate Attributes

Course Objective:

This paper will explain how students will learn about the nature, properties, and origins of viruses, their structure, and their classification. They will explore bacteriophages, their diversity, and their multiplication process. Students will also study viral transmission, features of viral nucleic acids, and replication strategies. Furthermore, they will gain knowledge about the relationship between viruses and cancer, prevention and control of viral diseases, and applications of virology in gene therapy, phage display, and cloning and expression using viral vectors.

Learning outcome:

1. Understanding viruses as entities and their chemical nature, different types of viruses infecting animals, plants, and bacteria (bacteriophages)
2. Understanding the biology of bacteriophages
3. Understanding the variety of plant viruses and animal viruses
4. Understanding the role of viruses in the causation of cancer

Theory Credit: 03

Practical Credit: 01

No. of Required Classes:75 (Theory: 45; Practical: 30)

No. of Contact Classes:75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Microbiology
Semester: Four
Course Name: Microbial Physiology and Metabolism
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 200-299, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Microbial Growth and Effect of Environment on Microbial Growth:** Definitions of growth, measurement of microbial growth, Batch culture, Continuous culture, generation time and specific growth rate, synchronous growth, diauxic growth curve Microbial growth in response to the environment - Temperature (psychrophiles, mesophiles, thermophiles, extremophiles, thermodurics, psychrotrophs), pH (acidophiles, alkaliphiles), solute and water activity (halophiles, xerophiles, osmophilic), Oxygen (aerobic, anaerobic, microaerophilic, facultative aerobe, facultative anaerobe), barophilic. Microbial growth in response to nutrition and energy – Autotroph/Phototroph, heterotrophy, Chemolithoautotroph, Chemolithoheterotroph, Chemoheterotroph, Chemolithotroph, photolithoautotroph, Photo-organoheterotroph.	10	10
Unit 2	**Nutrient uptake and Transport:** Passive and facilitated diffusion, Primary and secondary active transport, concept of uniport, symport and antiport, Group translocation, Iron uptake	04	08
Unit 3	**Chemoheterotrophic Metabolism - Aerobic Respiration:** Concept of aerobic respiration, anaerobic respiration and fermentation, Sugar degradation pathways i.e., EMP, ED, Pentose phosphate pathway, TCA cycle, Electron transport chain: components of respiratory chain, comparison of mitochondrial and bacterial ETC, electron transport phosphorylation, uncouplers and inhibitors	06	10
Unit 4	**Chemoheterotrophic Metabolism- Anaerobic respiration and fermentation:** Anaerobic respiration with special reference to dissimilatory	08	10

	nitrate reduction (Denitrification; nitrate/ nitrite and nitrate/ammonia respiration; fermentative nitrate reduction) Fermentation - Alcohol fermentation and Pasteur effect; Lactate fermentation (homofermentative and heterofermentative pathways), concept of linear and branched fermentation pathways		
Unit 5	**Chemolithotrophic and Phototrophic Metabolism:** Introduction to aerobic and anaerobic chemolithotrophs with an example each. Hydrogen oxidation (definition and reaction) and methanogenesis (definition and reaction) Introduction to phototrophic metabolism - groups of phototrophic microorganisms, anoxygenic vs. oxygenic photosynthesis with reference to photosynthesis in green bacteria, purple bacteria and cyanobacteria	12	12
Unit 6	**Nitrogen Metabolism - an overview:** Introduction to biological nitrogen fixation, Ammonia assimilation, Assimilatory nitrate reduction, dissimilatory nitrate reduction, denitrification	05	10
PRACTICAL [Credit: 01]			
1. Study and plot the growth curve of *E. coli* by turbidometric and standard plate count methods. 2. Calculations of generation time and specific growth rate of bacteria from the graph plotted with the given data 3. Effect of temperature on growth of *E. coli* 4. Effect of pH on growth of *E. coli* 5. Effect of salt on growth of *E. coli* 6. Demonstration of alcoholic fermentation 7. Demonstration of the thermal death time and decimal reduction time of *E. coli*.		30	40

Reading list:

1. Madigan MT, and Martinko JM (2014). Brock Biology of Microorganisms. 14th edition. Prentice Hall International Inc.
2. Moat AG and Foster JW. (2002). Microbial Physiology. 4th edition. John Wiley & Sons
3. Reddy SR and Reddy SM. (2005). Microbial Physiology. Scientific Publishers India
4. Gottschalk G. (1986). Bacterial Metabolism. 2nd edition. Springer Verlag

5. Stanier RY, Ingrahm JI, Wheelis ML and Painter PR. (1987). General Microbiology. 5th edition, McMillan Press.
6. Willey JM, Sherwood LM, and Woolverton CJ. (2013). Prescott's Microbiology. 9th edition. McGraw Hill Higher Education.

Graduate Attributes

Course Objective:

This paper aims to teach students about microbial growth, its measurement, and the effects of various environmental factors on growth. Students will learn about different nutrient uptake and transport mechanisms, chemoheterotrophic metabolism, including aerobic and anaerobic respiration, and fermentation. They will also explore chemolithotrophic and phototrophic metabolism in microorganisms and gain an overview of nitrogen metabolism, including biological nitrogen fixation, ammonia assimilation, and various reduction processes.

Learning outcome:

1. Understanding the growth characteristics of the microorganisms capable of growing under unusual environmental conditions of temperature, oxygen, and solute and water activity

2. Understanding the growth characteristics of the microorganisms that require different nutrients for growth and the associated mechanisms of energy generation for their survival, like autotrophs, heterotrophs, chemolithoautotrophs, etc.

3. Understanding the concepts of aerobic and anaerobic respiration and how these are manifested in the form of different metabolic pathways in microorganisms

Theory Credit: 03

Practical Credit: 01

No. of Required Classes:75 (Theory: 45; Practical: 30)

No. of Contact Classes:75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Microbiology
Semester: Four
Course Name: Bacteriology
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 200-299, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Microbial Cell Organization:** Cell size, shape, and arrangement, glycocalyx, capsule, flagella, endoflagella, fimbriae, and pili. Cell-wall: composition and detailed structure of Gram-positive and Gram-negative cell walls, Archaebacterial cell wall, Gram and acid-fast staining mechanisms, lipopolysaccharide (LPS), spheroplasts, protoplasts, and L-forms. Effect of antibiotics and enzymes on the cell wall. Cell Membrane: Structure, function, and Chemical composition of bacterial and archaeal cell membranes. Cytoplasm: Ribosomes, mesosomes, inclusion bodies, nucleoid, chromosome and plasmids. Endospore: Structure, formation, and stages of sporulation.	10	10
Unit 2	**Bacteriological Techniques and Microscopy:** Pure culture isolation: Streaking, serial dilution, and plating methods; cultivation, maintenance, and preservation/stocking of pure cultures; cultivation of anaerobic bacteria, and accessing non-culturable bacteria. Bright Field Microscope, Dark Field Microscope, Phase Contrast Microscope, Fluorescence Microscope, Confocal Microscopy, Scanning, and Transmission Electron Microscope	08	08
Unit 3	**Growth and nutrition:** Nutritional requirements in bacteria and nutritional categories; Culture media: components of media, natural and synthetic media, chemically defined media, complex media, selective, differential, indicator, enriched, and enrichment media Physical methods of microbial control: heat, low temperature, high pressure, filtration, desiccation, osmotic pressure, radiation Chemical methods of microbial control: disinfectants, types and modes of action	06	10

Unit 4	**Reproduction in Bacteria:** Asexual methods of reproduction, logarithmic representation of bacterial populations, phases of growth, calculation of generation time and specific growth rate	03	10
Unit 5	**Bacterial Systematics:** Aims and principles of classification, systematics and taxonomy; concept of species, taxa, strain; conventional, molecular and recent approaches to polyphasic bacterial taxonomy, evolutionary chronometers, rRNA oligonucleotide sequencing, signature sequences, and protein sequences. Differences between eubacteria and archaebacteria	08	07
Unit 6	**Important archaeal and eubacterial groups:** ***Archaebacteria*:** General characteristics, phylogenetic overview, genera belonging to Nanoarchaeota (*Nanoarchaeum*), Crenarchaeota (*Sulfolobus*, *Thermoproteus*) and Euryarchaeota [Methanogens (*Methanobacterium*, *Methanocaldococcus*), thermophiles (*Thermococcus*, *Pyrococcus*, *Thermoplasma*), and Halophiles (*Halobacterium*, *Halococcus*)] ***Eubacteria*:** Morphology, metabolism, ecological significance and economic importance of the following groups: ***Gram Negative*:** Non proteobacteria: General characteristics with suitable examples. Alpha proteobacteria: General characteristics with suitable examples Beta proteobacteria: General characteristics with suitable examples Gamma proteobacteria: General characteristics with suitable examples Delta proteobacteria: General characteristics with suitable examples Epsilon proteobacteria: General characteristics with suitable examples Zeta proteobacteria: General characteristics with suitable examples ***Gram Positive*:** Low G+C (Firmicutes): General characteristics with suitable examples of Low G+C (Firmicutes) and High G+C (Actinobacteria) ***Cyanobacteria*:** Introduction and general	10	15

	characteristics.		
PRACTICAL [Credit: 01]			
1. Preparation of different media: synthetic media BG-11, Complex media- Nutrient agar, McConkey agar, EMB agar. 2. Simple staining, Negative staining, Gram's staining 3. Acid fast staining-permanent slide only. 4. Capsule staining, Endospore staining 5. Isolation of pure cultures of bacteria by streaking method 6. Preservation of bacterial cultures by various techniques 7. Estimation of CFU count by spread plate method/pour plate method 8. Motility by the hanging drop method.		30	40

Reading list:

1. Atlas RM. (1997). Principles of Microbiology 2nd edition. WM.T.Brown Publishers.
2. Black JG. (2008). Microbiology: Principles and Explorations. 7th edition. Prentice Hall
3. Madigan MT, and Martinko JM. (2014). Brock Biology of Microorganisms. 14th edition. Parker J. Prentice Hall International, Inc.
4. Pelczar Jr MJ, Chan ECS, and Krieg NR. (2004). Microbiology 5th edition Tata McGraw Hill.
5. Srivastava S and Srivastava PS. (2003). Understanding Bacteria. Kluwer Academic Publishers, Dordrecht
6. Stanier RY, Ingraham JL, Wheelis ML and Painter PR. (2005). General Microbiology. 5th edition McMillan
7. Tortora GJ, Funke BR, and Case CL. (2008). Microbiology: An Introduction. 9th edition Pearson Education
8. Willey JM, Sherwood LM, and Woolverton CJ. (2013). Prescott's Microbiology. 9th edition. McGraw Hill Higher Education
9. Cappucino J and Sherman N. (2010). Microbiology: A Laboratory Manual. 9th edition. Pearson Education Limited.

Graduate Attributes

Course Objective:

This paper will explain the understanding of the microbial cell organization, including the structure, function, and composition of various cellular components, bacteriological techniques and various microscopy methods for studying microbial cells; microbial growth, nutrition, and physical and chemical methods of microbial control; bacterial reproduction; growth phases; and calculating generation time and specific growth rate. The paper will also grasp bacterial systematics, classification, taxonomy, and evolutionary chronometers, with a focus on the differences between eubacteria and archaebacteria, and examine important archaeal and eubacterial groups, their general characteristics, phylogenetic relationships, ecological significance, and economic importance.

Learning outcome:

1. Understanding the characteristics of bacterial cells, cell organelles, cell wall composition, and various appendages like capsules, flagella, or pili
2. Understanding the differences among many common bacteria by their salient characteristics; classifying bacteria into groups
3. Understanding the nutritional requirements of bacteria for growth; developing knowledge and understanding that, besides common bacteria, there are several other microbes that grow in extreme environments
4. Practical knowledge on basic laboratory experiments to study microorganisms; methods to preserve bacteria in the laboratory; calculating the generation time of growing bacteria

Theory Credit: 03

Practical Credit: 01

No. of Required Classes:75 (Theory: 45; Practical: 30)

No. of Contact Classes:75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Microbiology
Semester: Four
Course Name: Molecular Biology
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 200-299, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Structures of DNA and RNA / Genetic Material:** DNA Structure: Miescher to Watson and Crick- historic perspective, DNA structure, Salient features of double helix, Types of DNA, Types of genetic material, denaturation and renaturation, cot curves. DNA topology - linking number, topoisomerases; Organization of DNA Prokaryotes, Viruses, Eukaryotes. RNA Structure, Organelle DNA - mitochondria and chloroplast DNA.	08	08
Unit 2	**Replication of DNA (Prokaryotes and Eukaryotes):** Bidirectional and unidirectional replication, semi- conservative, semi-discontinuous replication Mechanism of DNA replication: Enzymes and proteins involved in DNA replication –DNA polymerases, DNA ligase, primase, telomerase – for replication of linear ends Various models of DNA replication including rolling circle, D- loop (mitochondrial), ϴ (theta) mode of replication and other accessory protein, Mismatch and excision repair	08	10
Unit 3	**Transcription in Prokaryotes and Eukaryotes:** Transcription: Definition, difference from replication, promoter - concept and strength of promoter; RNA Polymerase and the transcription unit; Transcription in Eukaryotes: RNA polymerases, general Transcription factors	07	10
Unit 4	**Post-Transcriptional Processing:** Split genes, concept of introns and exons, RNA splicing, spliceosome machinery, concept of alternative splicing, Polyadenylation and capping, Processing of rRNA, RNA interference: siRNA, miRNA and	07	10

	its significance		
Unit 5	**Translation (Prokaryotes and Eukaryotes):** Translational machinery, Charging of tRNA, aminoacyl tRNA synthetases, Mechanisms of initiation, elongation and termination of polypeptides in both prokaryotes and eukaryotes, Fidelity of translation, Inhibitors of protein synthesis in prokaryotes and eukaryotes	07	10
Unit 6	**Regulation of gene Expression in Prokaryotes and Eukaryotes:** Principles of transcriptional regulation, regulation at initiation with examples from lac and trp operons, Sporulation in *Bacillus*, Yeast mating type switching, Changes in Chromatin Structure - DNA methylation and Histone Acetylation mechanisms.	08	12
PRACTICAL [Credit: 01]			
1. Study of different types of DNA and RNA using micrographs and model/schematic representations 2. Study of semi-conservative replication of DNA through micrographs/ schematic representations 3. Isolation of genomic DNA from *E. coli* 4. Estimation of salmon sperm / calf thymus DNA using colorimeter (diphenylamine reagent) or UV spectrophotometer (A260 measurement) 5. Estimation of RNA using colorimeter (orcinol reagent) or UV spectrophotometer (A260 measurement) 6. Resolution and visualization of DNA by Agarose Gel Electrophoresis. 7. Resolution and visualization of proteins by Polyacrylamide Gel Electrophoresis (SDS-PAGE).		30	40

Reading list:

1. Watson JD, Baker TA, Bell SP, Gann A, Levine M and Losick R (2008) Molecular Biology of the Gene, 6th edition, Cold Spring Harbour Lab. Press, Pearson Publication
2. Becker WM, Kleinsmith LJ, Hardin J and Bertoni GP (2009) The World of the Cell, 7th edition, Pearson Benjamin Cummings Publishing, San Francisco
3. De Robertis EDP and De Robertis EMF (2006) Cell and Molecular Biology, 8th edition. Lippincott Williams and Wilkins, Philadelphia
4. Karp G (2010) Cell and Molecular Biology: Concepts and Experiments, 6th edition, John Wiley & Sons. Inc.
5. Sambrook J and Russell DW. (2001). Molecular Cloning: A Laboratory Manual. 4th Edition, Cold Spring Harbour Laboratory press.

6. Krebs J, Goldstein E, Kilpatrick S (2013). Lewin's Essential Genes, 3rd Ed., Jones and Bartlett Learning
7. Gardner EJ, Simmons MJ, Snustad DP (2008). Principles of Genetics. 8th Ed. Wiley-India.

Graduate Attributes

Course Objective:

This paper aims to provide students with an understanding of the structure and organization of genetic material, including DNA and RNA. They will explore the historical development of DNA and RNA research, DNA topology, and organelle DNA. Students will also study DNA replication in prokaryotes and eukaryotes, as well as transcription and post-transcriptional processing. Additionally, students will learn about translation and the regulation of gene expression, focusing on mechanisms such as transcriptional regulation and chromatin structure changes, including DNA methylation and histone acetylation.

Learning outcome:

1. Understanding the genome organization of model organisms, namely *E. coli* and Saccharomyces, and the molecular mechanisms that underlie mutations

2. Understanding and good knowledge about the three well-known mechanisms by which genetic material is transferred among microorganisms, namely transformation, transduction, and conjugation

3. Understanding the different types of extrachromosomal elements, or plasmids; the nature of the transposable elements in prokaryotic and eukaryotic cells

4. Practical knowledge of the isolation of plasmid DNA from bacterial cells and its visualization by performing agarose gel electrophoresis

Theory Credit: 03

Practical Credit: 01

No. of Required Classes:75 (Theory: 45; Practical: 30)

No. of Contact Classes:75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Microbiology
Semester: Five
Course Name: Microbial Genetics
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Genome Organization:** Genome organization in prokaryotes and eukaryotes; *E. coli*, *Saccharomyces*, *Tetrahymena*.	06	08
Unit 2	**GeneticMutation:** Mutations and mutagenesis: Definition and types of Mutations; Physical and chemical mutagens; Molecular basis of mutations; Functional mutants (loss and gain of function mutants); Uses of mutations Reversion and suppression: True revertants; Intra- and intergenic suppression; Ames's test; Mutator genes	08	10
Unit 3	**Plasmids:** Types of plasmids – F plasmid, R plasmid, colicinogenic plasmids, Ti plasmids, linear plasmids, yeast- 2 μ plasmid, Plasmid replication and partitioning, Host range, plasmid-incompatibility, plasmid amplification, Regulation of copy number, curing of plasmids	07	10
Unit 4	**Mechanisms of Genetic Exchange:** Transformation - Discovery, mechanism of natural competence Conjugation - Discovery, mechanism, Hfr and F' strains, Interrupted mating technique and time of entry mapping Transduction - Generalized transduction, specialized transduction, LFT & HFT lysates, Mapping by recombination and co-transduction of markers	09	12
Unit 5	**Phage Genetics:** Features of T4 genetics, Genetic basis of lytic versus lysogenic switch of phage lambda	07	10
Unit 6	**Transposable elements:** Prokaryotic transposable elements – Insertion Sequences, composite and non-composite transposons, Replicative and Non	08	10

	replicative transposition, Mu transposon Eukaryotic transposable elements - Yeast (Ty retrotransposon), Drosophila (P elements), Maize (Ac/Ds) Uses of transposons and transposition		
PRACTICAL [Credit: 01]			
1. Preparation of Master and Replica Plates 2. Study the effect of chemical (HNO_2) and physical (UV) mutagens on bacterial cells 3. Study survival curve of bacteria after exposure to ultraviolet (UV) light 4. Isolation of Plasmid DNA from *E. coli* 5. Study different conformations of plasmid DNA through Agaraose gel electrophoresis. 6. Demonstration of Bacterial Conjugation 7. Demonstration of bacterial transformation and transduction 8. Demonstration of AMES test		30	40

Suggested reading

1. Klug WS, Cummings MR, Spencer, C, Palladino, M (2011). Concepts of Genetics, 10th Ed., Benjamin Cummings
2. Krebs J, Goldstein E, Kilpatrick S (2013). Lewin’s Essential Genes, 3rd Ed., Jones and Bartlett Learning
3. Pierce BA (2011) Genetics: A Conceptual Approach, 4th Ed., Macmillan Higher Education Learning
4. Watson JD, Baker TA, Bell SP et al. (2008) Molecular Biology of the Gene, 6th Ed., Benjamin Cummings
5. Gardner EJ, Simmons MJ, Snustad DP (2008). Principles of Genetics. 8th Ed. Wiley-India
6. Russell PJ. (2009). i Genetics- A Molecular Approach. 3rd Ed, Benjamin Cummings
7. Sambrook J and Russell DW. (2001). Molecular Cloning: A Laboratory Manual. 4th Edition, Cold Spring Harbour Laboratory press.
8. Maloy SR, Cronan JE and Friefelder D (2004) Microbial Genetics 2nd EDITION., Jones and Barlett Publishers.

Graduate Attributes

Course Objective:

This paper aims to provide students with an understanding of genome organization in prokaryotes and eukaryotes, genetic mutations and mutagenesis, and the various types and functions of plasmids. Students will also explore the mechanisms of genetic exchange, including transformation, conjugation, and transduction, as well as phage genetics and the genetic basis of the lytic versus lysogenic switch. Lastly, they will study transposable elements in prokaryotes and eukaryotes and learn about their uses and implications in genetic research.

Learning outcome:

1. Understanding the genome organization of model organisms, namely *E. coli* and *Saccharomyces*, and the molecular mechanisms that underlie mutations
2. Understanding the mechanisms by which genetic material is transferred among microorganisms, namely transformation, transduction, and conjugation
3. Understanding the different types of extrachromosomal elements, or plasmids; the nature of the transposable elements in prokaryotic and eukaryotic cells
4. Practical training in the isolation of plasmid DNA from bacterial cells and its visualization by performing agarose gel electrophoresis

Theory Credit: 03

Practical Credit: 01

No. of Required Classes:75 (Theory: 45; Practical: 30)

No. of Contact Classes:75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Microbiology
Semester: Five
Course Name: Environmental Microbiology
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Microorganisms and their habitats:** Structure and function of ecosystems; Terrestrial Environment: Soil profile and soil microflora; Aquatic Environment: Microflora of freshwater and marine habitats; Atmosphere: Aero-microflora and dispersal of microbes. Animal Environment: Microbes in/on human body (Microbiomics) & animal (ruminants) body. Extreme Habitats: Extremophiles: Microbes thriving at high & low temperatures, pH, high hydrostatic & osmotic pressures, salinity, & low nutrient levels. Microbial succession in decomposition of plant organic matter	09	08
Unit 2	**Microbial Interactions:** Microbe interactions: Mutualism, synergism, commensalism, competition, amensalism, parasitism, predation Microbe-Plant interaction: Symbiotic and non-symbiotic interactions Microbe-animal interaction: Microbes in ruminants, nematophagous fungi and symbiotic luminescent bacteria	06	06
Unit 3	**Biogeochemical Cycling:** Carbon cycle: Microbial degradation of cellulose, hemicelluloses, lignin and chitin Nitrogen cycle: Nitrogen fixation, ammonification, nitrification, denitrification and nitrate reduction Phosphorus cycle: Phosphate immobilization and solubilisation Sulfur cycle: Microbes involved in sulfur cycle Other elemental cycles: Iron and manganese	10	14

Unit 4	**Waste Management:** Solid Waste management: Sources and types of solid waste, Methods of solid waste disposal (composting and sanitary landfill) Liquid waste management: Composition and strength of sewage (BOD and COD), Primary, secondary (oxidation ponds, trickling filter, activated sludge process and septic tank) and tertiary sewage treatment	08	12
Unit 5	**Microbial Bioremediation:** Principles and degradation of common pesticides, organic (hydrocarbons, oil spills) and inorganic (metals) matter, biosurfactants	06	08
Unit 6	**Water Potability:** Treatment and safety of drinking (potable) water, methods to detect potability of water samples: (a) standard qualitative procedure: presumptive test/MPN test, confirmed and completed tests for fecal coliforms (b) Membrane filter technique and (c) Presence/absence tests	06	12
PRACTICAL [Credit: 01]			
1. Analysis of soil - pH, moisture content, water holding capacity, percolation, capillary action. 2. Isolation of microbes (bacteria & fungi) from soil (28 ºC & 45 ºC). 3. Isolation of microbes (bacteria & fungi) from rhizosphere and rhizoplane. 4. Assessment of microbiological quality of water. 5. Determination of BOD of waste water sample. 6. Study the presence of microbial activity by detecting (qualitatively) enzymes (dehydrogenase, amylase, urease, etc.) in soil. 7. Isolation of *Rhizobium* from root nodules.		30	40

Reading list:

1. Atlas RM and Bartha R. (2000). Microbial Ecology: Fundamentals & Applications. 4th edition. Benjamin/Cummings Science Publishing, USA
2. Madigan MT, MartinkoJM and Parker J. (2014). Brock Biology of Microorganisms. 14th edition. Pearson/ Benjamin Cummings
3. Maier RM, Pepper IL and Gerba CP. (2009). Environmental Microbiology. 2nd edition, Academic Press
4. Okafor, N (2011). Environmental Microbiology of Aquatic & Waste systems. 1st edition, Springer, New York

5. Singh A, Kuhad, RC & Ward OP (2009). Advances in Applied Bioremediation. Volume 17, Springer-Verlag, Berlin Hedeilberg
6. Barton LL & Northup DE (2011). Microbial Ecology. 1st edition, Wiley Blackwell, USA Campbell RE. (1983). Microbial Ecology. Blackwell Scientific Publication, Oxford, England.
7. Coyne MS. (2001). Soil Microbiology: An Exploratory Approach. Delmar Thomson Learning.
8. Lynch JM &Hobbie JE. (1988). Microorganisms in Action: Concepts & Application in Microbial Ecology. Blackwell Scientific Publication, U.K.
9. Martin A. (1977). An Introduction to Soil Microbiology. 2nd edition. John Wiley & Sons Inc. New York & London.
10. Stolp H. (1988). Microbial Ecology: Organisms Habitats Activities. Cambridge University Press, Cambridge, England.
11. Subba Rao NS. (1999). Soil Microbiology. 4th edition. Oxford & IBH Publishing Co. New Delhi.
12. Willey JM, Sherwood LM, and Woolverton CJ. (2013). Prescott's Microbiology. 9th edition. McGraw Hill Higher Education.

Graduate Attributes

Course Objective:

This paper aims to familiarize students with the diverse habitats of microorganisms, their interactions with each other, plants, and animals, as well as the role of microbes in biogeochemical cycling. Students will also explore waste management techniques, focusing on solid and liquid waste treatment, and delve into microbial bioremediation principles and applications. Finally, they will learn about water potability, treatment, and safety, as well as methods to detect and ensure the quality of drinking water.

Learning outcome:

1. Understanding of different types of environments and habitats where microorganisms grow, including the microbiomes of the human gut and animal gut

2. Understanding the important role microorganisms play in maintaining a healthy environment through the degradation of solid and liquid wastes and knowing how these activities of microorganisms are used in sewage treatment plants, the production of activated sludge, and the functioning of septic tanks

3. Understanding the significance of BOD/COD and various tests involving the use of enumerating fecal E. coli for assessing the quality of water

4. Practical knowledge of conducting experiments to assess the BOD and COD of wastewaters and their interpretation; practically assessing the portability of drinking water using standard microbiological tests

Theory Credit: 03

Practical Credit: 01

No. of Required Classes:75 (Theory: 45; Practical: 30)

No. of Contact Classes:75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Microbiology
Semester: Five
Course Name: Food and Dairy Microbiology
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Foods as a substrate for microorganisms:** Intrinsic and extrinsic factors that affect growth and survival of microbes in foods, natural flora, and source of contamination of foods in general.	07	06
Unit 2	**Microbial spoilage of various foods:** Principles, Spoilage of vegetables, fruits, meat, eggs, milk and butter, bread, canned Foods	07	08
Unit 3	**Principles and methods of food preservation:** Principles, physical methods of food preservation: temperature (low, high, canning, drying), irradiation, hydrostatic pressure, high voltage pulse, microwave processing and aseptic packaging, chemical methods of food preservation: salt, sugar, organic acids, SO2, nitrite and nitrates, ethylene oxide, antibiotics and bacteriocins	08	12
Unit 4	**Fermented foods:** Dairy starter cultures, fermented dairy products: yogurt, acidophilus milk, kumiss, kefir, dahi and cheese, other fermented foods: dosa, sauerkraut, soy sauce and tampeh, Probiotics: Health benefits, types of microorganisms used, probiotic foods available in market.	08	12
Unit 5	**Food borne diseases (causative agents, foods involved, symptoms and preventive measures):** Food intoxications: *Staphylococcus aureus*, *Clostridium botulinum* and mycotoxins; Food infections: *Bacillus cereus*, *Vibrio parahaemolyticus*, *Escherichia coli*, Salmonellosis, Shigellosis, *Yersinia enterocolitica*, *Listeria monocytogenes* and *Campylobacter jejuni*	06	12
Unit 6	**Food sanitation and control; Detection of**	06	10

	foodborne pathogens: HACCP, Indices of food sanitary quality and sanitizers; Cultural and rapid detection methods of food borne pathogens in foods and introduction to predictive microbiology		
PRACTICAL [Credit: 01]			
1. MBRT of milk samples and their standard plate count. 2. Alkaline phosphatase test to check the efficiency of pasteurization of milk. 3. Isolation of any food borne bacteria from food products. 4. Isolation of spoilage microorganisms from spoiled vegetables/fruits. 5. Isolation of spoilage microorganisms from bread. 6. Preparation of Yogurt/Dahi.		30	40

Reading list:

1. Adams MR and Moss MO. (1995). Food Microbiology. 4th edition, New Age International (P) Limited Publishers, New Delhi, India.
2. Banwart JM. (1987). Basic Food Microbiology. 1st edition. CBS Publishers and Distributors, Delhi, India.
3. Davidson PM and Brannen AL. (1993). Antimicrobials in Foods. Marcel Dekker, New York.
4. Dillion VM and Board RG. (1996). Natural Antimicrobial Systems and Food Preservation. CAB International, Wallingford, Oxon.
5. Frazier WC and Westhoff DC. (1992). Food Microbiology. 3rd edition. Tata McGraw-Hill Publishing Company Ltd, New Delhi, India.
6. Gould GW. (1995). New Methods of Food Preservation. Blackie Academic and Professional, London.
7. Jay JM, Loessner MJ and Golden DA. (2005). Modern Food Microbiology. 7th edition, CBS Publishers and Distributors, Delhi, India.
8. Lund BM, Baird Parker AC, and Gould GW. (2000). The Microbiological Safety and Quality of Foods. Vol. 1-2, ASPEN Publication, Gaithersberg, MD.
9. Tortora GJ, Funke BR, and Case CL. (2008). Microbiology: An Introduction. 9th edition. Pearson Education.

Graduate Attributes

Course Objective:

This paper aims to provide students with an understanding of the factors affecting microbial growth and survival in foods, microbial spoilage of various food products, and principles and methods of food preservation. Students will explore fermented foods, their production, and health benefits, as well as learn about foodborne diseases, their causative agents, symptoms, and preventive measures. The course will also cover food sanitation and control measures, including HACCP, detection methods for foodborne pathogens, and an introduction to predictive microbiology.

Learning outcome:

1. Understanding the multifarious roles of microorganisms in soil, in association with plants, and thus in the field of agriculture
2. Understanding the role of microorganisms in the production of food, as causal organisms of food spoilage, and their role or importance in homemade fermented foods
3. Understanding the role of microorganisms in the causation of diseases and how to protect against food-borne pathogens
4. Practical knowledge on testing milk and different foods for the presence of microorganisms.,

Theory Credit: 03

Practical Credit: 01

No. of Required Classes:75 (Theory: 45; Practical: 30)

No. of Contact Classes:75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Microbiology
Semester: Five
Course Name: Industrial Microbiology
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Introduction to industrial microbiology:** Brief history and developments in industrial microbiology	03	04
Unit 2	**Isolation of industrially important microbial strains and fermentation media:** Sources of industrially important microbes and methods for their isolation, preservation and maintenance of industrial strains, strain improvement, Crude, and synthetic media; molasses, corn steep liquor, sulphite waste liquor, whey, yeast extract and protein hydrolysates	09	12
Unit 3	**Types of fermentation processes, bio-reactors and measurement of fermentation parameters:** Types of fermentation processes - Solid-state and liquid-state (stationary and submerged) fermentations; batch, fed-batch (eg. baker's yeast) and continuous fermentations Components of a typical bio-reactor, Types of bioreactors-Laboratory, pilot- scale and production fermenters, constantly stirred tank and air-lift fermenters, Measurement and control of fermentation parameters - pH, temperature, dissolved oxygen, foaming and aeration	09	14
Unit 4	**Down-stream processing:** Cell disruption, filtration, centrifugation, solvent extraction, precipitation, lyophilization and spray drying	06	08
Unit 5	**Microbial production of industrial products (microorganisms involved, media, fermentation conditions, downstream processing and uses):** Citric acid, ethanol, penicillin, glutamic acid, Vitamin B12 Enzymes (amylase, protease, lipase) Wine, beer	12	14

Unit 6	**Enzyme immobilization:** Methods of immobilization, advantages and applications of immobilization, large scale applications of immobilized enzymes (glucose isomerase and penicillin acylase)	06	08
PRACTICAL [Credit: 01]			
1. Study different parts of fermenter 2. Microbial fermentations for the production and estimation (qualitative and quantitative) of: (a) Enzymes: Amylase and Protease (b) Amino acid: Glutamic acid (c) Organic acid: Citric acid (d) Alcohol: Ethanol 3. A visit to any educational institute/industry to see an industrial fermenter, and other downstream processing operations.		30	40

Reading list:

1. Patel A.H. (1996). Industrial Microbiology. 1st edition, Macmillan India Limited
2. Okafor N. (2007). Modern Industrial Microbiology and Biotechnology. 1st edition. Bios Scientific Publishers Limited. USA
3. Waites M.J., Morgan N.L., Rockey J.S. and Higton G. (2001). Industrial Microbiology: An Introduction. 1st edition. Wiley – Blackwell
4. Glaze A.N. and Nikaido H. (1995). Microbial Biotechnology: Fundamentals of Applied Microbiology. 1st edition. W.H. Freeman and Company
5. Casida LE. (1991). Industrial Microbiology. 1st edition. Wiley Eastern Limited.
6. Crueger W and Crueger A. (2000). Biotechnology: A textbook of Industrial Microbiology. 2nd edition. Panima Publishing Co. New Delhi.
7. Stanbury PF, Whitaker A and Hall SJ. (2006). Principles of Fermentation Technology. 2nd edition, Elsevier Science Ltd.

Graduate Attributes

Course Objective:

This paper aims to provide an understanding of industrial microbiology, including its history and developments. Students will learn about the isolation, preservation, and maintenance of industrially important microbial strains and fermentation media. The course will cover various types of fermentation processes, bio-reactors, and measurement of fermentation parameters. Students will also explore downstream processing techniques and the microbial production of various industrial products, such as citric acid, ethanol, penicillin, and enzymes. Finally, the course will discuss enzyme immobilization methods, advantages, applications, and large-scale applications of immobilized enzymes.

Learning outcome:

1. Understanding of describing a large number of substrates that are used for industrial fermentation processes
2. Understanding of different types of reactors or fermenters that are used for laboratory, pilot, and industrial scale fermentations and their process parameters
3. Practical knowledge of the number of products that are produced by industrial fermentation processes

Theory Credit: 03

Practical Credit: 01

No. of Required Classes:75 (Theory: 45; Practical: 30)

No. of Contact Classes:75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Microbiology
Semester: Six
Course Name: Immunology
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Introduction:** Concept of Innate and Adaptive immunity; Contributions of following scientists to the development of field of immunology - Edward Jenner, Karl Landsteiner, Robert Koch, Paul Ehrlich, Elie Metchnikoff, Peter Medawar, MacFarlane Burnet, Neils K Jerne, Rodney Porter and Susumu Tonegawa	05	08
Unit 2	**Immune Cells and Organs:** Structure, Functions and Properties of: Immune Cells – Stem cell, T cell, B cell, NK cell, Macrophage, Neutrophil, Eosinophil, Basophil, Mast cell, Dendritic cell; and Immune Organs – Bone Marrow, Thymus, Lymph Node, Spleen, GALT, MALT, CALT	07	10
Unit 3	**Antigens and Antibodies:** Characteristics of an antigen (Foreignness, Molecular size and Heterogeneity); Haptens; Epitopes (T & B cell epitopes); T-dependent and T-independent antigens; AdjuvantsStructure, Types, Functions and Properties of antibodies; Antigenic determinants on antibodies (Isotypic, allotypic, idiotypic); VDJ rearrangements; Monoclonal and Chimeric antibodies Organization of MHC locus (Mice & Human); Structure and Functions of MHC I & II molecules; Antigen processing and presentation (Cytosolic and Endocytic pathways)	11	14
Unit 4	**Generation of Immune Response:** Primary and Secondary Immune Response; Generation of Humoral Immune Response (Plasma and Memory cells); Generation of Cell Mediated Immune Response (Self MHC restriction, T cell activation, Co- stimulatory signals); Killing Mechanisms by CTL and NK cells, Introduction to tolerance; Components of the Complement system; Activation pathways (Classical, Alternative and	12	10

	Lectin pathways); Biological consequences of complement Activation		
Unit 5	**Immunological Disorders and Tumor Immunity:** Types of Autoimmunity and Hypersensitivity with examples; Immunodeficiencies - Animal models (Nude and SCID mice), SCID, DiGeorge syndrome, Chediak-Higashi syndrome, Leukocyte adhesion deficiency, CGD; Types of tumors, tumor Antigens, causes and therapy for cancers.	05	08
Unit 6	**Immunological Techniques:** Principles of Precipitation, Agglutination, Immunodiffusion, Immunoelectrophoresis, ELISA, ELISPOT, Western blotting, Immunofluorescence, Flow cytometry, Immunoelectron microscopy.	05	10
PRACTICAL [Credit: 01]			
1. Identification of human blood groups. 2. Perform Total Leukocyte Count of the given blood sample. 3. Perform Differential Leukocyte Count of the given blood sample. 4. Separate serum from the blood sample (demonstration). 5. Perform immunodiffusion by Ouchterlony method. 6. Perform DOT ELISA. 7. Perform immuno-electrophoresis.		30	40

Reading list:

1. Abbas AK, Lichtman AH, Pillai S. (2007). Cellular and Molecular Immunology. 6th edition Saunders Publication, Philadelphia.
2. Delves P, Martin S, Burton D, Roitt IM. (2006). Roitt's Essential Immunology.11th edition Wiley Blackwell Scientific Publication, Oxford.
3. Goldsby RA, Kindt TJ, Osborne BA. (2007). Kuby's Immunology. 6th edition W.H. Freeman and Company, New York.
4. Murphy K, Travers P, Walport M. (2008). Janeway's Immunobiology. 7th edition Garland Science Publishers, New York.
5. Peakman M, and Vergani D. (2009). Basic and Clinical Immunology. 2nd edition Churchill Livingstone Publishers, Edinberg.
6. Richard C and Geiffrey S. (2009). Immunology. 6th edition. Wiley Blackwell Publication.

Graduate Attributes

Course Objective:

This paper aims to provide a comprehensive understanding of immunology, including the concepts of innate and adaptive immunity, contributions of key scientists in the field, and immune cells and organs. Students will explore the characteristics of antigens and antibodies, the organization of MHC locus, and the generation of immune responses. The course will also cover immunological disorders, tumor immunity, and various immunological techniques such as precipitation, agglutination, immunodiffusion, and flow cytometry.

Learning outcome:

1. Understanding the protective role of the immune system of the host
2. Understanding the basic components as well as the mechanisms underlying the immune system and its response to pathogenic microorganisms

Theory Credit: 03

Practical Credit: 01

No. of Required Classes:75 (Theory: 45; Practical: 30)

No. of Contact Classes:75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
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Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Microbiology
Semester: Six
Course Name: Medical Microbiology
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**History and evolution:** History of infectious disease, Koch's postulates, molecular postulates, types of pathogens – subcellular and infectious entities, prokaryotic and eukaryotic normal microflora in healthy human body, host parasite interactions and relationships, non-specific host defenses, virulence factors, normal flora and gnotobiology, epidemiology, infectious diseases, disease cycle, diagnostic principles, control, prevention, antimicrobial therapy.	08	12
Unit 2	**Medical virology:** Viral diseases: symptoms and pathogenesis, viral replication – lytic and lysogenic, latent infection, diagnosis, prevention and treatment of diseases caused by polio virus, hepatitis, influenza, HIV and oncogenic viruses, viral vaccines, interferons and antiviral drugs.	06	12
Unit 3	**Medical Bacteriology:** Bacterial diseases, virulence, adhesion, invasion and spread, action of toxins produced by pathogens, mechanism of pathogenesis, prophylaxis, therapy, prevention and laboratory diagnosis caused by *Staphylococcus*, *Streptococcus*, *Pneumococcus*, Enterobacteriaceae and *Mycobacterium,* diagnosis and prevention of bacterial diseases.	08	10
Unit 4	**Parasitology:** Biology of obligate parasite – Rickettsia, Chlamydia, Trypanosomes, Spirochetes etc., common mycotic infections in humans, superficial, subcutaneous, cutaneous and systemic mycosis, general description of mycotic pathogens, diagnosis and prevention.	08	08
Unit 5	**Cancer biology:** Cancer biology: causes of cancer, carcinogens and hereditary factors,	10	12

	pathophysiology of cancer, epigenetics, oncogenes, tumour suppressor genes, cell signaling and cancer, cancer cell biology, clonal evolution, biological properties of cancer cell, therapeutics, anti-angiogenesis, immunotherapy, gene therapy.		
Unit 6	**Community and infection:** Nosocomial infection, Multi Drug Resistance (MDR, XDR), community infection and spreading: SARS-COV2, Influenza, HIV, Pandemic diseases.	05	06
PRACTICAL [Credit: 01]			
1. Identify bacteria on the basis of cultural, morphological and biochemical characteristics: IMViC, TSI, nitrate reduction, urease production and catalase tests. 2. Study of composition and use of important differential media for identification of bacteria: EMB Agar, McConkey agar, Mannitol salt agar, Deoxycholate citrate agar, TCBS 3. Study of bacterial flora of skin by swab method 4. Perform antibacterial sensitivity by Kirby-Bauer method		30	40

Reading list:

1. Ananthanarayan R. and Paniker C.K.J. (2009) Textbook of Microbiology. 8th edition, University Press Publication.
2. Goering R., Dockrell H., Zuckerman M. and Wakelin D. (2007) Mims' MedicalMicrobiology. 4th edition. Elsevier.
3. Willey JM, Sherwood LM, and Woolverton CJ. (2013) Prescott, Harley and Klein'sMicrobiology. 9th edition. McGraw Hill Higher Education.

Graduate Attributes

Course Objective:

This paper will offer a comprehensive understanding of the history and evolution of infectious diseases, including Koch's postulates, host-parasite interactions, and the role of normal microflora. Students will delve into medical virology, bacteriology, and parasitology, exploring various viral, bacterial, and parasitic diseases, their pathogenesis, diagnosis, and prevention. The course will also cover cancer biology, addressing causes, pathophysiology, and therapeutic approaches. Finally, students will study community and infection, focusing on nosocomial infections, multi-drug resistance, and the spread of pandemic diseases.

Learning outcome:

1. Understanding the basic concepts of causation of disease by pathogenic microorganisms and the various parameters of assessment of their severity, including the broad categorization of the methods of diagnosis

2. Understanding of common bacterial, viral, fungal, and parasitic diseases of humans, including some very important diseases of animals

3. Understanding the protective role of the immune system of the host and developing an understanding of the basic components as well as the mechanisms underlying the immune system and its response to pathogenic microorganisms

4. Practical knowledge for growing common bacteria in different microbiological media, antibiotic sensitivity determination, and antigen antibody reaction (precipitation test in agarose)

Theory Credit: 03

Practical Credit: 01

No. of Required Classes:75 (Theory: 45; Practical: 30)

No. of Contact Classes:75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Microbiology
Semester: Six
Course Name: Recombinant DNA Technology
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Basics of genetic engineering:** Introduction to Genetic Engineering, milestones in genetic engineering and biotechnology, cloning Tools; Restriction modification systems: Types I, II and III. Mode of action, nomenclature, applications of Type II restriction enzymes in genetic engineering, DNA modifying enzymes and their applications: DNA polymerases. Terminal deoxynucleotidyl transferase, kinases and phosphatases, and DNA ligases	08	10
Unit 2	**Molecular cloning:** Cloning Vectors: Definition and Properties Plasmid vectors: pBR and pUC series Bacteriophage lambda and M13 based vectors Cosmids, BACs, YACs Use of linkers and adaptors Expression vectors: *E. coli* lac and T7 promoter-based vectors, yeast YIp, YEp and YCp vectors, Baculovirus based vectors, mammalian SV40-based expression vectors	08	12
Unit 3	**Transfer of foreign DNA:** Transformation of DNA: Chemical methods, Electroporation, Gene delivery: Microinjection, electroporation, biolistic method (gene gun), liposome and viral mediated delivery, Agrobacterium - mediated delivery DNA, RNA and Protein analysis: Agarose gel electrophoresis, Southern - and Northern - blotting techniques, dot blot, DNA microarray analysis, SDS-PAGE and Western blotting.	08	12
Unit 4	**DNA Amplification and DNA sequencing:** PCR: Basics of PCR, RT-PCR, Real-Time PCR Sanger’s method of DNA Sequencing: traditional and automated sequencing, Primer walking and shotgun sequencing	07	10

Unit 5	**Construction and Screening of Genomic and cDNA libraries:** Genomic and cDNA libraries: Preparation and uses, Screening of libraries: Colony hybridization and colony PCR, Chromosome walking and chromosome jumping	07	08
Unit 6	**Applications of genetic engineering:** Applications of genetic engineering; products of recombinant DNA technology: Products of human therapeutic interest - insulin, hGH, antisense molecules. Bt transgenic - cotton, brinjal, Gene therapy, recombinant vaccines, protein engineering and site directed mutagenesis	07	08
PRACTICAL [Credit: 01]			
1. Preparation of competent cells for transformation 2. Demonstration of Bacterial Transformation and calculation of transformation efficiency. 3. Digestion of DNA using restriction enzymes and analysis by agarose gel electrophoresis 4. Ligation of DNA fragments 5. Cloning of DNA insert and Blue white screening of recombinants. 6. Interpretation of sequencing gel electropherograms 7. Designing of primers for DNA amplification 8. Amplification of DNA by PCR 9. Demonstration of Southern blotting		30	40

Reading list:

1. Brown TA. (2010). Gene Cloning and DNA Analysis. 6th edition. Blackwell Publishing, Oxford, U.K.
2. Clark DP and Pazdernik NJ. (2009). Biotechnology: Applying the Genetic Revolution. Elsevier Academic Press, USA
3. Primrose SB and Twyman RM. (2006). Principles of Gene Manipulation and Genomics, 7th edition. Blackwell Publishing, Oxford, U.K.
4. Sambrook J and Russell D. (2001). Molecular Cloning-A Laboratory Manual. 3rd edition. Cold Spring Harbor Laboratory Press
5. Wiley JM, Sherwood LM and Woolverton CJ. (2008). Prescott, Harley and Klein's Microbiology. McGraw Hill Higher Education
6. Brown TA. (2007). Genomes-3. Garland Science Publishers
7. Primrose SB and Twyman RM. (2008). Genomics: Applications in human biology. Blackwell Publishing, Oxford, U.K.

Graduate Attributes

Course Objective:

This paper will focus on the basics of genetic engineering, how to transfer foreign DNA into a host, various modern approaches, determining the sequence by sequencing methods, how to construct and screen genomic and cDNA libraries, and modern applications of genetic engineering.

Learning outcome:

1. Understanding the tools and techniques for genetic engineering
2. Understanding how these tools and techniques are employed in the laboratory for the manipulation of DNA so as to make it relevant for biotechnological uses
3. Practical knowledge of the isolation of DNA, amplification of any gene by PCR, and its analysis by gel electrophoresis

Theory Credit: 03

Practical Credit: 01

No. of Required Classes:75 (Theory: 45; Practical: 30)

No. of Contact Classes:75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University
Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme
Subject: Microbiology
Semester: Six
Course Name: Bioinformatics and Biostatistics
Existing Base Syllabus: UG CBCS Syllabus
Course Level: 300-399, and subsequent level as per NEP structure

THEORY [Total marks: 60] Credit: 03; Total No. of classes: 45			
Unit no.	**Unit content**	**No. of classes**	**Marks**
Unit 1	**Introduction to Computer Fundamentals:** Operating systems: DOS, UNIX, LINUX, WINDOWS. Basics of programming languages – Theory on C++, Python, Java.	05	06
Unit 2	**Bioinformatics and Biological Databases:** RDBMS - Definition of relational database, Mode of data transfer (FTP, SFTP, SCP), advantage of encrypted data transfer biological databases - nucleic acid, genome, protein sequence and structure, gene expression databases, Database of metabolic pathways, Mode of data storage - File formats - FASTA, GenBank, Data submission & retrieval from NCBI, EMBL, DDBJ, UniProt, PDB.	07	10
Unit 3	**Approach to modern OMICS study:** Basics of Genomics, Proteomics, Transcriptomics, Metabolomics, KEGG, Gene ontology, functional network study.	06	08
Unit 4	**Sequence alignment and phylogeny:** Sequence Alignments: Local and Global Sequence alignment, pairwise and multiple sequence alignment. Scoring an alignment, scoring matrices, PAM & BLOSUM series of matrices; Phylogeny and Phylogenetic trees:Types of phylogenetic trees, Different approaches of phylogenetic tree construction - UPGMA, Neighbor joining (NJ), Maximum Parsimony (MP), Maximum likelihood (ML).	06	12
Unit 5	**Protein Structure Predictions:** Hierarchy of protein structure - primary, secondary, and tertiary structures, modeling Structural Classes, Motifs, Folds and Domains Protein structure prediction in	06	12

	presence and absence of structure template Energy minimizations and evaluation by Ramachandran plot Protein structure and rational drug design		
Unit 6	**Biostatistics:** Measures of central tendency, Measures of dispersion; skewness, kurtosis; Discrete and Continuous Random variable, Mathematical Expectation; Curve Fitting; Correlation and Regression. Emphasis on examples from Biological Sciences; Mean and Variance of Discrete and Continuous Distributions namely Binomial, Poisson and Normal distribution. Statistical methods: Scope of statistics: utility and misuse. Principles of statistical analysis of biological data. Sampling parameters. Difference between sample and Population, Sampling Errors, Censoring, difference between parametric and non-parametric statistics; Sampling Distributions, Standard Error, Testing of Hypothesis, Level of Significance and Degree of Freedom; Large Sample Test based on Normal Distribution, Small sample test based on t-test, Z- test and F test; Confidence Interval; Distribution-free test - Chi-square test; Basic introduction to Multivariate statistics, etc.	15	12
PRACTICAL [Credit: 01]			
	1. Introduction to different operating systems - UNIX, LINUX, and Windows 2. Introduction to bioinformatics databases (any three): NCBI/PDB/DDBJ, Uniprot, PDB 3. Sequence retrieval using BLAST 4. Sequence alignment & phylogenetic analysis using clustalW&phylip 5. Picking out a given gene from genomes using Genscan or other softwares (promoter region identification, repeat in genome, ORF prediction). Gene finding tools (Glimmer, GENSCAN), Primer designing, Genscan/ Genetool 6. Protein structure prediction: primary structure analysis, secondary structure prediction using psipred, homology modeling using Swiss Model. Molecular visualization using jmol, Protein structure model evaluation (PROCHECK) 7. Prediction of different features of a functional gene 8. Mean, Median, Mode from grouped and ungrouped Data set 9. Standard Deviation and Coefficient of Variation	30	40

10. Skewness and Kurtosis, Curve fitting 11. Correlation and Regression 12. Testing of Hypothesis- Normal Distribution, t-test and Chi-Square-test		

Reading list:

1. Saxena S (2003) A First Course in Computers, Vikas Publishing House
2. Pradeep and Sinha Preeti (2007) Foundations of Computing, 4th ed., BPB Publications
3. Lesk MA (2008) Introduction to Bioinformatics. Oxford Publication, 3rd International Student Edition.
4. Rastogi SC, Mendiratta N, Rastogi P (2007) Bioinformatics: methods and applications, genomics, proteomics and drug discovery, 2nd ed. Prentice Hall India Publication.

Graduate Attributes

Course Objective:

This paper will focus on various operating systems, the basics of programming languages, various biological databases, various modern approaches to OMICS study, nucleic acid and protein sequence alignment and phylogeny, predictions of protein structure, and biostatistics.

Learning outcome:

1. Understanding the basics of various operating systems and programming languages

2. Understanding how to align multiple sequences and determining the systematic position of a taxon

3. Understanding of basic knowledge of mathematics as applied to biological phenomena.

4. Understanding the basic concepts of statistics and their importance

Theory Credit: 03

Practical Credit: 01

No. of Required Classes:75 (Theory: 45; Practical: 30)

No. of Contact Classes:75 (Theory: 45; Practical: 30)

No. of Non-Contact Classes: Nil

Particulars of Course Designer (Name, Institution, email id):

Prof. Bhaben Tanti
Head, Department of Botany,
Gauhati University

Email id: btanti@gauhati.ac.in

Four-year Undergraduate Programme

Subject: Physics
Semester: First

Course Name: Mathematical Physics and Mechanics
Existing Base Syllabus: HS Maths and Physics
Course Level: PHY101
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Part A: Mathematical Physics			
Unit I- Vector Calculus	Scalar and vector fields. Derivatives of vector functions (physical examples-velocity, centripetal acceleration of a point in circular motion). Directional derivative. Gradient of a scalar field (example of Newton's gravitational force as gradient of a scalar potential). Gradient as normal vector to a surface. Divergence and curl of a vector field- solenoidal and irrotational vector fields. Laplacian operator (physical problems –Laplacian of gravitational potential, divergence of central force). Vector identities. Vector integration- Line integral (physical example- work done by a force, path dependence/independence and concept of conservative force). Surface and volume integrals. Concept of vector flux. Gauss's divergence theorem and Stokes's theorem (statement only).	8	Credit - 1
Unit– II: Curvilinear coordinates	Introduction to curvilinear coordinates. Orthogonal curvilinear coordinates. Examples of spherical, cylindrical and plane polar coordinates. Line element- transformation from Cartesian to curvilinear coordinates (spherical and cylindrical). Gradient, divergence and curl in spherical and cylindrical coordinates.	5	
Unit-III: Dirac delta function	Definition and properties of Dirac delta function. Representation of delta function by Gaussian function, rectangular function and Laplacian of 1/r . 3-Dimensional delta function.	2	
Part B – Mechanics			

Unit 1- Reference frames	Inertial frames. Non-inertial frames and fictitious forces. Uniformly rotating frame. Laws of physics in rotating coordinate systems. Centrifugal force. Coriolis force and its applications.	4	Credit - 2
Unit –II: Gravitation and central force motion	Motion under central force. Two-body problem and its reduction to one body problem. Kepler's laws, Gravitational potential and fields due to spherical body. Gauss's law and Poisson's equation for gravitational field.	7	
Unit –III: Conservation laws	Dynamics of a system of particles. Centre of mass. Principle of conservation of momentum. Torque. Impulse. Elastic and inelastic collisions between particles. Centre of mass and laboratory frames.	4	
Unit–IV: Dynamics of rigid bodies	Rigid body motion. Rotational motion. Moment of inertia of rectangular lamina, disc, cylindrical and spherical bodies. Kinetic energy of rotation. Motion involving both translation and rotation.	6	
Unit–V: Work and energy	Work and kinetic energy theorem. Conservative and non-conservative forces. Potential energy. Force as gradient of potential energy. Work and potential energy. Work done by non-conservative forces.	3	
Unit –VI: Oscillations	Oscillation - differential equation of simple harmonic motion and its solution. Total energy of oscillation.	2	
Unit –VII: Properties of matter	Relation between elastic constants. Twisting torque on a cylinder or wire. Cantilever. Kinematics of moving fluids: Poiseuille's equation for flow of a liquid through a capillary tube.	4	
Laboratory			
	At least four from the following: 1. To study the motion of spring and calculate (a) spring constant and (b) rigidity modulus. 2. To determine the moment of inertia of a cylinder about two different axes of symmetry by torsional oscillation method.		Credit-1

	3. To determine coefficient of viscosity of water by capillary flow method (Poiseuille's method). 4. To determine the Young's modulus of the material of a wire by Searle's apparatus. 5. To determine the modulus of rigidity of a wire (static method). 6. To determine the value of g using bar pendulum. 7. To determine the value of g using Kater's pendulum. 8. To determine the height of a building using a sextant. 9. To determine g and velocity for a freely falling body using digital timing technique.		

Reading list

1. Essential Mathematical Methods for the Physical Sciences; K.F. Riley and M.P. Hobson, Cambridge University Press.
2. Advanced Engineering Mathematics; E. Kreyszic, John Wiley & Sons (New York).
3. Mathematical Methods for Physicists; G. B. Arfken, H. J. Weber and F.E. Harris, Elsevier.
4. Mathematical Physics-I, K. K Pathak and S. Parasher, Vishal Publication, Jalandhar (Delhi).
5. Theoretical Mechanics, M. R. Spiegel, Tata McGraw Hill.
6. Mechanics; D. S. Mathur, S. Chand & Company Limited.
7. An Introduction to Mechanics, D. Kleppner and R. J. Kolenkow, Tata McGraw-Hill.
8. Mechanics, Berkeley Physics, vol.1, C. Kittel, W. Knight, et.al., Tata McGraw-Hill.
9. Physics, R. Resnick, D. Halliday and J. Walker, John Wiley & Sons.
10. Analytical Mechanics, G. R. Fowles and G. L. Cassiday, Cengage Learning.

Graduate Attributes

i. Course Objective

This course introduces mathematical physics and mechanics. The basic objectives of the course are

- *to introduce essential primary concepts in mathematical physics such as calculus of vectors, curvilinear coordinates and Dirac delta function which are required for developing insight of the theories of physics,*
- *to introduce the concepts of dynamics of particles, energy, oscillation and basic properties of matter which will equip students with the tools required for applying the concepts of physics in practical problems and*
- *to train the students with concept visualisation through some laboratory practices.*

ii. Learning outcome

On successful completion of the course, students will be able to understand the calculus of vectors and concept of curved spaces which play central roles in developing insight of the theories of physics. They will learn the powerful method of computation through Dirac delta function which often appears in complex problems of physics. Students will be able to understand and apply the concepts of dynamics of particles, energy, oscillation and basic properties of matter in various problems of physics, technology and engineering. They will be trained in concept realisation through laboratory practices.

Theory Credit: 03 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Dr. Sanjeev Kalita**, Gauhati University, sanjeev@gauhati.ac.in
2) **Dr. Krishna Kingkar Pathak**, Arya Vidyapeeth College, kkingkar@gmail.com
3) **Dr. Samrat Dey**, Pragjyotish College, samratdgr8@gmail.com

Subject: Physics
Semester: Two
Course Name: Mathematical Physics & Electricity and Magnetism
Existing Base Syllabus: HS Maths and Physics
Course Level: PHY151
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Part A: Mathematical Physics (Theory)			
Unit 1- Differential equations	First and second order ordinary differential equations (ODE). Homogeneous and inhomogeneous differential equations. Solutions of first order ODE – integrating factors (physical examples – radioactive decay, Newton's law of cooling, particle falling under gravity through a resistive medium). Concept of initial/boundary conditions. Solutions of second order ODE with constant coefficients - complementary function and particular integral (physical examples- simple harmonic oscillation, forced vibration). Wronskian- definition and its use to check linear independence of 2nd order homogeneous linear differential equation. Partial differential equations (PDE) (physical examples – wave equation, diffusion equation, Laplace and Poisson equation – introduction only). Exact and inexact differentials. Concept of variable separation in a PDE.	10	Credit - 1
Unit– II: Matrices	Properties of matrices. Determinant and rank. Transpose and complex conjugate of matrices. Hermitian and anti-Hermitian matrices. Unitary and orthogonal matrices. Representation of linear homogeneous and inhomogeneous equations through matrix equation. Inverse of a matrix. Eigen values and eigen-vectors. Cayley-Hamilton Theorem (statement only), Diagonalization of simple matrices.	5	
Part B – Electricity and Magnetism (Theory)			
Unit I: Electric field	Electrostatic field, electric flux. Gauss's law. Application of Gauss's law to charge distributions with planar, spherical and	13	Credit - 2

and electric potential	cylindrical symmetries. Conservative nature of electrostatic field. Electrostatic potential. Electrostatic energy of a system of charges. Electrostatic boundary conditions. Laplace’s and Poisson’s equations. Uniqueness theorem. Application of Laplace’s equation involving planar, spherical and cylindrical symmetries. Potential and electric field of a dipole. Force and torque on a dipole. Capacitance of a system of charged conductors. Parallel plate capacitor. Capacitance on an isolated conductor.		
Unit –II: Dielectric properties of matter	Electric field in matter. Polarisation, polarisation charges. Electrical susceptibility and dielectric constant. Capacitor (parallel plate, spherical and cylindrical) filled with dielectric. Displacement vector, $\vec{D}$. Relation between $\vec{E}$, $\vec{P}$ and $\vec{D}$. Gauss’s law in dielectrics.	4	
Unit –III: Magnetic field	Magnetic force on a point charge, definition and properties of magnetic field $\vec{B}$. Curl and divergence. Vector potential, $\vec{A}$. Magnetic scaler potential. Magnetic force on (i) a current carrying wire and (ii) between two elements. Torque on a current loop in a uniform magnetic field. Biot-Savart’s law and its simple application: straight wire and circular loop. Current loop as a magnetic dipole and its dipole moment (analogy with electric dipole). Ampere’s circuital law and its application to (i) solenoid and (ii) torus.	6	
Unit–IV: Magnetic properties of matter	Magnetization vector, $\vec{M}$. Magnetic intensity, $\vec{H}$. Magnetic susceptibility and permeability. Relation between $\vec{B}$, $\vec{H}$ and $\vec{M}$. Ferromagnetism. B-H curve and hysteresis.	2	
Unit–V: Electrical circuits	AC circuits: Kirchhoff’s laws for AC circuits. Complex reactance and inductance. Series LCR circuits and parallel LCR circuits: (i) phasor diagram, (ii) resonance, (iii) power dissipation, (iv) quality factor, and (v) band width. Ideal constant-voltage and constant-current sources. Thevenin theorem and Norton theorem (only statements and solving of related problems).	5	
Laboratory			
	At least four from the following:		Credit-1

	1. Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Current, (d) Capacitances, and (e) Checking electrical fuses. 2. To study the characteristics of a series RC circuit. 3. To determine an unknown Low Resistance using Potentiometer. 4. To determine an unknown Low Resistance using Carey Foster's Bridge. 5. To compare capacitances using De' Sauty's bridge. 6. Measurement of field strength $\vec{B}$ and its variation in a solenoid (determine $\frac{dB}{dx}$). 7. To verify the Thevenin and Norton Theorems. 8. To verify the superposition and maximum power transfer theorems. 9. To determine the self-inductance of a coil by Anderson's bridge. 10. To study the response curve of a Series LCR circuit and determine its (a) Resonant frequency, (b) Impedance at resonance, (c) Quality factor Q, and (d) Band width. 11. To study the response curve of a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q. 12. Measurement of charge and current sensitivity and CDR of Ballistic Galvanometer. 13. Determine a high resistance by leakage method using Ballistic Galvanometer. 14. To determine the self-inductance of a coil by Rayleigh's method.		

	15. To determine the mutual inductance of two coils by the Absolute method.		

Reading list

[1] Essential Mathematical Methods for the Physical Sciences; K. F. Riley and M. P. Hobson, Cambridge University Press.

[2] Advanced Engineering Mathematics; E. Kreyszic, John Wiley & Sons (New York)

[3] Mathematical Methods for Physicists; G. B. Arfken, H. J. Weber and F.E. Harris, Elsevier

[4] Mathematical Physics, H. K. Dass and Dr. Rama Verma, S. Chand Publication.

[5] Mathematical Physics-I; Krishna K. Pathak and Sangeeta Prasher, Vishal Publishing Co, Jalalandhar (Delhi).

[6] Introduction to Electrodynamics, D. J. Griffiths.

[7] Electricity and Magnetism [With electromagnetic theory and special theory of relativity], D. Chattopadhyay and P. C. Rakshit, 2013, New Central Book Agency (P) Limited.

[8] Electricity, Magnetism and Electromagnetic Theory, S. Mahajan and S. R. Choudhury, 2012, Tata Mcgraw.

[9] Schaum’s outline of Theory and Problems of Electromagnetics, J. A. Edminister.

[10] Electromagnetics, B. B. Laud, New Age International Publishers.

[11] Feynman Lectures Vol. 2, R. P. Feynman, R. B. Leighton, M. Sands, 2008, Pearson Education.

[12] Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-Hill Education.

[13] Elements of Electromagnetics, M. N. O. Sadiku, 2008. Pearson Education.

[14] Electricity and Magnetism, J. W. Fewkes and J. Yarwood, Vol. I, 1991, Oxford Univ. Press.

Graduate Attributes

i. Course Objective

- *To introduce the methods of solving differential equations.*
- *To introduce various concepts of matrix algebra.*
- *Electric field from vector calculus point of view and use of potential formulation to solve electrostatic problems.*
- *Magnetic fields of current carrying conductors, torus, solenoids etc. Study magnetic properties of matter.*
- *Study and analysis of AC circuits like LCR, and use of network theorems in electrical circuits.*

ii. Learning outcome

After the successful completion of the course, students will be able to understand methods of solving various differential equations appearing in physics. It will give an idea of how to study evolution of a physical system. Through matrix algebra students will be able to compute various matrix operations which are required for solving physical problems. They will be able to understand electric field and magnetic fields in matter, dielectric properties of matter, magnetic properties of matter, application of Kirchhoff's law in different circuits, and application of network theorem in different circuits. The students will also get accustomed to using multimeters and potentiometers, and they will be able to determine some of the important physical quantities related to electricity and magnetism for a better understanding of the topic.

Theory Credit: 03 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1. **Dr. Manos P. C. Kalita**, Gauhati University, mpckalita@gauhati.ac.in
2. **Dr. Chabin Thakuria**, Tihu College, chabinthakuria@gmail.com
3. **Dr. Bhaskar J. Hazarika**, Pandu College, bh53033@gmail.com
4. **Dr. Krishna Kinkar Pathak**, Arya Vidyapeeth College, kkingkar@gmail.com

Subject: Physics
Semester: Three
Course Name: Waves and Optics
Existing Base Syllabus: HS Maths and Physics
Course Level: PHY201
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Wave and Optics (Theory)			
Unit I: Superposition of harmonic oscillations	Superposition of waves: Linearity and Superposition principle, Superposition of two collinear oscillations having (1) equal frequencies and (2) different frequencies (Beats), Lissajous figures and their use.	4	Credit - 3
Unit– II: Wave motion	Waves: Progressive (Travelling) Waves, wave equation, plane wave and spherical wave, Longitudinal and Transverse Waves, dispersion, group velocity, phase velocity, Pressure of a Longitudinal Wave. Energy Transport. Intensity of Wave.	4	
Unit –III: Velocity of waves	Velocity of Waves: Velocity of Transverse Vibrations of Stretched Strings. Velocity of Longitudinal Waves in a Fluid in a Pipe. Newton's Formula for Velocity of Sound. Laplace's Correction.	4	
Unit–IV: Superposition of two harmonic waves	Superposition of Two Harmonic Waves: Standing (Stationary) Waves in a String: Fixed and Free Ends. Analytical Treatment. Phase and Group Velocities. Changes with respect to Position and Time. Energy of Vibrating String. Transfer of Energy. Normal Modes of Stretched Strings. Plucked and Struck Strings. Melde's Experiment. Longitudinal Standing Waves and Normal Modes. Open and Closed Pipes.	9	
Unit–V: Wave optics	Wave optics: Electromagnetic nature of light, definition and properties of wave front. Huygens principle. Temporal and Spatial coherence.	4	
Unit–VI: Interference	Division of wave front and amplitude, intensity distribution in an interference pattern, Young's	8	

	double slit experiment, Fresnel's Biprism. Phase change on reflection: Stokes' treatment, Interference in Thin Films: parallel and wedge-shaped films, Newton's Rings: Measurement of wavelength and refractive index, Michelson interferometer.		
Unit–VII: Diffraction	Fresnel and Fraunhofer diffraction. Fresnel's Half-Period Zones for Plane Wave. Fresnel diffraction pattern of a straight edge and at a circular aperture. Fraunhofer diffraction: Single slit. Double slit. Diffraction grating. Resolving power of grating.	7	
Unit–VIII: Polarization	Polarized light and its mathematical representation, Production of polarized light by reflection, refraction and scattering. Polarization by double refraction and Huygen's theory, Nicol prism, Production and analysis of circularly and elliptically polarized light.		
Laboratory			
	At least four from the following: 1. To determine the frequency of an electric tuning fork by Melde's experiment and verify λ^2-T law. 2. Study of Lissajous Figure of two different waves using CRO and find out the unknown frequency of an electrical signal. 3. Familiarization with: Schuster's focusing, determination of angle of prism. 4. To determine refractive index of the Material of a prism using sodium source. 5. To determine the dispersive power and Cauchy constants of the material of a prism using mercury source. 6. To determine wavelength of sodium light using Fresnel Biprism. 7. To determine wavelength of sodium light using Newton's Rings.		Credit-1

	8. To determine the thickness of a thin paper by measuring the width of the interference fringes produced by a wedge-shaped Film. 9. To determine wavelength of (1) Na source and (2) spectral lines of Hg source using plane diffraction grating. 10. To determine dispersive power and resolving power of a plane diffraction grating.		

Reading list

[1] Waves: Berkeley Physics Course, vol. 3, Francis Crawford, 2007, Tata McGraw-Hill.
[2] The Physics of Vibrations and Waves, H. J. Pain, 2013, John Wiley and Sons.
[3] Vibrations and Waves in Physics, 2nd edition, I. G. Main, 1984, Cambridge University Press.
[4] A Textbook of Sound, 3rd Edition, A. B. Wood, 1955, Bell & Sons.
[5] The Physics of Waves and Oscillations, N.K. Bajaj, 1998, Tata McGraw Hill.
[6] Fundamentals of Optics, F. A. Jenkins and H.E. White, 1981, McGraw-Hill
[7] Principles of Optics, Max Born and Emil Wolf, 7th Edn., 1999, Pergamon Press.
[8] Optics, Ajoy Ghatak, 2008, Tata McGraw Hill
[9] Principles of Optics, B. K. Mathur and T. P. Pandya, 1981, Tata McGraw-Hill International.
[10] Fundamental of Optics, A. Kumar, H. R. Gulati and D. R. Khanna, 2011, R. Chand Publications.

Graduate Attributes

i. Course Objective

- *To learn the superposition of harmonic waves and oscillations, different types of wave motions, formation of standing waves and velocity of waves in media.*
- *To learn optical phenomena such as interference, diffraction and polarization in terms of the wave model*
- *To learn the principles and applications of optical instruments like biprism, interferometer and diffraction grating etc.*
- *To learn hand on experiments with prism, biprism, spectrometer, Newton's ring apparatus, grating, CRO, sodium and mercury light sources etc.*

ii. Learning outcome

On successful completion of the course students will:

1. understand Simple Harmonic Oscillation and superposition principle.

2. understand the classical wave equation in transvers and longitudinal waves and solutions of few physical systems on its basis.

3. understand the concept of normal modes in transvers and longitudinal waves

4. understand the interference as superposition of waves from coherent sources and also understand the basic principle of Young's double slit experiment, Fresnel's Biprism, Newton's Rings, Michelson interferometer etc.

5. understand the basic concept of diffraction, Fresnel and Fraunhofer diffraction from a slit.

6. understand the concept of polarisation of light, the production and detection of polarized light.

7. understand working principle of prism, biprism, spectrometer, Newton's ring apparatus, grating, CRO, sodium and mercury light sources etc.

Theory Credit: 03 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Dr. Simanta Hazarika**, Gauhati University, simanta@gauhati.ac.in
2) **Dr. Hemen Kakati**, Nalbari College, hementeach@gmail.com
3) **Dr. Arup Jyoti Choudhury**, Guwahati College, arupjchoudhury@gmail.com

Subject: Physics
Semester: Four
Course Name: Classical Mechanics
Existing Base Syllabus: Mechanics of semester I
Course Level: PHY251
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Unit I: Mechanics of point particles- the Lagrangian approach	Review of Newtonian mechanics; system of particles; constrained motion – types of constraints; concept of degrees of freedom; generalised coordinates and velocities; principle of virtual work and D'Alembert's principle and associated problems; Lagrange's (Euler-Lagrange, EL) equation; physical problems (construction of EL equations only) – simple and compound pendulums, two vibrating particles of equal mass attached to springs, Lagrange's equations for a particle in spherical and cylindrical coordinate systems, falling body in uniform gravitational field.	14	Credit - 4
Unit– II: Mechanics of point particles – the Hamiltonian approach	Generalised momenta; Legendre transformation; Hamilton's canonical equations; Hamiltonian from the Lagrangian; conservation of energy and momentum; physical problems – Hamiltonian for simple pendulum, particle moving in central force field (gravitational potential).	6	
Unit –III: Small oscillation	Minimum of potential energy and concept of stable equilibrium; expansion of potential energy around a minimum; kinetic and potential energy matrices; equation of motion of small oscillation.	5	
Unit–IV: Special theory of relativity	Inadequacy of Galilean transformation; postulates of special relativity; Lorentz transformation; simultaneity and order of events; length contraction and time dilation; relativistic addition of velocities; variation of mass with velocity and mass-energy equivalence. Lorentz transformation as a rotation in spacetime; relation between proper time and coordinate time; relativistic kinematics: energy-momentum relation.	15	

Unit–V: Fluid dynamics	Definition of a fluid; idea fluids; density and pressure of a fluid; velocity of a fluid element and its time derivative; mass conservation and equation of continuity; incompressible fluid; Euler's equation of fluid dynamics; Navier-Stokes equation (introduction only).	5	

Reading list

(1) Classical Mechanics, H. Goldstein, C.P. Poole and J.L. Safko (Pearson Education)
(2) Theoretical Mechanics, M. R. Spiegel (McGraw Hill Book Company)
(3) Classical Mechanics, P.S. Joag and N.C Rana (McGraw Hill Book Company)
(4) Mathematical Physics, B. S. Rajput (Pragati Prakashan)
(5) Classical Mechanics, T.W.B. Kibble and F.H. Berkshire (Imperial College Press)
(6) Mechanics: Courses in Theoretical Physics (Vol. 1), L.D. Landau and E.M. Lifshitz (Butterworth-Heinemann) (3rd Edn.)
(7) Classical Mechanics: With introduction to non-linear oscillations and chaos, V.B. Bhatia (Narosa Publishing House)

Graduate Attributes

i. Course Objective

The basic objectives of the course are

- *to introduce the laws of classical dynamics*
- *to train students in solving problems of motion of particles, systems of particles and fluids and*
- *to introduce relativity and hence the idea of how space and time play role in dynamics of matter.*

ii. Learning outcome

On successful completion of the course students will be able to apply the laws of classical dynamics to physical problems of motion of particles, systems of particles and fluids in various fields of physics and natural science as a whole. They will also get the exposure of the idea of how space and time play role in dynamics of matter.

Theory Credit: 04 (Four)

Practical Credit: 0 (Zero)

No. of Required Classes: 60 (45 Theory; 15 Tutorials)

No. of Contact Classes: 60

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Dr. Sanjeev Kalita,** Gauhati University, sanjeev@gauhati.ac.in
2) **Dr. Samrat Dey,** Pragjyotish College, samratdgr8@gmail.com
3) **Dr. Mausumi Bhuyan,** Rangiya College, moubhuyan83@gmail.com

Subject: Physics
Semester: Four
Course Name: Quantum Mechanics I
Existing Base Syllabus: HS Maths and Physics
Course Level: PHY252
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Origin of Quantum Theory	Failure of classical theories, Explanation of Black body radiation, Photoelectric effect, Compton effect, different evidences in support of quantum theory, particle nature of radiation, Bohr's correspondence principle.	3	Credit - 3
Unit– II: Dynamical Variables as Operators and Uncertainty Principle	Dynamical variables as operators, definition of an operator, different types of operators and their properties, position, energy and momentum operator; commutation relations; introduction to Hilbert space, Dirac notation, eigenvalue and eigenfunctions; expectation value of an operator e.g. position, momentum operator etc, orthonormality condition, Ehrenfest's theorem. Simultaneous measurement and uncertainty principle; general statement of Heisenberg's uncertainty principle(for any two non commutating operators), different uncertainty relations involving canonical pair of variables; particle trajectory and fuzziness, applications of the position momentum uncertainty principle, application of energy time uncertainty principle to virtual particles and range of an interaction.	10	
Unit –III: Matter Wave and Wave-Particle Duality	Wave particle duality and de Broglie wavelength, particle as a wave or matter wave, wave description of particles by wave packets; phase and group velocity, wave function, wave amplitude, probability; Experimental verification of matter wave, Davisson and Germer experiment; linearity and superposition principle, two slit experiments with electrons and photons; Uncertainty	8	

	principle from wave packet description, Gaussian wave packet and its wave function.		
Unit–IV: Schrödinger Equation and it's applications	Time dependent Schrödinger Equation, Time independent Schrödinger Equation; Physical interpretation and properties of wave function, continuity of a wave function, boundary conditions and emergence of discrete and continuous energy levels; probabilities and normalisation in three and one dimension; equation of continuity, current density in both three and one dimension. Hamiltonian, stationary states and energy eigenvalues; expansion of an arbitrary wave function as a linear combination of energy eigenfunctions; General solution of the time dependent Schrödinger equation in terms of linear combinations of stationary states, discrete and continuous spectrum, wave function of a free particle, spread of Gaussian wave function in one dimension, Fourier transforms and momentum space wave function. Applications of Time independent Schrödinger Equation in different problems like : (i) particle in a one dimensional infinite potential well (quantum dot as an example) (ii) particle in a one dimensional finite square potential well (iii) barrier penetration problems – potential step and rectangular potential barrier (tunnel effect) (iv) linear harmonic oscillator (v) spherically symmetric potential for hydrogen atom- radial solution, spherical harmonics, angular momentum operator and different quantum numbers, radial distribution function and shapes of the probability densities for ground & first excited states; degeneracy of states : s, p, d states.	24	
Laboratory			
	<u>**At least four from the following:**</u> 1. Measurement of Planck's constant using black body radiation and photo-detector.		Credit-1

	2. Photo-electric effect: Photo current versus intensity and wavelength of light; maximum energy of photo-electrons versus frequency of light. 3. To determine work function of material of filament of directly heated vacuum diode. 4. To determine the Planck's constant using LEDs of at least 4 different colours. 5. To determine the wavelength of H_α emission line of hydrogen atom. 6. To determine the ionisation potential of mercury. 7. To determine the absorption lines in the rotational spectrum of iodine vapour. 8. To determine the value of e/m by (a) magnetic focusing or (b) bar magnet. 9. To setup the Millikan's oil drop apparatus and determine the charge of an electron. 10. To show the tunnelling effect in tunnel diode using I-V characteristics. 11. To determine the wavelength of laser source using diffraction from single slit. 12. To determine the wavelength of laser source using diffraction from double slits. 13. To determine (1) wavelength and (2) angular spread of He-Ne laser using plane diffraction grating.		

Reading list

1. N. Zettili, Quantum Mechanics, John Wiley & Sons (2001).
2. J. J. Sakurai and J. Napolitano, Modern Quantum Mechanics, Cambridge Univ. Press, 2020.
3. Y. R.Waghmare, Fundamentals of Quantum Mechanics, Wheeler publishing (2014).

4. P. A. M. Dirac, Principles of Quantum Mechanics, Oxford University Press (1981).
5. B. H. Bransden and C. J. Joachain, Quantum Mechanics, Pearson Education 2nd Ed. (2004).
6. K. Gottfried and T-M Yan, Quantum Mechanics: Fundamentals,2nd Ed., Springer (2003).
7. R. Shankar, Principles of Quantum Mechanics, Springer (India) (2008).
8. D. J. Griffiths, Introduction to Quantum Mechanics, Pearson Education (2005).
9. L. Schiff, Quantum Mechanics, Mcgraw-Hill (1968).
10. A. K. Ghatak and S. Lokanathan, Quantum Mechanics: Theory and Applications, Springer (2002).
11. A. Bieser, Concepts of Modern Physics, McGraw Hill (2002).
12. Arno Bohm, Quantum Mechanics: Foundations and Applications, 3rd Edition, Springer (1993).
13. H. C. Verma, Quantum Mechanics, TBS publications (2019).
14. P M Mathews and K. Venkatesan, A Text book of Quantum Mechanics, 2nd Edition, McGraw Hill (2010).

Graduate Attributes

i. Course Objective

- *To learn about the inadequacies of classical mechanics, the origin and need of quantum mechanics, historical developments in quantum mechanics.*
- *Dual nature of radiation & matter, description of matter wave through wave packet.*
- *Probabilistic nature and wave function, Schrödinger equation, the uncertainty principle, stationary and non-stationary states.*
- *Applications of Schrödinger equation in different cases like infinite and finite potential well, tunneling effect, linear harmonic oscillator and H-atom.*
- *Formulation of quantum mechanics in terms of operators.*

ii. Learning outcome

On successful completion of the course students will be able to learn physical and mathematical fundamentals of Quantum physics, and various topics in it. These concepts are used in various branches of physics, like condensed matter physics, lasers, quantum statistics, atomic and molecular physics, particle physics, astrophysics and optics etc.

Theory Credit: 03 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Prof Kalpana Bora,** Gauhati University, kalpana@gauhati.ac.in
2) **Dr. Bhaskar Jyoti Hazarika,** Pandu College, bh53033@gmail.com
3) **Dr Arup Jyoti Choudhury,** Guwahati College, arupjchoudhury@gmail.com

Subject: Physics
Semester: Four

Course Name: Analog Electronics
Existing Base Syllabus: HS Physics
Course Level: PHY253
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Semiconductor Diodes	P and N type semiconductors. Energy Level Diagram. Conductivity and Mobility, Concept of Drift velocity. PN Junction Fabrication (Simple Idea). Barrier Formation in PN Junction Diode. Static and Dynamic Resistance. Current Flow Mechanism in Forward and Reverse Biased Diode. Drift Velocity. Derivation for Barrier Potential, Barrier Width, and Current for Step Junction.	7	Credit - 3
Unit II: Two-terminal Devices and their Applications	Rectifier Diode: Half- wave Rectifiers. Centre-tapped and Bridge type Full-wave Rectifiers. Calculation of Ripple Factor and Rectification Efficiency. C-filter. Zener Diode and Voltage Regulation. Power supply without filter circuit and with C-filter circuit. Principle LEDs, Photodiode, and Solar Cell (Basic concept).	5	
Unit III: Bipolar Junction Transistors	n-p-n and p-n-p Transistors. Characteristics of CB, CE, and CC Configurations. Current gains α and β. Relations between α and β. Load line analysis of Transistors. DC Load line and Q-point. Physical Mechanism of Current Flow. Active, Cut-off, and Saturation Regions.	5	
Unit IV: Amplifiers	Transistor Biasing and Stabilization Circuits. Fixed Bias and Voltage Divider Bias. Transistor as a 2-port Network. h-parameter. Equivalent Circuit. Analysis of a single-stage CE amplifier using Hybrid Model. Input and Output Impedance. Current, Voltage, and Power Gains. Classification of Class A, B & C Amplifiers. Differential amplifiers.	7	
Unit V: Coupled Amplifier	Two-stage RC-coupled amplifier and its frequency response.	2	

Unit VI: Feedback in Amplifiers	Effects of Positive and Negative Feedback on Input Impedance. Output Impedance. Gain. Stability. Distortion and Noise	4	
Unit VII: Sinusoidal Oscillators	Barkhausen's Criterion for self-sustained oscillations. RC Phase shift oscillator. Determination of Frequency. Colpitt's oscillator.	5	
Unit VIII: Operational Amplifiers (Black Box approach)	Characteristics of an Ideal and Practical Op-Amp (IC 741). Open-loop and Closed-loop Gain. Frequency Response. CMRR. Slew Rate and Concept of Virtual Ground.	3	
Unit IX: Applications of Op-Amps	Inverting and non-inverting amplifiers. Adder. Subtractor. Differentiator. Integrator. Log and Anti Log amplifier. Zero crossing detector. Wein bridge oscillator. Comparator.	4	
Unit X: Introduction to CRO (Lectures 03)	Block Diagram of CRO. Electron Gun, Deflection System, and Time Base. Deflection Sensitivity. Applications of CRO: (1) Study of Waveform, (2) Measurement of Voltage, Current, Frequency, and Phase Difference.	3	
Laboratory			
	<u>At least four from the following:</u> 1. To study V-I characteristics of PN junction diode, and light emitting diode. 2. To study the V-I characteristics of a Zener diode and its use as a voltage regulator. 3. Study of V-I and power curves of solar cells, and find maximum power point and efficiency. 4. To study the characteristics of a Bipolar Junction Transistor in CE configuration. 5. To study the various biasing configurations of BJT for normal Class A operation. 6. To design a CE transistor amplifier of a given gain (mid-gain) using voltage divider bias.		Credit-1

	7. To study the frequency response of voltage gain of an RC-coupled transistor amplifier. 8. Using an Op-amp, design a Wien bridge oscillator for a given frequency. 9. To design a phase shift oscillator of given specifications using BJT. 10. To design and study Colpitt’s oscillator. 11. To design an inverting amplifier using Op-amp for the DC voltage of a given gain. 12. To design inverting amplifier using Op-amp and study its frequency response. 13. To design a non-inverting amplifier using Op-amp and study its frequency response. 14. To study the zero-crossing detector and comparator. 15. To add two DC voltages using Op-amp in inverting and non-inverting modes. 16. To design a precision Differential amplifier of given I/O specification using Op-amp. 17. To investigate the use of an Op-amp as an Integrator. 18. To investigate the use of an Op-amp as a Differentiator. 19. To measure (a) Voltage, and (b) Time period of a periodic waveform using CRO. Construct a series LR circuit. Display the two waveforms on the CRO and measure the phase differences between the voltages across R and L. 20. To test a Diode and Transistor using a Multimeter. Draw the forward bias characteristic of the diode. Using only the base-emitter junction of the transistor draw a characteristic curve and show that it behaves as a forward-biased diode.		

	Note: All students will have to do an electronic project on the circuits, for example, the power supply, the AM detector, etc. to get acquainted.		

Reading list

1. Integrated Electronics, J. Millman and C. C. Halkias, 1991, Tata Mc-Graw Hill.
2. Electronics: Fundamentals and Applications, J. D. Ryder, 2004, Prentice Hall.
3. Solid State Electronic Devices, B. G. Streetman & S. K. Banerjee, 6th Edn.,2009, PHI Learning
4. Electronic Devices & circuits, S. Salivahanan & N. S. Kumar, 3rd Ed., 2012, Tata Mc-Graw Hill
5. OP-Amps and Linear Integrated Circuit, R. A. Gayakwad, 4th edition, 2000, Prentice Hall
6. Microelectronic circuits, A. S. Sedra, K.C. Smith, A. N. Chandorkar, 2014, 6th Edn., Oxford University Press.
7. Electronic circuits: Handbook of design & applications, U. Tietze, C. Schenk,2008, Springer
8. Semiconductor Devices: Physics and Technology, S. M. Sze, 2nd Ed., 2002, Wiley India
9. Microelectronic Circuits, M. H. Rashid, 2nd Edition, Cengage Learning
10. Electronic Devices, 7/e Thomas L. Floyd, 2008, Pearson India
11. Electronics Fundamentals and Applications, D. Chattopadhyay and P. C. Rakshit, 17th Ed, 2023, New Age International Publishers

Graduate Attributes

i. Course Objective

- To introduce students to analog electronics with hands-on practice on implementing some of these in hardware.
- To make the students understand the physics of semiconductor p-n junction and application in devices like diodes, rectifiers, etc.
- To understand the working of bipolar junction transistors, biasing, stabilization circuits, and various applications like amplifiers, oscillators, etc. together with feedback.
- To know the basics of Operational Amplifiers and applications.

- To understand the basics of the use of CRO in measurements with hands-on experience with some applications

ii. Learning outcome

On successful completion of the course, students will be able to understand the physics of semiconductor p-n junction and devices such as rectifier diodes, Zener diode, photodiode, etc.; they will understand the basics of bipolar junction transistors, transistor biasing, and stabilization circuits; the concept of feedback in amplifiers and the oscillator circuits. Students will also have an understanding of operational amplifiers and their applications.

Theory Credit: 03 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Prof. Banty Tiru, Gauhati University,** btiru@gauhati.ac.in
2) **Dr. Shakeel Zaman, Handique Girls College,** shakeelzamal@gmail.com
3) **Dr. Sumanta Borthakur, B. Borooah College,** bortmontu1@gmail.com

Subject: Physics
Semester: Four
Course Name: Mathematical Physics
Existing Base Syllabus: HS Mathematics
Course Level: PHY254
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Partial Differential Equations	Solutions to partial differential equations, using separation of variables: Laplace's Equation in problems of rectangular, cylindrical and spherical symmetry. Wave equation and its solution for vibrational modes of a stretched string, rectangular and circular membranes.	10	Credit - 3
Unit II: Fourier Series	Periodic functions. Orthogonality of sine and cosine functions, Dirichlet Conditions (Statement only). Expansion of periodic functions in a series of sine and cosine functions and determination of Fourier coefficients. Complex representation of Fourier series. Application to square and triangular waves.	7	
Unit III: Complex Analysis	Functions of Complex Variables. Analyticity and Cauchy-Riemann Conditions. Examples of analytic functions. Singular functions: poles and branch points, order of singularity. Integration of functions with complex variable. Cauchy's Integral theorem and Cauchy's Integral formula. Simply and multiply connected regions. Laurent and Taylor's series expansions. Residue Theorem with application.	17	
Unit IV: Tensor Algebra	Introduction to tensor, Transformation of co-ordinates, Einstein's summation convention. Contravariant, covariant and mixed tensors. Symmetric and antisymmetric tensors, Kronecker delta, LeviCivita tensor. Quotient law of tensors. Rules of combination of tensors: addition, subtraction, outer multiplication, contraction and inner multiplication.	6	
Unit V: Introduction to Probability	Independent random variables: Probability distribution functions; binomial, Gaussian and Poisson, with examples. Mean and variance.	5	
Laboratory			

	At least four from the following: 1. Solve the differential equations $\frac{dy}{dx} = e^x$ with $y = 0$ for $x = 0$ $\frac{dy}{dx} + e^{-x}y = x^2$ $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} = -y$ $\frac{d^2y}{dx^2} + e^{-x}\frac{dy}{dx} = -y$ 2. Perform the multiplication of two 3 × 3 matrices. 3. Compute the eigenvalues and eigenvectors of the following matrices. $\begin{bmatrix} 4 & 3 & 7 \\ 1 & 2 & 7 \\ 2 & 0 & 4 \end{bmatrix}, \begin{bmatrix} 1 & -i & 3+4i \\ i & 2 & 4 \\ 3-4i & 4 & 3 \end{bmatrix}, \begin{bmatrix} 2 & -i & 2i \\ i & 4 & 3 \\ -2i & 3 & 5 \end{bmatrix}$ 4. Using random number compute the areas of circle, square, volume of sphere and value of pi (π). 5. Evaluate trigonometric functions e.g. *sinθ; cosθ; tanθ* etc. using Interpolation by Newton Gregory Forward and Backward difference formula. 6. Find the solution of Partial Differential Equations: (a) Wave equation (b) Heat equation. 7. Evaluate the integral *I*,where, $I = \frac{1}{\sqrt{2\pi\sigma^2}} \int exp\left[\frac{(x-2)^2}{2\sigma^2}\right](x+3)dx$ for $\sigma = 1.0, 0.1, 0.01$ and show that $I \to 5$ 8. Compute the *n*th roots of unity for *n* = 2, 3, and 4. 9. Find the two square roots of 5 + 12*i*.		Credit-1

Reading list

1. Mathematical Physics; H K Dass and R Verma, S Chand and Company limited.
2. Mathematical methods for Physics and Engineering; K. F Riley, M. P Hobson, S.J Bence, Cambridge University Press.
3. Graduate Mathematical Physics (With Mathematica Supplement); J J Kelly, Willey-VCH VerlagGmbH and Co. KGaA.
4. Mathematical Methods for Physicists; G. B. Arfken, H. J. Weber and F.E. Harris, Elsevier.
5. Ordinary and Partial Differential equations; M. D Raisinghania, S. Chand and Company Ltd.
6. Complex Variables; M R Spiegel,S Lipschutz, J J Schiller and D Spellman, Schaum's Outline Series, McGraw Hill Education.
7. Complex variables Demystified (A self-teaching guide); D McMahan, McGraw Hill Education.
8. A Student's Guide to vectors and Tensors; D A Fleisch, Cambridge University Press.
9. Vector analysis and an introduction to Tensor analysis; S Lipschutz, D Spellman, M R Spiegel, Schaum's Outline Series, McGraw Hill Education.
10. Tensors and applications with Scilab Programs; N D Soni, I.K International Publishing House Pvt. Limited.
11. Probability and Statistics; M R Spiegel, J J Schiller and R A Srinivasan, Schaum's Outline Series, McGraw Hill Education.

Graduate Attributes

i. Course Objective

- To solve partial differential equations using separation of variables, including Laplace's equation and the wave equation.
- To apply Fourier series expansion to represent periodic functions using sine and cosine functions.
- To understand complex analysis principles, including analytic functions, integration and residue theorem.
- To develop proficiency in tensor algebra, covering transformations, contravariant and covariant tensors and tensor algebra.
- To gain a preliminary knowledge to probability theory, focusing on independent random variables, probability distributions, and mean and variance calculations.

ii. Learning outcome

On successful completion of the course, the students will be equipped with the techniques related to solving partial differential equations using separation of variables method, application of Fourier series analysis, solving complex integrations, dealing with tensors and probability distributions which are relevant while dealing with wave mechanics, electrodynamics, quantum mechanics, theory of relativity and experimental physics.

Theory Credit: 03 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Dr. Subhankar Roy**, Gauhati University, subhankar@gauhati.ac.in
2) **Dr. Abhijit Das**, Gauhati University, abhijitdas@gauhati.ac.in
3) **Dr. Chabin Thakuria**, Tihu College, chabinthakuria@gmail.com

Subject: Physics
Semester: Five
Course Name: Atomic and Molecular Physics
Existing Base Syllabus: HS Physics and/ or Chemistry
Course Level: PHY-301
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Atom Model:	The Bohr model of the hydrogen-like atom, Sommerfeld Relativistic Atom Model: Elliptical orbits, explanation of fine structure of H alpha line in Balmer series of hydrogen atom. Limitation of Sommerfeld atom model. Orbital magnetic dipole moment: Bohr Magneton, Gyromagnetic Ratio, Larmor precession, Space Quantization, Electron Spin, quantum numbers associated with vector atom model, spin-orbit interaction, Coupling Schemes: L-S Coupling and j-j Coupling, Spectroscopic term and their notation, Stern-Gerlach experiment and its conclusion. Normal and Anomalous Zeeman Effect. Paschen Back and Stark Effect (Qualitative Discussion only).	20	Credit - 4
Unit II: X-rays:	Ionizing Power, X-ray Diffraction, Bragg's Law, X-ray Spectra: Continuous and characteristic X-rays Mosley's law, Compton effect.	8	
Unit III: Multi electron atoms:	Hund's rule, Periodic table: Pauli's exclusion principle, explanation of the periodic classification of the elements, Building up or Aufbau Principle, Broad features of Alkali atom (Na etc.) spectra and its explanation	10	
Unit IV: Molecular Spectra	Rotational Energy levels, Selection Rules and Pure Rotational Spectra of a diatomic Molecule. Vibrational Energy Levels, Selection Rules and Vibration Spectra of a diatomic Molecule. Rotation-Vibration Energy Levels, Selection Rules and Rotation-Vibration Spectra. Determination of Internuclear Distance.	15	
Unit V: Raman Effect	Quantum Theory of Raman Effect. Characteristics of Raman Lines. Stoke's and Anti-Stoke's Lines. Complimentary Character of Raman and infrared Spectra.	7	

Reading list

1. Introduction to Atomic spectra, H. E. White, Tata McGraw Hill (1934)
2. Atomic and Molecular Spectra, Raj Kumar
3. Concepts of Modern Physics, Arthur Beiser (McGraw-Hill Book Company, 1987)
4. Atomic physics, J. B. Rajam & foreword by Louis De Broglie (S. Chand & Co., 2007)
5. Physics of Atoms and Molecules, B. H. Bransden and C. J. Joachein.
   Fundamentals of Molecular Spectroscopy, C. N. Banwell and E. M. McCash

Graduate Attributes

i. Course Objective

- To learn the development of atom models.
- To learn the origin of atomic spectra and their modifications under different physical conditions.
- To learn the basics of molecular spectra for diatomic molecule and a few applications.

ii. Learning outcome

Students will be ability to describe the atomic spectra of one and two valance electron atoms and will also understand the change in behavior of atoms and corresponding modification of their spectra in external applied electric and magnetic field. They will understand the basic principle of pure rotational, vibrational, Rotation-Vibration and Raman spectra of molecules and their few applications.

Theory Credit: 04 (Four)

Practical Credit: 0 (Zero)

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Dr. Simanta Hazarika**, Gauhati University, simanta@gauhati.ac.in
2) **Dr. Hemen Kakati**, Nalbari College, hementeach@gmail.com
3) **Dr. Arup Jyoti Choudhury**, Guwahati College, arupjchoudhury@gmail.com

Subject: Physics
Semester: Five
Course Name: Condensed Matter Physics
Existing Base Syllabus: HS Physics, Chemistry and Mathematics
Course Level: PHY302
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Crystal Structure and Bonding in solids	Amorphous, crystalline and polycrystalline materials, lattice translation vectors, unit cell, types of crystal lattice, Bravais Lattice, Miller Indices, inter planer spacing. Ionic, covalent, metallic, van-der-Waal and hydrogen bondings, cohesive energy of ionic crystal, Madelung constant.	9	Credit - 3
Unit II: Elementary Lattice Dynamics	Basic idea of lattice vibration and phonon. Dulong and Petit's Law. Einstein and Debye theories of specific heat of solids, T^3 law.	4	
Unit III: Dielectric and Ferroelectric Properties of Materials	Polarization. local electric field at an Atom, depolarization field, electric susceptibility, polarizability. Clausius Mosotti equation, classical theory of electric polarizability, normal and anomalous dispersion, Cauchy and Sellmeir relations, Langevin-Debye equation. Piezoelectric effect, pyroelectric effect, ferroelectric effect, electrostrictive effect, Curie-Weiss Law.	10	
Unit IV: Transport properties of materials	Free electron theory of metals, electrical and thermal conductivity of metals, Wiedemann-Franz law, drawback of classical theory and modification with quantum theory, preliminary idea of band theory, band gap, conductor, semiconductor (*p* and *n* type) and insulator,	9	

	conductivity of semiconductor, mobility, measurement of conductivity (2-probe & 4-probe resistivity measurement method), Hall Effect (Qualitative idea).		
Unit V: Nanophysics and soft matter	Basic idea about nanomaterials, thin film physics and soft matter.	3	
Unit VI: Magnetic Properties of Matter	Dia, para, ferri, ferro and anti ferromagnetic materials, classical Langevin Theory of dia and paramagnetism, Curie's law, Weiss' theory of ferromagnetic domains, discussion of B − H Curve, hysteresis and energy Loss.	7	
Unit VII: Superconductivity	Basic idea of superconductivity, critical temperature, critical magnetic field, Meissner effect. Type I and type II Superconductors, isotope effect.	3	
Laboratory			
	At least four from the following: 1. Indexing of powder X-Ray diffraction data of cubic crystalline materials and determination of lattice parameters including inter planner spacing (XRD data needs to arrange by the department). 2. Measurement of susceptibility of a paramagnetic solution (Quinck's Tube Method). 3. To measure the magnetic susceptibility of solids. 4. To determine the Coupling Coefficient of a piezoelectric crystal. 5. To measure the Dielectric Constant of a dielectric materials with frequency. 6. To study the *P-E* Hysteresis loop of a Ferroelectric Crystal. 7. To draw the B − H curve of Fe		Credit-1

	using Solenoid & determine energy loss from Hysteresis. 8. To measure the variation of resistivity of a semiconductor with temperature by four-probe method and to determine its band gap. 9. To determine the Hall coefficient of a semiconductor sample.		

Reading list

1. Introduction to Solid State Physics, C Kittel
2. Lattice Dynamics, A K Ghatak and L S Kothari
3. Solid State Physics, A J Dekker.
4. Introductory Solid State Physics, H P Myers.
5. Solid State Physics, N W Ashcroft and N D Mermin
6. Magnetism in solids, D H Martin
7. Physics of Magnetism, S Chikazumi.
8. Solid State Physics, S O Pillai
9. Introduction to Nanotechnology, C. P. Poole, J. F. J. Owens

Graduate Attributes

i. Course Objective

- To provide the elementary idea about crystal structure, bonding and lattice dynamics in solids.
- To make the students understand the concepts of transport properties, dielectric properties, ferroelectric properties and magnetic properties in solids.
- To familiarise the students with nanomaterials, thin film, soft matter and superconductivity.

ii. Learning outcome

On successful completion of the course students will be able to acquire the basic knowledge of crystal structure, bonding in solids and elementary idea lattice dynamics of materials, dielectric, ferroelectric and magnetic properties of solids, the physics of electrons in solids, basic idea about nanomaterials, thin film and soft matter and understand the basic concept in superconductivity.

Theory Credit: 03 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Dr. Sulochana Deb**, Gauhati University, debsulochana@gauhati.ac.in
2) **Dr. Lavita Sharma** Jagiroad College, lavitasarma02@gmail.com
3) **Dr. Shyamolima**, Darrang College, Shyamoli_ma@yahoo.co.in

Subject: Physics
Semester: Five

Course Name: Heat and Thermodynamics
Existing Base Syllabus: HS Physics, Chemistry.
Course Level: PHY303
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Distribution of Velocities and Molecular Collisions	Maxwell-Boltzmann Law of Distribution of Velocities in an Ideal Gas and its Experimental Verification. Mean, RMS and Most Probable Speeds. Degrees of Freedom. Law of Equipartition of Energy (No proof required). Mean Free Path. Collision Probability. Transport Phenomenon in Ideal Gases: (1) Viscosity, and (2) Thermal Conductivity. Brownian Motion (qualitative idea only).	9	Credit - 3
Unit II: Real Gases	Behavior of Real Gases: Deviations from the Ideal Gas Equation. The Virial Equation. Andrew's Experiments on CO_2 Gas. Critical Constants. Continuity of Liquid and Gaseous State. Vapor and Gas. Boyle Temperature. Van der Waal's Equation of State for Real Gases. Values of Critical Constants. Law of Corresponding States. Comparison with Experimental Curves. Joule- Thomson Porous Plug Experiment. Joule- Thomson Effect, Joule-Kelvin coefficient for Ideal and Van der Waal Gases. Temperature of Inversion.	8	
Unit III: Principles of Thermodynamics	Thermodynamic preliminaries: Extensive and intensive properties, Thermodynamic Variables, Thermodynamic Equilibrium, P-V indicator diagram. Work done in terms of P and V, Zeroth Law of Thermodynamics & Concept of Temperature, Internal energy and First Law of Thermodynamics, Applications	16	

	of First Law: General Relation between C_P and C_V. Reversible and Irreversible process with examples. Heat & work, state function, Conversion of heat into work and vice versa, Work Done during Isothermal and Adiabatic Processes, Heat Engines, 2nd Law of Thermodynamics: Kelvin-Planck and Clausius Statements and their Equivalence, Carnot's Cycle, Carnot engine & efficiency. Refrigerator & coefficient of performance, Carnot's Theorem. Applications of Second Law of Thermodynamics: Thermodynamic Scale of Temperature and its Equivalence to Perfect Gas Scale.		
Unit IV: Entropy	Concept of Entropy, Clausius Theorem. Clausius Inequality, Second Law of Thermodynamics in terms of Entropy. Entropy of a perfect gas. Entropy Changes in Reversible and Irreversible processes with examples. Entropy of the Universe. Entropy Changes in Reversible and Irreversible Processes. Principle of Increase of Entropy. Temperature–Entropy diagrams for Carnot's Cycle. Third Law of Thermodynamics.	6	
Unit V: Thermodynamic Potentials and Thermodynamic Relations (Lectures 06)	Thermodynamic Potentials: Internal Energy, Enthalpy, Helmholtz Free Energy, Gibb's Free Energy, Surface Films and Variation of Surface Tension with Temperature, Derivations and applications of Maxwell's Relations, Maxwell's Relations:(1) Clausius Clapeyron equation, (2) Values of Cp-Cv, (3) TdS Equations, (4) Energy equations, (5) Change of Temperature during Adiabatic Process.	6	
Laboratory			
	At least four from the following: 1. To determine mechanical equivalent of heat, J, by Callender and Barne's constant flow method 2. To determine the mechanical equivalent		Credit-1

	of heat, J using calorimeter 3. To determine specific heat of a liquid using calorimeter 4. To determine the coefficient of thermal conductivity of Cu by Searle's Apparatus. 5. To determine the coefficient of thermal conductivity of an insulator by Lee and Charlton's disc method. 6. To determine the temperature coefficient of resistance by Platinum Resistance Thermometer (PRT). 7. To study the variation of thermo-emf of a thermocouple with difference of temperature of its two junctions. 8. To determine the change of entropy of universe for an AC circuit consists of a thermally insulated resistor. 9. To calibrate a thermocouple to measure temperature in a specified range using (1) Null method, (2) Direct measurement using OPAMP and to determine neutral temperature.		

Reading list

1. Heat and Thermodynamics, M. Zemansky, R. Dittman, McGraw-Hill Education, 2017.
2. A Treatise on Heat, Meghnad Saha and B. N. Srivastava, Indian Press, 1973.
3. Thermal Physics: Kinetic Theory, Thermodynamics and Statistical Mechanics, S. C. Garg, R. M. Bansal and C. K. Ghosh, Tata McGraw Hill Education Pvt Ltd, 2013.
4. Thermodynamics, Kinetic Theory and Statistical Thermodynamics, F. W. Sears & G. L. Salinger, Narosa Publishing House, 1998.
5. Thermal and Statistical Physics, R. B. Singh, New Academic Science, 2011.
6. Theory and Experiment on Thermal physics, P K. Chakrabarti, New Central Book Agency (P) Ltd, 2011.

Graduate Attributes

i. Course Objective

- To understand principles of thermodynamics
- To provide concepts of thermodynamic functions
- To address the basic framework of kinetic theory of gases

ii. Learning outcome

Upon completion of this course, students will be able to learn thermal properties of gas molecules and their collisions. With this course, students will acquire knowledge of thermodynamics with practical insights into thermal physics, which will help them to understand real world situations.

Theory Credit: 03 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Dr. Bimal Kumar Sarma**, Gauhati University, bimal@gauhati.ac.in
2) **Dr. Krishna Kingkar Pathak** , Arya Bidyapeeth College, kkingkar@gmail.com
3) **Dr. Diganta Sarma**, B. Borooah College, sarma.diganta@gmail.com

Subject: Physics
Semester: Five
Course Name: Electromagnetic Theory
Existing Base Syllabus: HS Physics, Chemistry and Mathematics
Course Level: PHY304
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Maxwell's equations	Maxwell's equations, Displacement Current, Vector and Scaler Potentials, Gauge Transformations: Coulomb and Lorentz Gauge, Boundary Conditions at Interface between Different Media, Poynting Theorem and Poynting Vector.	9	Credit - 3
Unit II: EM Wave Propagation in Unbounded Media	Plane EM Waves through Vacuum and Isotropic Dielectric Medium, Transverse Nature of Plane EM Waves, Refractive Index and Dielectric Constant, Propagation though Conducting Media, Relaxation Time, Skin Depth. Wave Propagation through Dilute Plasma (Basic Concepts).	9	
Unit III: EM wave in Bounded Media	Reflection and Refraction of Plane EM Waves at Plane Interface between two Dielectric Media – Laws of Reflection and Refraction, Fresnel's Formula for Perpendicular Polarization Case, Brewster's Law, Reflection and Transmission Co-efficient, Waveguides: Basic Concepts and Propagation of EM Waves in a Rectangular Waveguide.	9	
Unit IV: Polarization of Electromagnetic Waves	Description of Linear, Circular and Elliptical Polarization, Propagation of EM Waves in Anisotropic Media, Symmetric Nature of Dielectric Tensor, Fresnel's Formula, Uniaxial and Biaxial Crystals, Light Propagation in Uniaxial Crystal, Double Refraction, Polarization by Double Refraction, Nicol Prism; Ordinary & Extraordinary Refractive Indices, Production & Detection of Plane, Circularly and Elliptically Polarized Light; Phase Retardation Plates: Quarter-Wave and Half-Wave Plates, Babinet	11	

	Compensator and its Uses, Analysis of Polarized Light.		
Unit V: Rotary Polarization	Optical Rotation. Biot's Laws for Rotatory Polarization, Fresnel's Theory of Optical Rotation, Calculation of Angle of Rotation, Experimental Verification of Fresnel's Theory, Specific rotation, Laurent's Half-shade Polarimeter.	4	
Unit VI: Optical Fibres	Numerical Aperture, Step and Graded Indices (Definitions Only), Single and Multiple Mode Fibres (Concept and Definition Only)	3	
Laboratory			
	At least four from the following: 1. To verify the law of Malus for plane polarised light. 2. To determine the specific rotation of sugar solution using Polarimeter. 3. To analyze elliptically polarised light by using Babinet's compensator. 4. To study dependence of radiation on angle for a simple Dipole antenna. 5. To determine the wavelength and velocity of ultrasonic waves in a liquid (Kerosene Oil, Xylene etc.) by studying the diffraction through ultrasonic grating. 6. To study the reflection and refraction of microwaves. 7. To study polarization and double slit interference in microwaves. 8. To determine the refractive index of liquid by total internal reflection using Wollaston's air-film. 9. To determine the refractive index of (1) glass and (2) a liquid by total internal reflection using a Gaussian eyepiece. 10. To study the polarisation of light by reflection and determine the polarizing angle for air-glass interface. 11. To verify the Stefan's law of radiation and to determine Stefan's constant. 12. To determine the Boltzmann constant using V-I characteristic of pn junction diode.		Credit-1

Reading list

1. Introduction to Electrodynamics, D. J. Griffiths.
2. Electromagnetics, B. B. Laud, New Age International Publishers.
3. Elements of Electromagnetics, M. N. O. Sadiku, 2001, Oxford University Press.
4. Introduction to Electromagnetic Theory, T. L. Chow, 2006, Jones & Bartlett Learning.
5. Feynman Lectures Vol. 2, R. P. Feynman, R. B. Leighton, M. Sands, 2008, Pearson Education.
6. Fundamentals of Electromagnetics, M. A. W. Miah, 1982, Tata McGraw Hill.
7. Electromagnetic Field Theory, R. S. Kshetrimayun, 2012, McGraw Hill.
8. Engineering Electromagnetic, Willian H. Hayt, 2012, McGraw Hill.
9. Electricity and Magnetism [With electromagnetic theory and special theory of relativity], D. Chattopadhyay and P. C. Rakshit, 2013, New Central Book Agency (P) Limited.

Graduate Attributes

i. Course Objective

- To lay the foundation of electromagnetism through Maxwell's equations.
- Behaviour of electromagnetic waves as it propagates through vacuum and other media.
- Various effects that occur as electromagnetic waves propagate from one medium to another medium.
- Basic concepts of waveguides and fibre optics.
- Various aspects of electromagnetic wave polarisation

ii. Learning outcome

After the successful completion of the course, students will acquire the concepts of Maxwell's equations, propagation of electromagnetic (EM) waves in different homogeneous-isotropic as well as anisotropic unbounded and bounded media, production and detection of different types of polarized EM waves, general information of waveguides and fibre optics.

Theory Credit: 03 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) Dr. Manos Pratim Chakrapani Kalita, Gauhati University, mpckalita@gauhati.ac.in
2) Dr. Rudra Kumar Das, Jagiroad College, das1.rudra@gmail.com
3) Dr. Arup Deka, Darrang College, arupkrdeka280@gmail.com

Subject: Physics
Semester: Six
Course Name: NUCLEAR & PARTICLE PHYSICS
Existing Base Syllabus: HS Physics, Chemistry and Mathematics
Course Level: PHY351
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Basic Properties of Nuclei	Constituents of a nucleus: proton-electron hypothesis -Thompson atom model, failure of proton-electron hypothesis, discovery of neutrons, Rutherford gold foil experiment (qualitative) and atom model- mass, radius, volume, matter density of nuclei and their units. Binding energy, binding energy per nucleon, stability of a nucleus- neutron to proton ratio, stability line, stability limit against beta decays.	8	Credit - 4
Unit II: Radioactivity and Radioactive Laws	Types of Radioactivity – alpha, beta, and gamma decay. Laws of radioactive decay, disintegration constant, half-life and mean life. Activity of a radioactive source, units of radioactivity. Alpha decay: range, ionization and stopping power, range-energy relation, Geiger-Nuttall law, Fine structure of alpha energy spectrum. Beta decays: types of beta decays, essential conditions of beta decays, beta ray spectra, end point energy, Pauli's neutrino hypothesis. Gamma decay: origin of gamma radiation, its property, attenuation of gamma radiation in matter	10	
Unit III: Nuclear Instrumentation	Detectors: Interaction of Radiation with Matter: Energy loss by a charged particle due to ionization (Bethe- Block formula), energy loss of electrons, Cerenkov radiation. Interaction of photon with matter – Photoelectric effect, Compton effect, and Pair production. Gas filled detectors: Ionization chamber,	10	

	proportional counter, and GM counter – construction and working principle. Charged particle accelerators: Need of charged particle accelerators, Linear accelerator (LINAC) – Construction and working principle.		
Unit IV: Fission and Fusion	Energy consideration in Nuclear Reaction, Mass defect and Q-value of a nuclear reaction, Einstein's mass-energy equivalence principle and generation of nuclear energy. Nuclear Fission: Spontaneous and induced fission – definition and examples, Fission chain reactions and nuclear reactor: peaceful use of fission energy. Fusion and thermonuclear reactions: Energy production in stars (brief qualitative discussions).	10	
Unit V: Elementary Particles	Classification of elementary particles and their quantum numbers, conservation laws, Allowed and forbidden reactions, Types of interactions – strong, electro-magnetic and weak interactions.	7	

Reading list

1. Basic ideas and concepts in Nuclear Physics: An introductory approach by K Heyde, third edition, IOP Publication, 1999. 87
2. Nuclear Physics by S N Ghoshal, First edition, S. Chand Publication, 2010.
3. Introductory Nuclear Physics by K S Krane, Wiley-India Publication, 2008.
4. Nuclear Physics: principles and applications by J Lilley, Wiley Publication, 2006.
5. Radiation detection and measurement, G F Knoll, John Wiley & Sons, 2010.
6. Schaum's Outline of Modern Physics, McGraw-Hill, 1999.
7. Concept of Modern Physics by Arthur Beiser, McGraw Hill Education, 2009.
8. Nuclear Radiation Detector by S S Kapoor and V S Ramamurthy , 1st edition, New Age international publisher.

Graduate Attributes

i. Course Objective

- basic knowledge about the nucleus and other subatomic particles and their properties.
- knowledge about the radioactive disintegration of a nucleus and the laws of radioactive decays
- Knowledge on basic nuclear instrumentation and experimental techniques of nuclear physics.
- Basic knowledge of particle physics.

ii. Learning outcome

On successful completion of the course, the students shall be able to understand the structure and properties of a nucleus. They will also know about the properties of strong nuclear force that keeps the nuclei bound. They will learn about the radioactive decays and various laws of radioactive disintegration. Students will have adequate knowledge on the construction and working principles of particle accelerators and detectors. Moreover, students will be introduced to the world of particle physics – types and interactions. The acquired knowledge can be applied in the areas of nuclear medicine, medical physics, archaeology, geology and other interdisciplinary fields of Physics and Chemistry. It will enhance the special skills required for these fields.

Theory Credit: 04 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) Prof. Buddhadeb Bhattacharjee, Gauhati University, buddha@gauhati.ac.in
2) Dr. Mausumi Bhuyan, Rangiya College, moubhuyan83@gmail.com
3) Dr. Krishna Kingkar Pathak, Arya Vidyapeeth College, kkingkar@gmail.com

Subject: Physics
Semester: Six
Course Name: Digital Electronics
Existing Base Syllabus: HS Physics, Chemistry and Mathematics
Course Level: PHY352
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Integrated Circuits (qualitative treatment only)	Active & Passive Components. Discrete components. Wafer. Chip. Advantages and drawbacks of ICs. The scale of integration: SSI, MSI, LSI, and VLSI (basic idea and definitions only). Classification of ICs. Examples of Linear and Digital ICs.	3	Credit - 3
Unit II: Digital Circuits	Difference between Analog and Digital Circuits. Binary Numbers. Decimal to Binary and Binary to Decimal Conversion. BCD, Octal, and Hexadecimal numbers. AND, OR, and NOT Gates (realization using Diodes and Transistor). NAND and NOR Gates as Universal Gates. XOR and XNOR Gates	10	
Unit III: Boolean Algebra	Unit III: (Lectures 10) De Morgan's Theorems. Boolean Laws. Simplification of Logic Circuit using Boolean Algebra. Fundamental Products. The idea of Minterms and Maxterms. Conversion of a Truth table into Equivalent Logic Circuit by (1) Sum of Products Method and (2) Karnaugh Map.	10	
Unit IV: Arithmetic Circuits	Binary Addition. Binary Subtraction using 2's Complement. Half and Full Adders. Half & Full Subtractors, 4-bit binary Adder/Subtractor.	5	
Unit V: Timers: IC 555	Timers: IC 555 (Lectures 03) Block diagram and applications: Astable multivibrator and Monostable multivibrator.	3	
Unit VI: Sequential Circuits	(Lectures 04) SR, D, and JK Flip-Flops. Clocked (Level and Edge Triggered) Flip-Flops. Preset and Clear operations. Race-around conditions in JK Flip-Flop. M/S JK Flip-Flop.	4	

Unit VII: Shift Registers	Serial-in-Serial-out. Serial-in-Parallel-out. Parallel-in-Serial-out and Parallel-in-Parallel-out Shift Registers (only up to 4 bits).	4	
Unit VIII: Computer Organization	Input/output Devices. Data storage (the idea of RAM and ROM). Computer memory. Memory organization & addressing.	6	
Laboratory			
	At least four from the following:		Credit 1
	1. To design a switch (NOT gate) using (i) a PNP transistor and (ii) an NPN transistor. 2. To verify and design AND, OR, NOT, and XOR gates using NAND gates. 3. To design a combinational logic system for a specified Truth Table. 4. To convert a Boolean expression into a logic circuit and design it using logic gate ICs. 5. To design a Half Adder and Full Adder 6. To design a 4-bit binary Adder. 7. To design Half Subtractor and Full Subtractor 8. To design Adder-Subtractor using Full Adder IC. 9. To design an astable multivibrator of given specifications using 555 Timer. 10. To design a monostable multivibrator of given specifications using 555 Timer. 11. To build a D flip-flop circuit using NAND gates. 12. To build a JK flip-flop circuit using NAND gates. 13. To build JK Master-slave flip-flop using flip-flop ICs. 14. To make a 4-bit Shift Register (serial and parallel) using D-type/JK Flip-Flop ICs. 15. To build SR flip-flop circuit using NAND gates		

Reading list

1. Digital Principles and Applications, A. P. Malvino, D. P. Leach and Saha, 7th Ed., 2011, Tata McGraw
2. Fundamentals of Digital Circuits, Anand Kumar, 2nd Edn, 2009, PHI Learning Pvt. Ltd.
3. Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.
4. Digital Electronics G. K. Kharate ,2010, Oxford University Press
5. Digital Systems: Principles & Applications, R. J. Tocci, N. S. Widmer, 2001, PHI Learning

6. Logic circuit design, Shimon P. Vingron, 2012, Springer.
7. Digital Electronics, Subrata Ghoshal, 2012, Cengage Learning.
8. Digital Electronics, S. K. Mandal, 2010, 1st edition, McGraw Hill
9. Electronics Fundamentals and Applications, D. Chattopadhyay and P. C. Rakshit, 17th Ed, 2023, New Age International Publisher

Graduate Attributes

i. Course Objective

- To introduce the students to the basics of digital electronics and applications with handson experience in implementing some hardware.
- To help students develop a digital logic and apply it to solve real-life problems
- To analyze, design and implement various combinational and sequential logic circuits
- To classify different semiconductor memories.

ii. Learning outcome

After successful completion of the course student will be able to develop, implement and analyze digital logic circuits and apply them to solve real-life problems and classify different semiconductor memories

Theory Credit: 04 (Three)

Practical Credit: 01 (One)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) Prof. Banty Tiru, Gauhati University, btiru@gauhati.ac.in
2) Dr. Shakeel Zaman, Handique Girls College, shakeelzamal@gmail.com
3) Dr. Sumanta Borthakur, B. Borooah College, bortmontu1@gmail.com

Subject: Physics
Semester: Six
Course Name: Astronomy and Astrophysics
Existing Base Syllabus: HS Physics, Chemistry and Mathematics
Course Level: PHY353
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit –I: Fundamentals of astronomy	Basic components of the universe – stars, planets and galaxies; celestial sphere and celestial coordinates system - altitude-azimuth (Alt-Az) and right ascension-declination (RA-DEC); Introduction to constellations through sky observation and Stellarium; concept of time – universal time, solar and mean solar time, sidereal time, local sidereal time, Julian day; flux and luminosity of celestial objects; stellar magnitude scale – apparent and absolute magnitude; measurement of stellar distances – trigonometric parallax; introduction to HIPPARCOS and GAIA.	8	Credit - 4
Unit- II: Astronomical techniques	Telescopes –size and light gathering power; resolving power; different types of optical telescopes (reflecting and refracting); space telescopes; concept of virtual observatory; virtual observatory tools in astronomy – SIMBAD, Aladin; SDSS, AAVSO, Sky-View; introduction to photometry; CCD –an introduction; spectroscopy and polarimetry.	7	
Unit – III: Stellar astrophysics	Star formation from interstellar medium (introduction only); properties of stars – mass, luminosity, radius and effective surface temperature; mass-luminosity, mass-radius and luminosity-radiustemperature relation; variable stars-cepheids; star clusters – open and globular, their ages (introduction only). Gravity and thermodynamics – hydrostatic equilibrium of stars; virial theorem; internal temperature and pressure of stars; spectral classification –	13	

	HR diagram; stellar evolution- idea of nucleosynthesis in main sequence phase- pp and CNO cycle; evolution of Sun-like stars off the main sequence -red giants and white dwarfs- Chandrasekhar mass limit (introduction only); evolution of massive stars – neutron stars and black holes (introduction only).		
Unit-IV: The solar system	(Lectures 5) The Sun; properties of photosphere, chromospheres and corona; Formation of the solar system – Kant-Laplace nebular hypothesis; asteroid belt and meteorites; Distances and atmospheres of planets; Pluto and dwarf planets; comets – Kuiper belt and Oort cloud; extra-solar planets – transit method of detection (introduction only).	5	
Unit- V: Galaxies and cosmology	(Lectures 12) The Milky Way-shape, size and its components; classification of galaxies –Hubble's tuning fork diagram; types – spirals, elliptical and lenticular; difference between spirals and ellipticals. Large scale structure of the universe – galaxies, clusters, superclusters, filaments, walls and voids; Cosmological Principle; Hubble's law; Newtonian cosmology and derivation of Friedman equation; closed and oscillating universe, flat and open universe; the Hot Big Bang model; Cosmic Microwave Background (CMB); steady state universe (introduction only); flat rotation curves in galaxies and evidence of dark matter; dark energy (introduction only).	12	

Reading list

1. Astrophysics for physicists, A. Rai Choudhuri, Cambridge University Press.
2. An introduction to the theory of stellar structure and evolution, D. Prialnik, Cambridge University Press.
3. Astrophysics- Stars and galaxies, K. D. Abhyankar, Tata McGraw Hill Pub.
4. Textbook of astronomy and astrophysics with elements of cosmology, V. B. Bhatia, Narosa Pub.
5. Astronomy Methods - A Physical Approach to Astronomical Observations, Hale Bradt, Cambridge University Press.
6. Introduction to astrophysics, H.L. Duorah and K. Duorah, Mani Manik Prakash (Guwahati) Digital Principles and Applications, A. P. Malvino, D. P. Leach and Saha, 7th Ed., 2011, Tata McGraw
7. The physical universe – An introduction to astronomy, F. H. Shu, University of Science Books.

8. The structure of the universe, J.V. Narlikar, Oxford University Press.
9. Introduction to cosmology, B. Ryden, Cambridge University Press

Graduate Attributes

i. Course Objective

- To introduce the students with fundamental concepts and observational techniques in astronomy including virtual observatory tools,
- to introduce them with physical processes occurring inside the celestial objects and
- to introduce the physical concepts required for the study of recent frontiers in astrophysics.

ii. Learning outcome

On successful completion of this course students will be able to understand the fundamental concepts in astronomy. They will be able to apply physics of celestial objects in understanding the universe. They will be equipped with the skills required for (i) observational astronomy (ii) virtual observatory tools and (iii) physical concepts of recent frontiers in astrophysics.

Theory Credit: 04 (Three)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) Dr. Biman Jyoti Medhi, Gauhati University, biman@gauhati.ac.in
2) Dr. Sanjeev Kalita, Gauhati University, sanjeev@gauhati.ac.in
3) Dr. Pratima Dutta, Dimoria College, pratimadta2019@gmail.com,

Subject: Physics
Semester: Six
Course Name: Statistical Mechanics
Existing Base Syllabus: HS Physics, Chemistry and Mathematics
Course Level: PHY354
Syllabus showing each unit against class number and marks

Unit no.	Unit content	No. of classes	Marks/Credit
Theory			
Unit I: Classical Statistics	Microstate and macrostate, distributions of particles in compartments, principle of equal a priori probability. Phase space, volume of phase space. Elementary concept of ensembles, Types of ensembles. Ergodic hypothesis. Entropy and thermodynamic probability, Stirling's approximation, Maxwell-Boltzmann distribution function, Partition functions. Gibbs Paradox, Sackur Tetrode equation, Law of Equipartition of Energy (with proof) — Applications to specific heat and its limitations. Thermodynamic parameters (internal energy, entropy, free energy, enthalpy) using partition functions.	15	Credit - 4
Unit II: Classical and Quantum Theory of Radiation	Properties of thermal radiation. Blackbody radiation. Spectral distribution of Blackbody radiation, Kirchhoff's law. Stefan-Boltzmann law: Thermodynamic proof. Radiation pressure (for Normal and diffused case). Wien's Displacement law. Wien's Distribution Law. Saha's ionization formula. Rayleigh-Jean's Law (with proof). Ultraviolet catastrophe. Need of quantum statistics. Planck's quantum postulates. Planck's law of blackbody radiation: Experimental verification. Deduction of (1) Wien's Distribution Law, (2) RayleighJeans Law, (3) Stefan- Boltzmann Law, (4) Wien's Displacement law from Planck's black body radiation formula	12	

Unit III: Bose-Einstein Statistics	Bose-Einstein (BE) distribution, Pressure of a Bose gas, Bose Einstein Condensation (qualitative description only), Properties of liquid Helium (qualitative discussion only), Radiation as a photon gas and Bose's derivation of Planck's blackbody radiation formula, Thermodynamic functions of photon gas – energy, entropy, and free energy	8	
Unit IV: Fermi-Dirac Statistics	Fermi-Dirac (FD) distribution, FD function and Fermi Energy, Degenerate Fermi gas, strongly degenerate case (qualitative discussion only), Thermodynamic functions - energy and pressure of a completely degenerate Fermi gas, Heat capacity at low temperature, Free electron gas in metals and electronic specific heat, Relativistic Fermi gas, thermodynamics of white dwarf star (qualitative discussion only).	10	

Reading list

1. Statistical Mechanics, R K Pathria and P D Beale, Elsevier Science, 2021.
2. Statistical Physics, F. Reif, McGraw-Hill Education India, 2008.
3. Statistical and Thermal Physics, S. Lokanathan and R. S. Gambhir, PHI Learning, 1991.
4. Modern Thermodynamics with Statistical Mechanics, Carl S. Helrich, Springer, 2009.
5. An Introduction to Statistical Mechanics & Thermodynamics, R. H. Swendsen, Oxford University Press, 2012.
6. A Primer of Statistical Mechanics, R. B. Singh, New Age International Publishers, 2006.

Graduate Attributes

i. Course Objective

- To provide basic concepts of statistical mechanics
- Describing various thermodynamical phenomena using probability theory
- To learn classical and quantum statistics

ii. Learning outcome

Upon completion of the course, students will get accustomed to the microscopic origin of thermodynamic processes. After successful completion of the course, students will be able to perceive classical and quantum pictures of physical and chemical events

Theory Credit: 04 (Three)

No. of Required Classes: 45

No. of Contact Classes: 45

No. of Non-Contact Classes:

Particulars of Course Designer (Name, Institution, email id):

1) **Dr. Bimal Kumar Sarma**, Gauhati University, bimal@gauhati.ac.in
2) **Dr. Krishna Kingkar Pathak** , Arya Bidyapeeth College, kkingkar@gmail.com
3) **Dr. Diganta Sarma**, B. Borooah College, sarma.diganta@gmail.com

TECHNOLOGY

SYLLABUS OF

Bachelor of Computer Application

PROGRAM

Department of Computer Science
Gauhati University

Program Structure

Semester	Paper Name	Course type	Credit
I	Computer Fundamentals	Compulsory	4 (3+1)
	Introduction to C-Programming	Compulsory	4 (3+1)
	Mathematics I	Compulsory	4
II	Data Structures & Algorithms Using C	Compulsory	4(3+1)
	Digital Logic Fundamentals	Compulsory	4
	Mathematics II	Compulsory	4
III	Computer Organization and Architecture	Compulsory	4
	System Software	Compulsory	4(3+1)
	Object Oriented Programming through C++	Compulsory	4(3+1)
IV	Database Management System	Compulsory	4(3+1)
	Operating system	Compulsory	4(3+1)
	Automata Theory and Languages	Compulsory	4
	Python Programming	Compulsory	4(3+1)
V	Software Engineering	Compulsory	4
	Web Technologies	Compulsory	4(3+1)
	Java Programming	Compulsory	4(3+1)
	Computer Networks	Compulsory	4(3+1)
VI	i) Computer Graphics	Elective I	4(3+1)
	ii) Information Security and Cyber Laws		4
	iii) Computer Oriented Numerical and Statistical Methods		4 (3+1)
	i) Artificial Intelligence	Elective II	4(3+1)
	ii) Advanced Web Programming		
	iii) Data Mining and Warehousing		
	i) Optimization Techniques	Elective III	4
	ii) Mobile Application Development		4(3+1)
	iii) Graph Theory		4
	Project		4

Computer Fundamentals

1. Learning Outcomes: After completing this course, students will know about fundamentals of Computer System and Software.

2. Prerequisites: NIL

3. Semester: 1

4. Course type: Compulsory

5. Course level: 100-199

6. Theory credit: 3

7. Practical credit: 1

8. Number of required hours:

    a) Theory: 45 hrs (45 classes)

    b) Practical: 30 hrs (15 classes)

    c) Non Contact: NIL

9. Reference books:

    (a) Fundamentals of Computers, E Balagurusamy, McGraw Hill Education

    (b) Fundamentals of Computers, V. Rajaraman, Neeharika Adabala, PHI Learning

    (c) Computer Fundamentals, Anita Goel, Pearson Education

10. Contents of Syllabus:

(a) Theory

Unit I: Introduction to Computers and number systems 7 hrs

Number system, decimal, binary, octal and hexadecimal number system, conversion among number systems, definition of computer, basic components of computer, bus, evolution of computers, Generations of computers, classification of computers, data representation in a computer, ASCII, Unicode

Unit II: Memory and storage devices 8 hrs

Memory, memory hierarchy, registers, general purpose and special purpose registers, primary and secondary memory, volatile and non volatile memory, semiconductor memory, SRAM and DRAM, Read Only Memory, magnetic storage devices, optical storage devices, solid state devices, flash memory, storage evaluation criteria

Unit III: Input devices 7 hrs

Input device, keyboard, keyboard layouts, pointing devices, mechanical and optical mouse, scanner, hand-held and flat-bed scanners, OMR, OCR, MICR, digital camera, touchpad, trackball, joystick, digitizer, digital microphone

Unit IV: Output devices 7 hrs

Monitor, LCD, LED, plasma monitor, printers, impact printers, non-impact printers, dot matrix printers, inkjet printers, laser printers, thermal printers, plotters, voice output systems, projector,

Unit V: Programming languages and Software 11 hrs

CPU, control unit, computer instruction, instruction set, instruction execution life cycle, program, programming languages, machine level language, assembly language, low level language, high level language, language translators, assembler, compiler, interpreter, algorithm, definition of pseudocode, flowchart, flowchart of algorithm to find maximum of n numbers, software, flowchart of algorithm to find minimum of n numbers, flowchart of algorithm to find average of n numbers, software, flowchart of algorithm to display first n terms of Fibonacci series, flowchart of algorithm to check whether a given number is prime, software, software, application software, examples of application software, system software, examples of system software, what is operating system, what is device driver, open source software, proprietory vs open source software, examples of proprietory and open source software

Unit VI: Computer Network and Internet 5 hrs

Computer network, network topologies, LAN and WAN, internet, ISP, services over internet, www, web server, web browser, HTML, HTML tags: <html>, <head>, <title>, <body>, <h1>, <h2>, <h3>, <h4>, <h5>, <h6>, <br>, <p>, <a>, <ul>, <ol>, <li>, <center>, <table>, <th>, <tr>, <td>, introduction to CSS, domain name, URL, DNS, E-mail, telnet, FTP

(b) Practical

(i) Using a word processing software such as Libreoffice Writer	2 classes
(ii) Using a spreadsheet software such as Libreoffice Calc	3 classes
(iii) Using a presentation software such as Loibreoffice Impress	2 classes
(iv) Using an image editing software such as GIMP	2 classes
(v) Using an audio editing software such as Audacity	2 classes
(vi) Using a video editing software such as Openshot	2 classes
(vii) Designing HTML webpages	2 classes

11. Particulars of course designer:

Name: Dr. Hasin A Ahmed
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Introduction to C-Programming

1. Learning Outcomes: At the end of the course, students will be able to:
    - (a) Understand the basics of C programming like data types and operators
    - (b) Understand and write program in C to implement conditions, loops, functions
    - (c) Work on arrays, strings and basic file operations

2. Prerequisites: NIL

3. Semester: 1

4. Course type: Compulsory

5. Course level: 100-199

6. Theory credit: 3

7. Practical credit: 1

8. Number of required hours:

    a) Theory: 45 hrs (45 classes)

    b) Practical: 30 hrs (15 classes)

    c) Non Contact: NIL

9. Reference books:

    (a) B.S. Gottfried, “Schaum's Outline of Theory and Problems of Programming with C”, Mcgraw-Hill, 2007.
    (b) B. Kernighan, D. Ritchie, “The C Programming Language”, Second Edition, Prentice Hall, 1988
    (c) E. Balaguruswami, “Programming in ANSI C”, 2nd Ed., Tata McGraw Hill, 2004.
    (d) P. Greg, D. Miller. “C Programming: Absolute Beginner's Guide”, 3rd ed. Que, 2016.

10. Detailed Syllabus:

A. Theory

Unit 1: Getting started with C programming (10 Lectures)

Introduction to programming languages- High-level vs low level languages, compiled vs interpreted languages. Structure of a C program. Introduction to Header files. Main function and a simple program execution. Compiling and executing a program. C tokens – keywords, identifiers, constants, operators. Statements and expressions in C. Basic data types in C - integers, floats, doubles, characters. Void. Size and range of values of data types. Variables. Constants – integer constant, real constant, character constant, string constant. Declaration and initialization of variables and constants. Assigning values to variables. Operators in C – binary and unary operators. Arithmetic, assignment, logical, comparison, bitwise and conditional operators. Order of precedence of operators. Associativity of operators. Input and output statements – getchar(), getc(), getch(), putchar(), putc(), puts(), scanf(), printf(), format specifiers. Typecasting.

Unit 2: Control Structures in C (9 Lectures)

Control Structures in C. Basic programming constructs- Sequence, selection and iteration. Conditional statements – if, else, switch case. Nested conditions. Loops – for loop, while loop, do-while loop. Using loop for counting iterations. Using while loop for indefinite iterations. Nested loops. Break and continue statements.

Unit 3: Arrays and Strings **(8 Lectures)**

Introduction to Arrays. Declaration and initialization of arrays. Accessing array elements. Multidimensional arrays. Introduction to Strings. Declaration and initialization of strings. String input and output in C.

Unit 4: Functions and Pointers **(9 Lectures)**

Introduction to Pointers. Pointer declaration and initialization. Pointers and addresses. Pointers and Arrays. Basic concept of dynamic memory allocation, malloc(), calloc(). Introduction to functions. Function declaration and definition. Return types of function. Function arguments. Function calling – call by value vs call by reference. Passing an array as argument to a function. Basic concept of recursion.

Unit 5: Introduction to Structures and Unions **(4 Lectures)**

Basic concept of Structures and Unions in C. Structure declaration and initialization. Union declaration and initialization. Difference between structures and unions.

Unit 6: File Processing in C **(5 Lectures)**

Basic concept of file handling. Opening and closing file using fopen() and fclose(). Binary vs text files. Reading and writing files – fgets(), fscanf(), fprintf(). Random access to files.

B. List of Practical

(This is a suggestive list only. Questions need not be restricted to this list. The practical are advised to be performed in Linux environment)

(a) Write a program in C to print “Hello World”
(b) Write a program to take input of two numbers and print their sum, product, difference.
(c) Write a program to find the smallest or greatest of three numbers given as input.
(d) Write a program to print the sum and product of digits of an integer.
(e) Write a program to take a number representing a month and print the name of the month using switch case.
(f) Write a program that calculates the grade of a student based on their marks in a subject using nested if-else statements. Also print the range of marks for each grade using switch case.
(g) Write a program to take a number as input and print all the even numbers up to that number using while and for loop.
(h) Write a program to ask the user for an input to stop a loop or continue repeating after printing the iteration count using a do-while loop.
(i) Write a program to find the maximum, minimum, sum and average of *n* numbers without using array.
(j) Write a program that takes two integers as input and finds their greatest common divisor (GCD) using nested while loops and if statements.
(k) Write a program that calculates the sum of the first *n* terms of the Fibonacci sequence, where *n* is entered by the user, using a for-loop.
(l) Write a program that takes an integer as input and checks if it is a prime number.

(m) Write a program that calculates the sum of the first *n* terms of an arithmetic series, where *n*, the first term and common difference of the series are entered by the user.

(n) Write a program to compute the sum of the first *n* terms of the following series

S =1-2+3-4+5……

(o) Write a program to create an array with inputs from the user and print the same.

(p) Write a program to perform following actions on an array entered by the user:

a) Print the even-valued elements
b) Print the odd-valued elements
c) Print the array in reverse order

(q) Write a program to take a matrix from the user and print the transpose of the same.

(r) Write a program to ask for the name of the user and print the same.

(s) Write a program to take a string of length more than 10 and find the number of vowels in the string. Also print the position of the vowels in the string.

(t) Write a program using pointers to copy a string to another string variable without using library function.

(u) Write a program that swaps two numbers using pointers.

(v) Write a program to calculate Factorial of a number (i) using recursion, (ii) using iteration

(w) Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.

(x) Write a program to find sum of n elements entered by the user. To write this program, allocate memory dynamically using malloc() / calloc() functions or new operator.

(y) Write a function to accept two arrays as argument and returns their sum as an array.

(z) Write a program to implement struct in C. Create a structure of Student with RNo, Name and other credentials with proper datatype and print the same.

(aa) Write a program to implement union in C. Create a structure of Person with Pid, Name and other credentials with proper datatype and print the same.

(bb) Write a C program that opens a file for reading and displays the contents of the file in binary mode and text mode.

(cc) Write a C program that opens a file for reading and displays the contents of the file line by line on the screen.

(dd) Write a C program that opens a file in append mode and allows the user to add text to the end of the file.

Particulars of course designer:

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Mathematics I

1. Learning Outcomes: After successful completion of this course, students will be able to:
    - (a) Learn the concepts of set, relation, and function from Computer Science point of view.
    - (b) Know how to view a table/database as an n-ary relation.
    - (c) Learn what a matrix is and relate it with arrays used in programming.
    - (d) Understand determinants and how determinants are used in solving simultaneous equations.
    - (e) Get familiar with statistical and probabilistic measures that are used in computation related software/packages.

2. Prerequisites: NIL

3. Semester: 1

4. Course type: Compulsory

5. Course level: 100-199

6. Theory credit: 4

7. Practical credit: 0

8. Number of required hours:

    a) Theory: 60 hrs (60 classes)

    b) Practical: NIL

    c) Non Contact: NIL

9. Reference books:
    - (a) Discrete Mathematics Structures with Applications to Computer Science, J. P. Tremblay and R. Manohar, Mc-Graw Hill.
    - (b) Discrete Mathematics, N. Ch.SN Iyengar, K.A. Venkatesh, V. M. Chandrasekaran, P. S. Arunachalam, Vikash Publishing House Pvt Ltd.
    - (c) Elements of Discrete Mathematics, C. L. Liu, Mc-Graw Hill International Ed.

10. Course Details:

UNIT I: Sets, Relations and Functions (16 Lectures)

Sets: definition of set, cardinality of sets, finite, countable and infinite sets. Operations on sets, Venn diagram. Principle of inclusion and exclusion and their applications on simple problems. Multisets.

Relations: Definition and properties of binary relations, closures of relations, equivalence relations, equivalence classes and partitions, n-ary relations and representation of n-ary relations as tables. Partial ordering relations and lattices,

Functions: Definition of function, one-to-one and onto, principles of mathematical induction. Concave and convex functions.

UNIT II: Matrices (15 Lectures)

Definition and different types (such as identity matrix, diagonal matrix etc) of matrices, row and column operations; vectors and matrices, Addition, subtraction and multiplication of matrices, Properties of matrix operations, Existence of additive and multiplicative identity and additive inverse of a matrix. Representing relations using matrices. Transpose of a matrix and its properties. Symmetric and skew symmetric matrices, Elementary transformation of a matrix, Invertible matrices.

UNIT III: Determinants (16 Lectures)

Determinant of a square matrix, minor, cofactor, Adjoint of a matrix and matrix inversion. Inverse of a matrix using elementary transformation. Rank of a matrix and determination of rank of a matrix. Eigen values and Eigen vectors of a matrix (Stressing on symmetric matrices), Cayley-Hamilton theorem – Cramer's rule, Consistency of a system of linear non-homogenous equations and existence of solutions (statement only), Simple problems, Solutions of simultaneous linear equations by Gaussian elimination method.

UNIT IV: Fundamentals of Statistics and Discrete Probability (13 Lectures)

Types of Data, Attributes and variables; Construction of Frequency, Cumulative frequency. Graphical representation of Frequency distribution: Histogram, Frequency Polygon, Frequency Curve and Cumulative Frequency curves (Ogive curves). Diagrammatic representations: Simple bar, Subdivided bar, Pie diagrams.

Measures of central tendency-Mean, Median and Mode. Measures of variation – Range, Interquartile range, Standard Deviation and Variance.

Sample space, events, random variables, basic probability. Conditional Probability and Bayes theorem.

Particulars of course designer:

Name: Prof. Anjana Kakoti Mahanta
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E-mail id : anjana@gauhati.ac.in

Data Structures & Algorithms Using C

1. Learning Outcomes: At the end of the course, students will be able to:
   (a) Understand and apply the fundamental data structures and algorithms – such as arrays, linked lists, stacks, queues, trees, sorting and searching algorithms using C programming language.
   (b) Analyze the time and space complexity of different algorithms and choose the appropriate algorithm for a given problem.
   (c) Develop efficient algorithms to solve various computational problems by utilizing data structures and algorithms covered in the course.

2. Prerequisites: NIL

3. Semester: 2

4. Course type: Compulsory

5. Course level: 100-199

6. Theory credit: 3

7. Practical credit: 1

8. Number of required hours:

   a) Theory: 45 hrs (45 classes)

   b) Practical: 30 hrs (15 classes)

   c) Non Contact: NIL

9. Reference books:
   (a) Weiss, Mark Allen. "Data Structures and Algorithm Analysis in C". 3rd ed., Pearson, 2012
   (b) Sedgewick, Robert. "Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms". 3rd ed., Addison-Wesley Professional, 2002.
   (c) Goodrich, Michael T., and Roberto Tamassia. "Data Structures and Algorithms in C". 2nd ed., Wiley, 2011.
   (d) Gilberg, Richard F., and Behrouz A. Forouzan. "Data Structures: A Pseudocode Approach with C". Narosa Publishing House, 2009.

10. Detailed Syllabus:

A. Theory

Unit 1: Data Structures Overview and Arrays (8 Lectures)

Concepts of Data Types, Abstract Data Type, Data Structure, Fundamental and Derived Data Types. Importance of data structures. Array as a data structure (characteristics, advantages, disadvantages). Representation of arrays – single and multidimensional. Address calculation of array element using column and row major ordering. Address translation functions for one & two dimensional arrays. Insertion and deletion in arrays. Use of arrays for large number representation.

Unit 2: Linked Lists (9 Lectures)

Initialization and implementation of structures. Structure and pointers. Self referential structure. Introduction to linked lists. Singly linked list, doubly linked list, circular linked list. Operations on lists – creation, insertion, deletion, traversal, merging and splitting. Array of structures and Structure of Arrays. Array of lists and List of lists.

Unit 3: Stacks and Queues (9 Lectures)

Definition of Stack and Queue. Representation of stacks and queues using arrays and linked lists. Stack operations – push, pop. Queue operation – enqueue, dequeue. Circular Queue, Priority Queue, Conversion of infix arithmetic expression containing arithmetic operators and parenthesis to postfix and prefix expression. Evaluation of postfix expression.

Unit 4: Binary Trees (8 Lectures)

Definition of Trees – General tree and Binary tree. Basic terminologies – parent, child, height, depth, leaf, node, internal nodes, external nodes. Brief concept of Forest, ordered trees, strictly binary tree, complete binary tree. Representation of trees using arrays and linked lists. Binary tree traversal methods – pre-order, in-order, post-order. Recursive and non-recursive algorithms for traversal methods. Binary search trees. Operation on BST – creation, insertion and deletion of a node. Definition and characteristics of threaded binary trees, multi-way search trees. Breadth First Search, Depth First Search. Min heap and Max heap.

Unit 5: Searching and Sorting (6 Lectures)

Linear and binary search. Indexed search. Hashing. Hash Functions – division method, mid square method, folding. Conflict resolution – linear and quadratic probe. Sorting algorithms – Insertion sort, Selection sort, Bubble sort, Merge sort, Quick sort, Counting sort, Heap sort. In-place sorting and stable sorting.

Unit 6: Analysis of Algorithm and Complexity (5 Lectures)

Complexity measures of an algorithm – Time and space complexity. Average case and worst case analysis. Asymptotic notation as a measure of algorithm complexity, O and θ notations. Analysis of sorting algorithms and Searching algorithms in terms of time and space complexity in best, average and worst case.

B. List of Practicals

(This is a suggestive list only. Questions need not be restricted to this list. The practical are advised to be performed in Linux environment using C programming language.)

(a) Write a program to declare an array and initialize the values according to the user. Now ask the user for a number n and return the n^{th} element from the array.

(b) Write a program to implement array initialized with the numbers divisible by three up to 30. Write a function which accepts the array and return the positions of the even numbers in the array.

(c) Implement linked list in a program by writing functions for the following:

   a. Create a singly linked list of n nodes
   b. Count the number of nodes in the list
   c. Print the values of all the nodes
   d. Add a node at first, last and k^{th} position in the linked list
   e. Delete a node from first, last and k^{th} position
   f. Search for an element in the list. If found, return the position of the node. If not found, return a negative value.

(d) Write a program to implement doubly linked list.

(e) Write a function to concatenate two linked lists.

(f) Write a program to take a number *k* and split the linked list after *k*th position.

(g) Write a program to merge two sorted linked lists.

(h) Write a program to implement list of lists.

(i) Write a program to implement stack using array. Use push and pop operations on the array representation of the stack. Check whether the stack is full or empty.

(j) Write a program to implement stack using linked list. Use push and pop operations on the stack by inserting nodes and deleting nodes from the linked list. Also check if the stack is full or empty.

(k) Write a program to evaluate a simple postfix expression using stack.

(l) Write a program to convert a decimal number into binary number using stack.

(m) Write a program to implement queue using array. Add new elements to the queue and remove elements from the queue represented by array. Check whether the queue is full or empty.

(n) Write a program to implement queue using linked list. Add new elements to the queue and remove elements from the queue represented by linked list. Also check whether the queue is full or empty.

(o) Implement binary search and linear search algorithms on arrays.

(p) Implement binary search tree using array by writing a program to:
  a. Create a binary search tree using array
  b. Print the prefix notation of the BST
  c. Print the infix notation of the BST
  d. Print the postfix notation of the BST
  e. Search for an element in the BST

(q) Implement binary search tree using linked list by writing a program to:
  a. Create a binary search tree using linked list
  b. Print the prefix notation of the BST
  c. Print the infix notation of the BST
  d. Print the postfix notation of the BST
  e. Search for an element in the BST

(r) Implement following sorting algorithms:
  a. Bubble sort
  b. Insertion sort
  c. Selection sort
  d. Counting sort

Particulars of course designer

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Digital Logic Fundamentals

1. Learning Outcomes: After completing this course, students will have grasp of fundamental concepts of digital logic that will make their base to understand the concepts of computer architecture and organization.

2. Prerequisites: NIL

3. Semester: 2

4. Course type: Compulsory

5. Course level: 100-199

6. Theory credit: 4

7. Practical credit: 0

8. Number of required hours:

    a) Theory: 60 hrs (60 classes)

    b) Practical: NIL

    c) Non Contact: NIL

9. Reference books:
    (a) Digital Logic and Computer Design, M. Morris Mano, Pearson India

    (b) Digital Logic and Computer Organization, V. Rajaraman, T. Radhakrishnan, PHI Learning

10. Contents of Syllabus:

Unit I: Introduction to Binary Number System 10 hrs

Binary numbers, number base conversions, octal and hexa decimal numbers, 1's complement and 2's complement, representation of signed binary number: 1's complement, 2's complement and signed magnitude, subtraction with complements, arithmetic addition and subtraction of signed binary numbers, binary codes: BCD, Excess-3, error detection code: parity bit, error correction code: Hamming code, gray code, ASCII, EBCDIC, binary logic, logic gates: AND, OR, inverter, buffer, NAND, NOR, XOR and equivalence

Unit II: Boolean Algebra, Logic Gates and Integrated Circuits 15 hrs

Definition of boolean algebra, two valued boolean algebra, duality principle, theorems and postulates of boolean algebra, precedence of boolean operators, boolean expression and Venn diagram, boolean functions and truth tables, complement of a boolean function, minterms and maxterms, canonical forms of a boolean function, sum of minterms and its short notation, product of maxterms and its short notation, conversion between canonical forms, standard form of a boolean function, digital logic gates, integrated circuits and levels of integration, digital logic families

Unit III: Simplification of Boolean Functions 10 hrs

Map minimization method, two variable map, three variable maps, four variable map, five variable map, NAND and NOR implementation of boolean functions, don't-care conditions, tabulation method

Unit IV: Combinational Circuits 12 hrs

Definition of combinational circuit, design procedure, half adder, full adder, half subtractor, full subtractor, BCD-to-Excess-3 code converter, encoders and decoders, multiplexers, ROM

Unit V: Sequential circuits 13 hrs

Flip flops, RS flip flop, D flip flop, JK flip flop, T flip flop, master slave flip flops and edge triggered flip flops, state table of a sequential circuit, state diagram, characteristic tables of flip flops, Mealy and Moore machine, flip flop excitation tables, design procedure of clocked sequential circuit, 3-bit binary counter, shift register, ripple counter, RAM

Particulars of course designer:

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Mathematics II

1. Learning Outcomes: After successful completion of this course, students will be able to:
    - i. Learn the basic concepts of limit, continuity and derivatives.
    - ii. Understand graphs and its different representations in Computers. How to model real life problems using graphs. Learn a few basic graph traversal algorithms.
    - iii. Understand the basic idea of counting and use it in counting under various constraints.
    - iv. Understand Mathematical Logic from algorithmic point of view.

2. Prerequisites: NIL

3. Semester: 2

4. Course type: Compulsory

5. Course level: 100-199

6. Theory credit: 4

7. Practical credit: 0

8. Number of required hours:

    a) Theory: 60 hrs (60 classes)

    b) Practical: NIL

    c) Non Contact: NIL

9. Reference books:
    - (a) Discrete Mathematics structures with applications to Computer Science, J. P. Tremblay and R. Manohar, Mc-Graw Hill.
    - (b) Discrete Mathematics, N. Ch.SN Iyengar, K.A. Venkatesh, V. M. Chandrasekaran, P. S. Arunachalam, Vikash Publishing House Pvt Ltd.
    - (c) Elements of Discrete Mathematics, C. L. Liu, Mc-Graw Hill International Ed.

10. Course Details:

UNIT I Calculus (15 Lectures)

Intuitive idea of limits and continuity. Limits of polynomials and rational functions. Derivatives, Algebra of derivative of a function, Derivative of polynomials and trigonometric functions. Roll's theorem, Lagrange's Mean Value theorem and Taylor's theorem. Meaning of the sign of derivative, indeterminate forms, maxima and minima (single variable only).

UNIT 1I: Graph theory (15 Lectures)

Basic Definition of graph, Directed, Undirected and Weighted Graphs. Representation of graphs in Computers – Adjacency Matrix and Adjacency Lists. Degree of vertices – indegree and outdegree. Paths, Cycles and Acyclic graphs. Simple operations on graphs and amount of computations required for each operation. Connected graph, Tree and Forest. Bipartite graph, Algorithms on graph traversals- Breadth first search, Depth first search.

UNIT III: Combinatorics (15 Lectures)

Basic of counting principles, principle of inclusion-exclusion, application of inclusion and exclusion, Pigeonhole principle, generalized Pigeonhole principle and its application, permutations and combinations, circular permutations, permutations with repetitions, combinations with repetitions, permutations of sets with indistinguishable objects.

UNIT IV: Mathematical Logic (15 Lectures)

Connectives, truth tables, Tautologies and Contradictions, Equivalence and Implications, NAND and NOR, Normal forms- CNF, DNF, Converting expressions to CNF and DNF, Theory of inference, Propositional Calculus, Predicate calculus (only introduction), predicates and quantifiers.

Particulars of course designer:

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Computer Organization and Architecture

1. **Learning Outcome:** Student will
   - be able to learn about the structure, function and characteristics of computer systems.
   - understand the design of the various functional units and components of computers.
   - identify the elements of modern instructions sets and their impact on processor design.
   - able to learn about the function of each element of a memory hierarchy.
   - able to learn about identify and compare different methods for computer I/O.
   - Student will able to learn about basics of assembly language.
2. **Prerequisite:** NIL
3. **Semester: 3**
4. **Course Type: Compulsory**
5. **Course Level: 200-299**
6. **Theory credit:** 4
7. **Practical credit:** 0
8. **Number of required hours:**
   (a) Theory: 60 hrs (60 classes)
   (b) Practical: NIL
   (c) Non Contact: NIL
9. **List of reference books:**
   a) M.Morris Mano, *Computer System Architecture*, PHI publication.
   b) Hamachar, Vranesic and Zaky, *Computer Architecture*.
   c) William Stallings, *Computer Organization and Architecture*; Pearson.
   d) Ramesh Gaonkar, *Microprocessor Architecture, Programming, and Applications with the 8085*, 5th Edition.

10. Detailed Syllabus:

UNIT 1: Introduction (4 Lectures)

Definitions of Computer Organization and Architecture, History of computer architecture, Basic functional blocks of a computer: CPU, memory, Input-output subsystems, Control unit, Types of register- general purpose registers, special purpose registers, index registers.

UNIT 2: Data Representation (8 Lectures)

Number system, Complements, Representation of signed numbers, Subtraction of unsigned numbers, Fixed-Point representation- Integer representation, Arithmetic addition, Arithmetic subtraction, Overflow, Decimal Fixed-Point representation, Floating-Point representation, Other Binary Codes- Gray Code etc.

UNIT 3: Register Transfer and Micro-operation (8 Lectures)

Introduction to Register Transfer Language, Register transfer, Bus and Memory transfers, Arithmetic micro-operation- Binary adder, Binary adder-subtractor, Binary incrementer, Arithmetic circuit, Logic micro-operation, Shift micro-operation, Arithmetic logic shift unit.

UNIT4: Processing Unit (10 Lectures)

Instruction codes, Computer registers, General register organization, Register stack, Memory stack, Computer instructions, Data path in a CPU, Operations of a control unit, Hardwired control unit, Micro-programmed control unit, Instruction cycle, Operands, Addressing modes, Instruction format- Three-address instructions, Two-address instructions, One-address instructions, Zero-address instructions, Data transfer and manipulation- Data transfer instructions, Data manipulation instructions, Arithmetic instructions, Logical and Bit manipulation instructions, Shift instructions, Program Control-Status bit conditions, Conditional branch instructions, Subroutine call and return, Instruction execution cycle, CISC and RISC architectures.

UNIT 5: Memory Organization (10 Lectures)

Semiconductor memories, Memory cells - SRAM and DRAM cells, Concept of hierarchical memory organization, Interleaved memories, Cache memory unit - Concept of cache memory, Mapping methods, Organization of a cache memory unit, Cache replacement policies, Write policy, Concept of virtual memory.

UNIT 6: I/O Organization (10 Lectures)

Access of I/O devices, I/O ports, I/O control mechanisms - Program controlled I/O, Interrupt driven I/O, DMA controlled I/O, Interrupts: Types of interrupts, Enabling and disabling interrupts, Handling interrupts.

UNIT 7: Basics of Microprocessor and Assembly Language (10 Lectures)

Introduction to microprocessors, 8085 Microprocessor and its operation, 8085 instruction sets, Addressing modes in 8085, Classifications of instructions and addressing mode, Assembly language programming basics, Assembling, Executing and debugging the programs, Developing counters and Time delay routines, Interfacing concepts.

Particulars of course designer:

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System Software

1. Learning Outcome: After completing this course, students will have understanding of various types of system software.

2. Prerequisites: NIL

3. Semester: 3

4. Course Type: Elective

5. Course Level: 200-299

6. Theory Credit: 3

7. Practical Credit: 1

8. No of Hours:

Theory: 45 hrs (45 classes)

Practical: 30 hrs (15 classes)

Non Contact: NIL

9. List of Books:

a) System Software : An Introduction to Systems Programming, Leland L. Beck, D. Manjula, Pearson

b) Systems Programming, Dhananjay Dhamdhere, McGraw Hill Education

10. Contents of Syllabus:
(a) Theory
Unit I: Introduction to Operating System 10 hours
Types of software, Application software and system software, examples of system software, system programming, system software and machine architecture, the simplified instructional computer (SIC): *memory, registers, data formats, instruction formats, addressing modes, instruction set, input and output,* programming examples in SIC

Unit II: Assemblers 12 hours
Assembler definition, basic assembler functions, assembler algorithm and data structure, handling instruction formats and addressing modes, program relocation, handling literals, symbol defining statements, expressions, assembler design options: one pass assemblers and multi pass assemblers, introduction to NASM assembler

Unit III: Loaders and Linkers 7 hours
Loading, relocation and linking, loader, absolute loader, bootstrap loader, relocating loader, program linking, linking loader, linkage editor, static and dynamic linking

Unit IV: Macro processor 6 hours
Definition of macro processor, macro definition and expansion, macro processor algorithm and data structures, conditional macro expansion, general purpose macro processors, macro processing within language translators

Unit V: Compilers 10 hours
Compiler definition, grammars, lexical analysis, syntactic analysis, operator precedence parsing, recursive descent parsing, code generation, intermediate form, code optimization: machine

dependent and machine independent, interpreter

(b) Practical

1) Introduction to NASM assembler (1 class/2 hrs)
2) Introduction to segments and registers (1 class/2 hrs)
3) A simple assembly program to print hello (1 class/2 hrs)
4) Input and output in assembly language (1 class/2 hrs)
5) Conditional statements in assembly language (2 classes/4 hrs)
6) Looping in assembly language (3 classes/6 hrs)
7) An assembly language program that accepts two numbers from the user and displays sum of the numbers (1 class/2 hrs)
8) An assembly language program that changes case of accepted characters (1 class/2 hrs)
9) An assembly program that accepts a number and displays whether the number is odd or even (1 class/2 hrs)
10) An assembly program that accepts a number n from the user and displays "hello world" n number of times. (1 class/2 hrs)
11) An assembly program that accepts a number from the user and displays factorial of the number (1 class/2 hrs)
12) An assembly program that accepts a number n from the user and displays whether the number is prime (1 class/2 hrs)

Particulars of course designer:

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Object Oriented Programming through C++

1. **Learning Outcome:** After successful completion of this course, students will be able to:
   - Will be able to imagine real-life concepts as objects; derive their properties and functions to operate.
   - Develop programs using object- oriented features like data abstraction, polymorphism, inheritance, exception handling.
   - Know C++ streams, operators
   - Know file handling techniques in C++.

2. **Prerequisite:** NIL
3. **Semester: 3**
4. **Course Type: Compulsory**
5. **Course Level: 200-299**
6. **Theory credit:** 3
7. **Practical credit:** 1
8. **Number of required hours:**
   1. Theory: 45 hrs (45 classes)
   2. Practical: 30 hrs (15 classes)
   3. Non Contact: NIL
9. **List of reference books:**
   a) M. T. Somashekara, D. S. Guru et-al; *Object-Oriented Programming with C++,* 2nd Edition, PHI,2012.
   b) Bjarne Stroustrup, *The C++ Programming Language*, Special Edition, Pearson Education, 2004.
   c) Deitel&Deitel, *C++ How to program*, Pearson Education Asia, 6th Edition, 2008
   d) Schildt Herbert, *The Complete Reference C++,* Tata McGraw Hill, 4th Edition, 2003.

10. Detailed Syllabus:

a) Theory Content

UNIT 1: Introduction to object oriented programming (10 Lectures)

Origins of C++, Basic Concepts of Object Oriented Programming, Benefits of OOP, Applications of OOP, Introduction to C++, Structure of a Simple C++ program, Output operator, Input operator, Cascading of I/O operators, Tokens- keyword, identifiers, constants, strings and operators. Basic data types, User defined data types, Dynamic initialization of variables, Reference variables, Operators in C++, Scope resolution operator &applications, Member dereferencing operators, Memory Management operators, new and delete, Control Structures-simple if, if else, nested if, switch, while do, break and continue statements, Introduction to Functions-Function Prototyping, Call by reference, Return by reference, Inline functions, Default arguments, Constant arguments.

UNIT 2: Classes and objects (10 Lectures)

Introduction - Defining a class-Class Vs structures, Creating objects, Accessing class members, Defining member functions- Outside the class definition, Inside the class definition, Outside functions as inline, Nesting of member functions, Private member functions, Memory allocation for objects, Array-Declaring an array-accessing elements of an array, Array of objects, Friendly functions, Constructors and destructors, Basic Concepts of constructors, Default constructor, Parameterized constructor, Multiple constructors in a class, Constructor with default arguments, Dynamic initialization of objects, Copy constructor, Dynamic constructors, Destructors\

UNIT 3: Function and operator overloading **(9 Lectures)**

Overloading Concepts Function Overloading: Functions with different sets of parameters, default andconstant parameters, Rules for overloading operators. Defining operator overloading, OverloadingUnary operators, Prefix and Postfix operators overloading, Overloading Binary operators, overloadingrelational operators, Overloading using friend functions, Overloading subscript operator, Pitfalls ofoperator overloading, Type conversion-Basic to Class, Class to Basic

UNIT 4: Inheritance **(8 Lectures)**

Introduction-Defining derived classes, Types of inheritances. Making a private member inheritable, multilevel inheritance, multiple inheritance, Hierarchical inheritance, Hybrid inheritance, Virtual base classes, Abstract classes, Constructors in derived classes, nesting of classes, polymorphism-Compile time and Runtimepolymorphism, Pointers to objects, this pointer, Pointer to derived classes, Virtual functions, Rules forvirtual functions, Pure virtual functions.

UNIT 5: Streams **(4 Lectures)**

C++ stream classes-put() and get() functions, getline() and write() functions, Overloading << and >>operators, Formatted Console I/O operations, ios class functions-width(),precision(),fill(),setf() andunsetf(), Formatting flags, Manipulators, User defined manipulators.

UNIT 6: Files **(4 Lectures)**

Introduction-Stream classes for files, Opening files using constructor, Opening files using open(), Filemodes, Detecting end of file-eof(), Sequential input and output-put() and get()-Reading and writingobjects-read() and write()-Random Access files-Manipulating file.

b) Practical / Lab work to be performed

1. Define a class named *triangle* to represent a triangle using the lengths of the three sides. Write a constructor to initialize objects of this class, given the lengths of the sides. Also write member functions to check
   (a) if a triangle is isosceles
   (b) if a triangle is equilateral
   Write a main function to test your functions.
2. Define a structure *employee* with the following specifications.
   empno: integer
   ename: 20 characters
   basic, hra, da : float
   calculate() : a function to compute net pay as basic+hra+da with float return type.
   getdata() : a function to read values for empno, ename, basic, hra, da.
   dispdata() : a function to display all the data on the screen
   Write a main program to test the program.
3. Define a class *circle* to represent circles. Add a data member *radius* to store the radius of a circle. Write member functions area() and perimeter() to compute the area and perimeter of a circle.
4. Define a class *complex* with two data members *real* and *imag*to represent real and imaginary parts of a complex number. Write member functions

rpart() : to return the real part of a complex number
ipart() : to return the imaginary part of a complex number
add() : to add two complex numbers.
mul() : to multiply two complex numbers.
Write constructors with zero, one and two arguments to initialize objects. (*This is an example of polymorphism.*)

5. Define a class *point* with two data members *xordinate*and *yordinate*to represent all points in the two dimensional plane by storing their x co-ordinate and y co-ordinate values. Write member functions
dist(): to return the distance of the point from the origin.
slope(): to return the slope of the line obtained by joining this point with the origin.
Write constructors with zero, one and two arguments to initialize objects. Also write a friend function to compute the distance between two points.

6. Define a class *string* with the following data members char *p; int size; and write member functions to do the following (without using library function) and using dynamic memory allocation.

- Length of the string
- Compare two strings
- Copy one string to another
- Reverse the string

Write suitable constructors and destructors. Also write a copy constructor for the class.

7. For the class *complex* defined in 4 above, overload the <<, >>, + and * operators in the usual sense. Also overload the unary – operator.

8. For the class *string* defined in 6 above, overload the <<, >> and + operators where + is to be used for concatenating two strings.

9. Define a class *time* to store time as hour, minute and second, all being integer values. Write member functions to display time in standard formats. Also overload the ++ and – operators to increase and decrease a given time by one second where the minute and hour values will have to be updated whenever necessary.

10. Define a class to store matrices. Write suitable friend functions to add and multiply two matrices.

11. Write a class-based program implementing static members.

12. Define a class *student* with the following specification:
rollno : integer sname : 20 characters
Derive two classes *artst*and *scst*. The class *artst*will represent students belonging to arts streamand the class scst will represent students belonging to science stream. The artsst class will have additional data members *ph, hs, en*and as to store marks obtained by a student in three subjects Philosophy, History, English and Assamese. The class *scst*will have additional data members*ph, ch, ma and en*to store marks obtained in Physics, Chemistry, Mathematics and English.
Write the following member functions in the classes artst and scst
ctotal() : a function to calculate the total marks obtained by a student
takedata() : function to accept values of the data members
showdata(): function to display the marks sheet of a student .

13. Define an abstract base class *printer*. Derive three classes *laser-printer, line-printer* and *inkjet-printer*. The derived classes will have data members to store the features of that articular printer. Write pure virtual function display() in the base class and redefine it in the derived classes.

14. Define a abstract base class *figure* and add to it pure virtual functions. Derive three classes *circle, rectangle* and t*riangle* from it. A circle is to be represented by itsradius, rectangle by its length and breadth and triangle by the lengths of its sides. Write amain function and write necessary statements to achieve run time polymorphism.\

15. Write an interactive program to compute square root of a number. The input value must be tested for validity. If it is negative, the user defined function *my_sqrt()* should raise an exception.
16. Define a class *rational* to store rational numbers as a pair of integers, representing the numerator and denominator. Write a member function for setting the values of the numerator and denominator. This function should raise an exception if attempt is made to set a zero value as the denominator and in such cases it should be set to 1.
17. Write a class template for storing an array of elements. Overload the << and >> operators. Write a member function to sort the array in descending order.
18. Write a class template for representing a singly linked list. Write functions for inserting, deleting, searching and for displaying a linked list. Write a main function to test it on a linked-list of integers and characters.

Particulars of course designer:

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Database Management System

1. **Learning Outcome:** On successful completion of this course, the student should be able to:
    a. Learn database concepts and its architectural components.
    b. Describe different data models used for designing a database.
    c. To create a database using relational models and entity relationships concepts
    d. Normalize a database into various normal forms
    e. Design SQL queries to handle a relational database.
2. **Prerequisite:** NIL
3. **Semester: 4**
4. **Course Type: Compulsory**
5. **Course Level: 200-299**
6. **Theory Credit:** 3
7. **Practical Credit:** 1
8. **Number of required hours:**
    a. Theory: 45 hrs (45 classes)
    b. Practical: 30 hrs (15 classes)
    c. Non Contact: NIL

9. **List of reference books:**
    a. Dr. Satinder Bal Gupta and Aditya Mittal, *Introduction to Database Management System¸* University Science Press
    b. A. Silberschatz, H.F. Korth, S. Sudarshan, *Database System Concepts*, McGraw Hill
    c. R. Elmasri, S.B. Navathe, *Fundamentals of Database Systems*, Pearson Education
    d. Dr. Rajive Chopra, *Database Management System (DBMS): A Practical Approach*, S. Chand Publication

10. **Detailed Syllabus:**

A. Theory

UNIT-1:Introduction to Database Management Systems (5 Lectures)

Basic Definition and Concepts: *Data, Information, Meta Data, Data Dictionary, Database, Fields*, *Records* and *Files*. Definition of Database Management System (DBMS), Primary Functions of DBMS, Traditional File approach, Traditional file approach versus database management system approach, Disadvantages of Traditional File System, Need of a DBMS, Components of a DBMS, Advantages of DBMS, Disadvantages of Database Systems, Various uses of database System Applications, Database Users: *End users or naive users*, *Onlineusers*, *ApplicationProgrammers*, *DatabaseAdministrator*(*DBA*), Responsibilities of DBA.

UNIT 2: Database Management System Architecture (6 Lectures)

Definition of *Schemas*, *sub-schema* and *Instances*. Data Independence: *Physical Data Independence* and *Logical data Independence*. Three-tier architecture of DBMS, Advantages of three-level Architecture, basic concept of data model, Characteristics of Data Models, Types of Data models: *Record Based Data Models*, *Object Based Data Model* and *Physical Data Models*. Relational Data Model, Types of database Systems: *Single-user* database systems, *Multiuser* database systems, *Centralized* database systems, *Distributed* database systems and *Client/Server* database systems.

UNIT 3: E-R Modeling (8 Lectures)

Basic Concepts: *Entity*, *Attributes*, *Entity Sets*, *Domain*. Types of attributes: *Simple and Composite Attributes*, *Single Valued and Multi-valued Attributes*, *Derived Attributes and Stored Attributes*. Types Of Entity Sets*:Strong Entity Sets* and *Weak Entity Sets.* Concept of Relationship and Relationship sets, Types of Relationship: One-to-One, One-to-Many, Many-to-One and Many-to Many, Various Symbols used in ER Diagram, Mapping constraints: *MappingCardinalities(Cardinality Ratios)* and *ParticipationConstraints*. Definition of Key, Types of Keys: *SuperKey*, *Candidate Key, Primary Key, Alternate Key* and *Foreign Key*. Symbols used in E-R diagrams, Conversion of an ER and Diagram in to Relational Tables

UNIT 4: Relational Model and Relational Algebra(7 Lectures)

Definition of Relation, Data Structure of Relational Database: *Relation*, *Tuples*, *Attributes Domain, Degree* and *Cardinality.*Integrity Constraints, Domain Constraints, Key Constraints, Advantages and Disadvantages of Relational Model, Relational, Definition of Relational algebra, Operations in Relational Algebra: *Selection*, *Projection, Division, Rename, Union, Intersection, Set Difference, Natural-join operation, Outer join, Inner Join, Cartesian Product* and *Assignment operation*. Aggregate Functions and Operations: *Average, Maximum, Minimum, Sum* and *Count*.

UNIT 5: Functional Dependency and Normalization(8 Lectures)

Definition of Functional Dependency, Armstrong's Axioms in Functional Dependency, Types of Functional Dependency: *Partial Dependency, Full Functional Dependency, Transitive and Non-transitive Functional Dependency*,Armstrong's Axiom, Closure of a set of Functional Dependency, Closure of an Attribute,Definition of Canonical Cover, Algorithmto find the canonical cover of a FD set, Anomalies in relational database*: Insertion*, *Deletion* and *Update* anomalies, Concepts of Normalization, Benefits of Normalization, Types of Normal Forms: First Normal Form (1NF), Second Normal Form (2NF), Third Normal Form (3NF) and Boyce–Codd Normal Form (BCNF)

UNIT 6: Transaction and Concurrency Control (4 Lectures)

Definition of Transaction, ACID Properties of transaction, Transaction States, Definition of Concurrency Control, Need of Concurrency Control, The Lost Update Problem, The Uncommitted Dependency Problem, The Inconsistent Analysis Problem, Serializability: *View Serializability* and *Conflict Serializability*

UNIT 7: SQL Queries (7 Lectures)

Database Languages (Data Definition Languages, Data Manipulation Languages), Characteristics of SQL, Basic data types in SQL, Data-definition language (DDL) commands: *Create Database, Create Table*, *Drop Table*, *Alter Table*. SQL Constraints: *Primary Key, Foreign Key, Not Null, Unique, Check, Defaul,.*Data Manipulation Language (DML) commands: *Insert Into*, Delete, *Select*, *Update*. SQL clauses: *Where, Order By,* *Having, Group By* and *Like*. SQL join operations: *Inner Join, Left Outer Join, Right Outer Join* and *Full Join*. SQL aggregate functions: *sum(), count(), max(), min()* and *avg()*

B. Lab Contents: (30 hrs)

Practical / Lab work to be performed:

a) Implementation of SQL DDL statements in MySQL DBMS: CREATE DATABASE, CREATE TABLE, ALTER TABLE, RENAME, DROP DATABASE/TABLE

b) Use of SQL DML statements in MySQL DBMS: INSERT, SELECT, UPDATE, DELETE SQL commands

c) Implementing following constraints in MySQL DBMS: PRIMARY KEY, FOREIGN KEY, NOT NULL, UNIQUE and DEFAULT

d) Handling following SQL clauses in MySQL DBMS: WHERE, GROUP BY, ORDER BY, HAVING, IN, BETWEEN, LIKE

e) Working with following aggregate functions in MySQL DBMS: COUNT, AVG, MAX, MIN and SUM

f) Working with transaction processing command in MySQL DBMS: START TRANSACTION, COMMIT and ROLLBACK Statements, SET autocommit

Particulars of course designer:

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Operating system

1. **Learning Outcome:** After completing this course, students will have understanding of the internal structure and usage of various components related to an operating system.
2. **Prerequisite:** NIL
3. **Semester: 4**
4. **Course Type: Compulsory**
5. **Course Level: 200-299**
6. **Theory credit:** 3
7. **Practical credit:** 1
8. **Number of required hours:**

   Theory: 45 hrs (45 classes)
   Practical: 30 hrs (15 classes)
   Non Contact: NIL
9. **List of books:**

   a) Operating System Concepts, Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Wiley

   b) Modern Operating Systems, Andrew S. Tanenbaum, Prentice-Hall Of India Pvt. Limited

10. Detailed Syllabus:

A. Theory

Unit I: Introduction **7 hrs**

Application vs system software, operating system as system software, operating structure structure, types of operating systems: batch operating system, multiprogramming operating system, multi tasking operating system, distributed operating system, real time operating system, multi user operating system, major functions of operating system: Process Management, Process Synchronization, Memory Management, CPU Scheduling, File Management, I/O Management, Security, virtualization, cloud computing, open source operating system, history of operating system, the shell, system call, system boot

Unit II: Process and threads **10 hrs**

Process, process states: new, running, waiting, ready and terminated, Process Control Block (PCB), information stored in PCB, scheduling queue: job queue, ready queue and device queue, schedulers: long term schedulers, medium term scheduler and long term scheduler, swapping, degree of multiprogramming, I/O-bound and CPU-bound processes, context switching, inter-process communication: shared memory systems and message passing systems, socket, remote procedure call, threads, user threads, kernel threads, multi threading models: Many-to-One Model, One-to-One Model, Many-to-Many Model, CPU scheduling, Scheduling Criteria, scheduling algorithms: First-Come, First-Served Scheduling, Shortest-Job-First Scheduling, Priority Scheduling, Round-Robin Scheduling, Multilevel Queue Scheduling, Multilevel Feedback Queue Scheduling

Unit III: Process synchronization **8 hrs**

Race condition, critical section problem, Peterson's algorithm, Bakery algorithm, synchronization hardware: locking, synchronization software tools: mutex lock, semaphore (counting and binary), semaphore implementation, classic synchronization problems: bounded buffer problem, the readers –writers Problem, the dining-philosophers problem, monitor, synchronization in windows, synchronization in linux

Unit IV: Deadlock **10 hrs**

Deadlock, operations of a process performs while using a resource: Request. Use and Release, physical and logical resources, Necessary conditions: mutual exclusion, hold & wait, no preemption and circular wait, resource allocation graph, deadlock prevention: definition, preventing mutual exclusion, preventing hold & wait, preventing no preemption and preventing circular wait, deadlock avoidance: definition, safe state, safe sequence, resource allocation graph based algorithm and Banker's algorithm, deadlock detection: definition, wait-for graph, algorithm to detect deadlock for single instance resources, algorithm to detect deadlock for multiple instance resources and recovery from deadlock: process termination and resource preemption

Unit V: Memory Management **10 hrs**

Memory hierarchy, base register, limit register, address binding, logical and physical address spaces, memory management unit, relocation register, swapping, contiguous memory allocation: definition, memory protection, fixed partition scheme, variable partition scheme, first-fit, best-fit & worst-fit allocation strategies, non-contiguous memory allocation: simple paging and simple segmentation, internal and external fragmentation, TLB, virtual memory, demand paging, page fault, locality of reference principle, performance of demand paging, page replacement algorithms: FIFO, Optimal and LRU, allocation of frames: equal allocation and proportional allocation, global and local page replacement algorithms, thrashing

B. Practical

- **Basic linux commands**: pwd, ls, cd, mkdir, rmdir, rm, touch, man, cp, mv, locate, head, tail (***2 Classes/4 hrs***)
- **Advanced commands:** echo, cat, sudo, df, tar, apt-get, chmod, hostname, useradd, passwd, groupadd, grep, sed, uniq, wc, od, gzip, gunzip, find, date, cal, clear, top, ps, kill (***3 Classes/6 hrs***)
- **Shell scripting in linux:** shell, types of shell, shell script, echo command, shell variables, special variables ($$, $0, $n, $#, $?, $!), array, assignment operator (=), equality operator (==), not equality operator (!=), arithmetic operators (+,-, *, /, %), comparison operators (-eq, -neq, -gt, -lt, -ge, -le), logical operators (!,-o, -a), if...else statement, case...esac statement, while loop, for loop, break statement, continue statement, shell functions (***7 Classes/14 hrs***)
- **Using system calls in C program in linux**: fork(), exec(), exit(), getpid(), mkdir(), rmdir() etc. (***3 Classes/6 hrs***)

Particulars of course designer:

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Automata Theory and Languages

1. Learning Outcome: After completing this course, students will

- Understand the Mathematical model of a finite state machine. Know deterministic and non-deterministic versions of Finite automata.
- Grasp the mathematical concepts of languages and grammar.
- Know Pushdown Automata and the associated grammar/language.
- Know the properties of Regular languages and Context free languages.

2. Prerequisites: NIL
3. Semester: 4
4. Course Type: Compulsory
5. Course Level: 200-299
6. Theory Credit: 4
7. Practical Credit: 0
8. No of Hours:
a) Theory: 60 hrs (60 classes)
b) Practical: NIL
c) Non Contact: NIL

9. List of Books:

a) *An introduction to Formal Languages and Automata*, Peter Linz,Narosa.
b) *Introduction to Automata Theory, Languages and Computation*, Hopcroft, Motwani and Ullman, Pearson.
c) Theory of Computer Science (Automata, Languages and Computation), K. L. P. Mishra, N. Chandrasekaran; P. H.I.

10. Contents of Syllabus:

UNIT 1: Finite Automata (10 Lectures)
DFA, NFA, NFA with empty-moves, Equivalence of DFA and NFA, Reduction of the number of states in finite automata.

UNIT 2: Regular Languages and Regular Grammar (12 Lectures)
Concept of languages and grammar, Regular expressions, Connection between regular expressions and regular languages, Regular grammars, Right and Left-Linear Grammars, Equivalence between Regularlanguages and Regular grammars.

UNIT 3: Properties of Regular Languages (13 Lectures)
Closure under simple set operations- union, intersection, concatenation, complementation and star closure, Decision algorithms for emptiness, finiteness and infiniteness, equality, Proof of non-regularity using Pigeonhole principle and using pumping lemma for regular languages.

UNIT 4: Context Free languages (15 Lectures)
Context-free grammars, leftmost and rightmost derivations, derivation trees, Parsing and Ambiguity ingrammars and languages, Simplification of Context free Grammars- removing useless productions,empty-productions and unit-productions. Normal forms- Chomsky and Greibach normal forms, Pumping Lemma for CFL, Using Pumping Lemma to show that certain languages are not Context free

UNIT 5: Pushdown Automata (10 Lectures)
Definition and language accepted (acceptance by empty stack and final state and their equivalence), Pushdown Automata and Context free languages. Deterministic PDA and Deterministic Context free Languages.

Particulars of course designer:

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Python Programming

1. Learning Outcome: After completing this course, students will know about fundamentals of Python Programming and Problem Solving.

2. Prerequisites: NIL

3. Semester: 4

4. Course Type: Compulsory

5. Course Level: 200-299

6. Theory Credit: 3

7. Practical Credit: 1

8. No of Hours:

- Theory: 45 hrs (45 classes)
- Practical: 30 hrs (15 classes)
- Non Contact: NIL

9. List of Reference Books and Materials:

(a) Core Python Programming, R. Nageswara Rao, Dreamtech Press.

(b) Python: The Complete Reference, Martin C. Brown, McGraw Hill Education.

(c) http://docs.python.org/3/tutorial/index.html

10. Contents of Syllabus:

(a) Theory

Unit 1: Introduction to Python Programming (8 hrs)

Introduction, Installation of Python Interpreter, Python Shell, Code Indentation, Identifiers and Keywords, Literals, Strings, Operators (Arithmetic, Relational, Logical, Assignment, Ternary, Bitwise, Increment and Decrement Operators), Input and output statements, Output Formatting.

Unit 2: Control Statements and Functions (8 hrs)

Branching, Looping, Conditional Statement, Exit Functions, Break, Continue, Pass, Defining Functions, Default Arguments. Scope of Functions, Function Documentation, Lambda Functions & Map.

Unit 3: Python Data Structures (6 hrs)

List (List, Nested List, List as Matrix), Tuple, Set, Dictionary.

Unit 4: Exception Handing (4 hrs)

Errors, Exception Handling with try, Multiple Exception Handling, Writing own Exception.

Unit 5: File Handling (6 hrs)

Understanding read function, read(), readline() and readlines(), Understanding write functions, write() and writelines(), Programming using file operations, Reading config files, Writing log files in python.

Unit 6: OOP in Python

Creating Classes in Python, Instance Methods, Inheritance, Polymorphism, Exception Classes and Custom Exceptions.

Unit 7: Introduction to Libraries in Python (6 hrs)

NumPy, Matplotlib, OpenCV, Tkinter.

Unit 8: Python SQL Database Access (7 hrs)

Introduction to database driven program, Database Connection, Database Operations: INSERT, READ, UPDATE, DELETE, COMMIT AND ROLLBACK.

(b) Practical

- Introduction to Python console, operators, input and output statements.
- Python control statements and functions
- Data Structures in python
- Exception Handling
- File Handling
- Object Oriented Python programming
- Introduction to libraries (NumPy, Matplotlib, OpenCV)
- Python SQL Database Connection and database operations

Particulars of course designer:

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Software Engineering

1. Learning Outcome: On successful completion of this course, the student should be able to:

- Determine the primary problems that impact all software development processes.
- Choose relevant software development processes models, methodologies, and strategies for managing a specific software development process, and justify the choices
- Implement different software estimation metrics such as cost, effort size, staffing etc.
- Describe various software design approaches and various coding and testing strategies used in software engineering principles
- Know about software reliability and how to calculate software maintenance cost.

2. Prerequisites: NIL
3. Semester: 5
4. Course Type: Compulsory
5. Course Level: 300-399
6. Theory Credit: 4
7. Practical Credit: 0
8. No of Hours:
Theory: 60 hrs (60 classes)
Practical: 0 hrs
Non Contact: NIL
9. List of Books:
(a) Rajib Mall: *Fundamentals of Software Engineering*; PHI Learning Pvt. Ltd.
(b) Roger S. Pressman: *Software Engineering: A practitioner's Approach*; McGraw Hill.

10. Contents of Syllabus:
Unit 1: Introduction (4 Lectures)
Definition of Software Engineering, differentiation between Computer Science, Software Engineering and System Engineering, Program V/s software product, Exploratory style and modern style of software development, need of software engineering, characteristics of good software product

Unit 2: Software Development Life Cycle models (7 Lectures)
Definition of software development Life cycle (SDLC) models, Various life cycle modes: Classical Waterfall model, Iterative Waterfall model, Prototyping model, Evolutionary (Incremental) model, Spiral model, Agile Model, Agile V/s traditional SDLC Models, SCRUM model, Advantages and disadvantages of each of these SDLC models.

Unit 3: Requirement Analysis and Specification (7 Lectures)
What is Requirement Analysis and Gathering, Concept and Importance of Feasibility Study in Software design, Types of Feasibility: *Technical*, *Economical* and *Operational* feasibility, Software Requirement Specification (SRS) document, Components of an SRS (Software Requirement Specification): Functional and Non-Functional Component, Properties of a good SRS, Different users of SRS, Techniques to represent Complex Logic in SRS: Decision Tree and Decision Table.

Unit 4: Software Project Management (15 Lectures)
Basic idea of Software Project Management, Job Responsibilities of a Software Project Manager, Need of SPMP (Software Project Management Plan) document, Contents of SPMP, Need of Software documentation, Internal and External documentation, Software size estimation using Lines

of Code (LOC), Merits and Demerits of LOC metric, Function Point Metric, 3D Function Point metrics, Project Estimation Techniques: *Empirical estimation* and *Heuristics estimation* techniques. Empirical estimation techniques: *Delphi Cost Estimation* and *Delphi Cost Estimation.* Heuristic Estimation Techniques: *Basic COCOMO model* and *Intermediate COCOMO model.* Project Scheduling: *Work break down structure, Activity Networks* and *Critical Path Method.* Project Team structure: *Chief Programmer team* and *Democratic team* structure.

Unit 5: Software Design principles and Methodology (12 Lectures)

Top down and bottom up approach, External Design, Architectural Design and Detailed design, Concept of Cohesion in software design, Classification of Cohesions, Basic concept of Coupling, Classification of Couplings, Introduction to software Analysis and Software Design (SA/SD), Introduction to Data Flow Diagram, Symbols used in DFD, Context Diagram in DFD, Advantages and Disadvantages of DFDs., Balanced DFD, Structured Design: *Transaction Analysis* and *Transform Analysis.* Need of Object Oriented Design and Analysis, UML (Unified Modeling Language), different views of UML, Various UML Diagrams: *Use Case diagram, Class Diagram, Object Diagram*, *Sequence Diagram* and *Collaboration diagram.*

Unit 6: Coding and Testing (9 Lectures)

Goals of coding, Code Review techniques: Code Walkthrough, Code Inspection, Definition of Test cases, test suits, negative testing and positive testing. Different levels of software testing: *unit testing*, *Integration Testing*, *System Testing* and *acceptance testing*. Differentiation between Verification and Validation, Black box testing approaches: *Equivalent Class Partitioning* and *Boundary Value Analysis*, White Box testing approaches: *Statement Coverage*, *Branch Coverage, Condition* Coverage and Path *Coverage. Approach*, MaCabe's Cyclomatic Complexity, Basic idea of various system testing approaches: *Smoke testing, Stress testing, Volume testing* and *Compatibility testing*

Unit 7: Software Reliability and Maintenance (6 Lectures)

What is reliability? Reliability metrics of Software Products: ROCOF, MTTF, MTTR, MTBF, POFOD and availability. ISO 9000 Certification, need of ISO Certification, How to get ISO 9000 certification, Definition of Software Maintenance, Types of Software maintenance: *Corrective, Adaptive* and *Perfective* maintenance, Estimation of Software Maintenance Cost.

Particulars of course designer:

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Web Technologies

1. Learning Outcome: At the end of the course, students will be able to:

- Understand the basic concept of web applications and web services.
- Design basic well-structured web page using HTML and CSS
- Develop the ability to implement interactive elements and dynamic content using basic JavaScript
- Develop a foundational understanding of server-side scripting using PHP

2. Prerequisites: NIL
3. Semester: 5
4. Course Type: Compulsory
5. Course Level: 300-399
6. Theory Credit: 3
7. Practical Credit: 1
8. No of Hours:
Theory: 45 hrs (45 classes)
Practical: 30 hrs (15 classes)
Non Contact: NIL
9. List of Reference Books:

a) Jackson J.C. (2007). *Web Technologies: A Computer Science Perspective*. Pearson.
b) Duckett, J. (2011). *HTML and CSS: Design and Build Websites*. John Wiley & Sons.
c) Robbins, J. N. (2018). *A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics*. O'Reilly Media.
d) Robbins, J. N. (2018). *Learning Web Design: A Beginner's Guide.* O'Reilly Media.
e) Haverbeke, M. (2018). *Eloquent JavaScript*. No Starch Press.
f) Welling, L., & Thomson, L. (2016). *PHP and MySQL Web Development* (5th ed.). Addison-Wesley Professional.

10. Contents of Syllabus:
A. Theory
Unit 1: Introduction to Web Technologies (8 Lectures)

Concepts of the Internet and the World Wide Web (WWW), Overview of web browsers and their functionalities. Client-Server Architecture in Web Applications. Communication Protocols – HTTP, HTTPS, FTP. Working of DNS. Brief concepts of port, URL, cache and cookies. Web Content Accessibility Guidelines. Privacy concerns and data protection regulations, GDPR. Introduction to Web Hosting and control panels.

Unit 2: Front End Development using HTML (10 Lectures)

Website and Webpage. Basic concept of Markup Language. Introduction to HTML. Basic HTML structure. Text formatting Tags – headings, paragraph, line break, horizontal rule. Link and Navigation – anchor tags. Lists - ordered, unordered, definition list. Image and multimedia tags. Tables in HTML. Forms and Input types – text, email, password, radio, select, checkbox, textarea, date, url, submit, button. Semantic HTML. Sectioning elements – header, nav, main, section, article, aside, footer.

Unit 3: Front End Design using CSS (9 Lectures)

Introduction to CSS. CSS syntax and rule structure. Inline, Internal and External CSS. CSS selectors – element, class, ID, attribute. Combinators – descendant, child, adjacent sibling, general sibling. Understanding the CSS Box Model – content, padding, border, margin. CSS colours and backgrounds – background-color, background-image, background-repeat. CSS typography – font properties, text properties.

Unit 4: Client-Side Scripting with JavaScript (10 Lectures)

JavaScript as a high-level interpreted language. JavaScript code execution in web browsers – JavaScript execution context. JavaScript syntax and datatypes. JavaScript variables – var, let, const. Assignment and scope of JavaScript variables. Operators in JavaScript – arithmetic, comparison, logical, assignment. Conditional Statements. Looping Structures. Function declaration and Invocation in JavaScript. Introduction to the Document Object Model. Accessing HTML elements in DOM – by id, by tag name, by class name, query selectors. Manipulating DOM elements – create, add, append, remove. InnerText vs InnerHTML. Manipulating CSS styles using DOM. Event handling and delegation with the DOM using JavaScript. Client-side form validation using JavaScript. Handling form validation and processing data.

Unit 5: Server-Side Programming with PHP (8 Lectures)

Introduction to PHP and role in Web development. PHP syntax and variables. Basic PHP functions – Built-in PHP functions, string manipulation functions, mathematical functions, date and time functions. PHP forms and form handling. Form submission methods – GET and POST. Handling form data with PHP. Uploading files with PHP. Introduction to the tech-stack. Role of Apache, PHP, MySQL etc. Introduction to Databases and SQL. Connecting to databases with PHP. Executing SQL queries with PHP. Retrieving, inserting, updating and deleting data from databases using PHP.

B. List of Practical

(This is a suggestive list only. Questions need not be restricted to this list.)

1. Create a basic HTML webpage structure with a heading, paragraph, and an image.
2. Build a navigation menu using an unordered list (<ul>) with clickable links.
3. Implement a form with input fields for name, email, and a submit button.
4. Create a table with multiple rows and columns to display tabular data.
5. Design an image gallery using HTML and CSS with proper padding and border.
6. Embed a YouTube video on a webpage using the <iframe> tag.
7. Implement an ordered list (<ol>) to display a step-by-step tutorial or instructions.
8. Create a dropdown select menu (<select>) with multiple options.
9. Use HTML5 semantic tags (such as <header>, <nav>, <section>, <article>, <footer>) to structure and organize content on a webpage.
10. Build a registration form with fields for name, email, password, date of birth, address and other such fields with a submit button. Include appropriate input types, labels and placeholders.
11. Style a heading element with a custom font, colour and background.
12. Apply different background colors to alternate rows in a table.
13. Implement a hover effect on a button that changes its background colour or adds a solid border.
14. Style a form input field with custom border, padding, and background color.
15. Implement a CSS tooltip that displays additional information when hovering over an element.
16. Build a simple JavaScript calculator that can perform basic arithmetic operations.
17. Create a button that, when clicked, appends a new paragraph element with a specific text content to an existing div element.

18. Implement a function that changes the innerText of a paragraph element to display a random number between 1 and 10 every time a button is clicked.
19. Build a form with input fields for name and email. When the form is submitted, use innerHTML to display a confirmation message with the entered name and email on the webpage.
20. Build a form with input fields for email, password and confirm password. When the form is submitted, use an alert to display a success message if the password and confirm password values matches, otherwise show an error alert. Use JavaScript for the validation.
21. Create a list of items. Add a click event listener to each item so that when clicked, the background color of the clicked item changes.
22. Write a PHP script to display the current date and time on a webpage.
23. Write a PHP script to connect to a MySQL database and fetch data from a table.
24. Create a registration form with fields for username, email, and password. Implement server-side validation to check for duplicate usernames or invalid email formats. Store the user registration data in a MySQL database. Provide feedback to the user upon successful registration or display appropriate error messages.
25. Design a webpage that displays a list of notices retrieved from a MySQL database. Implement functionality to add new notices to the database using a form. Allow users to view and delete individual notices. Apply appropriate styling to the notices and ensure proper validation and sanitization of user input.

Particulars of Course Designer:

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Java Programming

1. Learning Outcome: After completing this course, students will be familiar with the core concepts of java programming and classes of swing package.
2. Prerequisites: NIL
3. Semester: 5
4. Course Type: Compulsory
5. Course Level: 300-399
6. Theory Credit: 3
7. Practical Credit: 1
8. No of Hours:
  a) Theory: 45 hrs (45 classes)
  b) Practical: 30 hrs (15 classes)
  c) Non Contact: NIL
9. List of Reference Books:
  a) *Java: The Complete Reference*, Herbert Schildt, McGrawHill
  b) *Java How to Program,* Paul Deitel, Harvey Deitel, Pearson

10. Contents of Syllabus:
A. Theory
Unit I: Introduction (3 hrs)
High level language, compiled and interpreted languages, history of java programming language, compilation of java code, bytecode, java interpreter, javac and java command, path environmental variable, Java IDE, features of java programming language: simple, object oriented, robust, architecture neutral and interpreted

Unit II: Data types, operators and control statements (12 hrs)
Java as strongly typed language, primitive data types, integer data types: byte, short, int and long, floating point data types: float and double, character data type, boolean data type, literals: integer literals, floating-point literals, boolean literals, character literals and string literals, declaring a variable, dynamic Initialization, the scope and lifetime of variables, type-casting in java, one dimensional array, multi dimensional array, arithmetic operators: the basic arithmetic operators, the modulus operator, arithmetic compound assignment operators, increment operator and decrement operator, bitwise operators, relational operators, short circuit logical operator, the assignment operator, branching statements: if-else and switch-case statements, looping statements: while, do-while, for and for-each statements, jump statements: break and continue

Unit III: Object oriented features of java (10 hrs)
Defining a class, member variable and member methods, access specifiers: default, private and public, declaring objects, assigning object reference variables, constructors, parameterized constructors, the this keyword, garbage collection, the finalize( ) method, overloading methods, overloading constructor, static keyword, final keyword, command line arguments in java, inheritance, super class and sub class, protected access specifier, super keyword, constructor call in multilevel inheritance, method overriding, dynamic method dispatch, abstract class, interfaces, type wrappers

Unit IV: String handling and packages (5 hrs)
String class, String constructors, String length, special string operations: string literals, string concatenation, string concatenation with other data types, string conversion and toString( ), character extraction: charAt( ), getChars( ), string Comparison: equals( ) and equalsIgnoreCase(), regionMatches( ), startsWith( ) and endsWith( ), equals( ) Versus ==, compareTo( ), searching

strings, data conversion using valueOf( ), StringBuffer, StringBuffer constructors, length( ) and capacity( ), ensureCapacity( ), setLength( ), charAt( ) and setCharAt( ), getChars( ), package, defining a package, CLASSPATH, importing packages

Unit V: Exception handling and I/O (5 hrs)

Exception-handling, exception types, uncaught exceptions, try and catch block, multiple catch blocks, nested try statements, throw, throws, finally, java's built-in exceptions, creating own exception classes, java I/O classes, reading console input, writing console output, reading and writing files

Unit VI: Swing package and database connectivity (10 hrs)

Swing package, simple GUI-Based Input/Output with JoptionPane, Jframe, JLabel, JTextField, Jbutton, handling event in a Jframe object, layout managers: BorderLayout, FlowLayout, GridLayout, CardLayout, GridBagLayout, JtoggleButton, JCheckBox, JRadioButton, Jlist, JcomboBox, JDBC, JDBC driver, connectivity steps, connectivity with MySQL, DriverManager class, Connection class, Statement class, ResultSet class, PreparedStatement class

B. Practical

- Java programs to demonstrate the use of data types and operators
- Java input through Scanner class and JOptionPane class
- Java programs to demonstrate the use of control statements.
- Java programs to demonstrate the use of classes, objects, visibility modes, constructors and destructor.
- Java programs to demonstrate the use of inheritance and polymorphism.
- Java programs to demonstrate the use of polymorphism.
- Java programs to handle strings,Java programs implementing exception handling.
- Demonstrating the use and creation of packages in java.
- Java program with JFrame, JTextfield and JButton with event handling
- Using JLabel, JTextArea and JPasswordField in java with event handling
- Working with layout managers in JFrame
- Using JCheckBox, JRadioButton and JComboBox in a JFrame
- Connecting JFrame components to a DBMS

Particulars of course designer:

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Computer Networks

1. Learning Outcome: After completing this course, students

- Student will able to learn about the general principles of data communication.
- Student will able to learn about how computer networks are organized with the concept of layered approach.
- Student will able to learn about how signals are used to transfer data between nodes.
- Student will able to learn about how packets in the Internet are delivered.
- Student will able to learn about how routing protocols work.
- Student will able to learn about functions of transport layer
- Student will able to learn about functions of application layer

2. Prerequisites: NIL

3. Semester: 5

4. Course Type: Compulsory

5. Course Level: 300-399

6. Theory Credit: 3

7. Practical Credit: 1

8. No of Hours:

a) Theory: 45 hrs (45 classes)
b) Practical: 30 hrs (15 classes)
c) Non Contact: NIL

9. List of Books:

a) B. A. Forouzan: *Data Communications and Networking*, Fourth edition, THM, 2007.
b) A. S. Tanenbaum: *Computer Networks***,** Fourth edition**,** PHI , 2002.

10. Contents of Syllabus:

A. Theory

UNIT 1: Introduction to Computer Networks (5 Lectures)

Data communication system and its components, Definition of network, Types of network, Network topologies, Network protocol, Layered network architecture, Overview of OSI reference model, Overview of TCP/IP protocol suite.

UNIT 2: Physical Layer Communication (10 Lectures)

Analog and digital signal, Definition of bandwidth, Maximum data rate of a channel, Line encoding schemes, Transmission modes, Modulation techniques, Multiplexing techniques- FDM and TDM, Transmission media-Guided and Unguided, Switching techniques- Circuit switching, Packet switching, Connectionless datagram switching, Connection-oriented virtual circuit switching.

UNIT 3: Data Link Layer Functions and Protocol (10 Lectures)

Definition of Framing, Framing methods, Error detection techniques, Error correction techniques, Flow control mechanisms- Simplex protocol, Stop and Wait ARQ, Go-Back-N ARQ, Point to Point protocol.

UNIT 4: Multiple Access Protocol and Networks(5 Lectures)

Basics of ALOHA protocols, Basics of CSMA/CD protocols, Ethernet LANS, Connecting LAN and back-bone networks- Repeaters, Hubs, Switches, Bridges, Router and Gateways

UNIT 5: Networks Layer Functions and Protocols (8 Lectures)

Connection oriented vs Connectionless services, Definition of Routing, Routing algorithms, IP protocol, IP addresses, ARP, RARP

UNIT 6: Transport Layer Functions and Protocols (4 Lectures)

Transport services, TCP vs UDP protocol, TCP connection establishment- Three way handshakes, TCP connection release

UNIT 7: Overview of Application Layer Protocols (3 Lectures)

Overview of DNS, Overview of WWW, URL, Email architecture, HTTP protocol

B. Practical / Lab work to be performed (15 Practical Classes/30 hrs)

- Implement the data link layer farming methods such as Bit Stuffing.
- Study of different types of Network cables.
- Study of network IP.
- Connect the computers in Local Area Network.
- Study of basic network command and Network configuration commands.
- Configure a Network topology using packet tracer software.
- Simulate Cyclic Redundancy Check (CRC) error detection algorithm for noisy channel.
- Simulate and implement Stop and Wait protocol for noisy channel.
- Simulate and implement Go-Back-N sliding window protocol.
- Simulate and implement Selective Repeat sliding window protocol.
- Simulate and implement Dijkstra Algorithm for shortest path routing.
- Simulate and implement Distance vector routing algorithm

Particulars of Course Designer:

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Computer Graphics

1. Learning Outcome:

After completing this course, students will know about basic elements of Computer Graphics, fundamental of Computer graphics algorithms along with basic mathematical foundations of computer graphics.

2. Prerequisites: NIL

3. Semester: 6

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 3

7. Practical Credit: 1

8. No of Hours:

a) Theory: 45 hrs (45 classes)
b) Practical: 30 hrs (15 classes)
c) Non Contact: NIL

9. List of Reference Books:

a) D. Hearn, M. Baker: Computer Graphics, Prentice Hall of India 2008.
b) J.D.Foley, A.Van Dan, Feiner, Hughes Computer Graphics Principles & Practice 2nd edition Publication Addison Wesley 1990.
c) D.F.Rogers Procedural Elements for Computer Graphics, McGraw Hill 1997.
d) D.F.Rogers, Adams Mathematical Elements for Computer Graphics, McGraw Hill, 2nd edition 1989.

10. Contents of Syllabus:

A. Theory

UNIT 1: Introduction (2 Hours)

Basic elements of Computer Graphics, Applications of Computer Graphics

UNIT 2: Graphics Hardware (5 Hours)

Input Devices: Keyboard, Mouse, Trackball & Space ball, Joystick, Data Glove, Digitizers, Image Scanners, Touch panels, Light Pens systems. Output display devices: Refresh CRT, Raster-Scan display and Random-scan display technique, Color display techniques-Beam penetration method and Shadow-mask method, Direct view storage tubes, Emissive & Non-emissive flat-panel, Displays-Plasma panels, LED and LCD monitor, Three-dimensional viewing devices and Virtual-Reality systems Display processor: Raster-scan systems, Random-scan systems

UNIT 3: Fundamental Techniques in Graphics (20 Hours)

Line-drawing algorithms:DDA algorithm and Bresenham's Line drawing Algorithm, Midpoint Algorithm for Circle and Ellipse Generation, Curve generation. Attributes for output primitives: Area-filling Algorithms - Scan-line Polygon-fill, 2-D Geometric Transformations: Basic transformations-translation, Rotation and Scaling Matrix representations and Homogeneous Co-ordinate representations, Composite transformations among translation, Rotation and Scaling, 2-D viewing: Definition, Viewing transformation pipeline, Window-to-viewport Co-ordinate transformation.

2-D Clipping: Concept and Algorithm: Point clipping, Line clipping - Cohen-Sutherland algorithm, Area clipping, Text clipping, Polygon clipping. 3-D concepts: Display methods-Parallel projection, perspective projection 3-D geometric transformations: Transformation, Translation, Rotation and Scaling around axes, 3-D Viewing Projections – Parallel and Perspective.

UNIT 4: Geometric Modelling (8 Hours)

Representing curves and surface, Bezier curves and surfaces – Definition of Bezier curve and its properties, Algorithms for Bezier curves and surfaces, Hermite curve

UNIT 5: Visible Surface determination (5 Hours)

Definition, approaches for visible surface detection, object-space methods- Back-Face Detection, Image space methods: Depth Buffer Methods, A Buffer Method, Scan Line Method, Depth-Sorting Method

UNIT 6: Surface rendering (5 Hours)

Definition and importance, light sources, Basic illumination models-Ambient light, Diffuse reflection, Specula reflector and Phong model

B. Practical:

- Write a program to implement DDA algorithm for line drawing.
- Write a program to implement Bresenham's line drawing algorithm.
- Write a program to implement mid-point circle drawing algorithm.
- Write a program to clip a line using Cohen-Sutherland line clipping algorithm.
- Write a program to clip a polygon using Sutherland Hodgeman algorithm.
- Write a program to apply 2D translation on a 2D object (use homogenous coordinates).
- Write a program to apply 2D rotation on a 2D object (use homogenous coordinates).
- Write a program to apply 2D scaling on a 2D object (use homogenous coordinates).
- Write a program to apply 2D reflection of a 2D object (use homogenous coordinates).
- Write a program to apply 2D shear operation on a 2D object (use homogenous coordinates).
- Write a program to apply 3D translation on a 3D object (use homogenous coordinates).
- Write a program to apply 3D rotation on a 3D object (use homogenous coordinates).
- Write a program to apply 3D scaling on a 3D object (use homogenous coordinates).
- Write a program to apply 3D reflection of a 3D object (use homogenous coordinates).
- Write a program to apply 3D shear operation on a 3D object (use homogenous coordinates).
- Write a program to draw Hermite/Bezier curve.

Particulars of course designer:

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Information Security and Cyber Laws

1. Learning Outcome:
After the completion of the course, the students will be able to develop basic understanding of security, cryptography, system attack and defences against them.

2. Prerequisites: NIL
3. Semester: 6
4. Course Type: Elective
5. Course Level: 300-399
6. Theory Credit: 4
7. Practical Credit: 0
8. No of Hours:

a) Theory: 60 hrs (60 classes)
b) Practical: NIL
c) Non Contact: NIL

9. List of Books:

(a) Merkow, M., & Breithaupt, J.(2005) Information Security Principles and Practices. 5th edition. Prentice Hall.
(b) Cryptography And Network Security Principles And Practice, Fourth or Fifth Edition, William Stallings, Pearson Edition.
(c) Cyber Law & Cyber Crimes, Advocat Prashant Mali; Snow White publications, Mumbai
(d) The Information Technology Act, 2000; Bare Act – Professional Book Publishers, New Delhi

10. Contents of Syllabus:

UNIT 1: Introduction (15 Lectures)

Basic components of security (Confidentiality, Integrity and Availability), Attacks, Computer Crime, Security Services, Security Mechanism, Cyber Crimes, information Technology ACT, Cryptography, Substitution Cipher, Transposition Cipher, Block Cipher, Stream Cipher, Confusion, Diffusion, Symmetric Key, Asymmetric Key, Encryption, DES Algorithm, Hash Function, Digital Signature, Digital Certificate.

UNIT 2: Program Security (10 Lectures)

Program Security, Program Errors, Buffer Oveflow, Incomplete mediation, Time-of-check to Time-of- use Errors, Malicious codes, Virus, Threats, Control against Programs, Program Security Issues. Protection in OS: Memory and Address protection, Access control, File protection, User Authentication.

UNIT 3: Database Security (10 Lectures)

Reliability, Integrity, Sensitive Data, Inference, Multilevel Security,Issues regarding the right to access information: Protecting Data, Multiple security level and categorization of data and users, Loss of integrity, Loss of availability, Loss of confidentiality, Access control, Inference control, flow control, data encryption

UNIT 4: Security in Networks (Cyber Attack) (15 Lectures)

Threats in Networks, Security Controls- Architecture, Encryption, Content Integrity, Strong Authentication, Firewalls: Design and Types of Firewalls, Intrusion Detection System, Secure Email, Denial-of-service attacks, Man in the middle Attack, Phishing, Spoofing and Spam Attacks, Drive-by attack, SQL Injection, Birthday attack, Social Engineering attack, Password Attack. Cross site scripting Attack, Malware Attack, Administering Security, Security Planning, Risk Analysis, Organisational Security Policy, Web Servers and Browsers, HTTP, Cookies, Caching, Secure Socket Layer (SSL), Secure Electronic Transaction (SET), E-mail Risks, Spam, E-mail Protocols, Simple Mail Transfer

Protocol (SMTP), Post office Protocol (POP), Internet Access Message protocol (ICMP), Secured Mail: Pretty Good Privacy (PGP), S/MIME (Secure/Multipurpose Internet Mail Extensions)

UNIT 5: Cyber Laws (10 Lectures)

Cyber crime, Types of crimes, Information technology Act 2000: Salient Feature of IT Act 2000, various authorities under IT Act and their powers, Penalties & Offences, amendments, Sections under the Information Technology Act such as:

- [Section 43] Penalty and compensation for damage to computer etc.
- [Section 65] Penalty for temping with the computers source documents
- [Section 66] Punishment for hacking with computer system, data alteration etc
- [Section 66A] Punishment for sending offensive messages through any communication services
- [Section 66B] Receiving stolen computer's resources or communication devices dishonestly
- [Section 66C] Punishment for identity theft
- [Section 66D] Punishment for cheating by impersonation by using computer resource
- [Section 66E] Punishment for violation of privacy
- [Section 66F] Punishment for cyber terrorism
- [Section 67] Punishment for publishing or transmitting obscene material in electronic form
- [Section 67A] Punishment for publishing or transmitting of material containing sexually explicit act, etc. in electronic form
- [Section 67B] Punishment for publishing or transmitting of material depicting children in sexually explicit act, etc. in electronic form
- [Section 72] Breach of confidentiality and privacy

Particulars of course designer:

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Computer Oriented Numerical and Statistical Methods

1. Course Objective:

This objective of this course is to provide students the understanding of basic numerical and statistical problems and to provide skills to solve these problems.

2. Prerequisites: NIL
3. Semester: 6
4. Course Type: Elective
5. Course Level: 300-399
6. Theory Credit: 3
7. Practical Credit: 1
8. No of Hours:

a) Theory: 45 hrs (45 classes)
b) Practical: 30 hrs (15 classes)
c) Non Contact: NIL

9. List of Reference Books:

(a) Rajaraman, V, "Computer Oriented Numerical Methods", 3rd edition, Prentice Hall
(b) Balaguruswami, E., "*Computer Oriented Statistical and Numerical Methods*", Macmillan Publishers India Limited

10. Contents of Syllabus:

A. Theory

Unit No & Name	Topics of the Unit	No of Classes (1 Class=1 hr.)
UNIT-I: **Introduction to Computer Arithmetic**	Representation of numbers: Fixed Point and Floating point representations, Normalized Floating Representation, Floating Point Arithmetic, Properties of Floating Point, Numbers and their accuracy, Approximations and errors. Errors: truncation error, rounded off error, absolute error, relative error, percentage error and error propagation	7
UNIT-II: **Algebraic and Transcendental Equations**	Introduction to linear and nonlinear equations, measures of accuracy, Properties of polynomial equations, Initial approximation to a root, Solution of algebraic/transcendental equations: Bisection Method, Iteration method, Method of false position, Newton-Raphson method, Rate of convergence of Iterative methods, Solution of simultaneous linear equations by using Gauss elimination method	8
UNIT-III: **Interpolation**	Polynomial Interpolation, Finite Differences, Newton's Forward Difference Interpolation, Newton's Backward Difference Interpolation, Newton's Divided Difference Interpolation	6
UNIT-IV: **Solution of Differential Equation**	Taylor series method, Euler's method, Runge-Kutta method of 1st, 2nd & 4th order.	6
UNIT-VI: **Descriptive Statistics**	Types of Data, Attributes and Variables, Construction of Frequency, Cumulative frequency, Graphical Representation of Frequency distribution: Histogram, Frequency Polygon, Frequency Curve and	6

	Cumulative Frequency Curves (Ogive curves), Diagrammatic Representations: Simple bar, Subdivided bar, Pie Diagrams	
UNIT-V: **Measure of central tendency**	Measure of central tendency-Mean, Median and Mode. Measure of variation-Range, Interquartile range, Standard Deviation and Variance	4
UNIT-VI: **Probability Theory**	Sample Space, events, random variables, Discrete probability, Conditional Probability and Bayes theorem, Linear Regression and Correlation, Probability Distribution Functions-Binomial, Random and Poisson	8
	Total Contact Hours:	45

B. Lab Content:

Practical / Lab work to be performed using C/C++/Java programming Language:

Lab No	Topics to be of the Laboratory work	No of Classes (1 Class=1 hour)
1	Apply the Bi-section method for approximation of root for a given polynomial equation.	2
2	Apply the False Position method for approximation of root for a given polynomial equation	2
3	Implement Newton Raphson method for approximation of root for a given polynomial equation.	2
4	Implement Gauss elimination method to solve simultaneous linear equations	3
5	Develop programs to implement Newton's Forward Difference Interpolation	3
6	Develop programs to implement Newton's Backward Difference Interpolation	3
7	Develop programs to implement Newton's Divided Difference Interpolation	3
8	Develop program to apply Taylor's series for e raise to the power x	3
9	Implement Euler's method for solving a differential equation	3
10	Implement Runge-Kutta method of 1st, 2nd & 4th order for solving a differential equation	3
11	Write programs to find Mean, Median and Mode for a given set of data	3
	Total Contact Classes:	30

Particulars of course designer:

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Artificial Intelligence

1. Learning Outcome:

After completing this course, students will know the fundamentals of artificial intelligence (AI), identify problems where artificial intelligence techniques are applicable and able to apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.

2. Prerequisites: NIL
3. Semester: 6
4. Course Type: Elective
5. Course Level: 300-399
6. Theory Credit: 3
7. Practical Credit: 1
8. No of Hours:

a) Theory: 45 hrs (45 classes)
b) Practical: 30 hrs (15 classes)
c) Non Contact: NIL

9. List of Reference Books:

(a) Rich & Knight, Artificial Intelligence – Tata McGraw Hill, 2nd edition, 1991.

(b) Russell & Norvig, Artificial Intelligence-A Modern Approach, LPE, Pearson Prentice Hall, 2nd edition, 2005.

(c) W.F. Clocksin and Mellish, Programming in PROLOG, Narosa Publishing House, 3rd edition, 2001.

(d) DAN.W. Patterson, Introduction to A.I and Expert Systems – PHI, 2007.

(e) Ivan Bratko, Prolog Programming for Artificial Intelligence, Addison-Wesley, Pearson Education, 3rd edition, 2000.

10. Contents of Syllabus:

A. Theory

UNIT 1: Introduction (4 Hours)

Introduction to Artificial Intelligence, Background and Applications, Turing Test and Rational Agent approaches to AI, Introduction to Intelligent Agents, their structure, behavior and environment.

UNIT 2: Problem Solving and Searching Techniques (16 Hours)

Problem Characteristics, Production Systems, Control Strategies, Breadth First Search, Depth First Search, Hill climbing and its Variations, Heuristics Search Techniques: Best First Search, A* algorithm, Constraint Satisfaction Problem, Means-End Analysis, Introduction to Game Playing, Min-Max and Alpha-Beta pruning algorithms.

UNIT 3: Knowledge Representation (14 Hours)

Introduction to First Order Predicate Logic, Resolution Principle, Unification, Semantic Nets, Conceptual Dependencies, Frames, and Scripts, Production Rules, Conceptual Graphs.
Programming in Logic (PROLOG)

UNIT 4: Dealing with Uncertainty and Inconsistencies (6 Hours)

Truth Maintenance System, Default Reasoning, Probabilistic Reasoning, Bayesian Probabilistic Inference, Possible World Representations.

UNIT 5: Understanding Natural Languages (5 Hours)

Parsing Techniques, Context-Free and Transformational Grammars, Recursive and Augmented Transition Nets.

B. Practical:

- Write a prolog program to calculate the sum of two numbers.
- Write a prolog program to find the maximum of two numbers.
- Write a prolog program to calculate the factorial of a given number.
- Write a prolog program to calculate the nth Fibonacci number.
- Write a prolog program, insert_nth(item, n, into_list, result) that asserts that result is the list into_list with item inserted as the nth element into every list at all levels.
- Write a Prolog program to remove the nth item from a list.
- Write a Prolog program, remove nth (Before, After) that asserts the After list is the Before list with the removal of every nth item from every list at all levels.
- Write a Prolog program to implement append for two lists.
- Write a Prolog program to implement palindrome (List).
- Write a Prolog program to implement max(X,Y,Max) so that Max is the greater of two numbers X and Y.
- Write a Prolog program to implement maxlist(List,Max) so that Max is the greatest number in the list of numbers List.
- Write a Prolog program to implement sumlist(List,Sum) so that Sum is the sum of a given list of numbers List.
- Write a Prolog program to implement two predicates evenlength(List) and oddlength (List) so that they are true if their argument is a list of even or odd length respectively.
- Write a Prolog program to implement reverse (List, Reversed List) that reverses lists.
- Write a Prolog program to implement maxlist (List, Max) so that Max is the greatest number in the list of numbers List using cut predicate.
- Write a Prolog program to implement GCD of two numbers.
- Write a prolog program that implements Semantic Networks/Frame Structures.

Particulars of course designer:

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Advanced Web Programming

1. Learning Outcome: At the end of the course, students will be able to:

- (a) Design basic well-structured web page using HTML and CSS
- (b) Develop the ability to implement interactive elements and dynamic content using basic JavaScript
- (c) Develop a foundational understanding of server-side scripting using PHP
- (d) Create a CRUD web application using HTML, CSS, JavaScript, PHP and MySQL.

2. Prerequisites: NIL

3. Semester: 6

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 3

7. Practical Credit: 1

8. No of Hours:

- a) Theory: 45 hrs (45 classes)
- b) Practical: 30 hrs (15 classes)
- c) Non Contact: NIL

9. List of Reference Books:

(a) Duckett, J. (2011). HTML and CSS: Design and Build Websites. John Wiley & Sons.

(b) Robbins, J. N. (2018). Learning Web Design: A Beginner's Guide. O'Reilly Media.

(c) Nixon, R. (2014). Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5 (4th ed.). O'Reilly Media.

(d) Duckett, J. (2014). JavaScript and JQuery: Interactive Front-End Web Development. John Wiley & Sons.

(e) Haverbeke, M. (2018). Eloquent JavaScript. No Starch Press.

(f) Welling, L., & Thomson, L. (2016). PHP and MySQL Web Development (5th ed.). Addison-Wesley Professional.

10. Contents of Syllabus:

A. Theory

Unit 1: Advanced HTML (6 Lectures)

Review of basic HTML tags and their usage. Working with forms – validation using HTML5 attributes. HTML5 Semantic Elements – header, nav, section, article, aside, footer. Applying proper semantic markup for improved SEO. Multimedia integration. Embedding images with different attributes. Adding video and audio. Meta information and Document Structure – metadata, viewport settings.

Unit 2: Advanced Design with CSS (12 Lectures)

Review of CSS. CSS Selectors. Specificity and the cascade. Psudo-classes and pseudo-elements.CSS Box sizing. Gradient and Transparent backgrounds. CSS Typography – Line height and letter spacing. Web-safe fonts. CSS Layout. Display property – inline, block, inline-block, none. Positioning – static, relative, absolute, fixed. Floats and clear property. Box alignment – flexbox and grid layout.Responsive Web Design – Media queries and breakpoints. Fluid layouts. Brief concept of CSS preprocessors – Sass, Less. Brief concept of CSS frameworks – Bootstrap, Tailwind.

Unit 3: Advanced JavaScript (12 Lectures)

Review of JavaScript concepts. Functions in JavaScript. Lexical Environment. Arrays and Array manipulation in JavaScript.. JavaScript Events and Event Handling – Event propagation and event delegation. Implementing interactivity with user actions. Introduction to JavaScript APIs. Callback functions and event loop. Promise chain. Asynchronous function with async/wait. DOM manipulation and event handling with jQuery. Overview of AJAX. Brief concept of XMLHttpRequest object.

Unit 4: Server-Side Scripting using PHP (10 Lectures)

Review of PHP as a server-side scripting language. Handling forms and user input with PHP. Interacting with databases and performing CRUD operations using PHP and MySQL. User authentication using PHP. Implementing user registration and login functionality. Session management and Token based authentication. Overview of Cookies and their use in Web applications. Working with cookies in PHP – setting, reading, deleting. Concept of Cross-site scripting (XSS).

Unit 5: Advanced Concepts of Web Programming (5 Lectures)

Overview of web hosting – shared hosting, VPS, dedicated hosting, cloud hosting. Overview of Server-Side Includes (SSI). Brief concepts of Web APIs and data integration. Concept of JavaScript frameworks – React.js and Node.js. Version Control Systems. Brief overview of Continuous Integration and Deployment. Overview of Web security and SSL/TLS. Web analytics and monitoring.

B. List of Practical

(This is a suggestive list only. Questions need not be restricted to this list.)

1) Create a semantic HTML structure for a blog post, including headings, paragraphs, images, and nested elements.
2) Develop an HTML5 video player with custom controls, including play, pause, volume control, and full-screen functionality.
3) Create a responsive HTML layout using CSS Grid or Flexbox that adapts to different screen sizes and orientations.
4) Develop a responsive navigation menu that collapses into a hamburger menu for mobile devices, utilizing media queries and CSS transitions.
5) Implement a CSS animation or transition to create a smooth fade-in effect for an element on page load.
6) Design a CSS grid layout that displays a multi-column card-based UI, where each card has a consistent height but variable width. Each card should display an image, title, and description.
7) Develop a CSS-only tooltip that appears when hovering over an element, with customizable styles and positioning.
8) Design a CSS drop-down menu with multiple levels of nested submenus, allowing users to navigate through the menu hierarchy.
9) Create a CSS layout that implements a sticky header, where the header remains fixed at the top of the page while the content scrolls.
10) Build a responsive landing page using HTML5, including a hero section, feature sections, and a contact form.
11) Implement a CSS grid-based layout for a product catalog, showcasing multiple products with consistent spacing and alignment.

12) Implement a custom dropdown menu using HTML, CSS, and JavaScript, with options that can be selected and displayed.
13) Build a form validation mechanism using HTML5 form validation attributes and JavaScript, ensuring that required fields are filled out correctly. Use CSS to design the form and the validation messages.
14) Develop a slideshow or carousel using JavaScript and the DOM API, with next/previous controls and automatic playback.
15) Implement a dynamic table that allows users to add or remove rows, with the ability to edit and delete individual cells.
16) Develop a live search functionality that filters and displays search results from the content of the web page in real-time as the user types, using JavaScript and DOM manipulation.
17) Use a callback function to perform an asynchronous AJAX request and update the content of a specific HTML element with the response.
18) Implement a callback-based timer that executes a specific function after a certain period of time has elapsed.
19) Create a simple asynchronous form submission process using AJAX, displaying a loading spinner while waiting for the response.
20) Develop a weather application that uses an asynchronous API call to fetch weather data based on user input, displaying the results on the page.
21) Implement a user registration form in PHP, which securely stores user credentials in a database and performs validation checks for email uniqueness and password strength.
22) Create a login page in PHP that verifies user credentials against the stored data in the database and redirects authenticated users to a secure dashboard.
23) Develop a Password reset functionality in PHP, allowing users to request a password reset link via email and securely update their password.
24) Implement a user profile page in PHP, which displays and allows users to edit their personal information such as name, email, and profile picture.
25) Create a session-based shopping cart system in PHP, allowing users to add products, update quantities, and remove items, while maintaining cart information across different pages.
26) Develop an access control system in PHP, where certain pages or features are restricted to logged-in users only and unauthorized users are redirected to a login page.
27) Implement user roles and permissions in PHP, allowing administrators to assign different levels of access to users based on their roles (e.g., admin, moderator, user).
28) Create a "Remember Me" functionality in PHP, using cookies to remember and automatically log in returning users for a certain period of time.
29) Develop a logout mechanism in PHP that destroys the user session and redirects users to a logout confirmation page or the login page.
30) Implement account activation via email in PHP, where new users receive an activation link to verify their email address and activate their account.

Particulars of course designer:

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Data Mining and Warehousing

1. Learning Outcome:

a) Understanding the process of Knowledge Discovery in Databases.
b) Understand the functionality of the various data warehousing component.
c) Characterize the kinds of patterns that can be discovered by association rule mining.
d) Analysis of different types of data by clustering and classification.

2. Prerequisites: NIL
3. Semester: 6
4. Course Type: Elective
5. Course Level: 300-399
6. Theory Credit: 3
7. Practical Credit: 1
8. No of Hours:

a) Theory: 45 hrs (45 classes)
b) Practical: 30 hrs (15 classes)
c) Non Contact: NIL

9. List of Reference Books:

a) A.K. Puzari, *Data Mining Techniques*, University Press.
b) J. Han, J. Pie and M. Kamber, *Data Mining: Concepts and Techniques*, Morgan Kaufmann.
c) P. Tan, M. Steinbach and V. Kumar, *Introduction to Data Mining*, Pearson Education (LPE).
d) G. K. Gupta, *Introduction to Data Mining with Case Studies*, PHI.

10. Contents of Syllabus:

A. Theory

UNIT 1: Overview (4 Lectures)

What is Data Mining?, Knowledge Discovery in Databases (KDD) vs. Data Mining, Types of Data, Basic Data Mining Tasks, Predictive and Descriptive data mining techniques, Supervised and Unsupervised learning techniques, Basics of Pre-processing methods- Data Cleaning, Data Integration and Transformation, Data Reduction, Data Visualization.

UNIT 2: Data Warehousing (6 Lectures)

What is Data Warehouse? Multidimensional Data Model, Data Cube, Basic Components of Multidimensional Data Model, OLAP Operations- Slicing, Dicing, Drilling, Drill-Up, Drill-Down, Drill-Within, Drill-Across, Pivot(Rotate), Schema of Warehouse, Data Warehouse Architecture, Metadata.

UNIT 3: Association Rule Mining (12 Lectures)

What is Market Basket Data?, k-Itemset, Support of an Itemset, Frequent Itemsets, Infrequent Itemsets, Maximal Frequent Itemsets, Closed Frequent Itemsets, Association Rules, Confidence of a Rule, Problem of Mining Association Rules, Algorithm for Mining Frequent Itemsets- Apriori Algorithm, Pincer-Search Algorithm, DIC (Dynamic Itemset Counting) Algorithm, Steps of Mining Association Rules.

UNIT 4: Clustering (12 Lectures)

What is Clustering, Partitional vs Hierarchical Clustering, Types of Data in Clustering, Distance Measures used in Clustering- Euclidean Distance, Manhattan Distance, Similarity Measures used in Clustering- Cosine Similarity, Jacquard Coefficient, Partitional Clustering Methods- K-Means, K-Mediods, PAM, CLARA, CLARANS, Density Based Clustering Methods- DBSCAN, Introduction to Hierarchical Clustering.

UNIT 5: Classification (8 Lectures)

What is Classification? Issues Regarding Classification, K-Nearest Neighbor Classifiers, Bayesian classification, Introduction to Decision Tree.

UNIT 6: Recent Trends and Techniques used in Data Mining (3 Lectures)

Basic Concepts of- Web Mining, Spatial Data Mining, Temporal Data Mining, Big Data Mining, Concept of Neural Network, Genetic Algorithm.

B. Practical / Lab work to be performed

- Implement ***any one*** from the following-
  - Write a computer program to implement A priori algorithm to mine all frequent itemsets from a transactional dataset. Use hashing to store the item sets in the level wise generation of candidate sets.
  - Write a computer program to implement the Pincer Search algorithm.
  - Write a computer program to implement the DIC (Dynamic Item set) algorithm.
- Implement ***any four*** from the following-
  - Write computer program to implement the K-Means algorithm using different distance measures stated in the syllabus.
  - Write computer program to implement the PAM algorithm using different similarity measures stated in the syllabus.
  - Write a computer program to implement the CLARA algorithm.
  - Write a computer program to implement the CLARANS algorithm.
  - Write a computer program to implement the DBSCAN algorithm.
  - Write a computer program to implement the K-NN algorithm.

Particulars of Course Designer:

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Optimization Techniques

1. Learning Outcome:
On successful completion of the course, students will be able to get thorough knowledge on formulation of optimization model and solution methods on optimization.

2. Prerequisites: NIL

3. Semester: 6

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 4

7. Practical Credit: 0

8. No of Hours:
- a) Theory: 60 hrs (60 classes)
- b) Practical: NIL
- c) Non Contact: NIL

9. List of Reference Books:
- a) Rao S.S,"Optimization – Theory and applications", Wiley Easter Ltd., 1979
- b) Cordan C.C. Beveridge and Robert S. Schedther, "Optimization, Theory and Practice" McGraw Hill Co.1970.
- c) HarndyA.Tahh. "Operations Research, An Introduction", Macmillan Publishers Co.NewYork,1982

10. Contents of Syllabus:

UNIT 1: Introduction (5 Lectures)

Concept of Optimization- classification of optimization –problems, Simulation of Models, Art of Modeling.

UNIT 2: Modelling with Linear Programming (10 Lectures)

Linear Programming Model, Two variable LP Model, Types of Formulation of Simplex Method, Dual Simplex Method, Sensitivity Analysis, LP Model in Equation Form, Transportation Problem, Network Model, Minimal Spanning Tree Algorithm, Shortest route Problem. Necessary and sufficient conditions for finding extrema point, Bisection method.

UNIT 3: Queuing Theory (10 Lectures)

Queuing Model, Elements of Queuing Model, Pure Birth and Death Models, Queues with combined arrival and departures, random and series queues, Generalized and Specialized Queing Models.

UNIT 4: Unconstrained Optimization (10 Lectures)

Newton and Quasi-Newton methods, Conjugate gradient methods, Linesearch and Trust Region methods Quadratic programming problem-Wolfe's method & Beale's method.

UNIT 5: Constrained Optimization (10 Lectures)

Linear programming, Equality and inequality linear constraints. Barrier and augmented Lagrangian methods, Sequential quadratic programming, Infeasible start Newton method, Interior-point methods (inequality constrained minimization; barrier method; primal-dual interior point method Goal Programming-Basics of goal programming, goal programming formulation, goal programming algorithms: Weights method & preemptive method, Graphical solution

Particulars of course designer:

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Mobile Application Development

1. Learning Outcome: After completing this course, students will know:
- (a) Fundamentals of Mobile Application Development.
- (b) Difference between Native and Cross Platform Applications. Pros and Cons of Each Approach.
- (c) To Design and Build a Complete Native Android Application with Both UI and Backend.
- (d) To Design and Build a Complete Cross Platform Application with Both UI and Backend using Flutter.

2. Prerequisites: NIL

3. Semester: 6

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 3

7. Practical Credit: 1

8. No of Hours:

- a) Theory: 45 hrs (45 classes)
- b) Practical: 30 hrs (15 classes)
- c) Non Contact: NIL

9. List of Reference Books and Materials:
- i. Android Programming: The Big Nerd Ranch Guide - Bill Phillips, Chris Stewart, Kristin Marsicano, Brian Gardner
- ii. Professional Android - Reto Meier, Ian Lake
- iii. Android Documentation - https://developer.android.com/

10. Contents of Syllabus:

a) Theory

Unit I: Introduction to Mobile Application Development 5 hrs

Fundamentals of Mobile Application – Understanding Mobile Application Development Basics, Major Mobile OSs and their market share, Understanding Cross Platform and Native Application Development, The advantages and disadvantages of each approach, Components of a Mobile Application, Basic Design Principles of Mobile UI including Wireframing, Typography and Content Flow.

Unit II: Getting Familiar with Android 5 hrs

Introduction to Android Operating System. History and Versions of Android. Understanding the Basics of Android Operating System including OS architecture, Anatomy of an Android Application(apk), learning about various approaches of Android Application development like Native Application Development using Java/Kotlin or Cross Platform Application Development with Flutter/React-Native/Ionic etc. In-depth understanding of each approach and their pros and cons.

Unit III: Getting Started with Native Android Application Development 10 hrs

Setting up Android Studio and getting familiarized with the IDE, Setting up JDK and Android Emulator, Creating the First App – Hello World App, Understanding various essential folders and files associated with an Android App stored inside*manifests, java* and *res* directories. Basic understanding about *Gradle*.Running the App for the first time. Getting started with USB Debugging at a physical Android Device. Understanding debugging facilities available with Android Studio. Getting Started with XML for Android UI Design, Learning Various UI Components of Android. Working with various UI resources like Images, Colors, Fonts etc. Creating a UI oriented App from Scratch. Working withlayout switching in Portrait and Landscape mode. Providing functionality to an Android Application using Java, Understanding Android *Activity* and its lifecycle, various events associated with Activity Lifecycle – *onCreate()*, *onStart()*, *onPause()*, *onResume()*, *onStop()*, *onRestart()*, *onDestroy()* etc. Broadcast Receivers, Intent and Filters. Advanced Layouts in Android including ListView, CardView, RecyclerView etc., Fragments, Material Design in Android – Principles and Implementation, Styles and Themes.

Unit IV: Advanced Android Application Development 10 hrs

Working with System Components in Android – File System Access, Location based Services, Phone, SMS, Bluetooth, Camera, Sensors etc. and App Permission Management, Working with Multimedia Content like Audio & Video in Android. Working with API Calls and Web Services,Packaging and Publishing Android Applications.

Unit V: Working with Databases in Android 5 hrs

Building database driven Apps in Android, Working with SQLite, Interacting with Remote Databases using JSON, Performing CRUD operations in both Local and Remote Databases. Understanding Realtime Databases and getting started with Firebase. Implementing Firebase backend in previously developed CRUD application.

Unit VI: Cross Platform Mobile Application Development using Flutter 10 hrs

Getting Started with Flutter and Dart, Understanding Flutter Architecture, Considering other alternatives, setting up the Development Environment, Material Design and System Services. Working with CRUD and HTTP Requests, Publishing and Packaging Apps for both Android and iOS and publishing at different platforms.

b) Practical Assignments

a) Build a Calculator App in Android.
b) Build a Tic-Tac-Toe Game. The game should keep records of Each Player and Game Time of each match.
c) Build an Android News Reader app which fetches news from an online API like Google News and shows the stories in a list. Whenever the user clicks on the heading of a particular story, the full story appears with the featured image.
d) Build a Simple Chat App in Flutter using Firebase. Export the app to both Android and iOS.

Particulars of course designer:

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Graph Theory

1. Learning Outcome: After completing this course, students will have understanding of graph theoretic concepts, problems and associated algorithmic solutions.
2. Prerequisites: NIL
3. Semester: 6
4. Course Type: Elective
5. Course Level: 300-399
6. Theory Credit: 4
7. Practical Credit: 0
8. No of Hours:

a) Theory: 60 hrs (60 classes)
b) Practical: NIL
c) Non Contact: NIL

9. List of Books:

(a) Introduction to Graph Theory, Douglas B. West, Pearson

(b) Introduction to Graph Theory, Robin J. Wilson, Pearson Education Limited

(c) Graph Theory with Applications to Engineering and Computer Science, Narasingh Deo, PHI

10. Contents of Syllabus:

Unit I: Introduction **5 hrs**

Graph, directed and undirected graph, weighted and unweighted graph, simple and multigraph, degree, in degree and out degree, Handshaking theorem, complete graph, bipartite graph, cut set, cut vertices, graph representations: incidence matrix, adjacency matrix and adjacency list, BFS traversal and DFS traversals on a graph using stack and queue data structures, isomorphism, homomorphism

Unit II: Connectivity, paths and cycle **15 hrs**

Walk, path and cycle, connected graphs, disconnected graphs, components, Hamiltonian path, Hamiltonian cycle, Hamiltonian graphs, Dirac's theorem, Eulerian path, Eulerian cycle, Euler graphs, Fleuri's algorithm, 2-connected graphs, connectivity and digraph, k-connected and k-edge connected graphs, application of Menger's theorem, Shortest path problem, variations of shortest path problem: single source shortest path problem, single pair shortest path problem and all pairs shortest path problem, Dijkstra's algorithm, Bellman Ford algorithm, Floyd Warshall's algorithm, Johnson's algorithm

Unit III: Tree **12 hrs**

Tree, forest, properties of tree, spanning tree, spanning forest, counting trees, Cayley's theorem, matrix-tree theorem, minimum spanning tree, Kruskal's algorithm, Prim's algorithm, disjoint spanning trees, graph decomposition, graceful labeling, graceful graph, binary tree, binary search tree, AVL tree, multiway search tree, B tree, B+ tree

Unit IV: Matching and coloring **13 hrs**

Matching, bipartite matching, maximum bipartite matching, Ford Fulkerson's algorithm for finding maximal bipartite matching, perfect bipartite matching, non-bipartite matching, maximal non-bipartite matching, largest maximal matching, perfect non-bipartite matching, Hall's Marriage theorem, vertex cover, vertex cover and matching, independent sets, dominating sets, atable matching, Hungarian algorithm, introduction to Edmonds Blossom shrinking algorithm, vertex coloring, k-colorable graph, chromatic number, Brook’s theorem, clique number, map coloring problem

Unit V: Digraph **7 hrs**

Digraph, simple digraph, connected and strongly connected digraph, orientable graph, Eulerian digraph, Hamiltonian digraph, tournament, Markov chains, Flow networks, residual graph, augmenting path, Ford Fulkerson’s algorithm

Unit VI: Classical problems **8 hrs**

Travelling Salesman Problem, variants of Travelling Salesman Problem, Chinese Postman Problem, variants of Chinese Postman Problem, the minimum connector problem, Huffman coding and Huffman tree, Konisgsberg bridge problem, three utilities problem

Particulars of course designer:

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The END

NEP 2020 Syllabus

B.Sc. in Computer Science (Major-Minor)

Paper Name: COMPUTER FUNDAMENTALS AND PROGRAMMING

1. **Learning Outcome:**
    - At the end of the course, students will be able to:
    - Understand the basics of Computer and programming
    - Adopt algorithmic approach to solve problems using pseudocode and flowcharts
    - Understand and write programs in C to implement conditions, loops, functions and other
    - programming constructs
    - Work on arrays, strings and basic file operations in C
2. **Prerequisite:** NIL
3. **Semester: 1**
4. **Course Type: Compulsory**
5. **Course Level: 100-199**
6. **Theory Credit:** 3
7. **Practical Credit:** 1
8. **Number of required hours:**
    a) Theory: 45 hrs
    b) Practical: 30 hrs
    c) Non Contact: 5 hrs

8. List of reference books:

a) B.S. Gottfried, “Schaum's Outline of Theory and Problems of Programming with C”, Mcgraw-Hill, 2007.
b) B. Kernighan, D. Ritchie, “The C Programming Language”, Second Edition, Prentice Hall, 1988
c) E. Balaguruswami, “Programming in ANSI C”, 2nd Ed., Tata McGraw Hill, 2004.
d) V. Rajaraman, “Fundamentals of Computer”, 4th Ed., PHI, 2006
e) R. Thareja, “Computer Fundamentals & Programming in C”, Oxford University Press, 2013.

8. Detailed Syllabus:

Unit 1: Computer Fundamentals (9 Lectures)

Introduction to computer hardware, software– application and system software. Operating systems. Major components of a Digital Computer – ALU and CU, Memory – primary and secondary memory. Storage devices – magnetic storage devices, optical storage devices, Input devices– mouse, keyboard, touch-screen, scanner etc., output devices – CRT/LCD/LED monitors, printers etc. Number systems – binary, octal, hexadecimal, BCD. Conversion between two number systems. Signed magnitude, 1’s complement and 2’s complement representation. Character encodings – ASCII, EBCDIC, Unicode. Basic overview of networks and the Internet, WWW.

Unit 2: Programming Basics (4 Lectures)

Introduction to programming languages. Low-level and high-level language and their characteristics. Compiler vs. interpreter. IDE. Bugs and its types. Algorithms, pseudocodes and flowcharts. Overview of the C programming language. Structure of a C program.

Unit 3: Datatypes and Operators (5 Lectures)

Basic data types in C - integers, floats, doubles, characters, and void. Size and range of values of data types. Variables. Declaring variables. Operators and expressions, Input and output statements – getchar(), getc(), getch(), putchar(), putc(), puts(), scanf(), printf(), format specifiers. Typecasting. Operators in C – binary and unary operators. Arithmetic, assignment, logical, comparison, bitwise and conditional operators. Order of precedence of operators. Associativity of operators. Expressions and statements in C. L-value and R-value. Basic syntax and semantics for expressions and statements.

Unit 4: Control Structures and Functions (8 Lectures)

Control structures in C. Decision making with if, if-else, switch statements. Nested conditions. Looping with while, do-while, and for statement. Break and continue statements. Nested loops. Introduction to functions. Function prototypes and arguments. Defining and calling functions in C. Return values and types. Formal and actual parameter. Call by value, Call by reference. Introduction to recursion. Writing recursive functions in C. Importance of main() function, return type of main() function.

Unit 5: Arrays and Strings (5 Lectures)

Introduction to arrays. Declaration and initialization of arrays. Accessing array elements. Multidimensional arrays. Introduction to strings. Declaration and initialization of strings. String input and output in C. String manipulation functions in C – strlen(), strcpy(), strcat(), strcmp().

Unit 6: Pointers and Memory Allocation (6 Lectures)

Introduction to Pointers. Pointer declaration and initialization. Pointers and addresses. Pointers and arrays. Pointers and functions. Review of call by reference. Pointer arithmetic. Passing an array using pointer in function call. Introduction to dynamic memory allocation. Allocation and deallocation of memory using malloc(), calloc(), and free() functions.

Unit 7: Structure and Union (4 Lectures)

Introduction to structures. Declaration and initialization of structures. Accessing structure members. Nested structures and arrays of structures. Unions in C. Declaration and initialization of unions. Accessing union members. Differences between structures and unions. Typedef.

Unit 8: File Handling and Preprocessor Directives (4 Lectures)

Introduction to file handling in C. Opening and closing files – fopen(), fclose(). Modes of opening a file. Binary files and text files. Reading and writing files – fgetc(), fgets(), fread(), fputc(), fputs(), fwrite(). File pointers. Error handling in file operations. Preprocessor directives in C - #define, #include, #ifdef, #ifndef, and #endif directives. Using preprocessor directives to define constants and macros. Header files.

List of Practical

(This is a suggestive list only. Questions need not be restricted to this list. The practical are advised to be performed in Linux environment.)

1. Write a program in C to print "Hello World"
2. Write a program to take input of two numbers and print their sum, product, difference.
3. Write a program to find the smallest or greatest of three numbers given as input.
4. Write a program to print the sum and product of digits of an integer.
5. Write a program to print a triangle of stars as follows (take number of lines from user):

```
    *
   ***
  *****
 *******
*********
```

6. Write a program to reverse a number.
7. Write a program to compute the sum of the first n terms of the following series
   S = 1+1/2+1/3+1/4+……
8. Write a program to compute the sum of the first n terms of the following series
   S =1-2+3-4+5……
9. Write a function that checks whether a given string is Palindrome or not. Use this function to find whether the string entered by user is Palindrome or not.
10. Write a function to find whether a given no. is prime or not. Use the same to generate the prime numbers less than 100.
11. Write a program to compute the factors of a given number.
12. Write a program to display Fibonacci series (i) using recursion, (ii) using iteration
13. Write a program to calculate Factorial of a number (i) using recursion, (ii) using iteration
14. Write a program in which a function is passed address of two variables and then alter its contents.
15. Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.
16. Write a program to create an array with inputs from the user and print the same.
17. Write a program to perform following actions on an array entered by the user:
    a) Print the even-valued elements
    b) Print the odd-valued elements
    c) Calculate and print the sum and average of the elements of array
    d) Print the maximum and minimum element of array
    e) Remove the duplicates from the array
    f) Print the array in reverse order

    The program should present a menu to the user and ask for one of the options. The menu should also include options to re-enter array and to quit the program.

18. Write a program to take a matrix from the user and print the transpose of the same.
19. Write a program to take two matrices from the user and find the sum and product of both.
20. Write a program to perform following operations on strings:
    a) Convert all lowercase characters to uppercase
    b) Convert all uppercase characters to lowercase
    c) Calculate number of vowels in the string
    d) Reverse the string
    e) Concatenate two strings without using strcat() function.
    f) Concatenate two strings using strcat() function.
    g) Compare two strings using strcmp()
    h) Copy one string to another using strcpy()
21. Write a program that swaps two numbers using pointers.
22. Write a program to find sum of n elements entered by the user. To write this program, allocate memory dynamically using malloc() / calloc() functions or new operator.
23. Write a function to accept two arrays as argument and returns their sum as an array.
24. Write a program to use a macro to swap two numbers.
25. Write a program to implement struct in C. Create a structure of Student with RNo, Name and other credentials with proper datatype and print the same.
26. Write a program to implement union in C. Create a structure of Person with Pid, Name and other credentials with proper datatype and print the same.
27. Write a C program that opens a file for reading and displays the contents of the file in binary mode and text mode.
28. Write a C program that opens a file for reading and displays the contents of the file character by character and line by line on the screen.
29. Write a C program to open a file and count the number of characters and lines in the file.
30. Write a C program that opens a file in append mode and allows the user to add text to the end of the file.

Particulars of Course Designer:

Name : Risheraj Baruah
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Email id : rishirajbaruah@gauhati.ac.in

Paper Name: COMPUTER ORGANIZATION

1. **Learning Outcome:**
    - Student will able to learn about the structure, function and characteristics of computer systems.
    - Student will understand the design of the various functional units and components of computers.
    - Student will identify the elements of modern instructions sets and their impact on processor design.
    - Student will able to learn about the function of each element of a memory hierarchy.
    - Student will able to learn about identify and compare different methods for computer I/O.
    - Student will able to learn about basics of assembly language.
    -
2. **Prerequisite:** NIL
3. **Semester: 2**
4. **Course Type: Compulsory**
5. **Course Level: 100-199**
6. **Theory Credit:** 4
7. **Practical Credit:** 0
8. **Number of required hours:**
    a) Theory: 60 hrs
    b) Practical: 0 hrs
    c) Non Contact: 5 hrs

8. List of reference books:

f) M.Morris Mano, *Computer System Architecture*, PHI publication.
g) Hamachar, Vranesic and Zaky, *Computer Architecture*.
h) William Stallings, *Computer Organization and Architecture*; Pearson.
i) Ramesh Gaonkar, *Microprocessor Architecture, Programming, and Applications with the 8085*, 5th Edition.

8. Detailed Syllabus:

UNIT 1: Introduction (4 Lectures)

Definitions of Computer Organization and Architecture, History of computer architecture, Basic functional blocks of a computer: CPU, memory, Input-output subsystems, Control unit, Types of register- general purpose registers, special purpose registers, index registers.

UNIT 2: Data Representation (8 Lectures)

Number system, Complements, Representation of signed numbers, Subtraction of unsigned numbers, Fixed-Point representation- Integer representation, Arithmetic addition, Arithmetic subtraction, Overflow, Decimal Fixed-Point representation, Floating-Point representation, Other Binary Codes- Gray Code etc.

UNIT 3: Register Transfer and Micro-operation (8 Lectures)

Introduction to Register Transfer Language, Register transfer, Bus and Memory transfers, Arithmetic micro-operation- Binary adder, Binary adder-subtractor, Binary incrementer, Arithmetic circuit, Logic micro-operation, Shift micro-operation, Arithmetic logic shift unit.

UNIT4: Processing Unit (10 Lectures)

Instruction codes, Computer registers, General register organization, Register stack, Memory stack, Computer instructions, Data path in a CPU, Operations of a control unit, Hardwired control unit, Micro-programmed control unit, Instruction cycle, Operands, Addressing modes, Instruction format- Three-address instructions, Two-address instructions, One-address instructions, Zero-address instructions, Data transfer and manipulation- Data transfer instructions, Data manipulation instructions, Arithmetic instructions, Logical and Bit manipulation instructions, Shift instructions, Program Control-Status bit conditions, Conditional branch instructions, Subroutine call and return, Instruction execution cycle, CISC and RISC architectures.

UNIT 5: Memory Organization (10 Lectures)

Semiconductor memories, Memory cells - SRAM and DRAM cells, Concept of hierarchical memory organization, Interleaved memories, Cache memory unit - Concept of cache memory, Mapping methods, Organization of a cache memory unit, Cache replacement policies, Write policy, Concept of virtual memory.

UNIT 6: I/O Organization (10 Lectures)

Access of I/O devices, I/O ports, I/O control mechanisms - Program controlled I/O, Interrupt driven I/O, DMA controlled I/O, Interrupts: Types of interrupts, Enabling and disabling interrupts, Handling interrupts.

UNIT 7: Basics of Microprocessor and Assembly Language (10 Lectures)

Introduction to microprocessors, 8085 Microprocessor and its operation, 8085 instruction sets, Addressing modes in 8085, Classifications of instructions and addressing mode, Assembly language programming basics, Assembling, Executing and debugging the programs, Developing counters and Time delay routines, Interfacing concepts.

Particulars of Course Designer:

Name: Dr Irani Hazarika
Contact No: 8486965773
Email: queensarathi@gmail.com

Paper Name: Object Oriented Programming using C++

1. **Learning Outcomes:** After successful completion of this course, students will be able to:
    - Differentiate between Structured programming and Object-Oriented Programming.
    - Learn the concept of objects and develop the ability of imagining real life concepts as objects and derive their properties and functions to operate these objects.
    - Develop programs using different object- oriented programming features such as data bstraction, polymorphism, inheritance, exception handling etc.

2. **Prerequisites: NIL**
3. **Semester: 3**
4. **Course Type:** Compulsory
5. **Course Level:** 200-299
6. **Theory Credit:** 3
7. **Practical Credit: 1**
8. **No of required hours:**
    a) Theory: 45 hrs
    b) Practical: 30 hrs
    c) Non Contact: 5 hrs

List of Reference Books:

a) M. T. Somashekara, D. S. Guru et-al; *Object-Oriented Programming with C++, 2nd Edition*, PHI,2012.
b) Bjarne Stroustrup, The *C++ Programming Language, Special Edition,* Pearson Education, 2004.
c) Deitel&Deitel, *C++ How to program,* Pearson Education Asia, 6th Edition, 2008
d) Schildt Herbert, *The Complete Reference C++,* Tata McGraw Hill, 4th Edition, 2003.

9. **Contents of Syllabus:**

A. Theory

UNIT 1: Introduction to object-oriented programming (3 Lectures)

Basic Concepts of Object-Oriented Programming and design, Benefits and applications of OOP.

UNIT 2: Introduction to C++ (6 lectures)

Structure of a Simple C++ program, Output operator,Input operator, Cascading of I/O operators, Tokens- keyword, identifiers, constants, strings andoperators. Basic data types, User defined data types, Dynamic initialization of variables, Referencevariables, Operators in C++, Scope resolution operator & applications, Member dereferencingoperators, Memory Management operators, new and delete, Control Structures-simple if, if else,nested if, switch, while do, break and continue statements, Introduction to Functions-FunctionPrototyping, Call-by-reference, Return by reference, Inline functions, Default arguments, Constarguments.

UNIT 3: Classes and objects (11 Lectures)

Introduction - Defining a class; class versus structures, creating objects, accessing class members, defining member functions- outside the class definition and inside the class definition, outside functions as inline. Nesting of member functions, private member functions, memoryallocation for objects. Array-declaring an array, accessing elements of an array, array of objects. Friendly functions. Basic Concepts of constructors and destructors with examples. Defaultconstructor, Parameterized constructor, Multiple constructors in a class. Constructor with defaultarguments, Copy constructor. Dynamic initialization of objects. Dynamic constructors and destructors.

UNIT 4: Function and operator overloading (10 Lectures)

Concept of Overloading. Function Overloading: Functions with different sets of parameters, default and constant parameters, Rules for overloading operators, defining operator overloading. Overloading unary operators -prefix and postfix operators. Overloading Binaryoperators and relational operators. Overloading using friend functions.

UNIT 5: Inheritance (12 Lectures)

Concept of Inheritance -defining derived classes. Types of inheritances, Making a private memberinheritable, multilevel inheritance, multiple inheritance, Hierarchical inheritance, Hybridinheritance, Virtual base classes, Abstract classes, Constructors in derived classes, nesting ofclasses, polymorphism-Compile time and Runtime polymorphism, Pointers to objects, “this” pointer,Pointer to derived classes, Virtual functions, Rules for virtual functions, Pure virtual functions.

UNIT 6: Exception Handling (3 lectures)

Examples of exceptions and handling exceptions using try, catch and throw statements.

B. Practicals

Following Practical / Lab works to be performed preferably in Linux Environment

1. Define a class named “triangle” to represent a triangle using the lengths of the three sides. Write a constructor to initialize objects of this class, given the lengths of the sides. Also write member functions to check
   - (a) if a triangle is isosceles
   - (b) if a triangle is equilateral

   Write a main function to test your functions.

2. Define a structure “employee” with the following specifications.

   empno : integer
   ename : 20 characters
   basic, hra, da : float
   calculate() : a function to compute net pay as basic+hra+da with float return type.

getdata() : a function to read values for *empno*, ename, basic, hra, da.
dispdata() : a function to display all the data on the screen
Write a main program to test the program.

3. Define a class "circle" to represent circles. Add a data member radius to store the radius of acircle. Write member functions *area*() and *perimeter*() to compute the area and perimeter of acircle.

4. Define a class "complex" with two data members "real" and "imag" to represent real and imaginaryparts of a complex number. Write member functions
rpart() : to return the real part of a complex number
ipart() : to return the imaginary part of a complex number
add() : to add two complex numbers.
mul() : to multiply two complex numbers.
Write constructors with zero, one and two arguments to initialize objects.

5. Define a class "point" with two data members "*xordinate*" and "*yordinate*" to represent all points in the two-dimensional plane by storing their x co-ordinate and y co-ordinate values. Write member functions
dist() : to return the distance of the point from the origin.
slope(): to return the slope of the line obtained by joining this point with the origin.
Write constructors with zero, one and two arguments to initialize objects. Also write a friend function to compute the distance between two points.

6. Define a class "string" with the following data members char *p; int size; and write member functions to do the following (without using library function) and using dynamic memory allocation.

- Length of the string
- Compare two strings
- Copy one string to another
- Reverse the string

Write suitable constructors and destructors. Also write a copy constructor for the class.

7. For the class "complex" defined in 4 above, overload the <<, >>, + and * operators in the usual sense. Also overload the unary – operator.

8. Define a class "time" to store time as hour, minute and second, all being integer values. Write member functions to display time in standard formats. Also overload the ++ and – operators to increase and decrease a given time by one second where the minute and hour values will have to be updated whenever necessary.

9. Define a class to store matrices. Write suitable friend functions to add and multiply two matrices.

10. Write a class-based program implementing static members.

11. Define a class student with the following specification:
rollno : integer sname : 20 characters

Derive two classes *artst* and *scst*. The class artst will represent students belonging to arts stream and the class scst will represent students belonging to science stream. The *artst* class will have additional data members ph, hs, en and as to store marks obtained by a student in three subjects Philosophy, History, English and Assamese. The class scst will have additional data member *sph*, *ch*, *ma* and *en* to store marks obtained in *Physics*, *Chemistry*, *Mathematics* and *English*.
Write the following member functions in the classes artst and scst; ctotal() : a function to calculate the total marks obtained by a student; *takedata*() : a function to accept values of the data members and showdata() : a function to display the marks sheet of a student .

12. Define an abstract base class printer. Derive three classes laser-printer, line-printer and inkjet-printer. The derived classes will have data members to store the features of that particular printer. Write pure virtual function display() in the base class and redefine it in the derived classes.

13. Define a abstract base class figure and add to it pure virtual functions

display() : to display a figure
get() : to input parameters of the figure
area() : to compute the area of a figure
perimeter() : to compute the perimeter of a figure.

Derive three classes circle, rectangle and triangle from it. A circle is to be represented by its radius, rectangle by its length and breadth and triangle by the lengths of its sides. Write a main function and write necessary statements to achieve run time polymorphism.
14. Write an interactive program to compute square root of a number. The input value must be tested for validity. If it is negative, the user defined function *my_sqrt*() should raise an exception.

Particulars of course designer:

Name: Prof. Anjana Kakoti Mahanta
Contact No.: 9864425716
E-mail id : anjana@gauhati.ac.in

Paper Name: Data Structure

1. **Learning Outcomes**: At the end of the course, students will be able to:
    - Understand and apply the fundamental data structures and algorithms – such as arrays, linked lists, stacks, queues, trees, sorting and searching algorithms using C programming language.
    - Analyze the time and space complexity of different algorithms and choose the appropriate algorithm for a given problem.
    - Develop efficient algorithms to solve various computational problems by utilizing data structures and algorithms covered in the course.

2. **Prerequisites**: NIL

3. Semester: 4

4. Course Type: Elective

5. Course Level: 200-299

6. Theory Credit: 3

7. Practical Credit: 1

8. No of required hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Reference Books:

e) Weiss, Mark Allen. "Data Structures and Algorithm Analysis in C". 3rd ed., Pearson, 2012
f) Sedgewick, Robert. "Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms". 3rd ed., Addison-Wesley Professional, 2002.
g) Goodrich, Michael T., and Roberto Tamassia. "Data Structures and Algorithms in C". 2nd ed., Wiley, 2011.
h) Gilberg, Richard F., and Behrouz A. Forouzan. "Data Structures: A Pseudocode Approach with C". Narosa Publishing House, 2009.

10. Contents of Syllabus:

A. Theory

Unit 1: Data Structures Overview and Arrays (8 Lectures)

Concepts of Data Types, Abstract Data Type, Data Structure, Fundamental and Derived Data Types. Importance of data structures. Array as a data structure (characteristics, advantages, disadvantages). Representation of arrays – single and multidimensional. Address calculation of array element using column and row major ordering. Address translation functions for one & two dimensional arrays. Insertion and deletion in arrays. Use of arrays for large number representation.

Unit 2: Linked Lists (9 Lectures)

Initialization and implementation of structures. Structure and pointers. Self referential structure. Introduction to linked lists. Singly linked list, doubly linked list, circular linked list. Operations on lists – creation, insertion, deletion, traversal, merging and splitting.

Unit 3: Stacks and Queues (9 Lectures)

Definition of Stack and Queue. Representation of stacks and queues using arrays and linked lists. Stack operations – push, pop. Queue operation – enqueue, dequeue. Circular Queue, Priority Queue, Conversion of infix arithmetic expression containing arithmetic operators and parenthesis to postfix and prefix expression. Evaluation of postfix expression.

Unit 4: Binary Trees (8 Lectures)

Definition of Trees – General tree and Binary tree. Basic terminologies – parent, child, height, depth, leaf, node, internal nodes, external nodes. Brief concept of Forest, ordered trees, strictly binary tree, complete binary tree. Representation of trees using arrays and linked lists. Binary tree traversal methods – pre-order, in-order, post-order. Recursive and non-recursive algorithms for traversal methods. Binary search trees. Operation on BST – creation, insertion and deletion of a node. Definition and characteristics of threaded binary trees. Min heap and Max heap.

Unit 5: Searching and Sorting (6 Lectures)

Linear and binary search. Indexed search. Hashing. Hash Functions – division method, mid square method, folding. Conflict resolution – linear and quadratic probe. Sorting algorithms – Insertion sort, Selection sort, Bubble sort, Merge sort, Quick sort, Counting sort, Heap sort. In-place sorting and stable sorting.

Unit 6: Analysis of Algorithm and Complexity (5 Lectures)

Complexity measures of an algorithm – Time and space complexity. Average case and worst case analysis. Asymptotic notation as a measure of algorithm complexity, O and θ notations. Analysis of sorting algorithms and Searching algorithms in terms of time and space complexity in best, average and worst case.

Time and Space complexity of algorithms, average case and worst case analysis, asymptotic notation as a measure of algorithm complexity, Θ and O notation. Analysis of sorting algorithms-Selection sort, Bubble sort, Insertion sort, Heap sort, Quick sort and analysis of searching algorithms – linear search and binary search.

List of Practical

(This is a suggestive list only. Questions need not be restricted to this list. The practical are advised to be performed in Linux environment using C programming language.)

31. Write a program to declare an array and initialize the values according to the user. Now ask the user for a number *n* and return the n^{th} element from the array.
32. Write a program to implement array initialized with the numbers divisible by three up to 30. Write a function which accepts the array and return the positions of the even numbers in the array.
33. Implement linked list in a program by writing functions for the following:
    a. Create a singly linked list of *n* nodes
    b. Count the number of nodes in the list
    c. Print the values of all the nodes
    d. Add a node at first, last and k^{th} position in the linked list

    e. Delete a node from first, last and k^{th} position
    f. Search for an element in the list. If found, return the position of the node. If not found, return a negative value.
34. Write a program to implement doubly linked list.
35. Write a function to concatenate two linked lists.
36. Write a program to take a number k and split the linked list after k^{th} position.
37. Write a program to merge two sorted linked lists.
38. Write a program to implement list of lists.
39. Write a program to implement stack using array. Use push and pop operations on the array representation of the stack. Check whether the stack is full or empty.
40. Write a program to implement stack using linked list. Use push and pop operations on the stack by inserting nodes and deleting nodes from the linked list. Also check if the stack is full or empty.
41. Write a program to evaluate a simple postfix expression using stack.
42. Write a program to convert a decimal number into binary number using stack.
43. Write a program to implement queue using array. Add new elements to the queue and remove elements from the queue represented by array. Check whether the queue is full or empty.
44. Write a program to implement queue using linked list. Add new elements to the queue and remove elements from the queue represented by linked list. Also check whether the queue is full or empty.
45. Implement binary search and linear search algorithms on arrays.
46. Implement binary search tree using array by writing a program to:
    a. Create a binary search tree using array
    b. Print the prefix notation of the BST
    c. Print the infix notation of the BST
    d. Print the postfix notation of the BST
    e. Search for an element in the BST
47. Implement binary search tree using linked list by writing a program to:
    a. Create a binary search tree using linked list
    b. Print the prefix notation of the BST
    c. Print the infix notation of the BST
    d. Print the postfix notation of the BST
    e. Search for an element in the BST
48. Implement following sorting algorithms:
    Bubble sort, Insertion sort , Selection sort, Counting sort

Particulars of Course Designer:
Name : Risheraj Baruah
Contact No. : +91 8486942427
Email id : rishirajbaruah@gauhati.ac.in

Paper Name: Database Management System

1. **Learning Outcome:**

   On successful completion of this course, the student should be able to:
   - Learn database concepts and its architectural components.
   - Describe different data models used for designing a database.
   - To create a database using relational models and entity relationships concepts
   - Normalize a database into various normal forms
   - Design SQL queries to handle a relational database.
2. **Prerequisite:** NIL
3. **Semester: 4**
4. **Course Type: Compulsory**
5. **Course Level: 200-299**
6. **Theory Credit:** 3
7. **Practical Credit:** 1
8. **Number of required hours:**
   a) Theory: 45 hrs
   b) Practical: 30 hrs
   c) Non Contact: 5 hrs

8. List of reference books:

a) Dr. Satinder Bal Gupta and Aditya Mittal, *Introduction to Database Management System¸* University Science Press
b) A. Silberschatz, H.F. Korth, S. Sudarshan, *Database System Concepts*, McGraw Hill
c) R. Elmasri, S.B. Navathe, *Fundamentals of Database Systems*, Pearson Education
d) Dr. Rajive Chopra, *Database Management System (DBMS): A Practical Approach*, S. Chand Publication

8. Detailed Syllabus:

UNIT-1: **Introduction to Database Management Systems** **(5 Lectures)**

Basic Definition and Concepts: *Data, Information, Meta Data, Data Dictionary, Database, Fields*, *Records* and *Files*. Definition of Database Management System (DBMS), Primary Functions of DBMS, Traditional File approach, Traditional file approach versus database management system approach, Disadvantages of Traditional File System, Need of a DBMS, Components of a DBMS, Advantages of DBMS, Disadvantages of Database Systems, Various uses of database System Applications, Database Users: *End users or naive users*, *Online users*, *Application Programmers*, *Database Administrator*(*DBA*), Responsibilities of DBA.

UNIT 2: Database Management System Architecture **(6 Lectures)**

Definition of *Schemas*, *sub-schema* and *Instances*. Data Independence: *Physical Data Independence* and *Logical data Independence*. Three-tier architecture of DBMS, Advantages of three-level Architecture, basic concept of data model, Characteristics of

Data Models, Types of Data models: *Record Based Data Models*, *Object Based Data Model* and *Physical Data Models*. Relational Data Model, Types of database Systems: *Single-user* database systems, *Multiuser* database systems, *Centralized* database systems, *Distributed* database systems and *Client/Server* database systems.

UNIT 3: E-R Modeling (8 Lectures)

Basic Concepts: *Entity*, *Attributes*, *Entity Sets*, *Domain*. Types of attributes: *Simple and Composite Attributes*, *Single Valued and Multi-valued Attributes*, *Derived Attributes and Stored Attributes*. Types Of Entity Sets*: Strong Entity Sets* and *Weak Entity Sets.* Concept of Relationship and Relationship sets, Types of Relationship: One-to-One, One-to-Many, Many-to-One and Many-to Many, Various Symbols used in ER Diagram, Mapping constraints: *Mapping Cardinalities (Cardinality Ratios)* and *Participation Constraints*. Definition of Key, Types of Keys: *Super Key*, *Candidate Key, Primary Key, Alternate Key* and *Foreign Key*. Symbols used in E-R diagrams, Conversion of an ER and Diagram in to Relational Tables

UNIT4: Relational Model and Relational Algebra (7 Lectures)

Definition of Relation, Data Structure of Relational Database: *Relation*, *Tuples*, *Attributes Domain, Degree* and *Cardinality.* Integrity Constraints, Domain Constraints, Key Constraints, Advantages and Disadvantages of Relational Model, Relational, Definition of Relational algebra, Operations in Relational Algebra: *Selection*, *Projection, Division, Rename, Union, Intersection, Set Difference, Natural-join operation, Outer join, Inner Join, Cartesian Product* and *Assignment operation*. Aggregate Functions and Operations: *Average, Maximum, Minimum, Sum* and *Count*.

UNIT 5: Functional Dependency and Normalization (8 Lectures)

Definition of Functional Dependency, Armstrong's Axioms in Functional Dependency, Types of Functional Dependency: *Partial Dependency, Full Functional Dependency, Transitive and Non-transitive Functional Dependency*, Armstrong's Axiom, Closure of a set of Functional Dependency, Closure of an Attribute, Definition of Canonical Cover, Algorithm to find the canonical cover of a FD set, Anomalies in relational database*: Insertion*, *Deletion* and *Update* anomalies, Concepts of Normalization, Benefits of Normalization, Types of Normal Forms: First Normal Form (1NF), Second Normal Form (2NF), Third Normal Form (3NF) and Boyce–Codd Normal Form (BCNF)

UNIT 6: Transaction and Concurrency Control (4 Lectures)

Definition of Transaction, ACID Properties of transaction, Transaction States, Definition of Concurrency Control, Need of Concurrency Control, The Lost Update Problem, The Uncommitted Dependency Problem, The Inconsistent Analysis Problem, Serializability: *View Serializability* and *Conflict Serializability*

UNIT 7: SQL Queries (7 Lectures)

Database Languages (Data Definition Languages, Data Manipulation Languages), Characteristics of SQL, Basic data types in SQL, Data-definition language (DDL) commands: *Create Database, Create Table*, *Drop Table*, *Alter Table*. SQL Constraints: *Primary Key, Foreign Key, Not Null, Unique, Check, Defaul,*. Data Manipulation Language (DML) commands: *Insert Into*, Delete, *Select*, *Update*. SQL clauses: *Where, Order By, Having, Group By* and *Like*. SQL join operations: *Inner Join, Left Outer Join, Right Outer Join* and *Full Join*. SQL aggregate functions: *sum(), count(), max(), min()* and *avg()*

Lab Contents:

Practical / Lab work to be performed:

- Implementation of SQL DDL statements in MySQL DBMS: CREATE DATABASE, CREATE TABLE, ALTER TABLE, RENAME, DROP DATABASE/TABLE
- Use of SQL DML statements in MySQL DBMS: INSERT, SELECT, UPDATE, DELETE SQL commands
- Implementing following constraints in MySQL DBMS: PRIMARY KEY, FOREIGN KEY, NOT NULL, UNIQUE and DEFAULT
- Handling following SQL clauses in MySQL DBMS: WHERE, GROUP BY, ORDER BY, HAVING, IN, BETWEEN, LIKE
- Working with following aggregate functions in MySQL DBMS: COUNT, AVG, MAX, MIN and SUM
- Working with transaction processing command in MySQL DBMS: START TRANSACTION, COMMIT and ROLLBACK Statements, SET autocommit

Particulars of course designer:

Name : Dwipen Laskar
Contact No : +916000795681
Email-id : laskardwipen@gauhati.ac.in

Paper Name: Mathematical Foundation of Computer Science

1. Learning Outcome: After successful completion of this course, students will be able to:

- Learn the concepts of set, relation, and function from Computer Science point of view.
- Understand the basic idea of counting and use it in counting under various constraints.
- Understand graphs and its different representations in Computers. How to model real life problems using graphs. Learn a few basic graph traversal algorithms.
- Understand Mathematical Logic from algorithmic point of view.

2. Prerequisities: Nil
3. Semester: 4
4. Course Type: Elective
5. Course Level: 200-299
6. Theory Credit: 4
7. Practical Credit: 0
8. No of Hours:

a) Theory: 60 hrs
b) Practical: 0 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) *Elements of Discrete mathematics*, C.L. Liu , D.P. Mahopatra; 2nd Edition , Tata McGraw Hill, 1985,
b) **Discrete Mathematics and Its Applications**, Kenneth Rosen, Sixth Edition ,McGraw Hill 2006.
c) *Introduction to Algorithms*, T.H. Coremen, C.E. Leiserson, R. L. Rivest; 3rd edition Prentice Hall of India, 2009.
d) *Discrete Mathematics and Graph Theory*; Grimaldi, 5th Edition; 2019, Pearson.

10. Contents of Syllabus:
A. Theory
UNIT 1: **(16 Lectures)**
Sets, Relations and Functions

Sets: definition of set, cardinality of sets, finite, countable and infinite sets. Operations on sets, Venn diagram. Principle of inclusion and exclusion and their applications on simple problems. Multisets.

Relations: Definition and properties of binary relations, closures of relations, equivalence relations, equivalence classes and partitions, n-ary relations and representation of n-ary relations as tables. Partial ordering relations and lattices,

Functions: Definition of function**,** one-to-one and onto, principles of mathematical induction. Concave and convex functions.

UNIT 2: Combinatorics **(15 lectures)**

Basic of counting principles, principle of inclusion-exclusion, application of inclusion and exclusion, Mathematical Induction. Pigeonhole principle, generalized Pigeonhole principle and its application, permutations and combinations, circular permutations, permutations with repetitions, combinations with repetitions, permutations of sets with indistinguishable objects

UNIT 3: Growth of Functions (5 Lectures)

Asymptotic behavior of functions, Asymptotic Notations - Big-O and Theta. Summation formulas and properties, Bounding Summations.

UNIT 4: Graph Theory (12 Lectures)

Basic Definition of graph, Directed, Undirected and Weighted Graphs. Representation of graphs in Computers – Adjacency Matrix and Adjacency Lists. Degree of vertices – indegree and outdegree. Paths, Cycles and Acyclic graphs. Simple operations on graphs and amount of computations required for each operation. Connected graph, Tree and Forest. Bipartite graph, Algorithms on graph traversals- Breadth first search, Depth first search.

UNIT 5: Mathematical Logic (12 Lectures)

Connectives, truth tables, Tautologies and Contradictions, Equivalence and Implications, NAND and NOR, Normal forms- CNF, DNF, Converting expressions to CNF and DNF, Theory of inference, Propositional Calculus, Predicate calculus (only introduction), predicates and quantifiers.

Particulars of course designer:

Name: Prof. Anjana Kakoti Mahanta
Contact No.: 9864425716
E-mail id : anjana@gauhati.ac.in

Paper Name: Operating System

1. **Learning Outcomes**: After successful completion of this course, students will be able to:
    - Learning Outcomes: After completing this course, students will have understanding of the internal structure and usage of various components related to an operating system.

2. Prerequisites: NIL

3. Semester: 4

4. Course Type: Elective

5. Course Level: 200-299

6. Theory Credit: 3

7. Practical Credit: 1

8. No of required hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Reference Books:

i) Operating System Concepts, Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Wiley
j) Modern Operating Systems, Andrew S. Tanenbaum, Prentice-Hall Of India Pvt. Limited

10. Contents of Syllabus:

A. Theory

Unit I: Introduction (7 hrs)

Application vs system software, operating system as system software, operating structure structure, types of operating systems: batch operating system, multiprogramming operating system, multi tasking operating system, distributed operating system, real time operating system, multi user operating system, major functions of operating system: Process Management, Process Synchronization, Memory Management, CPU Scheduling, File Management, I/O Management, Security, virtualization, cloud computing, open source operating system, history of operating system, the shell, system call, system boot

Unit II: Process and threads (10 hrs)

Process, process states: new, running, waiting, ready and terminated, Process Control Block (PCB), information stored in PCB, scheduling queue: job queue, ready queue and device queue, schedulers: long term schedulers, medium term scheduler and long term scheduler, swapping, degree of multiprogramming, I/O-bound and CPU-bound processes, context switching, inter-process communication: shared memory systems and message passing systems, socket, remote procedure call, threads, user threads, kernel threads, multi threading models: Many-to-One Model, One-to-One Model, Many-to-Many Model, CPU scheduling, Scheduling Criteria, scheduling algorithms: First-Come, First-Served Scheduling, Shortest-Job-First Scheduling, Priority Scheduling, Round-Robin Scheduling, Multilevel Queue Scheduling, Multilevel Feedback Queue Scheduling

Unit III: Process synchronization (8 hrs)

Race condition, critical section problem, Peterson's algorithm, Bakery algorithm, synchronization hardware: locking, synchronization software tools: mutex lock, semaphore (counting and binary), semaphore implementation, classic synchronization problems: bounded buffer problem, the readers –writers Problem, the dining-philosophers problem, monitor, synchronization in windows, synchronization in Linux

Unit IV: Deadlock (10 hrs)

Deadlock, operations of a process performs while using a resource: Request. Use and Release, physical and logical resources, Necessary conditions: mutual exclusion, hold & wait, no preemption and circular wait, resource allocation graph, deadlock prevention: definition, preventing mutual exclusion, preventing hold & wait, preventing no preemption and preventing circular wait, deadlock avoidance: definition, safe state, safe sequence, resource allocation graph based algorithm and Banker's algorithm, deadlock detection: definition, wait-for graph, algorithm to detect deadlock for single instance resources, algorithm to detect deadlock for multiple instance resources and recovery from deadlock: process termination and resource preemption

Unit V: Memory Management (10 hrs)

Memory hierarchy, base register, limit register, address binding, logical and physical address spaces, memory management unit, relocation register, swapping, contiguous memory allocation: definition, memory protection, fixed partition scheme, variable partition scheme, first-fit, best-fit & worst-fit allocation strategies, non-contiguous memory allocation: simple paging and simple segmentation, internal and external fragmentation, TLB, virtual memory, demand paging, page fault, locality of reference principle, performance of demand paging, page replacement algorithms: FIFO, Optimal and LRU, allocation of frames: equal allocation and proportional allocation, global and local page replacement algorithms, thrashing

Practicals:

- Basic linux commands: pwd, ls, cd, mkdir, rmdir, rm, touch, man, cp, mv, locate, head, tail Advanced commands: echo, cat, sudo, df, tar, apt-get, chmod, hostname, useradd, passwd, groupadd, grep, sed, uniq, wc, od, gzip, gunzip, find, date, cal, clear, top, ps, kill
- Shell scripting in linux: shell, types of shell, shell script, echo command, shell variables,
- special variables ($$, $0, $n, $#, $?, $!), array, assignment operator (=), equality operator (==), not equality operator (!=), arithmetic operators (+,-, *, /, %), comparison operators (-eq, -neq, -gt, -lt, - ge, -le), logical operators (!,-o, -a), if...else statement, case...esac statement, while loop, for loop, break statement, continue statement, shell functions 7 classes
- Using system calls in C program in linux: fork(), exec(), exit(), getpid(), mkdir(), rmdir() etc.

Particulars of course designer:

Name: Dr. Hasin Afzal Ahmed
Contact No.: 8011810533

E-mail id: hasin@gauhati.ac.in

Paper Name: Computer Networks

1. Learning Outcome: After completing this course, students

- Student will able to learn about the general principles of data communication.
- Student will able to learn about how computer networks are organized with the concept of layered approach.
- Student will able to learn about how signals are used to transfer data between nodes.
- Student will able to learn about how packets in the Internet are delivered.
- Student will able to learn about how routing protocols work.
- Student will able to learn about functions of transport layer
- Student will able to learn about functions of application layer

2. Prerequisites: NIL

3. Semester: 5

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 3

7. Practical Credit: 1

8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) B. A. Forouzan: *Data Communications and Networking*, Fourth edition, THM, 2007.
b) A. S. Tanenbaum: *Computer Networks*, Fourth edition, PHI , 2002.

10. Contents of Syllabus:

A. Theory

Detailed Syllabus:

UNIT 1: Introduction to Computer Networks **(5 Lectures)**

Data communication system and its components, Definition of network, Types of network, Network topologies, Network protocol, Layered network architecture, Overview of OSI reference model, Overview of TCP/IP protocol suite.

UNIT 2: Physical Layer Communication **(10 Lectures)**

Analog and digital signal, Definition of bandwidth, Maximum data rate of a channel, Line encoding schemes, Transmission modes, Modulation techniques, Multiplexing techniques- FDM and TDM, Transmission media-Guided and Unguided, Switching techniques- Circuit switching, Packet switching, Connectionless datagram switching, Connection-oriented virtual circuit switching.

UNIT 3: Data Link Layer Functions and Protocol **(10 Lectures)**

Definition of Framing, Framing methods, Error detection techniques, Error correction techniques, Flow control mechanisms- Simplex protocol, Stop and Wait ARQ, Go-Back-N ARQ, Point to Point protocol.

UNIT 4: Multiple Access Protocol and Networks (5 Lectures)

Basics of ALOHA protocols, Basics of CSMA/CD protocols, Ethernet LANS, Connecting LAN and back-bone networks- Repeaters, Hubs, Switches, Bridges, Router and Gateways

UNIT 5: Networks Layer Functions and Protocols (8 Lectures)

Connection oriented vs Connectionless services, Definition of Routing, Routing algorithms, IP protocol, IP addresses, ARP, RARP

UNIT 6: Transport Layer Functions and Protocols (4 Lectures)

Transport services, TCP vs UDP protocol, TCP connection establishment- Three way handshakes, TCP connection release

UNIT 7: Overview of Application Layer Protocols (3 Lectures)

Overview of DNS, Overview of WWW, URL, Email architecture, HTTP protocol

B. Practical / Lab work to be performed (15 Practical Classes)

- Implement the data link layer farming methods such as Bit Stuffing.
- Study of different types of Network cables.
- Study of network IP.
- Connect the computers in Local Area Network.
- Study of basic network command and Network configuration commands.
- Configure a Network topology using packet tracer software.
- Simulate Cyclic Redundancy Check (CRC) error detection algorithm for noisy channel.
- Simulate and implement Stop and Wait protocol for noisy channel.
- Simulate and implement Go-Back-N sliding window protocol.
- Simulate and implement Selective Repeat sliding window protocol.
- Simulate and implement Dijkstra Algorithm for shortest path routing.
- Simulate and implement Distance vector routing algorithm

Particulars of Course Designer:

Name: Dr Irani Hazarika
Contact No: 8486965773
Email: queensarathi@gmail.com

Paper Name: Java Programming

1. Learning Outcome: After completing this course, students will be

- Familiar with the core concepts of java programming and classes of swing package.

2. Prerequisites: NIL
3. Semester: 5
4. Course Type: Elective
5. Course Level: 300-399
6. Theory Credit: 3
7. Practical Credit: 1
8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) *Java: The Complete Reference*, Herbert Schildt, McGrawHill
b) *Java How to Program,* Paul Deitel, Harvey Deitel, Pearson

10. Contents of Syllabus:
A. Theory
Detailed Syllabus:

Unit I: Introduction (3 hrs)

High level language, compiled and interpreted languages, history of java programming language, compilation of java code, bytecode, java interpreter, javac and java command, path environmental variable, Java IDE, features of java programming language: simple, object oriented, robust, architecture neutral and interpreted

Unit II: Data types, operators and control statements (12 hrs)

Java as strongly typed language, primitive data types, integer data types: byte, short, int and long, floating point data types: float and double, character data type, boolean data type, literals: integer literals, floating-point literals, boolean literals, character literals and string literals, declaring a variable, dynamic Initialization, the scope and lifetime of variables, type-casting in java, one dimensional array, multi dimensional array, arithmetic operators: the basic arithmetic operators, the modulus operator, arithmetic compound assignment operators, increment operator and decrement operator, bitwise operators, relational operators, short circuit logical operator, the assignment operator, branching statements: if-else and switch-case statements, looping statements: while, do-while, for and for-each statements, jump statements: break and continue

Unit III: Object oriented features of java (10 hrs)

Defining a class, member variable and member methods, access specifiers: default, private and public, declaring objects, assigning object reference variables, constructors, parameterized constructors, the this keyword, garbage collection, the finalize( ) method, overloading methods, overloading constructor, static keyword, final keyword, command line arguments in java, inheritance, super class and sub class, protected access specifier, super keyword, constructor call in multilevel inheritance, method overriding, dynamic method dispatch, abstract class, interfaces, type wrappers

Unit IV: String handling and packages (5 hrs)

String class, String constructors, String length, special string operations: string literals, string concatenation, string concatenation with other data types, string conversion and toString( ), character extraction: charAt( ), getChars( ), string Comparison: equals( ) and equalsIgnoreCase(), regionMatches( ), startsWith( ) and endsWith( ), equals( ) Versus ==, compareTo( ), searching strings, data conversion using valueOf( ), StringBuffer, StringBuffer constructors, length( ) and capacity( ), ensureCapacity( ), setLength( ), charAt( ) and setCharAt( ), getChars( ), package, defining a package, CLASSPATH, importing packages

Unit V: Exception handling and I/O (5 hrs)

Exception-handling, exception types, uncaught exceptions, try and catch block, multiple catch blocks, nested try statements, throw, throws, finally, java's built-in exceptions, creating own exception classes, java I/O classes, reading console input, writing console output, reading and writing files

Unit VI: Swing package and database connectivity (10 hrs)

Swing package, simple GUI-Based Input/Output with JoptionPane, Jframe, JLabel, JTextField, Jbutton, handling event in a Jframe object, layout managers: BorderLayout, FlowLayout, GridLayout, CardLayout, GridBagLayout, JtoggleButton, JCheckBox, JRadioButton, Jlist, JcomboBox, JDBC, JDBC driver, connectivity steps, connectivity with MySQL, DriverManager class, Connection class, Statement class, ResultSet class, PreparedStatement class

(b) Practical

- Java programs to demonstrate the use of data types and operators
- Java input through Scanner class and JOptionPane class
- Java programs to demonstrate the use of control statements.
- Java programs to demonstrate the use of classes, objects, visibility modes, constructors and destructor.
- Java programs to demonstrate the use of inheritance and polymorphism.
- Java programs to demonstrate the use of polymorphism.
- Java programs to handle strings,Java programs implementing exception handling.
- Demonstrating the use and creation of packages in java.
- Java program with JFrame, JTextfield and JButton with event handling
- Using JLabel, JTextArea and JPasswordField in java with event handling
- Working with layout managers in JFrame
- Using JCheckBox, JRadioButton and JComboBox in a JFrame

- Connecting JFrame components to a DBMS

Particulars of course designer:

Name: Dr. Hasin Afzal Ahmed
Contact No.: 8011810533
E-mail id: hasin@gauhati.ac.in

Paper Name: Python Programming

1. Learning Outcome: After completing this course, students

- Know about fundamentals of Python Programming and Problem Solving.

2. Prerequisites: NIL
3. Semester: 5
4. Course Type: Elective
5. Course Level: 300-399
6. Theory Credit: 3
7. Practical Credit: 1
8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

c) *Core Python Programming*, R. Nageswara Rao, Dreamtech Press.
d) *Python: The Complete Reference*, Martin C. Brown, McGraw Hill Education.
e) http://docs.python.org/3/tutorial/index.html

10. Contents of Syllabus:
A. Theory
Detailed Syllabus:

Unit 1: Introduction to Python Programming (8 hrs)
Introduction, Installation of Python Interpreter, Python Shell, Code Indentation, Identifiers and Keywords, Literals, Strings, Operators (Arithmetic, Relational, Logical, Assignment, Ternary, Bitwise, Increment and Decrement Operators), Input and output statements, Output Formatting.

Unit 2: Control Statements and Functions (8 hrs)
Branching, Looping, Conditional Statement, Exit Functions, Break, Continue, Pass, Defining Functions, Default Arguments. Scope of Functions, Function Documentation, Lambda Functions & Map.

Unit 3: Python Data Structures (6 hrs)
List (List, Nested List, List as Matrix), Tuple, Set, Dictionary.

Unit 4: Exception Handing (4 hrs)
Errors, Exception Handling with try, Multiple Exception Handling, Writing own Exception.

Unit 5: File Handling (6 hrs)

Understanding read function, read(), readline() and readlines(), Understanding write functions, write() and writelines(), Programming using file operations, Reading config files, Writing log files in python.

Unit 6: OOP in Python

Creating Classes in Python, Instance Methods, Inheritance, Polymorphism, Exception Classes and Custom Exceptions.

Unit 7: Introduction to Libraries in Python (6 hrs)

NumPy, Matplotlib, OpenCV, Tkinter.

Unit 8: Python SQL Database Access (7 hrs)

Introduction to database driven program, Database Connection, Database Operations: INSERT, READ, UPDATE, DELETE, COMMIT AND ROLLBACK.

(b) Practical

- Introduction to Python console, operators, input and output statements.
- Python control statements and functions
- Data Structures in python
- Exception Handling
- File Handling
- Object Oriented Python programming
- Introduction to libraries (NumPy, Matplotlib, OpenCV)
- Python SQL Database Connection and database operations

Particulars of course designer:

Name: Dr. Sanjib Kr Kalita
Contact No.: 8812051150
E-mail id: sanjib959@gauhati.ac.in

Paper Name: Software Engineering

1. **Learning Outcome:** On successful completion of this course, the student should be able to:
    - Determine the primary problems that impact all software development processes.
    - Choose relevant software development processes models, methodologies, and strategies for managing a specific software development process, and justify the choices
    - Implement different software estimation metrics such as cost, effort size, staffing etc.
    - Describe various software design approaches and various coding and testing strategies used in software engineering principles
    - Know about software reliability and how to calculate software maintenance cost.

2. Prerequisites: NIL
3. Semester: 5
4. Course Type: Elective
5. Course Level: 300-399
6. Theory Credit: 4
7. Practical Credit: 0
8. No of Hours:

a) Theory: 60 hrs
b) Practical: 0 hrs
c) Non Contact: 5 hrs

9. List of Books:

c) Rajib Mall: *Fundamentals of Software Engineering*; PHI Learning Pvt. Ltd.
d) Roger S. Pressman: *Software Engineering: A practitioner's Approach*; McGraw Hill.

10. Contents of Syllabus:
A. Theory
Detailed Syllabus:
Unit 1: Introduction (4 Lectures)

Definition of Software Engineering, differentiation between Computer Science, Software Engineering and System Engineering, Program V/s software product, Exploratory style and modern style of software development, need of software engineering, characteristics of good software product

Unit 2: Software Development Life Cycle models (7 Lectures)

Definition of software development Life cycle (SDLC) models, Various life cycle modes: Classical Waterfall model, Iterative Waterfall model, Prototyping model, Evolutionary (Incremental) model, Spiral model, Agile Model, Agile V/s traditional SDLC Models, SCRUM model, Advantages and disadvantages of each of these SDLC models.

Unit 3: Requirement Analysis and Specification (7 Lectures)

What is Requirement Analysis and Gathering, Concept and Importance of Feasibility Study in Software design, Types of Feasibility: *Technical*, *Economical* and *Operational* feasibility, Software Requirement Specification (SRS) document, Components of an SRS (Software Requirement Specification): Functional and Non-Functional Component, Properties of a good SRS, Different users of SRS, Techniques to represent Complex Logic in SRS: Decision Tree and Decision Table.

Unit 4: Software Project Management (15 Lectures)

Basic idea of Software Project Management, Job Responsibilities of a Software Project Manager, Need of SPMP (Software Project Management Plan) document, Contents of SPMP, Need of Software documentation, Internal and External documentation, Software size estimation using Lines of Code (LOC), Merits and Demerits of LOC metric, Function Point Metric, 3D Function Point metrics, Project Estimation Techniques: *Empirical estimation* and *Heuristics estimation* techniques. Empirical estimation techniques: *Delphi Cost Estimation* and *Delphi Cost Estimation.* Heuristic Estimation Techniques: *Basic COCOMO model* and *Intermediate COCOMO model.* Project Scheduling: *Work break down structure, Activity Networks* and *Critical Path Method.* Project Team structure: *Chief Programmer team* and *Democratic team* structure.

Unit 5: Software Design principles and Methodology (12 Lectures)

Top down and bottom up approach, External Design, Architectural Design and Detailed design, Concept of Cohesion in software design, Classification of Cohesions, Basic concept of Coupling, Classification of Couplings, Introduction to software Analysis and Software Design (SA/SD), Introduction to Data Flow Diagram, Symbols used in DFD, Context Diagram in DFD, Advantages and Disadvantages of DFDs., Balanced DFD, Structured Design: *Transaction Analysis* and *Transform Analysis.* Need of Object Oriented Design and Analysis, UML (Unified Modeling Language), different views of UML, Various UML Diagrams: *Use Case diagram, Class Diagram, Object Diagram*, *Sequence Diagram* and *Collaboration diagram.*

Unit 6: Coding and Testing (9 Lectures)

Goals of coding, Code Review techniques: Code Walkthrough, Code Inspection, Definition of Test cases, test suits, negative testing and positive testing. Different levels of software testing: *unit testing*, *Integration Testing*, *System Testing* and *acceptance testing*. Differentiation between Verification and Validation, Black box testing approaches: *Equivalent Class Partitioning* and *Boundary Value Analysis*, White Box testing approaches: *Statement Coverage*, *Branch Coverage, Condition* Coverage and Path *Coverage. Approach*, MaCabe's Cyclomatic Complexity, Basic idea of various system testing approaches: *Smoke testing, Stress testing, Volume testing* and *Compatibility testing*

Unit 7: Software Reliability and Maintenance (6 Lectures)

What is reliability? Reliability metrics of Software Products: ROCOF, MTTF, MTTR, MTBF, POFOD and availability. ISO 9000 Certification, need of ISO Certification, How to get ISO 9000 certification, Definition of Software Maintenance, Types of Software maintenance: *Corrective, Adaptive* and *Perfective* maintenance, Estimation of Software Maintenance Cost.

Particulars of course designer:

Name : Dwipen Laskar
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Paper Name: Web Technologies

1. Learning Outcome: At the end of the course, students will be able to:

- Understand the basic concept of web applications and web services.
- Design basic well-structured web page using HTML and CSS
- Develop the ability to implement interactive elements and dynamic content using basic JavaScript
- Develop a foundational understanding of server-side scripting using PHP

2. Prerequisities: NIL
3. Semester: 5
4. Course Type: Compulsory
5. Course Level: 300-399
6. Theory Credit: 3
7. Practical Credit: 1
8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

e) Jackson J.C. (2007). *Web Technologies: A Computer Science Perspective*. Pearson.
f) Duckett, J. (2011). *HTML and CSS: Design and Build Websites*. John Wiley & Sons.
g) Robbins, J. N. (2018). *A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics*. O'Reilly Media.
h) Robbins, J. N. (2018). *Learning Web Design: A Beginner's Guide.* O'Reilly Media.
i) Haverbeke, M. (2018). *Eloquent JavaScript*. No Starch Press.
j) Welling, L., & Thomson, L. (2016). *PHP and MySQL Web Development* (5th ed.). Addison-Wesley Professional.

10. Contents of Syllabus:
A. Theory
Detailed Syllabus:
Unit 1: Introduction to Web Technologies (8 Lectures)

Concepts of the Internet and the World Wide Web (WWW), Overview of web browsers and their functionalities. Client-Server Architecture in Web Applications. Communication Protocols – HTTP, HTTPS, FTP. Working of DNS. Brief concepts of port, URL, cache and cookies. Web Content Accessibility Guidelines. Privacy concerns and data protection regulations, GDPR. Introduction to Web Hosting and control panels.

Unit 2: Front End Development using HTML (10 Lectures)

Website and Webpage. Basic concept of Markup Language. Introduction to HTML. Basic HTML structure. Text formatting Tags – headings, paragraph, line break, horizontal rule. Link and Navigation – anchor tags. Lists - ordered, unordered, definition list. Image and multimedia tags. Tables in HTML. Forms and Input types – text, email, password, radio, select, checkbox, textarea, date, url, submit, button. Semantic HTML. Sectioning elements – header, nav, main, section, article, aside, footer.

Unit 3: Front End Design using CSS (9 Lectures)

Introduction to CSS. CSS syntax and rule structure. Inline, Internal and External CSS. CSS selectors – element, class, ID, attribute. Combinators – descendant, child, adjacent sibling, general sibling. Understanding the CSS Box Model – content, padding, border, margin. CSS colours and backgrounds – background-color, background-image, background-repeat. CSS typography – font properties, text properties.

Unit 4: Client-Side Scripting with JavaScript (10 Lectures)

JavaScript as a high-level interpreted language. JavaScript code execution in web browsers – JavaScript execution context. JavaScript syntax and datatypes. JavaScript variables – var, let, const. Assignment and scope of JavaScript variables. Operators in JavaScript – arithmetic, comparison, logical, assignment. Conditional Statements. Looping Structures. Function declaration and Invocation in JavaScript. Introduction to the Document Object Model. Accessing HTML elements in DOM – by id, by tag name, by class name, query selectors. Manipulating DOM elements – create, add, append, remove. InnerText vs InnerHTML. Manipulating CSS styles using DOM. Event handling and delegation with the DOM using JavaScript. Client-side form validation using JavaScript. Handling form validation and processing data.

Unit 5: Server-Side Programming with PHP (8 Lectures)

Introduction to PHP and role in Web development. PHP syntax and variables. Basic PHP functions – Built-in PHP functions, string manipulation functions, mathematical functions, date and time functions. PHP forms and form handling. Form submission methods – GET and POST. Handling form data with PHP. Uploading files with PHP. Introduction to the tech-stack. Role of Apache, PHP, MySQL etc. Introduction to Databases and SQL. Connecting to databases with PHP. Executing SQL queries with PHP. Retrieving, inserting, updating and deleting data from databases using PHP.

B. List of Practical

(This is a suggestive list only. Questions need not be restricted to this list.)

1. Create a basic HTML webpage structure with a heading, paragraph, and an image.
2. Build a navigation menu using an unordered list (<ul>) with clickable links.
3. Implement a form with input fields for name, email, and a submit button.
4. Create a table with multiple rows and columns to display tabular data.
5. Design an image gallery using HTML and CSS with proper padding and border.

6. Embed a YouTube video on a webpage using the <iframe> tag.
7. Implement an ordered list (<ol>) to display a step-by-step tutorial or instructions.
8. Create a dropdown select menu (<select>) with multiple options.
9. Use HTML5 semantic tags (such as <header>, <nav>, <section>, <article>, <footer>) to structure and organize content on a webpage.
10. Build a registration form with fields for name, email, password, date of birth, address and other such fields with a submit button. Include appropriate input types, labels and placeholders.
11. Style a heading element with a custom font, colour and background.
12. Apply different background colors to alternate rows in a table.
13. Implement a hover effect on a button that changes its background colour or adds a solid border.
14. Style a form input field with custom border, padding, and background color.
15. Implement a CSS tooltip that displays additional information when hovering over an element.
16. Build a simple JavaScript calculator that can perform basic arithmetic operations.
17. Create a button that, when clicked, appends a new paragraph element with a specific text content to an existing div element.
18. Implement a function that changes the innerText of a paragraph element to display a random number between 1 and 10 every time a button is clicked.
19. Build a form with input fields for name and email. When the form is submitted, use innerHTML to display a confirmation message with the entered name and email on the webpage.
20. Build a form with input fields for email, password and confirm password. When the form is submitted, use an alert to display a success message if the password and confirm password values matches, otherwise show an error alert. Use JavaScript for the validation.
21. Create a list of items. Add a click event listener to each item so that when clicked, the background color of the clicked item changes.
22. Write a PHP script to display the current date and time on a webpage.
23. Write a PHP script to connect to a MySQL database and fetch data from a table.
24. Create a registration form with fields for username, email, and password. Implement server-side validation to check for duplicate usernames or invalid email formats. Store the user registration data in a MySQL database. Provide feedback to the user upon successful registration or display appropriate error messages.
25. Design a webpage that displays a list of notices retrieved from a MySQL database. Implement functionality to add new notices to the database using a form. Allow users to view and delete individual notices. Apply appropriate styling to the notices and ensure proper validation and sanitization of user input.

Particulars of Course Designer:

Name : Risheraj Baruah

Contact No. : +91 8486942427 Email id : rishirajbaruah@gauhati.ac.in

Paper Name: Artificial Intelligence

1. Learning Outcome:

After completing this course, students will know the fundamentals of artificial intelligence (AI), identify problems where artificial intelligence techniques are applicable and able to apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.

2. Prerequisites: NIL

3. Semester: 6

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 3

7. Practical Credit: 1

8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) *Rich & Knight, Artificial Intelligence* – Tata McGraw Hill, 2nd edition, 1991.
b) *Russell & Norvig, Artificial Intelligence*-A Modern Approach, LPE, Pearson Prentice Hall, 2nd edition, 2005.
c) *W.F. Clocksin and Mellish, Programming in PROLOG,* Narosa Publishing House, 3rd edition, 2001.
d) *DAN.W. Patterson, Introduction to A.I and Expert Systems* – PHI, 2007.
e) *Ivan Bratko, Prolog Programming for Artificial Intelligence*, Addison-Wesley, Pearson Education, 3rd edition, 2000.

10. Contents of Syllabus:

A. Theory

Detailed Syllabus:

UNIT 1: Introduction (4 Hours)

Introduction to Artificial Intelligence, Background and Applications, Turing Test and Rational Agent approaches to AI, Introduction to Intelligent Agents, their structure, behavior and environment.

UNIT 2: Problem Solving and Searching Techniques (16 Hours)

Problem Characteristics, Production Systems, Control Strategies, Breadth First Search, Depth First Search, Hill climbing and its Variations, Heuristics Search Techniques: Best First Search, A* algorithm, Constraint Satisfaction Problem, Means-End Analysis, Introduction to Game Playing, Min-Max and Alpha-Beta pruning algorithms.

UNIT 3: Knowledge Representation (14 Hours)

Introduction to First Order Predicate Logic, Resolution Principle, Unification, Semantic Nets, Conceptual Dependencies, Frames, and Scripts, Production Rules, Conceptual Graphs. Programming in Logic (PROLOG)

UNIT 4: Dealing with Uncertainty and Inconsistencies (6 Hours)

Truth Maintenance System, Default Reasoning, Probabilistic Reasoning, Bayesian Probabilistic Inference, Possible World Representations.

UNIT 5: Understanding Natural Languages (5 Hours)

Parsing Techniques, Context-Free and Transformational Grammars, Recursive and Augmented Transition Nets.

Practical:

- Write a prolog program to calculate the sum of two numbers.
- Write a prolog program to find the maximum of two numbers.
- Write a prolog program to calculate the factorial of a given number.
- Write a prolog program to calculate the nth Fibonacci number.
- Write a prolog program, insert_nth(item, n, into_list, result) that asserts that result is the list into_list with item inserted as the nth element into every list at all levels.
- Write a Prolog program to remove the nth item from a list.
- Write a Prolog program, remove nth (Before, After) that asserts the After list is the Before list with the removal of every nth item from every list at all levels.
- Write a Prolog program to implement append for two lists.
- Write a Prolog program to implement palindrome (List).
- Write a Prolog program to implement max(X,Y,Max) so that Max is the greater of two numbers X and Y.
- Write a Prolog program to implement maxlist(List,Max) so that Max is the greatest number in the list of numbers List.
- Write a Prolog program to implement sumlist(List,Sum) so that Sum is the sum of a given list of numbers List.
- Write a Prolog program to implement two predicates evenlength(List) and oddlength (List) so that they are true if their argument is a list of even or odd length respectively.
- Write a Prolog program to implement reverse (List, Reversed List) that reverses lists.
- Write a Prolog program to implement maxlist (List, Max) so that Max is the greatest number in the list of numbers List using cut predicate.
- Write a Prolog program to implement GCD of two numbers.
- Write a prolog program that implements Semantic Networks/Frame Structures.

Particulars of course designer:

Name: Dr. Diganta Kumar Pathak

Contact No.: 9707737222

E-mail id: digantakumarpathak@gauhati.ac.in

Paper Name: Automata Theory and Languages

1. Learning Outcome: After completing this course, students

- Understand the Mathematical model of a finite state machine. Know deterministic and non-deterministic versions of Finite automata.
- Grasp the mathematical concepts of languages and grammar.
- Know Pushdown Automata and the associated grammar/language.
- Know the properties of Regular languages and Context free languages.

2. Prerequisites: NIL

3. Semester: 6

4. Course Type: Compulsory

5. Course Level: 300-399

6. Theory Credit: 4

7. Practical Credit: 0

8. No of Hours:

a) Theory: 60 hrs
b) Practical: 0 hrs
c) Non Contact: 5 hrs

9. List of Books:

f) *An introduction to Formal Languages and Automata*, Peter Linz,Narosa.
g) *Introduction to Automata Theory, Languages and Computation*, Hopcroft, Motwani and Ullman, Pearson.
h) Theory of Computer Science (Automata, Languages and Computation), K. L. P. Mishra, N. Chandrasekaran; P. H.I.

10. Contents of Syllabus:

A. Theory

Detailed Syllabus:

UNIT 1: Finite Automata (10 Lectures)

DFA, NFA, NFA with empty-moves, Equivalence of DFA and NFA, Reduction of the number of states in finite automata.

UNIT 2: Regular Languages and Regular Grammar (12 Lectures)

Concept of languages and grammar, Regular expressions, Connection between regular expressions and regular languages, Regular grammars, Right and Left-Linear Grammars, Equivalence between Regularlanguages and Regular grammars.

UNIT 3: Properties of Regular Languages (13 Lectures)

Closure under simple set operations- union, intersection, concatenation, complementation and star closure, Decision algorithms for emptiness, finiteness and infiniteness, equality, Proof of non-regularity using Pigeonhole principle and using pumping lemma for regular languages.

UNIT 4: Context Free languages (15 Lectures)

Context-free grammars, leftmost and rightmost derivations, derivation trees, Parsing and Ambiguity ingrammars and languages, Simplification of Context free Grammars- removing useless productions,empty-productions and unit-productions. Normal forms- Chomsky and Greibach normal forms, Pumping Lemma for CFL, Using Pumping Lemma to show that certain languages are not Context free

UNIT 5: Pushdown Automata (10 Lectures)

Definition and language accepted (acceptance by empty stack and final state and their equivalence), Pushdown Automata and Context free languages. Deterministic PDA and Deterministic Context free Languages.

Particulars of course designer:

Name: Prof. Anjana Kakoti Mahanta
Contact No.: 9864425716
E-mail id : anjana@gauhati.ac.in

Paper Name: Cloud Computing

1. Learning Outcome:

After completing this course, students will know about cloud computing environment, it need and applications.

2. Prerequisites: NIL

3. Semester: 6

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 4

7. Practical Credit: 0

8. No of Hours:

a) Theory: 60 hrs
b) Practical: 0 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) *Cloud Computing: Principles and Paradigms*, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley,2011

b) *Enterprise Cloud Computing - Technology*, Architecture, Applications, Gautam Shroff, Cambridge University Press, 2010

c) *Cloud Computing Bible*, Barrie Sosinsky, Wiley-India, 2010

d) *Cloud Security: A Comprehensive Guide to Secure Cloud Computing*, Ronald L. Krutz, Russell Dean Vines, Wiley- India,2010

e) *Cloud computing,* Ashish Bhatnagar, KATSON Books.

f) *NPTEL :Cloud computing*, By Prof. Soumya Kanti Ghosh, IIT Kharagpur

9. Contents of Syllabus:

A. Theory

Detailed Syllabus:

Unit 1: Introduction to Cloud Computing (10 Lectures)

Introduction, Definition, basic concepts and terminology, characteristics, goals and benefits, risks and challenges, historical developments, clouds types, Role of networks in cloud computing, Virtualization Technology, Enterprise knowledge clouds, Cloud Computing(NIST Model), Client server Architecture, Client server model vs. Cloud model.

Unit 2: Cloud Computing Architecture (10 Lectures)

Introduction, Cloud Computing stack, Service models(XaaS) : Infrastructure as a Services(IaaS), Platform as a service(PaaS), Software as a Service(SaaS), Application of XaaS, Deployment Models, Microsoft Azure vs Amazon EC2

Unit 3: Service Management in Cloud Computing (10 Lectures)

Service Level Agreements(SLAs), SLA contents, Web Service SLA, Difference between Cloud

SLA and Web service SLA, Types of SLA, Service level objectives, Service level management, Considerations for SLA, SLA requirements, Cloud properties: Economic viewpoint

Unit 4: Data Management in Cloud Computing (10 Lectures)

Introduction: Relational database, Google File system, BigTable, MapReduce, Data Storage Techniques, Looking at Data, Scalability & Cloud Services, Database & Data Stores in Cloud, Large scale data processing, Parallel database.

Unit 5: Cloud Security (10 Lectures)

Security – Basic components, Security attacks, Infrastructure Security, Data Security and Storage, Identity and Access Management, Access control, Trust, Reputation, Risk.

Unit 6: Case Study on Open Source and Commercial clouds (10 Lectures)

OpenStack, OpenStack Capability, OpenStack History, OpenStack Architecture, OpenStack components, Meghamala(IITKGP), Google Cloud Platform, Microsoft Azure

Particulars of course designer:

Name: Dr. Sanjib Kr Kalita
Contact No.: 8812051150
E-mail id: sanjib959@gauhati.ac.in

Paper Name: Complier Design

1. Learning Outcome:

a) Use compiler construction tools and describes the Functionality of each stage of compilation process
b) Construct Grammars for Natural Languages and find the Syntactical Errors/Semantic errors during the compilations using parsing techniques
c) Analyze different representations of intermediate code.
d) Construct new compiler for new languages.
e) Participate in GATE, PGECET and other competitive examinations

2. Prerequisites: NIL
3. Semester: 6
4. Course Type: Elective
5. Course Level: 300-399
5. Theory Credit: 4
6. Practical Credit: 0
7. No of Hours:

a) Theory: 60 hrs
b) Practical: 0 hrs
c) Non Contact: 5 hrs

8. List of Books:

a) *Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman* (2007), *Compilers:Principles, Techniques and Tools*, 2nd edition, Pearson Education, New Delhi, India.
b) Alfred V. Aho, Jeffrey D. Ullman (2001), *Principles of compiler design*, Indian student edition, Pearson Education, New Delhi, India.
c) *Kenneth C. Louden (1997), Compiler Construction– Principles and Practice*, 1st edition, PWS Publishing.
d) *K. L. P Mishra, N. Chandrashekaran (2003*), *Theory of computer science- Automata Languages and computation*, 2nd edition, Prentice Hall of India, New Delhi, India.
e) *Andrew W. Appel (2004*), *Modern Compiler Implementation C*, Cambridge University Press, UK.
f) *John R. Levine, Tony Mason, Doug Brown*, *Lex & Yacc*, O'reilly

9. Contents of Syllabus:

A. Theory

Detailed Syllabus:

UNIT 1: Introduction to Compiler (12 Lectures)

Definition of compiler, Phases of a compiler, Lexical analysis, Role of lexical analyzer, Tokens, Patterns, Lexemes, Input buffering, Specification of tokens-strings and languages, operations on languages, regular expressions, regular definitions, Recognition of tokens, Lexical analyzer generator- Lex, Finite automata, From Regular expressions to automata.

UNIT 2: Syntax Analysis (16 Lectures)

Parsing, Role of parser, Context free grammar, Parse tree and derivations, Ambiguity, Eliminating ambiguity from dangling-else grammar, Elimination of left recursion, Left factoring,
Top Down Parsing- Recursive descent parser, Predictive parser- LL(1) Grammar, construction of predictive parsing table.

Bottom Up Parsing- Reductions, Handle pruning, Shift-Reduce parsing, Conflicts during shift-reduce parsing, LR Parser-Items, Kernel items, Non-kernel items, closure of Item Sets, The function GOTO, LR (0) automaton, Construction of SLR parsing table, Basics of LALR parser, Automatic parser generator-YACC.

UNIT 3: Syntax Directed Translation (12 Lectures)

Syntax directed definition- inherited and synthesized attributes, evaluating an SDD at the nodes of a parse tree, Evaluation orders of SDD's- dependency graphs, ordering the evaluation of attributes, S-attributed and L-attributed definitions, Applications of syntax-directed translation- construction of syntax trees, the structure of a Type, Syntax directed translation schemes- postfix translation schemes, SDT's with actions inside productions, eliminating left recursion from SDT's, Variants of syntax trees- directed acyclic graphs (DAG) for expressions, The value-number method for constructing DAG's, Three address code- Quadruples, Triples and Indirect triples, Static single-assignment form, Types and Declarations, Translation of expressions, Type Checking, Basics of Control flow, Basics of Backpatching.

UNIT 4: Run Time Environments (10 Lectures)

Storage organization, Stack allocation of space, Access to non-local data on Stack, Basics of Heap management, Basics of garbage collection

UNIT 5: Code Generation and optimization (10 Lectures)

Machine dependent code generation, Issues in design of code generator, The target language, Addresses in the target code, Basic blocks and flow graphs, Optimization of basic blocks- the DAG representation of Basic blocks, Finding local common sub-expression, dead code elimination, A simple code generator, Basics of Peephole optimization, The Principal Sources of Optimization, Introduction to Data-Flow Analysis.

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Particulars of Course Designer:

Name: Dr Irani Hazarika
Contact No: 8486965773
Email: queensarathi@gmail.com

Paper Name: Computer Graphics

1. Learning Outcome:

After completing this course, students will know about basic elements of Computer Graphics, fundamental of Computer graphics algorithms along with basic mathematical foundations of computer graphics.

2. Prerequisites: NIL

3. Semester: 6

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 3

7. Practical Credit: 1

8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) D. Hearn, M. Baker: Computer Graphics, Prentice Hall of India 2008.
b) J.D.Foley, A.Van Dan, Feiner, Hughes Computer Graphics Principles & Practice 2nd edition Publication Addison Wesley 1990.
c) D.F.Rogers Procedural Elements for Computer Graphics, McGraw Hill 1997.
d) D.F.Rogers, Adams Mathematical Elements for Computer Graphics, McGraw Hill, 2nd edition 1989.

10. Contents of Syllabus:

A. Theory

Detailed Syllabus:

UNIT 1: Introduction (2 Hours)

Basic elements of Computer Graphics, Applications of Computer Graphics

UNIT 2: Graphics Hardware (5 Hours)

Input Devices: Keyboard, Mouse, Trackball & Space ball, Joystick, Data Glove, Digitizers, Image Scanners, Touch panels, Light Pens systems. Output display devices: Refresh CRT, Raster-Scan display and Random-scan display technique, Color display techniques-Beam penetration method and Shadow-mask method, Direct view storage tubes, Emissive & Non-emissive flat-panel, Displays-Plasma panels, LED and LCD monitor, Three-dimensional viewing devices and Virtual-Reality systems Display processor: Raster-scan systems, Random-scan systems

UNIT 3: Fundamental Techniques in Graphics (20 Hours)

Line-drawing algorithms:DDA algorithm and Bresenham's Line drawing Algorithm, Midpoint Algorithm for Circle and Ellipse Generation, Curve generation. Attributes for output primitives: Area-filling Algorithms - Scan-line Polygon-fill, 2-D Geometric Transformations: Basic transformations-translation, Rotation and Scaling Matrix representations and Homogeneous Co-ordinate representations, Composite transformations among translation, Rotation and Scaling, 2-D viewing: Definition, Viewing transformation pipeline, Window-to-viewport Co-ordinate transformation.

2-D Clipping: Concept and Algorithm: Point clipping, Line clipping - Cohen-Sutherland algorithm, Area clipping, Text clipping, Polygon clipping. 3-D concepts: Display methods-Parallel projection, perspective projection 3-D geometric transformations: Transformation, Translation, Rotation and Scaling around axes, 3-D Viewing Projections – Parallel and Perspective.

UNIT 4: Geometric Modelling **(8 Hours)**

Representing curves and surface, Bezier curves and surfaces – Definition of Bezier curve and its properties, Algorithms for Bezier curves and surfaces, Hermite curve

UNIT 5: Visible Surface determination **(5 Hours)**

Definition, approaches for visible surface detection, object-space methods- Back-Face Detection, Image space methods: Depth Buffer Methods, A Buffer Method, Scan Line Method, Depth-Sorting Method

UNIT 6: Surface rendering **(5 Hours)**

Definition and importance, light sources, Basic illumination models-Ambient light, Diffuse reflection, Specula reflector and Phong model

Practical:

- Write a program to implement DDA algorithm for line drawing.
- Write a program to implement Bresenham's line drawing algorithm.
- Write a program to implement mid-point circle drawing algorithm.
- Write a program to clip a line using Cohen-Sutherland line clipping algorithm.
- Write a program to clip a polygon using Sutherland Hodgeman algorithm.
- Write a program to apply 2D translation on a 2D object (use homogenous coordinates).
- Write a program to apply 2D rotation on a 2D object (use homogenous coordinates).
- Write a program to apply 2D scaling on a 2D object (use homogenous coordinates).
- Write a program to apply 2D reflection of a 2D object (use homogenous coordinates).
- Write a program to apply 2D shear operation on a 2D object (use homogenous coordinates).
- Write a program to apply 3D translation on a 3D object (use homogenous coordinates).
- Write a program to apply 3D rotation on a 3D object (use homogenous coordinates).
- Write a program to apply 3D scaling on a 3D object (use homogenous coordinates).
- Write a program to apply 3D reflection of a 3D object (use homogenous coordinates).
- Write a program to apply 3D shear operation on a 3D object (use homogenous coordinates).
- Write a program to draw Hermite/Bezier curve.

Particulars of course designer:

Name: Dr. Diganta Kumar Pathak
Contact No.: 9707737222
E-mail id: diganta.kumarpathak@gauhati.ac.in

Paper Name: Data Mining and Warehousing

1. Learning Outcome:

f) Understanding the process of Knowledge Discovery in Databases.
g) Understand the functionality of the various data warehousing component.
h) Characterize the kinds of patterns that can be discovered by association rule mining.
i) Analysis of different types of data by clustering and classification.

2. Prerequisites: NIL
3. Semester: 6
4. Course Type: Elective
5. Course Level: 300-399
6. Theory Credit: 3
7. Practical Credit: 1
8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) A.K. Puzari, *Data Mining Techniques*, University Press.
b) J. Han, J. Pie and M. Kamber, *Data Mining: Concepts and Techniques*, Morgan Kaufmann.
c) P. Tan, M. Steinbach and V. Kumar, *Introduction to Data Mining*, Pearson Education (LPE).
d) G. K. Gupta, *Introduction to Data Mining with Case Studies*, PHI.

10. Contents of Syllabus:

A. Theory

Detailed Syllabus:

UNIT 1: Overview (4 Lectures)

What is Data Mining?, Knowledge Discovery in Databases (KDD) vs. Data Mining, Types of Data, Basic Data Mining Tasks, Predictive and Descriptive data mining techniques, Supervised and Unsupervised learning techniques, Basics of Pre-processing methods- Data Cleaning, Data Integration and Transformation, Data Reduction, Data Visualization.

UNIT 2: Data Warehousing (6 Lectures)

What is Data Warehouse? Multidimensional Data Model, Data Cube, Basic Components of Multidimensional Data Model, OLAP Operations- Slicing, Dicing, Drilling, Drill-Up, Drill-Down, Drill-Within, Drill-Across, Pivot(Rotate), Schema of Warehouse, Data Warehouse Architecture, Metadata.

UNIT 3: Association Rule Mining (12 Lectures)

What is Market Basket Data?, k-Itemset, Support of an Itemset, Frequent Itemsets, Infrequent Itemsets, Maximal Frequent Itemsets, Closed Frequent Itemsets, Association Rules, Confidence of a Rule, Problem of Mining Association Rules, Algorithm for Mining Frequent Itemsets- Apriori Algorithm, Pincer-Search Algorithm, DIC (Dynamic Itemset Counting) Algorithm, Steps of Mining Association Rules.

UNIT 4: Clustering (12 Lectures)

What is Clustering, Partitional vs Hierarchical Clustering, Types of Data in Clustering, Distance Measures used in Clustering- Euclidean Distance, Manhattan Distance, Similarity Measures used in Clustering- Cosine Similarity, Jacquard Coefficient, Partitional Clustering Methods- K-Means, K-Mediods, PAM, CLARA, CLARANS, Density Based Clustering Methods- DBSCAN, Introduction to Hierarchical Clustering.

UNIT 5: Classification (8 Lectures)

What is Classification? Issues Regarding Classification, K-Nearest Neighbor Classifiers, Bayesian classification, Introduction to Decision Tree.

UNIT 6: Recent Trends and Techniques used in Data Mining (3 Lectures)

Basic Concepts of- Web Mining, Spatial Data Mining, Temporal Data Mining, Big Data Mining, Concept of Neural Network, Genetic Algorithm.

Practical / Lab work to be performed

- Implement ***any one*** from the following-
  - Write a computer program to implement A priori algorithm to mine all frequent itemsets from a transactional dataset. Use hashing to store the item sets in the level wise generation of candidate sets.
  - Write a computer program to implement the Pincer Search algorithm.
  - Write a computer program to implement the DIC (Dynamic Item set) algorithm.
- Implement ***any four*** from the following-
  - Write computer program to implement the K-Means algorithm using different distance measures stated in the syllabus.
  - Write computer program to implement the PAM algorithm using different similarity measures stated in the syllabus.
  - Write a computer program to implement the CLARA algorithm.
  - Write a computer program to implement the CLARANS algorithm.
  - Write a computer program to implement the DBSCAN algorithm.
  - Write a computer program to implement the K-NN algorithm.

Particulars of Course Designer:

Name: Dr Irani Hazarika
Contact No: 8486965773 Email: queensarathi@gmail.com

Paper Name: Design and Analysis of Algorithms

1. Learning Outcome:

After successful completion of this course, students will:

- know how to analyze algorithms.
- learn the different algorithm design techniques.
- be acquainted with the advanced sorting and searching algorithms and their complexities.
- know graph representation techniques together with traversal algorithms.
- know why tree balancing is required and how to achieve this.

2. Prerequisites: NIL

3. Semester: 6

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 4

7. Practical Credit: 0

8. No of Hours:

a) Theory: 60 hrs
b) Practical: 0 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) *Introduction to Algorithms*, Cormen. T. H., Leiserson C. E. and Rivest. R. L., 3rd edition (2010)Tata-McgrawHill Publishers.
b) *Fundamentals of Computer Algorithms*; Horowitz and Sahani; (2nd Edition), Galgotia.
c) *Design and Analysis of Computer Algorithms*; Aho.A, Hopcroft J.E. and Ullman J.D.; (2011), PearsonEducation.
d) *Introduction to the Design and Analysis of Algorithms*, Levitin, 3/e 2017, Pearson Education.

10. Contents of Syllabus:

A. Theory

Detailed Syllabus:

UNIT 1: Introduction (6 Hours)

Analysisof Algorithms – worst case and average case analysis; Time and space complexity of algorithms; Asymptotic notations O and θ. Proving correctness of algorithms.

UNIT 2: Algorithm Design Techniques (10 Hours)

Iterative techniques, Divide and Conquer, Dynamic Programming, GreedyAlgorithms. Applications of these techniques in problems like sorting, searching, matrix multiplication, LCS (Longest Common Sequence) problem, Knap-sack problem.

UNIT 3: Sorting and Searching Techniques (20 Hours)

Elementary sorting techniques–Bubble Sort, Insertion Sort, Merge Sort, AdvancedSorting techniques - Heap Sort, Quick Sort, Sorting in Linear Time - Bucket Sort,Radix Sort and Counting Sort, Searching Techniques, Medians & Order Statistics,complexity analysis of all the techniques.

UNIT 4: Balanced Trees **(9 Hours)**

Tree balancing, Height of a Red-Black tree, Rotations - Left Rotations, Right Rotations, Insertion and
Deletion in Red-Black trees.

UNIT 5: Graph Algorithms **(9 Hours)**

Representations of Graphs; Adjacency Matrix and Adjacency Lists. Simple operations like computing degree, indegree, outdegree of vertices using the representation techniques and computing work done in all cases. Graph traversal algorithms–Breadth First Search, Depth First Search and their Applications.

UNIT 6: String Processing **(6 Hours)**

String Matching, KMP Technique.

Particulars of course designer:

Name: Prof. Anjana Kakoti Mahanta
Contact No.: 9864425716
E-mail id : anjana@gauhati.ac.in

Paper Name: Graph Theory

1. Learning Outcome:

- After completing this course, students will have understanding of graph theoretic concepts, problems and associated algorithmic solutions.

2. Prerequisites: NIL

3. Semester: 6

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 4

7. Practical Credit: 0

8. No of Hours:

a) Theory: 60 hrs
b) Practical: 0 hrs
c) Non Contact: 5 hrs

9. List of Books:

e) *Introduction to Graph Theory*, Douglas B. West, Pearson
f) *Introduction to Graph Theory*, Robin J. Wilson, Pearson Education Limited
g) *Graph Theory with Applications to Engineering and Computer Science*, Narasingh Deo, PHI

10. Contents of Syllabus:

A. Theory

Detailed Syllabus:

Unit I: Introduction **5 hrs**

Graph, directed and undirected graph, weighted and unweighted graph, simple and multigraph, degree, in degree and out degree, Handshaking theorem, complete graph, bipartite graph, cut set, cut vertices, graph representations: incidence matrix, adjacency matrix and adjacency list, BFS traversal and DFS traversals on a graph using stack and queue data structures, isomorphism, homomorphism

Unit II: Connectivity, paths and cycle **15 hrs**

Walk, path and cycle, connected graphs, disconnected graphs, components, Hamiltonian path, Hamiltonian cycle, Hamiltonian graphs, Dirac's theorem, Eulerian path, Eulerian cycle, Euler graphs, Fleuri's algorithm, 2-connected graphs, connectivity and digraph, k-connected and k-edge connected graphs, application of Menger's theorem, Shortest path problem, variations of shortest path problem: single source shortest path problem, single pair shortest path problem and all pairs shortest path problem, Dijkstra's algorithm, Bellman Ford algorithm, Floyd Warshall's algorithm, Johnson's algorithm

Unit III: Tree **12 hrs**

Tree, forest, properties of tree, spanning tree, spanning forest, counting trees, Cayley's theorem, matrix-tree theorem, minimum spanning tree, Kruskal's algorithm, Prim's algorithm, disjoint spanning trees, graph decomposition, graceful labeling, graceful graph, binary tree, binary search tree, AVL tree, multiway search tree, B tree, B+ tree

Unit IV: Matching and coloring **13 hrs**

Matching, bipartite matching, maximum bipartite matching, Ford Fulkerson's algorithm for finding maximal bipartite matching, perfect bipartite matching, non-bipartite matching, maximal non-bipartite matching, largest maximal matching, perfect non-bipartite matching, Hall's Marriage theorem, vertex cover, vertex cover and matching, independent sets, dominating sets, atable matching, Hungarian algorithm, introduction to Edmonds Blossom shrinking algorithm, vertex coloring, k-colorable graph, chromatic number, Brook's theorem, clique number, map coloring problem

Unit V: Digraph **7 hrs**

Digraph, simple digraph, connected and strongly connected digraph, orientable graph, Eulerian digraph, Hamiltonian digraph, tournament, Markov chains, Flow networks, residual graph, augmenting path, Ford Fulkerson's algorithm

Unit VI: Classical problems **8 hrs**

Travelling Salesman Problem, variants of Travelling Salesman Problem, Chinese Postman Problem, variants of Chinese Postman Problem, the minimum connector problem, Huffman coding and Huffman tree, Konisgsberg bridge problem, three utilities problem

Particulars of course designer:

Name: Dr. Hasin Afzal Ahmed
Contact No.: 8011810533
E-mail id: hasin@gauhati.ac.in

SYLLABUS OF

Bachelor of Science in Information Technology

PROGRAM

Department of Computer Science
Gauhati University

Program Structure

Semester	Paper Name	Course type	Credit
I	Computer Fundamentals	Compulsory	4 (3+1)
	Introduction to C-Programming	Compulsory	4 (3+1)
	Mathematical Foundation in Information Technology	Compulsory	4
II	Data Structures & Algorithms Using C	Compulsory	4(3+1)
	Digital Logic Fundamentals	Compulsory	4
	Computer Oriented Numerical and Statistical Methods	Compulsory	4 (3+1)
III	Computer Organization and Architecture	Compulsory	4
	Operating System	Compulsory	4(3+1)
	Object Oriented Programming through C++	Compulsory	4(3+1)
IV	Database Management System	Compulsory	4(3+1)
	Python Programming	Compulsory	4(3+1)
	Automata Theory and Languages	Compulsory	4
	Design and Analysis of Algorithms	Compulsory	4(3+1)
V	Software Engineering	Compulsory	4
	Web Technologies	Compulsory	4(3+1)
	Java Programming	Compulsory	4(3+1)
	Computer Networks	Compulsory	4(3+1)
VI	i) Computer Graphics	Elective I	4(3+1)
	ii) Information Security and Cyber Laws		4
	iii) System Software		4 (3+1)
	i) Artificial Intelligence	Elective II	4(3+1)
	ii) Advanced Web Programming		
	iii) Data Mining and Warehousing		
	i) Optimization Techniques	Elective III	4
	ii) Mobile Application Development		4(3+1)
	iii) Graph Theory		4(3+1)
	Project		4

Paper Name: Mathematical Foundation in Information Technology

1. Learning Outcomes: After successful completion of this course, students will be able to:

- a) Understand the Mathematical model of a finite state machine. Know deterministic and non-deterministic versions of Finite automata.
- b) Grasp the mathematical concepts of languages and grammar.
- c) Know Pushdown Automata and the associated grammar/language.
- d) Know the properties of Regular languages and Context free languages.

2. Prerequisites: NIL

3. Semester: 1

4. Course Type: Compulsory

5. Course Level: 100-199

6. Theory credit: 4

7. Practical credit: 0

8. **Number of required hours:**

- a) Theory: 60 hrs
- b) Practical: 0 hrs
- c) Non Contact: 5 hrs

9. List of books:

- a) Introduction to Automata Theory, Languages and Computation, Hopcroft, Motwani and Ullman, Pearson.
- b) Theory of Computer Science (Automata, Languages and Computation),K. L. P. Mishra, N. Chandrasekaran; P. H.I.

10. Contents of Syllabus:

UNIT 1: (16 Lectures)

Sets, Relations and Functions

Sets: definition of set, cardinality of sets, finite, countable and infinite sets. Operations on sets, Venn diagram. Principle of inclusion and exclusion and their applications on simple problems. Multisets.

Relations: Definition and properties of binary relations, closures of relations, equivalence relations, equivalence classes and partitions, n-ary relations and representation of n-ary relations as tables. Partial ordering relations and lattices,

Functions: Definition of function**,** one-to-one and onto, principles of mathematical induction. Concave and convex functions.

UNIT 2: Combinatorics (15lectures)

Basic of counting principles, principle of inclusion-exclusion, application of inclusion and exclusion,Mathematical Induction. Pigeonhole principle, generalized Pigeonhole principle and its application, permutations and combinations, circular permutations, permutations with repetitions, combinations with repetitions, permutations of sets with indistinguishable objects

UNIT 3: Growth of Functions (5 Lectures)

Asymptotic behavior of functions, Asymptotic Notations - Big-O and Theta. Summation formulas and properties, Bounding Summations.

UNIT 4: Graph Theory (12 Lectures)

Basic Definition of graph, Directed, Undirected and Weighted Graphs. Representation of graphs in Computers – Adjacency Matrix and Adjacency Lists. Degree of vertices – indegree and outdegree. Paths, Cycles and Acyclic graphs. Simple operations on graphs and amount of computations required for each operation. Connected graph, Tree and Forest. Bipartite graph, Algorithms on graph traversals- Breadth first search, Depth first search.

UNIT 5: Mathematical Logic **(12 Lectures)**

Connectives, truth tables, Tautologies and Contradictions, Equivalence and Implications, NAND and NOR, Normal forms- CNF, DNF, Converting expressions to CNF and DNF, Theory of inference, Propositional Calculus, Predicate calculus (only introduction), predicates and quantifiers.

Particulars of Course Designer:

Name: Prof. Anjana Kakoti Mahanta
Contact No.: 9864425716
E-mail id : anjana@gauhati.ac.in

Paper Name: Computer Oriented Numerical and Statistical Methods

1. **Learning Outcome:** On successful completion of this course, the student should be able to:
    - learn the properties of Floating Point, Numbers and their accuracy, approximations and errors
    - Learn various probability methods, Interpolation methods etc.
    - To solve basic problems in probability and statistics
2. **Prerequisite:** NIL
3. **Semester: 2**
4. **Course Type: Compulsory**
5. **Course Level: 100-199**
6. **Theory credit:** 3
7. **Practical credit:** 1
8. **Number of required hours:**
    - d) Theory: 45 hrs
    - e) Practical: 30 hrs
    - f) Non Contact: 5 hrs
9. **List of books:**
    - a) Rajaraman, V, "Computer Oriented Numerical Methods", 3rd edition, Prentice Hall
    - b) Balaguruswami, E., "*Computer Oriented Statistical and Numerical Methods*", Macmillan Publishers India Limited

10. Detailed Syllabus:

a) Theory

UNIT-I: **Introduction to Computer Arithmetic** **(7 hrs)**
Representation of numbers: Fixed Point and Floating point representations, Normalized Floating Representation, Floating Point Arithmetic, Properties of Floating Point, Numbers and their accuracy, Approximations and errors. Errors: truncation error, rounded off error, absolute error, relative error, percentage error and error propagation

UNIT-II: **Algebraic and Transcendental Equations** **(8 hrs)**
Introduction to linear and nonlinear equations, measures of accuracy, Properties of polynomial equations, Initial approximation to a root, Solution of algebraic/transcendental equations: Bisection Method, Iteration method, Method of false position, Newton-Raphson method, Rate of convergence of Iterative methods, Solution of simultaneous linear equations by using Gauss elimination method

UNIT-III: **Interpolation** **(6 hrs)**
Polynomial Interpolation, Finite Differences, Newton's Forward Difference Interpolation, Newton's Backward Difference Interpolation, Newton's Divided Difference Interpolation
UNIT-IV: **Solution of Differential Equation** **(6 hrs)**
Taylor series method, Euler's method, Runge-Kutta method of 1st, 2nd & 4th order.

UNIT-V: **Descriptive Statistics** **(6 hrs)**
Types of Data, Attributes and Variables, Construction of Frequency, Cumulative frequency, Graphical Representation of Frequency distribution: Histogram, Frequency Polygon, Frequency Curve and

Cumulative Frequency Curves (Ogive curves), Diagrammatic Representations: Simple bar, Subdivided bar, Pie Diagrams

UNIT-VI: **Measure of central tendency** **(4 hrs)**
Measure of central tendency-Mean, Median and Mode. Measure of variation-Range, Interquartile range, Standard Deviation and Variance

UNIT-VII: **Measure of central tendency** **(8 hrs)**
Sample Space, events, random variables, Discrete probability, Conditional Probability and Bayes theorem, Linear Regression and Correlation, Probability Distribution Functions-Binomial, Random and Poisson

b) Lab Content:

Practical / Lab work to be performed using C/C++/Java programming Language:

- Apply the Bi-section method for approximation of root for a given polynomial equation.
- Apply the False Position method for approximation of root for a given polynomial equation
- Implement Newton Raphson method for approximation of root for a given polynomial equation.
- Implement Gauss elimination method to solve simultaneous linear equations
- Develop programs to implement Newton's Forward Difference Interpolation
- Develop programs to implement Newton's Backward Difference Interpolation
- Develop programs to implement Newton's Divided Difference Interpolation
- Develop program to apply Taylor's series for e raise to the power x
- Implement Euler's method for solving a differential equation
- Implement Runge-Kutta method of 1st, 2nd & 4th order for solving a differential equation
- Write programs to find Mean, Median and Mode for a given set of data

Particulars of course designer:

Name: Dwipen Laskar
Contact No.: 6000795681
E-mail id: laskardwipen@gauhati.ac.in

Paper Name: Data Structures & Algorithms Using C

1. **Learning Outcome:** At the end of the course, students will be able to:
    - Understand and apply the fundamental data structures and algorithms – such as arrays, linked lists, stacks, queues, trees, sorting and searching algorithms using C programming language.
    - Analyze the time and space complexity of different algorithms and choose the appropriate algorithm for a given problem.
    - Develop efficient algorithms to solve various computational problems by utilizing data structures and algorithms covered in the course.
2. **Prerequisite:** NIL
3. **Semester: 2**
4. **Course Type: Compulsory**
5. **Course Level: 100-199**
6. **Theory credit:** 3
7. **Practical credit:** 1
8. **Number of required hours:**
    g) Theory: 45 hrs
    h) Practical: 30 hrs
    i) Non Contact: 5 hrs
9. **List of books:**
    a) Weiss, Mark Allen. "Data Structures and Algorithm Analysis in C". 3rd ed., Pearson, 2012
    b) Sedgewick, Robert. "Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms". 3rd ed., Addison-Wesley Professional, 2002.
    c) Goodrich, Michael T., and Roberto Tamassia. "Data Structures and Algorithms in C". 2nd ed., Wiley, 2011.
    d) Gilberg, Richard F., and Behrouz A. Forouzan. "Data Structures: A Pseudocode Approach with C". Narosa Publishing House, 2009.

10. Detailed Syllabus:

Unit 1: Data Structures Overview and Arrays (8 Lectures)

Concepts of Data Types, Abstract Data Type, Data Structure, Fundamental and Derived Data Types. Importance of data structures. Array as a data structure (characteristics, advantages, disadvantages). Representation of arrays – single and multidimensional. Address calculation of array element using column and row major ordering. Address translation functions for one & two dimensional arrays. Insertion and deletion in arrays. Use of arrays for large number representation.

Unit 2: Linked Lists (9 Lectures)

Initialization and implementation of structures. Structure and pointers. Self referential structure. Introduction to linked lists. Singly linked list, doubly linked list, circular linked list. Operations on lists – creation, insertion, deletion, traversal, merging and splitting. Array of structures and Structure of Arrays. Array of lists and List of lists.

Unit 3: Stacks and Queues (9 Lectures)

Definition of Stack and Queue. Representation of stacks and queues using arrays and linked lists. Stack operations – push, pop. Queue operation – enqueue, dequeue. Circular Queue, Priority Queue, Conversion of infix arithmetic expression containing arithmetic operators and parenthesis to postfix and prefix expression. Evaluation of postfix expression.

Unit 4: Binary Trees (8 Lectures)

Definition of Trees – General tree and Binary tree. Basic terminologies – parent, child, height, depth, leaf, node, internal nodes, external nodes. Brief concept of Forest, ordered trees, strictly binary tree, complete binary tree. Representation of trees using arrays and linked lists. Binary tree traversal methods – pre-order, in-order, post-order. Recursive and non-recursive algorithms for traversal methods. Binary search trees. Operation on BST – creation, insertion and deletion of a node. Definition and characteristics of threaded binary trees, multi-way search trees. Breadth First Search, Depth First Search. Min heap and Max heap.

Unit 5: Searching and Sorting (6 Lectures)

Linear and binary search. Indexed search. Hashing. Hash Functions – division method, mid square method, folding. Conflict resolution – linear and quadratic probe. Sorting algorithms – Insertion sort, Selection sort, Bubble sort, Merge sort, Quick sort, Counting sort, Heap sort. In-place sorting and stable sorting.

Unit 6: Analysis of Algorithm and Complexity (5 Lectures)

Complexity measures of an algorithm – Time and space complexity. Average case and worst case analysis. Asymptotic notation as a measure of algorithm complexity, O and θ notations. Analysis of sorting algorithms and Searching algorithms in terms of time and space complexity in best, average and worst case.

List of Practical

(This is a suggestive list only. Questions need not be restricted to this list. The practical are advised to be performed in Linux environment using C programming language.)

1. Write a program to declare an array and initialize the values according to the user. Now ask the user for a number n and return the n^{th} element from the array.
2. Write a program to implement array initialized with the numbers divisible by three up to 30. Write a function which accepts the array and return the positions of the even numbers in the array.
3. Implement linked list in a program by writing functions for the following:
    a. Create a singly linked list of n nodes
    b. Count the number of nodes in the list
    c. Print the values of all the nodes
    d. Add a node at first, last and k^{th} position in the linked list
    e. Delete a node from first, last and k^{th} position
    f. Search for an element in the list. If found, return the position of the node. If not found, return a negative value.

4. Write a program to implement doubly linked list.
5. Write a function to concatenate two linked lists.
6. Write a program to take a number *k* and split the linked list after k^{th} position.
7. Write a program to merge two sorted linked lists.
8. Write a program to implement list of lists.
9. Write a program to implement stack using array. Use push and pop operations on the array representation of the stack. Check whether the stack is full or empty.
10. Write a program to implement stack using linked list. Use push and pop operations on the stack by inserting nodes and deleting nodes from the linked list. Also check if the stack is full or empty.
11. Write a program to evaluate a simple postfix expression using stack.
12. Write a program to convert a decimal number into binary number using stack.
13. Write a program to implement queue using array. Add new elements to the queue and remove elements from the queue represented by array. Check whether the queue is full or empty.
14. Write a program to implement queue using linked list. Add new elements to the queue and remove elements from the queue represented by linked list. Also check whether the queue is full or empty.
15. Implement binary search and linear search algorithms on arrays.
16. Implement binary search tree using array by writing a program to:
    a. Create a binary search tree using array
    b. Print the prefix notation of the BST
    c. Print the infix notation of the BST
    d. Print the postfix notation of the BST
    e. Search for an element in the BST
17. Implement binary search tree using linked list by writing a program to:
    a. Create a binary search tree using linked list
    b. Print the prefix notation of the BST
    c. Print the infix notation of the BST
    d. Print the postfix notation of the BST
    e. Search for an element in the BST
18. Implement following sorting algorithms:
    a. Bubble sort
    b. Insertion sort
    c. Selection sort
    d. Counting sort

Particulars of Course Designer:

Name : Risheraj Baruah
Contact No. : +91 8486942427
Email id : rishirajbaruah@gauhati.ac.in

Paper Name: Digital Logic Fundamentals

1. **Learning Outcome:**
    - After completing this course, students will have grasp of fundamental concepts of digital logic that will make their base to understand the concepts of computer architecture and organization
2. **Prerequisite:** NIL
3. **Semester: 2**
4. **Course Type: Compulsory**
5. **Course Level: 100-199**
6. **Theory credit:** 4
7. **Practical credit:** 0
8. **Number of required hours:**
    - j) Theory: 60 hrs
    - k) Practical: 0 hrs
    - l) Non Contact: 5 hrs
9. **List of books:**
    - e) Digital Logic and Computer Design, M. Morris Mano, Pearson India
    - f) Digital Logic and Computer Organization, V. Rajaraman, T. Radhakrishnan, PHI Learning

10. Detailed Syllabus:

Unit I: Introduction to Binary Number System 10 hrs

Binary numbers, number base conversions, octal and hexa decimal numbers, 1's complement and 2's complement, representation of signed binary number: 1's complement, 2's complement and signed magnitude, subtraction with complements, arithmetic addition and subtraction of signed binary numbers, binary codes: BCD, Excess-3, error detection code: parity bit, error correction code: Hamming code, gray code, ASCII, EBCDIC, binary logic, logic gates: AND, OR, inverter, buffer, NAND, NOR, XOR and equivalence

Unit II: Boolean Algebra, Logic Gates and Integrated Circuits 15 hrs

Definition of boolean algebra, two valued boolean algebra, duality principle, theorems and postulates of boolean algebra, precedence of boolean operators, boolean expression and Venn diagram, boolean functions and truth tables, complement of a boolean function, minterms and maxterms, canonical forms of a boolean function, sum of minterms and its short notation, product of maxterms and its short notation, conversion between canonical forms, standard form of a boolean function, digital logic gates, integrated circuits and levels of integration, digital logic families

Unit III: Simplification of Boolean Functions 10 hrs

Map minimization method, two variable map, three variable maps, four variable map, five variable map, NAND and NOR implementation of boolean functions, don't-care conditions, tabulation method

Unit IV: Combinational Circuits 12 hrs

Definition of combinational circuit, design procedure, half adder, full adder, half subtractor, full subtractor, BCD-to-Excess-3 code converter, encoders and decoders, multiplexers, ROM

Unit V: Sequential circuits 13 hrs

Flip flops, RS flip flop, D flip flop, JK flip flop, T flip flop, master slave flip flops and edge triggered flip flops, state table of a sequential circuit, state diagram, characteristic tables of flip flops, Mealy and Moore machine, flip flop excitation tables, design procedure of clocked sequential circuit, 3-bit binary counter, shift register, ripple counter, RAM

Particulars of course designer:

Name: Dr. Hasin Afzal Ahmed
Contact No.: 8011810533
E-mail id: hasin@gauhati.ac.in

Paper Name: Computer Organization and Architecture

1. **Learning Outcome:** Student will
    - be able to learn about the structure, function and characteristics of computer systems.
    - understand the design of the various functional units and components of computers.
    - identify the elements of modern instructions sets and their impact on processor design.
    - able to learn about the function of each element of a memory hierarchy.
    - able to learn about identify and compare different methods for computer I/O.
    - Student will able to learn about basics of assembly language.
2. **Prerequisite:** NIL
3. **Semester: 3**
4. **Course Type: Compulsory**
5. **Course Level: 200-299**
6. **Theory credit:** 4
7. **Practical credit:** 0
8. **Number of required hours:**
    - m) Theory: 60 hrs
    - n) Practical: 0 hrs
    - o) Non Contact: 5 hrs
9. **List of books:**

g) M.Morris Mano, *Computer System Architecture*, PHI publication.
h) Hamachar, Vranesic and Zaky, *Computer Architecture*.
i) William Stallings, *Computer Organization and Architecture*; Pearson.
j) Ramesh Gaonkar, *Microprocessor Architecture, Programming, and Applications with the 8085*, 5th Edition.

10. Detailed Syllabus:

UNIT 1: Introduction (4 Lectures)

Definitions of Computer Organization and Architecture, History of computer architecture, Basic functional blocks of a computer: CPU, memory, Input-output subsystems, Control unit, Types of register- general purpose registers, special purpose registers, index registers.

UNIT 2: Data Representation (8 Lectures)

Number system, Complements, Representation of signed numbers, Subtraction of unsigned numbers, Fixed-Point representation- Integer representation, Arithmetic addition, Arithmetic subtraction, Overflow, Decimal Fixed-Point representation, Floating-Point representation, Other Binary Codes-Gray Code etc.

UNIT 3: Register Transfer and Micro-operation (8 Lectures)

Introduction to Register Transfer Language, Register transfer, Bus and Memory transfers, Arithmetic micro-operation- Binary adder, Binary adder-subtractor, Binary incrementer, Arithmetic circuit, Logic micro-operation, Shift micro-operation, Arithmetic logic shift unit.

UNIT4: Processing Unit (10 Lectures)

Instruction codes, Computer registers, General register organization, Register stack, Memory stack, Computer instructions, Data path in a CPU, Operations of a control unit, Hardwired control unit, Micro-programmed control unit, Instruction cycle, Operands, Addressing modes, Instruction format-

Three-address instructions, Two-address instructions, One-address instructions, Zero-address instructions, Data transfer and manipulation- Data transfer instructions, Data manipulation instructions, Arithmetic instructions, Logical and Bit manipulation instructions, Shift instructions, Program Control-Status bit conditions, Conditional branch instructions, Subroutine call and return, Instruction execution cycle, CISC and RISC architectures.

UNIT 5: Memory Organization (10 Lectures)

Semiconductor memories, Memory cells - SRAM and DRAM cells, Concept of hierarchical memory organization, Interleaved memories, Cache memory unit - Concept of cache memory, Mapping methods, Organization of a cache memory unit, Cache replacement policies, Write policy, Concept of virtual memory.

UNIT 6: I/O Organization (10 Lectures)

Access of I/O devices, I/O ports, I/O control mechanisms - Program controlled I/O, Interrupt driven I/O, DMA controlled I/O, Interrupts: Types of interrupts, Enabling and disabling interrupts, Handling interrupts.

UNIT 7: Basics of Microprocessor and Assembly Language (10 Lectures)

Introduction to microprocessors, 8085 Microprocessor and its operation, 8085 instruction sets, Addressing modes in 8085, Classifications of instructions and addressing mode, Assembly language programming basics, Assembling, Executing and debugging the programs, Developing counters and Time delay routines, Interfacing concepts.

Particulars of course designer:

Name: Dr Irani Hazarika
Contact No: 8486965773
Email: queensarathi@gmail.com

Paper Name: Object Oriented Programming through C++

1. **Learning Outcome:** After successful completion of this course, students will be able to:
    - Will be able to imagine real-life concepts as objects; derive their properties and functions to operate.
    - Develop programs using object- oriented features like data abstraction, polymorphism, inheritance, exception handling.
    - Know C++ streams, operators
    - Know file handling techniques in C++.

2. **Prerequisite:** NIL
3. **Semester: 3**
4. **Course Type: Compulsory**
5. **Course Level: 200-399**
6. **Theory credit:** 3
7. **Practical credit:** 1
8. **Number of required hours:**
    p) Theory: 45 hrs
    q) Practical: 30 hrs
    r) Non Contact: 5 hrs
9. **List of books:**
    k) M. T. Somashekara, D. S. Guru et-al; *Object-Oriented Programming with C++,* 2nd Edition, PHI,2012.
    l) Bjarne Stroustrup, *The C++ Programming Language*, Special Edition, Pearson Education, 2004.
    m) Deitel&Deitel, *C++ How to program*, Pearson Education Asia, 6th Edition, 2008
    n) Schildt Herbert, *The Complete Reference C++,* Tata McGraw Hill, 4th Edition, 2003.

10. Detailed Syllabus:

a) Theory Content

UNIT 1: Introduction to object oriented programming (10 Lectures)
Origins of C++, Basic Concepts of Object Oriented Programming, Benefits of OOP, Applications of OOP, Introduction to C++, Structure of a Simple C++ program, Output operator, Input operator, Cascading of I/O operators, Tokens- keyword, identifiers, constants, strings and operators. Basic data types, User defined data types, Dynamic initialization of variables, Reference variables, Operators in C++, Scope resolution operator &applications, Member dereferencing operators, Memory Management operators, new and delete, Control Structures-simple if, if else, nested if, switch, while do, break and continue statements, Introduction to Functions-Function Prototyping, Call by reference, Return by reference, Inline functions, Default arguments, Constant arguments.

UNIT 2: Classes and objects (10 Lectures)
Introduction - Defining a class-Class Vs structures, Creating objects, Accessing class members, Defining member functions- Outside the class definition, Inside the class definition, Outside functions as inline, Nesting of member functions, Private member functions, Memory allocation for

objects, Array-Declaring an array-accessing elements of an array, Array of objects, Friendly functions, Constructors and destructors, Basic Concepts of constructors, Default constructor, Parameterized constructor, Multiple constructors in a class, Constructor with default arguments, Dynamic initialization of objects, Copy constructor, Dynamic constructors, Destructors\

UNIT 3: Function and operator overloading (9 Lectures)

Overloading Concepts Function Overloading: Functions with different sets of parameters, default andconstant parameters, Rules for overloading operators. Defining operator overloading, OverloadingUnary operators, Prefix and Postfix operators overloading, Overloading Binary operators, overloadingrelational operators, Overloading using friend functions, Overloading subscript operator, Pitfalls ofoperator overloading, Type conversion-Basic to Class, Class to Basic

UNIT 4: Inheritance (8 Lectures)

Introduction-Defining derived classes, Types of inheritances. Making a private member inheritable, multilevel inheritance, multiple inheritance, Hierarchical inheritance, Hybrid inheritance, Virtual base classes, Abstract classes, Constructors in derived classes, nesting of classes, polymorphism-Compile time and Runtimepolymorphism, Pointers to objects, this pointer, Pointer to derived classes, Virtual functions, Rules forvirtual functions, Pure virtual functions.

UNIT 5: Streams (4 Lectures)

C++ stream classes-put() and get() functions, getline() and write() functions, Overloading << and >>operators, Formatted Console I/O operations, ios class functions-width(),precision(),fill(),setf() andunsetf(), Formatting flags, Manipulators, User defined manipulators.

UNIT 6: Files (4 Lectures)

Introduction-Stream classes for files, Opening files using constructor, Opening files using open(), Filemodes, Detecting end of file-eof(), Sequential input and output-put() and get()-Reading and writingobjects-read() and write()-Random Access files-Manipulating file.

b) Practical / Lab work to be performed

1. Define a class named *triangle* to represent a triangle using the lengths of the three sides. Write a constructor to initialize objects of this class, given the lengths of the sides. Also write member functions to check
   (a) if a triangle is isosceles
   (b) if a triangle is equilateral
   Write a main function to test your functions.
2. Define a structure *employee* with the following specifications.
   empno: integer
   ename: 20 characters
   basic, hra, da : float
   calculate() : a function to compute net pay as basic+hra+da with float return type.
   getdata() : a function to read values for empno, ename, basic, hra, da.
   dispdata() : a function to display all the data on the screen
   Write a main program to test the program.
3. Define a class *circle* to represent circles. Add a data member *radius* to store the radius of a circle. Write member functions area() and perimeter() to compute the area and perimeter of a circle.
4. Define a class *complex* with two data members *real* and *imag*to represent real and imaginary parts of a complex number. Write member functions

rpart() : to return the real part of a complex number
ipart() : to return the imaginary part of a complex number
add() : to add two complex numbers.
mul() : to multiply two complex numbers.

Write constructors with zero, one and two arguments to initialize objects. (*This is an example of polymorphism.*)

5. Define a class *point* with two data members *xordinate*and *yordinate*to represent all points in the two dimensional plane by storing their x co-ordinate and y co-ordinate values. Write member functions

dist(): to return the distance of the point from the origin.
slope(): to return the slope of the line obtained by joining this point with the origin.

Write constructors with zero, one and two arguments to initialize objects. Also write a friend function to compute the distance between two points.

6. Define a class *string* with the following data members char *p; int size; and write member functions to do the following (without using library function) and using dynamic memory allocation.

- Length of the string
- Compare two strings
- Copy one string to another
- Reverse the string

Write suitable constructors and destructors. Also write a copy constructor for the class.

7. For the class *complex* defined in 4 above, overload the <<, >>, + and * operators in the usual sense. Also overload the unary – operator.

8. For the class *string* defined in 6 above, overload the <<, >> and + operators where + is to be used for concatenating two strings.

9. Define a class *time* to store time as hour, minute and second, all being integer values. Write member functions to display time in standard formats. Also overload the ++ and – operators to increase and decrease a given time by one second where the minute and hour values will have to be updated whenever necessary.

10. Define a class to store matrices. Write suitable friend functions to add and multiply two matrices.

11. Write a class-based program implementing static members.

12. Define a class *student* with the following specification:

rollno : integer sname : 20 characters

Derive two classes *artst*and *scst*. The class *artst*will represent students belonging to arts streamand the class scst will represent students belonging to science stream. The artsst class will have additional data members *ph, hs, en*and as to store marks obtained by a student in three subjects Philosophy, History, English and Assamese. The class *scst*will have additional data members*ph, ch, ma and en*to store marks obtained in Physics, Chemistry, Mathematics and English.

Write the following member functions in the classes artst and scst
ctotal() : a function to calculate the total marks obtained by a student
takedata() : function to accept values of the data members
showdata(): function to display the marks sheet of a student .

13. Define an abstract base class *printer*. Derive three classes *laser-printer, line-printer* and *inkjet-printer*. The derived classes will have data members to store the features of that articular printer. Write pure virtual function display() in the base class and redefine it in the derived classes.
14. Define a abstract base class *figure* and add to it pure virtual functions. Derive three classes *circle, rectangle* and t*riangle* from it. A circle is to be represented by itsradius, rectangle by its length and breadth and triangle by the lengths of its sides. Write amain function and write necessary statements to achieve run time polymorphism.\
15. Write an interactive program to compute square root of a number. The input value must be tested for validity. If it is negative, the user defined function *my_sqrt()* should raise an exception.
16. Define a class *rational* to store rational numbers as a pair of integers, representing the numerator and denominator. Write a member function for setting the values of the numerator and denominator. This function should raise an exception if attempt is made to set a zero value as the denominator and in such cases it should be set to 1.
17. Write a class template for storing an array of elements. Overload the << and >> operators. Write a member function to sort the array in descending order.
18. Write a class template for representing a singly linked list. Write functions for inserting, deleting, searching and for displaying a linked list. Write a main function to test it on a linked-list of integers and characters.

Particulars of course designer:

Name: Prof. Anjana Kakoti Mahanta
Contact No.: 9864425716
E-mail id : anjana@gauhati.ac.in

Paper Name: Operating System

1. **Learning Outcome:** After completing this course, students will have understanding of the internal structure and usage of various components related to an operating system.
2. **Prerequisite:** NIL
3. **Semester: 3**
4. **Course Type: Compulsory**
5. **Course Level: 200-399**
6. **Theory credit:** 3
7. **Practical credit:** 1
8. **Number of required hours:**
   s) Theory: 45 hrs
   t) Practical: 30 hrs
   u) Non Contact: 5 hrs
9. **List of books:**

   o) Operating System Concepts, Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Wiley

   p) Modern Operating Systems, Andrew S. Tanenbaum, Prentice-Hall Of India Pvt. Limited

10. Detailed Syllabus:

Unit I: Introduction 7 hrs
Application vs system software, operating system as system software, operating structure structure, types of operating systems: batch operating system, multiprogramming operating system, multi tasking operating system, distributed operating system, real time operating system, multi user operating system, major functions of operating system: Process Management, Process Synchronization, Memory Management, CPU Scheduling, File Management, I/O Management, Security, virtualization, cloud computing, open source operating system, history of operating system, the shell, system call, system boot

Unit II: Process and threads 10 hrs
Process, process states: new, running, waiting, ready and terminated, Process Control Block (PCB), information stored in PCB, scheduling queue: job queue, ready queue and device queue, schedulers: long term schedulers, medium term scheduler and long term scheduler, swapping, degree of multiprogramming, I/O-bound and CPU-bound processes, context switching, inter-process communication: shared memory systems and message passing systems, socket, remote procedure call, threads, user threads, kernel threads, multi threading models: Many-to-One Model, One-to-One Model, Many-to-Many Model, CPU scheduling, Scheduling Criteria, scheduling algorithms: First-Come, First-Served Scheduling, Shortest-Job-First Scheduling, Priority Scheduling, Round-Robin Scheduling, Multilevel Queue Scheduling, Multilevel Feedback Queue Scheduling

Unit III: Process synchronization 8 hrs
Race condition, critical section problem, Peterson’s algorithm, Bakery algorithm, synchronization hardware: locking, synchronization software tools: mutex lock, semaphore (counting and binary), semaphore implementation, classic synchronization problems: bounded buffer problem, the readers –writers Problem, the dining-philosophers problem, monitor, synchronization in windows, synchronization in linux

Unit IV: Deadlock **10 hrs**

Deadlock, operations of a process performs while using a resource: Request. Use and Release, physical and logical resources, Necessary conditions: mutual exclusion, hold & wait, no preemption and circular wait, resource allocation graph, deadlock prevention: definition, preventing mutual exclusion, preventing hold & wait, preventing no preemption and preventing circular wait, deadlock avoidance: definition, safe state, safe sequence, resource allocation graph based algorithm and Banker's algorithm, deadlock detection: definition, wait-for graph, algorithm to detect deadlock for single instance resources, algorithm to detect deadlock for multiple instance resources and recovery from deadlock: process termination and resource preemption

Unit V: Memory Management **10 hrs**

Memory hierarchy, base register, limit register, address binding, logical and physical address spaces, memory management unit, relocation register, swapping, contiguous memory allocation: definition, memory protection, fixed partition scheme, variable partition scheme, first-fit, best-fit & worst-fit allocation strategies, non-contiguous memory allocation: simple paging and simple segmentation, internal and external fragmentation, TLB, virtual memory, demand paging, page fault, locality of reference principle, performance of demand paging, page replacement algorithms: FIFO, Optimal and LRU, allocation of frames: equal allocation and proportional allocation, global and local page replacement algorithms, thrashing

(b) Practical

- **Basic linux commands**: pwd, ls, cd, mkdir, rmdir, rm, touch, man, cp, mv, locate, head, tail (***2 Classes/4 hrs***)
- **Advanced commands:** echo, cat, sudo, df, tar, apt-get, chmod, hostname, useradd, passwd, groupadd, grep, sed, uniq, wc, od, gzip, gunzip, find, date, cal, clear, top, ps, kill (***3 Classes/6 hrs***)
- **Shell scripting in linux:** shell, types of shell, shell script, echo command, shell variables, special variables ($$, $0, $n, $#, $?, $!), array, assignment operator (=), equality operator (==), not equality operator (!=), arithmetic operators (+,-, *, /, %), comparison operators (-eq, -neq, -gt, -lt, -ge, -le), logical operators (!,-o, -a), if...else statement, case...esac statement, while loop, for loop, break statement, continue statement, shell functions (**7 *Classes/14 hrs***)
- **Using system calls in C program in linux**: fork(), exec(), exit(), getpid(), mkdir(), rmdir() etc. (***3 Classes/6 hrs***)

Particulars of course designer:

Name: Dr. Hasin Afzal Ahmed
Contact No.: 8011810533
E-mail id: hasin@gauhati.ac.in

Paper Name: Automata Theory and Languages

1. Learning Outcome: After completing this course, students

- Understand the Mathematical model of a finite state machine. Know deterministic and non-deterministic versions of Finite automata.
- Grasp the mathematical concepts of languages and grammar.
- Know Pushdown Automata and the associated grammar/language.
- Know the properties of Regular languages and Context free languages.

2. Prerequisites: NIL

3. Semester: 4

4. Course Type: Compulsory

5. Course Level: 200-299

6. Theory Credit: 4

7. Practical Credit: 0

8. No of Hours:

a) Theory: 60 hrs
b) Practical: 0 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) *An introduction to Formal Languages and Automata*, Peter Linz,Narosa.
b) *Introduction to Automata Theory, Languages and Computation*, Hopcroft, Motwani and Ullman, Pearson.
c) Theory of Computer Science (Automata, Languages and Computation), K. L. P. Mishra, N. Chandrasekaran; P. H.I.

10. Contents of Syllabus:

A. Theory

Detailed Syllabus:

UNIT 1: Finite Automata (10 Lectures)

DFA, NFA, NFA with empty-moves, Equivalence of DFA and NFA, Reduction of the number of states in finite automata.

UNIT 2: Regular Languages and Regular Grammar (12 Lectures)

Concept of languages and grammar, Regular expressions, Connection between regular expressions and regular languages, Regular grammars, Right and Left-Linear Grammars, Equivalence between Regularlanguages and Regular grammars.

UNIT 3: Properties of Regular Languages (13 Lectures)

Closure under simple set operations- union, intersection, concatenation, complementation and star closure, Decision algorithms for emptiness, finiteness and infiniteness, equality, Proof of non-regularity using Pigeonhole principle and using pumping lemma for regular languages.

UNIT 4: Context Free languages (15 Lectures)

Context-free grammars, leftmost and rightmost derivations, derivation trees, Parsing and Ambiguity ingrammars and languages, Simplification of Context free Grammars- removing useless productions,empty-productions and unit-productions. Normal forms- Chomsky and Greibach normal forms, Pumping Lemma for CFL, Using Pumping Lemma to show that certain languages are not Context free

UNIT 5: Pushdown Automata (10 Lectures)

Definition and language accepted (acceptance by empty stack and final state and their equivalence), Pushdown Automata and Context free languages. Deterministic PDA and Deterministic Context free Languages.

Particulars of course designer:

Name: Prof. Anjana Kakoti Mahanta
Contact No.: 9864425716
E-mail id : anjana@gauhati.ac.in

Paper Name: Database Management System

1. **Learning Outcome:**

   On successful completion of this course, the student should be able to:
   - Learn database concepts and its architectural components.
   - Describe different data models used for designing a database.
   - To create a database using relational models and entity relationships concepts
   - Normalize a database into various normal forms
   - Design SQL queries to handle a relational database.
2. **Prerequisite:** NIL
3. **Semester: 4**
4. **Course Type: Compulsory**
5. **Course Level: 200-299**
6. **Theory Credit:** 3
7. **Practical Credit:** 1
8. **Number of required hours:**
   a) Theory: 45 hrs
   b) Practical: 30 hrs
   c) Non Contact: 5 hrs

9. List of reference books:

a) Dr. Satinder Bal Gupta and Aditya Mittal, *Introduction to Database Management System*, University Science Press
b) A. Silberschatz, H.F. Korth, S. Sudarshan, *Database System Concepts*, McGraw Hill
c) R. Elmasri, S.B. Navathe, *Fundamentals of Database Systems*, Pearson Education
d) Dr. Rajive Chopra, *Database Management System (DBMS): A Practical Approach*, S. Chand Publication

10. Detailed Syllabus:

UNIT-1: **Introduction to Database Management Systems** **(5 Lectures)**

Basic Definition and Concepts: *Data, Information, Meta Data, Data Dictionary, Database, Fields*, *Records* and *Files*. Definition of Database Management System (DBMS), Primary Functions of DBMS, Traditional File approach, Traditional file approach versus database management system approach, Disadvantages of Traditional File System, Need of a DBMS, Components of a DBMS, Advantages of DBMS, Disadvantages of Database Systems, Various uses of database System Applications, Database Users: *End users or naive users*, *Online users*, *Application Programmers*, *Database Administrator*(*DBA*), Responsibilities of DBA.

UNIT 2: Database Management System Architecture **(6 Lectures)**

Definition of *Schemas*, *sub-schema* and *Instances*. Data Independence: *Physical Data Independence* and *Logical data Independence*. Three-tier architecture of DBMS, Advantages of three-level Architecture, basic concept of data model, Characteristics of Data Models, Types of Data models: *Record Based Data Models*, *Object Based Data Model* and *Physical Data Models*. Relational Data Model, Types of database Systems: *Single-user* database systems, *Multiuser* database systems, *Centralized* database systems, *Distributed* database systems and *Client/Server* database systems.

UNIT 3: E-R Modeling (8 Lectures)

Basic Concepts: *Entity*, *Attributes*, *Entity Sets*, *Domain*. Types of attributes: *Simple and Composite Attributes*, *Single Valued and Multi-valued Attributes*, *Derived Attributes and Stored Attributes*. Types Of Entity Sets*: Strong Entity Sets* and *Weak Entity Sets.* Concept of Relationship and Relationship sets, Types of Relationship: One-to-One, One-to-Many, Many-to-One and Many-to Many, Various Symbols used in ER Diagram, Mapping constraints: *Mapping Cardinalities (Cardinality Ratios)* and *Participation Constraints*. Definition of Key, Types of Keys: *Super Key*, *Candidate Key, Primary Key, Alternate Key* and *Foreign Key*. Symbols used in E-R diagrams, Conversion of an ER and Diagram in to Relational Tables

UNIT4: Relational Model and Relational Algebra (7 Lectures)

Definition of Relation, Data Structure of Relational Database: *Relation*, *Tuples*, *Attributes Domain, Degree* and *Cardinality.* Integrity Constraints, Domain Constraints, Key Constraints, Advantages and Disadvantages of Relational Model, Relational, Definition of Relational algebra, Operations in Relational Algebra: *Selection*, *Projection, Division, Rename, Union, Intersection, Set Difference, Natural-join operation, Outer join, Inner Join, Cartesian Product* and *Assignment operation*. Aggregate Functions and Operations: *Average, Maximum, Minimum, Sum* and *Count*.

UNIT 5: Functional Dependency and Normalization (8 Lectures)

Definition of Functional Dependency, Armstrong's Axioms in Functional Dependency, Types of Functional Dependency: *Partial Dependency, Full Functional Dependency, Transitive and Non-transitive Functional Dependency*, Armstrong's Axiom, Closure of a set of Functional Dependency, Closure of an Attribute, Definition of Canonical Cover, Algorithm to find the canonical cover of a FD set, Anomalies in relational database*: Insertion*, *Deletion* and *Update* anomalies, Concepts of Normalization, Benefits of Normalization, Types of Normal Forms: First Normal Form (1NF), Second Normal Form (2NF), Third Normal Form (3NF) and Boyce–Codd Normal Form (BCNF)

UNIT 6: Transaction and Concurrency Control (4 Lectures)

Definition of Transaction, ACID Properties of transaction, Transaction States, Definition of Concurrency Control, Need of Concurrency Control, The Lost Update Problem, The Uncommitted Dependency Problem, The Inconsistent Analysis Problem, Serializability: *View Serializability* and *Conflict Serializability*

UNIT 7: SQL Queries (7 Lectures)

Database Languages (Data Definition Languages, Data Manipulation Languages), Characteristics of SQL, Basic data types in SQL, Data-definition language (DDL) commands: *Create Database, Create Table*, *Drop Table*, *Alter Table*. SQL Constraints: *Primary Key, Foreign Key, Not Null, Unique, Check, Defaul,*. Data Manipulation Language (DML) commands: *Insert Into*, Delete, *Select*, *Update*. SQL clauses: *Where, Order By, Having, Group By* and *Like*. SQL join operations: *Inner Join, Left Outer Join, Right Outer Join* and *Full Join*. SQL aggregate functions: *sum(), count(), max(), min()* and *avg()*

Lab Contents: (30 hrs)

Practical / Lab work to be performed:

- Implementation of SQL DDL statements in MySQL DBMS: CREATE DATABASE, CREATE TABLE, ALTER TABLE, RENAME, DROP DATABASE/TABLE
- Use of SQL DML statements in MySQL DBMS: INSERT, SELECT, UPDATE, DELETE SQL commands
- Implementing following constraints in MySQL DBMS: PRIMARY KEY, FOREIGN KEY, NOT NULL, UNIQUE and DEFAULT
- Handling following SQL clauses in MySQL DBMS: WHERE, GROUP BY, ORDER BY, HAVING, IN, BETWEEN, LIKE
- Working with following aggregate functions in MySQL DBMS: COUNT, AVG, MAX, MIN and SUM
- Working with transaction processing command in MySQL DBMS: START TRANSACTION, COMMIT and ROLLBACK Statements, SET autocommit

Particulars of course designer:

Name : Dwipen Laskar
Contact No : +916000795681
Email-id : laskardwipen@gauhati.ac.in

Paper Name: Design and Analysis of Algorithms

1. Learning Outcome:

After successful completion of this course, students will:

- know how to analyze algorithms.
- learn the different algorithm design techniques.
- be acquainted with the advanced sorting and searching algorithms and their complexities.
- know graph representation techniques together with traversal algorithms.
- know why tree balancing is required and how to achieve this.

2. Prerequisites: NIL

3. Semester: 4

4. Course Type: Compulsory

5. Course Level: 200-299

6. Theory Credit: 4

7. Practical Credit: 0

8. No of Hours:

a) Theory: 60 hrs
b) Practical: 0 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) *Introduction to Algorithms*, Cormen. T. H., Leiserson C. E. and Rivest. R. L., 3rd edition (2010)Tata-McgrawHill Publishers.
b) *Fundamentals of Computer Algorithms*; Horowitz and Sahani; (2nd Edition), Galgotia.
c) *Design and Analysis of Computer Algorithms*; Aho.A, Hopcroft J.E. and Ullman J.D.; (2011), PearsonEducation.
d) *Introduction to the Design and Analysis of Algorithms*, Levitin, 3/e 2017, Pearson Education.

10. Contents of Syllabus:

A. Theory

Detailed Syllabus:

UNIT 1: Introduction (6 Hours)

Analysisof Algorithms – worst case and average case analysis; Time and space complexity of algorithms; Asymptotic notations O and θ. Proving correctness of algorithms.

UNIT 2: Algorithm Design Techniques (10 Hours)

Iterative techniques, Divide and Conquer, Dynamic Programming, GreedyAlgorithms. Applications of these techniques in problems like sorting, searching, matrix multiplication, LCS (Longest Common Sequence) problem, Knap-sack problem.

UNIT 3: Sorting and Searching Techniques (20 Hours)

Elementary sorting techniques–Bubble Sort, Insertion Sort, Merge Sort, AdvancedSorting techniques - Heap Sort, Quick Sort, Sorting in Linear Time - Bucket Sort,Radix Sort and Counting Sort, Searching Techniques, Medians & Order Statistics,complexity analysis of all the techniques.

UNIT 4: Balanced Trees (9 Hours)

Tree balancing, Height of a Red-Black tree, Rotations - Left Rotations, Right Rotations, Insertion and Deletion in Red-Black trees.

UNIT 5: Graph Algorithms **(9 Hours)**

Representations of Graphs; Adjacency Matrix and Adjacency Lists. Simple operations like computing degree, indegree, outdegree of vertices using the representation techniques and computing work done in all cases. Graph traversal algorithms–Breadth First Search, Depth First Search and their Applications.

UNIT 6: String Processing **(6 Hours)**

String Matching, KMP Technique.

Particulars of course designer:

Name: Prof. Anjana Kakoti Mahanta
Contact No.: 9864425716
E-mail id : anjana@gauhati.ac.in

Paper Name: Python Programming

1. Learning Outcome: After completing this course, students

- Know about fundamentals of Python Programming and Problem Solving.

2. Prerequisites: NIL
3. Semester: 4
4. Course Type: Compulsory
5. Course Level: 200-299
6. Theory Credit: 3
7. Practical Credit: 1
8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

d) *Core Python Programming*, R. Nageswara Rao, Dreamtech Press.
e) *Python: The Complete Reference*, Martin C. Brown, McGraw Hill Education.
f) *http://docs.python.org/3/tutorial/index.html*

10. Contents of Syllabus:
A. Theory
Detailed Syllabus:

Unit 1: Introduction to Python Programming (8 hrs)
Introduction, Installation of Python Interpreter, Python Shell, Code Indentation, Identifiers and Keywords, Literals, Strings, Operators (Arithmetic, Relational, Logical, Assignment, Ternary, Bitwise, Increment and Decrement Operators), Input and output statements, Output Formatting.

Unit 2: Control Statements and Functions (8 hrs)
Branching, Looping, Conditional Statement, Exit Functions, Break, Continue, Pass, Defining Functions, Default Arguments. Scope of Functions, Function Documentation, Lambda Functions & Map.

Unit 3: Python Data Structures (6 hrs)
List (List, Nested List, List as Matrix), Tuple, Set, Dictionary.

Unit 4: Exception Handing (4 hrs)
Errors, Exception Handling with try, Multiple Exception Handling, Writing own Exception.

Unit 5: File Handling (6 hrs)
Understanding read function, read(), readline() and readlines(), Understanding write functions, write() and writelines(), Programming using file operations, Reading config files, Writing log files in python.

Unit 6: OOP in Python
Creating Classes in Python, Instance Methods, Inheritance, Polymorphism, Exception Classes and Custom Exceptions.

Unit 7: Introduction to Libraries in Python (6 hrs)
NumPy, Matplotlib, OpenCV, Tkinter.

Unit 8: Python SQL Database Access (7 hrs)

Introduction to database driven program, Database Connection, Database Operations: INSERT, READ, UPDATE, DELETE, COMMIT AND ROLLBACK.

(b) Practical

- Introduction to Python console, operators, input and output statements.
- Python control statements and functions
- Data Structures in python
- Exception Handling
- File Handling
- Object Oriented Python programming
- Introduction to libraries (NumPy, Matplotlib, OpenCV)
- Python SQL Database Connection and database operations

Particulars of course designer:

Name: Dr. Sanjib Kr Kalita
Contact No.: 8812051150
E-mail id: sanjib959@gauhati.ac.in

Paper Name: Computer Networks

1. Learning Outcome: After completing this course, students

- Student will able to learn about the general principles of data communication.
- Student will able to learn about how computer networks are organized with the concept of layered approach.
- Student will able to learn about how signals are used to transfer data between nodes.
- Student will able to learn about how packets in the Internet are delivered.
- Student will able to learn about how routing protocols work.
- Student will able to learn about functions of transport layer
- Student will able to learn about functions of application layer

2. Prerequisites: NIL
3. Semester: 5
4. Course Type: Compulsory
5. Course Level: 300-399
6. Theory Credit: 3
7. Practical Credit: 1
8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

g) B. A. Forouzan: *Data Communications and Networking*, Fourth edition, THM, 2007.
h) A. S. Tanenbaum: *Computer Networks***,** Fourth edition**,** PHI , 2002.

10. Contents of Syllabus:
A. Theory
Detailed Syllabus:

UNIT 1: Introduction to Computer Networks (5 Lectures)

Data communication system and its components, Definition of network, Types of network, Network topologies, Network protocol, Layered network architecture, Overview of OSI reference model, Overview of TCP/IP protocol suite.

UNIT 2: Physical Layer Communication (10 Lectures)

Analog and digital signal, Definition of bandwidth, Maximum data rate of a channel, Line encoding schemes, Transmission modes, Modulation techniques, Multiplexing techniques- FDM and TDM, Transmission media-Guided and Unguided, Switching techniques- Circuit switching, Packet switching, Connectionless datagram switching, Connection-oriented virtual circuit switching.

UNIT 3: Data Link Layer Functions and Protocol (10 Lectures)

Definition of Framing, Framing methods, Error detection techniques, Error correction techniques, Flow control mechanisms- Simplex protocol, Stop and Wait ARQ, Go-Back-N ARQ, Point to Point protocol.

UNIT 4: Multiple Access Protocol and Networks (5 Lectures)

Basics of ALOHA protocols, Basics of CSMA/CD protocols, Ethernet LANS, Connecting LAN and back-bone networks- Repeaters, Hubs, Switches, Bridges, Router and Gateways

UNIT 5: Networks Layer Functions and Protocols (8 Lectures)

Connection oriented vs Connectionless services, Definition of Routing, Routing algorithms, IP protocol, IP addresses, ARP, RARP

UNIT 6: Transport Layer Functions and Protocols (4 Lectures)

Transport services, TCP vs UDP protocol, TCP connection establishment- Three way handshakes, TCP connection release

UNIT 7: Overview of Application Layer Protocols (3 Lectures)

Overview of DNS, Overview of WWW, URL, Email architecture, HTTP protocol

B. Practical / Lab work to be performed (15 Practical Classes/30 hrs)

- Implement the data link layer farming methods such as Bit Stuffing.
- Study of different types of Network cables.
- Study of network IP.
- Connect the computers in Local Area Network.
- Study of basic network command and Network configuration commands.
- Configure a Network topology using packet tracer software.
- Simulate Cyclic Redundancy Check (CRC) error detection algorithm for noisy channel.
- Simulate and implement Stop and Wait protocol for noisy channel.
- Simulate and implement Go-Back-N sliding window protocol.
- Simulate and implement Selective Repeat sliding window protocol.
- Simulate and implement Dijkstra Algorithm for shortest path routing.
- Simulate and implement Distance vector routing algorithm

Particulars of Course Designer:

Name: Dr Irani Hazarika
Contact No: 8486965773
Email: queensarathi@gmail.com

Paper Name: Java Programming

1. Learning Outcome: After completing this course, students will be

- Familiar with the core concepts of java programming and classes of swing package.

2. Prerequisites: NIL
3. Semester: 5
4. Course Type: Compulsory
5. Course Level: 300-399
6. Theory Credit: 3
7. Practical Credit: 1
8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) *Java: The Complete Reference*, Herbert Schildt, McGrawHill
b) *Java How to Program,* Paul Deitel, Harvey Deitel, Pearson

10. Contents of Syllabus:
A. Theory
Detailed Syllabus:

Unit I: Introduction (3 hrs)

High level language, compiled and interpreted languages, history of java programming language, compilation of java code, bytecode, java interpreter, javac and java command, path environmental variable, Java IDE, features of java programming language: simple, object oriented, robust, architecture neutral and interpreted

Unit II: Data types, operators and control statements (12 hrs)

Java as strongly typed language, primitive data types, integer data types: byte, short, int and long, floating point data types: float and double, character data type, boolean data type, literals: integer literals, floating-point literals, boolean literals, character literals and string literals, declaring a variable, dynamic Initialization, the scope and lifetime of variables, type-casting in java, one dimensional array, multi dimensional array, arithmetic operators: the basic arithmetic operators, the modulus operator, arithmetic compound assignment operators, increment operator and decrement operator, bitwise operators, relational operators, short circuit logical operator, the assignment operator, branching statements: if-else and switch-case statements, looping statements: while, do-while, for and for-each statements, jump statements: break and continue

Unit III: Object oriented features of java (10 hrs)

Defining a class, member variable and member methods, access specifiers: default, private and public, declaring objects, assigning object reference variables, constructors, parameterized constructors, the this keyword, garbage collection, the finalize( ) method, overloading methods, overloading constructor, static keyword, final keyword, command line arguments in java, inheritance, super class and sub class, protected access specifier, super keyword, constructor call in multilevel inheritance, method overriding, dynamic method dispatch, abstract class, interfaces, type wrappers

Unit IV: String handling and packages (5 hrs)

String class, String constructors, String length, special string operations: string literals, string concatenation, string concatenation with other data types, string conversion and toString( ), character extraction: charAt( ), getChars( ), string Comparison: equals( ) and equalsIgnoreCase(), regionMatches( ), startsWith( ) and endsWith( ), equals( ) Versus ==, compareTo( ), searching strings, data conversion using valueOf( ), StringBuffer, StringBuffer constructors, length( ) and capacity( ), ensureCapacity( ), setLength( ), charAt( ) and setCharAt( ), getChars( ), package, defining a package, CLASSPATH, importing packages

Unit V: Exception handling and I/O **(5 hrs)**
Exception-handling, exception types, uncaught exceptions, try and catch block, multiple catch blocks, nested try statements, throw, throws, finally, java's built-in exceptions, creating own exception classes, java I/O classes, reading console input, writing console output, reading and writing files

Unit VI: Swing package and database connectivity **(10 hrs)**
Swing package, simple GUI-Based Input/Output with JoptionPane, Jframe, JLabel, JTextField, Jbutton, handling event in a Jframe object, layout managers: BorderLayout, FlowLayout, GridLayout, CardLayout, GridBagLayout, JtoggleButton, JCheckBox, JRadioButton, Jlist, JcomboBox, JDBC, JDBC driver, connectivity steps, connectivity with MySQL, DriverManager class, Connection class, Statement class, ResultSet class, PreparedStatement class

(b) Practical

- Java programs to demonstrate the use of data types and operators
- Java input through Scanner class and JOptionPane class
- Java programs to demonstrate the use of control statements.
- Java programs to demonstrate the use of classes, objects, visibility modes, constructors and destructor.
- Java programs to demonstrate the use of inheritance and polymorphism.
- Java programs to demonstrate the use of polymorphism.
- Java programs to handle strings,Java programs implementing exception handling.
- Demonstrating the use and creation of packages in java.
- Java program with JFrame, JTextfield and JButton with event handling
- Using JLabel, JTextArea and JPasswordField in java with event handling
- Working with layout managers in JFrame
- Using JCheckBox, JRadioButton and JComboBox in a JFrame
- Connecting JFrame components to a DBMS

Particulars of course designer:

Name: Dr. Hasin Afzal Ahmed
Contact No.: 8011810533
E-mail id: hasin@gauhati.ac.in

Paper Name: Software Engineering

1. **Learning Outcome:** On successful completion of this course, the student should be able to:
    - Determine the primary problems that impact all software development processes.
    - Choose relevant software development processes models, methodologies, and strategies for managing a specific software development process, and justify the choices
    - Implement different software estimation metrics such as cost, effort size, staffing etc.
    - Describe various software design approaches and various coding and testing strategies used in software engineering principles
    - Know about software reliability and how to calculate software maintenance cost.

2. Prerequisites: NIL
3. Semester: 5
4. Course Type: Compulsory
5. Course Level: 300-399
6. Theory Credit: 4
7. Practical Credit: 0
8. No of Hours:

a) Theory: 60 hrs
b) Practical: 0 hrs
c) Non Contact: 5 hrs

9. List of Books:

c) Rajib Mall: *Fundamentals of Software Engineering*; PHI Learning Pvt. Ltd.
d) Roger S. Pressman: *Software Engineering: A practitioner's Approach*; McGraw Hill.

10. Contents of Syllabus:
A. Theory
Detailed Syllabus:

Unit 1: Introduction (4 Lectures)

Definition of Software Engineering, differentiation between Computer Science, Software Engineering and System Engineering, Program V/s software product, Exploratory style and modern style of software development, need of software engineering, characteristics of good software product

Unit 2: Software Development Life Cycle models (7 Lectures)

Definition of software development Life cycle (SDLC) models, Various life cycle modes: Classical Waterfall model, Iterative Waterfall model, Prototyping model, Evolutionary (Incremental) model, Spiral model, Agile Model, Agile V/s traditional SDLC Models, SCRUM model, Advantages and disadvantages of each of these SDLC models.

Unit 3: Requirement Analysis and Specification (7 Lectures)

What is Requirement Analysis and Gathering, Concept and Importance of Feasibility Study in Software design, Types of Feasibility: *Technical*, *Economical* and *Operational* feasibility, Software Requirement Specification (SRS) document, Components of an SRS (Software Requirement Specification): Functional and Non-Functional Component, Properties of a good SRS, Different users of SRS, Techniques to represent Complex Logic in SRS: Decision Tree and Decision Table.

Unit 4: Software Project Management (15 Lectures)

Basic idea of Software Project Management, Job Responsibilities of a Software Project Manager, Need of SPMP (Software Project Management Plan) document, Contents of SPMP, Need of Software documentation, Internal and External documentation, Software size estimation using Lines of Code (LOC), Merits and Demerits of LOC metric, Function Point Metric, 3D Function Point metrics, Project Estimation Techniques: *Empirical estimation* and *Heuristics estimation* techniques. Empirical estimation techniques: *Delphi Cost Estimation* and *Delphi Cost Estimation.* Heuristic Estimation Techniques: *Basic COCOMO model* and *Intermediate COCOMO model.* Project Scheduling: *Work break down structure, Activity Networks* and *Critical Path Method.* Project Team structure: *Chief Programmer team* and *Democratic team* structure.

Unit 5: Software Design principles and Methodology (12 Lectures)

Top down and bottom up approach, External Design, Architectural Design and Detailed design, Concept of Cohesion in software design, Classification of Cohesions, Basic concept of Coupling, Classification of Couplings, Introduction to software Analysis and Software Design (SA/SD), Introduction to Data Flow Diagram, Symbols used in DFD, Context Diagram in DFD, Advantages and Disadvantages of DFDs., Balanced DFD, Structured Design: *Transaction Analysis* and *Transform Analysis.* Need of Object Oriented Design and Analysis, UML (Unified Modeling Language), different views of UML, Various UML Diagrams: *Use Case diagram, Class Diagram, Object Diagram*, *Sequence Diagram* and *Collaboration diagram.*

Unit 6: Coding and Testing (9 Lectures)

Goals of coding, Code Review techniques: Code Walkthrough, Code Inspection, Definition of Test cases, test suits, negative testing and positive testing. Different levels of software testing: *unit testing*, *Integration Testing*, *System Testing* and *acceptance testing*. Differentiation between Verification and Validation, Black box testing approaches: *Equivalent Class Partitioning* and *Boundary Value Analysis*, White Box testing approaches: *Statement Coverage*, *Branch Coverage, Condition* Coverage and Path *Coverage. Approach*, MaCabe's Cyclomatic Complexity, Basic idea of various system testing approaches: *Smoke testing, Stress testing, Volume testing* and *Compatibility testing*

Unit 7: Software Reliability and Maintenance (6 Lectures)

What is reliability? Reliability metrics of Software Products: ROCOF, MTTF, MTTR, MTBF, POFOD and availability. ISO 9000 Certification, need of ISO Certification, How to get ISO 9000 certification, Definition of Software Maintenance, Types of Software maintenance: *Corrective, Adaptive* and *Perfective* maintenance, Estimation of Software Maintenance Cost.

Particulars of course designer:

Name : Dwipen Laskar
Contact No : +916000795681
Email-id : laskardwipen@gauhati.ac.in

Paper Name: Web Technologies

1. Learning Outcome: At the end of the course, students will be able to:
- Understand the basic concept of web applications and web services.
- Design basic well-structured web page using HTML and CSS
- Develop the ability to implement interactive elements and dynamic content using basic JavaScript
- Develop a foundational understanding of server-side scripting using PHP

2. Prerequisities: NIL
3. Semester: 5
4. Course Type: Compulsory
5. Course Level: 300-399
6. Theory Credit: 3
7. Practical Credit: 1
8. No of Hours:
a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:
a) Jackson J.C. (2007). *Web Technologies: A Computer Science Perspective*. Pearson.
b) Duckett, J. (2011). *HTML and CSS: Design and Build Websites*. John Wiley & Sons.
c) Robbins, J. N. (2018). *A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics*. O'Reilly Media.
d) Robbins, J. N. (2018). *Learning Web Design: A Beginner's Guide.* O'Reilly Media.
e) Haverbeke, M. (2018). *Eloquent JavaScript*. No Starch Press.
f) Welling, L., & Thomson, L. (2016). *PHP and MySQL Web Development* (5th ed.). Addison-Wesley Professional.

10. Contents of Syllabus:
A. Theory
Detailed Syllabus:

Unit 1: Introduction to Web Technologies (8 Lectures)

Concepts of the Internet and the World Wide Web (WWW), Overview of web browsers and their functionalities. Client-Server Architecture in Web Applications. Communication Protocols – HTTP, HTTPS, FTP. Working of DNS. Brief concepts of port, URL, cache and cookies. Web Content Accessibility Guidelines. Privacy concerns and data protection regulations, GDPR. Introduction to Web Hosting and control panels.

Unit 2: Front End Development using HTML (10 Lectures)

Website and Webpage. Basic concept of Markup Language. Introduction to HTML. Basic HTML structure. Text formatting Tags – headings, paragraph, line break, horizontal rule. Link and Navigation – anchor tags. Lists - ordered, unordered, definition list. Image and multimedia tags. Tables in HTML. Forms and Input types – text, email, password, radio, select, checkbox, textarea, date, url, submit, button. Semantic HTML. Sectioning elements – header, nav, main, section, article, aside, footer.

Unit 3: Front End Design using CSS (9 Lectures)

Introduction to CSS. CSS syntax and rule structure. Inline, Internal and External CSS. CSS selectors – element, class, ID, attribute. Combinators – descendant, child, adjacent sibling, general sibling. Understanding the CSS Box Model – content, padding, border, margin. CSS colours and backgrounds – background-color, background-image, background-repeat. CSS typography – font properties, text properties.

Unit 4: Client-Side Scripting with JavaScript (10 Lectures)

JavaScript as a high-level interpreted language. JavaScript code execution in web browsers – JavaScript execution context. JavaScript syntax and datatypes. JavaScript variables – var, let, const. Assignment and scope of JavaScript variables. Operators in JavaScript – arithmetic, comparison, logical, assignment. Conditional Statements. Looping Structures. Function declaration and Invocation in JavaScript. Introduction to the Document Object Model. Accessing HTML elements in DOM – by id, by tag name, by class name, query selectors. Manipulating DOM elements – create, add, append, remove. InnerText vs InnerHTML. Manipulating CSS styles using DOM. Event handling and delegation with the DOM using JavaScript. Client-side form validation using JavaScript. Handling form validation and processing data.

Unit 5: Server-Side Programming with PHP (8 Lectures)

Introduction to PHP and role in Web development. PHP syntax and variables. Basic PHP functions – Built-in PHP functions, string manipulation functions, mathematical functions, date and time functions. PHP forms and form handling. Form submission methods – GET and POST. Handling form data with PHP. Uploading files with PHP. Introduction to the tech-stack. Role of Apache, PHP, MySQL etc. Introduction to Databases and SQL. Connecting to databases with PHP. Executing SQL queries with PHP. Retrieving, inserting, updating and deleting data from databases using PHP.

B. List of Practical

(This is a suggestive list only. Questions need not be restricted to this list.)

1. Create a basic HTML webpage structure with a heading, paragraph, and an image.
2. Build a navigation menu using an unordered list (<ul>) with clickable links.
3. Implement a form with input fields for name, email, and a submit button.
4. Create a table with multiple rows and columns to display tabular data.
5. Design an image gallery using HTML and CSS with proper padding and border.
6. Embed a YouTube video on a webpage using the <iframe> tag.
7. Implement an ordered list (<ol>) to display a step-by-step tutorial or instructions.
8. Create a dropdown select menu (<select>) with multiple options.
9. Use HTML5 semantic tags (such as <header>, <nav>, <section>, <article>, <footer>) to structure and organize content on a webpage.
10. Build a registration form with fields for name, email, password, date of birth, address and other such fields with a submit button. Include appropriate input types, labels and placeholders.
11. Style a heading element with a custom font, colour and background.
12. Apply different background colors to alternate rows in a table.
13. Implement a hover effect on a button that changes its background colour or adds a solid border.

14. Style a form input field with custom border, padding, and background color.
15. Implement a CSS tooltip that displays additional information when hovering over an element.
16. Build a simple JavaScript calculator that can perform basic arithmetic operations.
17. Create a button that, when clicked, appends a new paragraph element with a specific text content to an existing div element.
18. Implement a function that changes the innerText of a paragraph element to display a random number between 1 and 10 every time a button is clicked.
19. Build a form with input fields for name and email. When the form is submitted, use innerHTML to display a confirmation message with the entered name and email on the webpage.
20. Build a form with input fields for email, password and confirm password. When the form is submitted, use an alert to display a success message if the password and confirm password values matches, otherwise show an error alert. Use JavaScript for the validation.
21. Create a list of items. Add a click event listener to each item so that when clicked, the background color of the clicked item changes.
22. Write a PHP script to display the current date and time on a webpage.
23. Write a PHP script to connect to a MySQL database and fetch data from a table.
24. Create a registration form with fields for username, email, and password. Implement server-side validation to check for duplicate usernames or invalid email formats. Store the user registration data in a MySQL database. Provide feedback to the user upon successful registration or display appropriate error messages.
25. Design a webpage that displays a list of notices retrieved from a MySQL database. Implement functionality to add new notices to the database using a form. Allow users to view and delete individual notices. Apply appropriate styling to the notices and ensure proper validation and sanitization of user input.

Particulars of Course Designer:
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Paper Name: Advanced Web Programming

1. Learning Outcome: At the end of the course, students will be able to:

a) Design basic well-structured web page using HTML and CSS
b) Develop the ability to implement interactive elements and dynamic content using basic JavaScript
c) Develop a foundational understanding of server-side scripting using PHP
d) Create a CRUD web application using HTML, CSS, JavaScript, PHP and MySQL.

2. Prerequisites: NIL
3. Semester: 6
4. Course Type: Elective
5. Course Level: 300-399
6. Theory Credit: 3
7. Practical Credit: 1
8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) Duckett, J. (2011). HTML and CSS: Design and Build Websites. John Wiley & Sons.
b) Robbins, J. N. (2018). Learning Web Design: A Beginner's Guide. O'Reilly Media.
c) Nixon, R. (2014). Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5 (4th ed.). O'Reilly Media.
d) Duckett, J. (2014). JavaScript and JQuery: Interactive Front-End Web Development. John Wiley & Sons.
e) Haverbeke, M. (2018). Eloquent JavaScript. No Starch Press.
f) Welling, L., & Thomson, L. (2016). PHP and MySQL Web Development (5th ed.). Addison-Wesley Professional.

10. Contents of Syllabus:
A. Theory
Detailed Syllabus:

Unit 1: Advanced HTML **(6 Lectures)**
Review of basic HTML tags and their usage. Working with forms – validation using HTML5 attributes. HTML5 Semantic Elements – header, nav, section, article, aside, footer. Applying proper semantic markup for improved SEO. Multimedia integration. Embedding images with different attributes. Adding video and audio. Meta information and Document Structure – metadata, viewport settings.

Unit 2: Advanced Design with CSS **(12 Lectures)**
Review of CSS. CSS Selectors. Specificity and the cascade. Psudo-classes and pseudo-elements.CSS Box sizing. Gradient and Transparent backgrounds. CSS Typography – Line height and letter spacing. Web-safe fonts. CSS Layout. Display property – inline, block, inline-block, none. Positioning – static, relative, absolute, fixed. Floats and clear property. Box alignment – flexbox and grid layout.Responsive Web Design – Media queries and breakpoints. Fluid layouts. Brief concept of CSS preprocessors – Sass, Less. Brief concept of CSS frameworks – Bootstrap, Tailwind.

Unit 3: Advanced JavaScript **(12 Lectures)**

Review of JavaScript concepts. Functions in JavaScript. Lexical Environment. Arrays and Array manipulation in JavaScript.. JavaScript Events and Event Handling – Event propagation and event delegation. Implementing interactivity with user actions. Introduction to JavaScript APIs. Callback functions and event loop. Promise chain. Asynchronous function with async/wait. DOM manipulation and event handling with jQuery. Overview of AJAX. Brief concept of XMLHttpRequest object.

Unit 4: Server-Side Scripting using PHP (10 Lectures)

Review of PHP as a server-side scripting language. Handling forms and user input with PHP. Interacting with databases and performing CRUD operations using PHP and MySQL. User authentication using PHP. Implementing user registration and login functionality. Session management and Token based authentication. Overview of Cookies and their use in Web applications. Working with cookies in PHP – setting, reading, deleting. Concept of Cross-site scripting (XSS).

Unit 5: Advanced Concepts of Web Programming (5 Lectures)

Overview of web hosting – shared hosting, VPS, dedicated hosting, cloud hosting. Overview of Server-Side Includes (SSI). Brief concepts of Web APIs and data integration. Concept of JavaScript frameworks – React.js and Node.js. Version Control Systems. Brief overview of Continuous Integration and Deployment. Overview of Web security and SSL/TLS. Web analytics and monitoring.

b) List of Practical

(This is a suggestive list only. Questions need not be restricted to this list.)

1. Create a semantic HTML structure for a blog post, including headings, paragraphs, images, and nested elements.
2. Develop an HTML5 video player with custom controls, including play, pause, volume control, and full-screen functionality.
3. Create a responsive HTML layout using CSS Grid or Flexbox that adapts to different screen sizes and orientations.
4. Develop a responsive navigation menu that collapses into a hamburger menu for mobile devices, utilizing media queries and CSS transitions.
5. Implement a CSS animation or transition to create a smooth fade-in effect for an element on page load.
6. Design a CSS grid layout that displays a multi-column card-based UI, where each card has a consistent height but variable width. Each card should display an image, title, and description.
7. Develop a CSS-only tooltip that appears when hovering over an element, with customizable styles and positioning.
8. Design a CSS drop-down menu with multiple levels of nested submenus, allowing users to navigate through the menu hierarchy.
9. Create a CSS layout that implements a sticky header, where the header remains fixed at the top of the page while the content scrolls.
10. Build a responsive landing page using HTML5, including a hero section, feature sections, and a contact form.
11. Implement a CSS grid-based layout for a product catalog, showcasing multiple products with consistent spacing and alignment.
12. Implement a custom dropdown menu using HTML, CSS, and JavaScript, with options that can be selected and displayed.

13. Build a form validation mechanism using HTML5 form validation attributes and JavaScript, ensuring that required fields are filled out correctly. Use CSS to design the form and the validation messages.
14. Develop a slideshow or carousel using JavaScript and the DOM API, with next/previous controls and automatic playback.
15. Implement a dynamic table that allows users to add or remove rows, with the ability to edit and delete individual cells.
16. Develop a live search functionality that filters and displays search results from the content of the web page in real-time as the user types, using JavaScript and DOM manipulation.
17. Use a callback function to perform an asynchronous AJAX request and update the content of a specific HTML element with the response.
18. Implement a callback-based timer that executes a specific function after a certain period of time has elapsed.
19. Create a simple asynchronous form submission process using AJAX, displaying a loading spinner while waiting for the response.
20. Develop a weather application that uses an asynchronous API call to fetch weather data based on user input, displaying the results on the page.
21. Implement a user registration form in PHP, which securely stores user credentials in a database and performs validation checks for email uniqueness and password strength.
22. Create a login page in PHP that verifies user credentials against the stored data in the database and redirects authenticated users to a secure dashboard.
23. Develop a Password reset functionality in PHP, allowing users to request a password reset link via email and securely update their password.
24. Implement a user profile page in PHP, which displays and allows users to edit their personal information such as name, email, and profile picture.
25. Create a session-based shopping cart system in PHP, allowing users to add products, update quantities, and remove items, while maintaining cart information across different pages.
26. Develop an access control system in PHP, where certain pages or features are restricted to logged-in users only and unauthorized users are redirected to a login page.
27. Implement user roles and permissions in PHP, allowing administrators to assign different levels of access to users based on their roles (e.g., admin, moderator, user).
28. Create a "Remember Me" functionality in PHP, using cookies to remember and automatically log in returning users for a certain period of time.
29. Develop a logout mechanism in PHP that destroys the user session and redirects users to a logout confirmation page or the login page.
30. Implement account activation via email in PHP, where new users receive an activation link to verify their email address and activate their account.

Particulars of course designer:

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Paper Name: Artificial Intelligence

1. Learning Outcome:
After completing this course, students will know the fundamentals of artificial intelligence (AI), identify problems where artificial intelligence techniques are applicable and able to apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.

2. Prerequisites: NIL
3. Semester: 6
4. Course Type: Elective
5. Course Level: 300-399
6. Theory Credit: 3
7. Practical Credit: 1
8. No of Hours:

d) Theory: 45 hrs
e) Practical: 30 hrs
f) Non Contact: 5 hrs

9. List of Books:

g) *Rich & Knight, Artificial Intelligence* – Tata McGraw Hill, 2nd edition, 1991.
h) *Russell & Norvig, Artificial Intelligence*-A Modern Approach, LPE, Pearson Prentice Hall, 2nd edition, 2005.
i) *W.F. Clocksin and Mellish, Programming in PROLOG,* Narosa Publishing House, 3rd edition, 2001.
j) *DAN.W. Patterson, Introduction to A.I and Expert Systems* – PHI, 2007.
k) *Ivan Bratko, Prolog Programming for Artificial Intelligence*, Addison-Wesley, Pearson Education, 3rd edition, 2000.

10. Contents of Syllabus:
A. Theory
Detailed Syllabus:
UNIT 1: Introduction (4 Hours)
Introduction to Artificial Intelligence, Background and Applications, Turing Test and Rational Agent approaches to AI, Introduction to Intelligent Agents, their structure, behavior and environment.

UNIT 2: Problem Solving and Searching Techniques (16 Hours)
Problem Characteristics, Production Systems, Control Strategies, Breadth First Search, Depth First Search, Hill climbing and its Variations, Heuristics Search Techniques: Best First Search, A* algorithm, Constraint Satisfaction Problem, Means-End Analysis, Introduction to Game Playing, Min-Max and Alpha-Beta pruning algorithms.

UNIT 3: Knowledge Representation (14 Hours)

Introduction to First Order Predicate Logic, Resolution Principle, Unification, Semantic Nets, Conceptual Dependencies, Frames, and Scripts, Production Rules, Conceptual Graphs.
Programming in Logic (PROLOG)

UNIT 4: Dealing with Uncertainty and Inconsistencies (6 Hours)
Truth Maintenance System, Default Reasoning, Probabilistic Reasoning, Bayesian Probabilistic Inference, Possible World Representations.

UNIT 5: Understanding Natural Languages (5 Hours)

Parsing Techniques, Context-Free and Transformational Grammars, Recursive and Augmented Transition Nets.

Practical:

- Write a prolog program to calculate the sum of two numbers.
- Write a prolog program to find the maximum of two numbers.
- Write a prolog program to calculate the factorial of a given number.
- Write a prolog program to calculate the nth Fibonacci number.
- Write a prolog program, insert_nth(item, n, into_list, result) that asserts that result is the list into_list with item inserted as the nth element into every list at all levels.
- Write a Prolog program to remove the nth item from a list.
- Write a Prolog program, remove nth (Before, After) that asserts the After list is the Before list with the removal of every nth item from every list at all levels.
- Write a Prolog program to implement append for two lists.
- Write a Prolog program to implement palindrome (List).
- Write a Prolog program to implement max(X,Y,Max) so that Max is the greater of two numbers X and Y.
- Write a Prolog program to implement maxlist(List,Max) so that Max is the greatest number in the list of numbers List.
- Write a Prolog program to implement sumlist(List,Sum) so that Sum is the sum of a given list of numbers List.
- Write a Prolog program to implement two predicates evenlength(List) and oddlength (List) so that they are true if their argument is a list of even or odd length respectively.
- Write a Prolog program to implement reverse (List, Reversed List) that reverses lists.
- Write a Prolog program to implement maxlist (List, Max) so that Max is the greatest number in the list of numbers List using cut predicate.
- Write a Prolog program to implement GCD of two numbers.
- Write a prolog program that implements Semantic Networks/Frame Structures.

Particulars of course designer:

Name: Dr. Diganta Kumar Pathak
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Paper Name: Computer Graphics

1. Learning Outcome:

After completing this course, students will know about basic elements of Computer Graphics, fundamental of Computer graphics algorithms along with basic mathematical foundations of computer graphics.

2. Prerequisites: NIL

3. Semester: 6

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 3

7. Practical Credit: 1

8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) D. Hearn, M. Baker: Computer Graphics, Prentice Hall of India 2008.
b) J.D.Foley, A.Van Dan, Feiner, Hughes Computer Graphics Principles & Practice 2nd edition Publication Addison Wesley 1990.
c) D.F.Rogers Procedural Elements for Computer Graphics, McGraw Hill 1997.
d) D.F.Rogers, Adams Mathematical Elements for Computer Graphics, McGraw Hill, 2nd edition 1989.

10. Contents of Syllabus:

A. Theory

Detailed Syllabus:

UNIT 1: Introduction (2 Hours)

Basic elements of Computer Graphics, Applications of Computer Graphics

UNIT 2: Graphics Hardware (5 Hours)

Input Devices: Keyboard, Mouse, Trackball & Space ball, Joystick, Data Glove, Digitizers, Image Scanners, Touch panels, Light Pens systems. Output display devices: Refresh CRT, Raster-Scan display and Random-scan display technique, Color display techniques-Beam penetration method and Shadow-mask method, Direct view storage tubes, Emissive & Non-emissive flat-panel, Displays-Plasma panels, LED and LCD monitor, Three-dimensional viewing devices and Virtual-Reality systems Display processor: Raster-scan systems, Random-scan systems

UNIT 3: Fundamental Techniques in Graphics (20 Hours)

Line-drawing algorithms:DDA algorithm and Bresenham's Line drawing Algorithm, Midpoint Algorithm for Circle and Ellipse Generation, Curve generation. Attributes for output primitives: Area-filling Algorithms - Scan-line Polygon-fill, 2-D Geometric Transformations: Basic transformations-translation, Rotation and Scaling Matrix representations and Homogeneous Co-ordinate representations, Composite transformations among translation, Rotation and Scaling, 2-D viewing: Definition, Viewing transformation pipeline, Window-to-viewport Co-ordinate transformation. 2-D Clipping: Concept and Algorithm: Point clipping, Line clipping - Cohen-Sutherland algorithm, Area clipping, Text clipping, Polygon clipping. 3-D concepts: Display methods-Parallel projection, perspective projection 3-D geometric transformations: Transformation, Translation, Rotation and Scaling around axes, 3-D Viewing Projections – Parallel and Perspective.

UNIT 4: Geometric Modelling (8 Hours)

Representing curves and surface, Bezier curves and surfaces – Definition of Bezier curve and its properties, Algorithms for Bezier curves and surfaces, Hermite curve

UNIT 5: Visible Surface determination (5 Hours)

Definition, approaches for visible surface detection, object-space methods- Back-Face Detection, Image space methods: Depth Buffer Methods, A Buffer Method, Scan Line Method, Depth-Sorting Method

UNIT 6: Surface rendering (5 Hours)

Definition and importance, light sources, Basic illumination models-Ambient light, Diffuse reflection, Specula reflector and Phong model

Practical:

- Write a program to implement DDA algorithm for line drawing.
- Write a program to implement Bresenham's line drawing algorithm.
- Write a program to implement mid-point circle drawing algorithm.
- Write a program to clip a line using Cohen-Sutherland line clipping algorithm.
- Write a program to clip a polygon using Sutherland Hodgeman algorithm.
- Write a program to apply 2D translation on a 2D object (use homogenous coordinates).
- Write a program to apply 2D rotation on a 2D object (use homogenous coordinates).
- Write a program to apply 2D scaling on a 2D object (use homogenous coordinates).
- Write a program to apply 2D reflection of a 2D object (use homogenous coordinates).
- Write a program to apply 2D shear operation on a 2D object (use homogenous coordinates).
- Write a program to apply 3D translation on a 3D object (use homogenous coordinates).
- Write a program to apply 3D rotation on a 3D object (use homogenous coordinates).
- Write a program to apply 3D scaling on a 3D object (use homogenous coordinates).
- Write a program to apply 3D reflection of a 3D object (use homogenous coordinates).
- Write a program to apply 3D shear operation on a 3D object (use homogenous coordinates).
- Write a program to draw Hermite/Bezier curve.

Particulars of course designer:

Name: Dr. Diganta Kumar Pathak
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Paper Name: Data Mining and Warehousing

1. Learning Outcome:

a) Understanding the process of Knowledge Discovery in Databases.
b) Understand the functionality of the various data warehousing component.
c) Characterize the kinds of patterns that can be discovered by association rule mining.
d) Analysis of different types of data by clustering and classification.

2. Prerequisites: NIL

3. Semester: 6

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 3

7. Practical Credit: 1

8. No of Hours:

a) Theory: 45 hrs
b) Practical: 30 hrs
c) Non Contact: 5 hrs

9. List of Books:

a) A.K. Puzari, *Data Mining Techniques*, University Press.
b) J. Han, J. Pie and M. Kamber, *Data Mining: Concepts and Techniques*, Morgan Kaufmann.
c) P. Tan, M. Steinbach and V. Kumar, *Introduction to Data Mining*, Pearson Education (LPE).
d) G. K. Gupta, *Introduction to Data Mining with Case Studies*, PHI.

10. Contents of Syllabus:

A. Theory

Detailed Syllabus:

UNIT 1: Overview (4 Lectures)

What is Data Mining?, Knowledge Discovery in Databases (KDD) vs. Data Mining, Types of Data, Basic Data Mining Tasks, Predictive and Descriptive data mining techniques, Supervised and Unsupervised learning techniques, Basics of Pre-processing methods- Data Cleaning, Data Integration and Transformation, Data Reduction, Data Visualization.

UNIT 2: Data Warehousing (6 Lectures)

What is Data Warehouse? Multidimensional Data Model, Data Cube, Basic Components of Multidimensional Data Model, OLAP Operations- Slicing, Dicing, Drilling, Drill-Up, Drill-Down, Drill-Within, Drill-Across, Pivot(Rotate), Schema of Warehouse, Data Warehouse Architecture, Metadata.

UNIT 3: Association Rule Mining (12 Lectures)

What is Market Basket Data?, k-Itemset, Support of an Itemset, Frequent Itemsets, Infrequent Itemsets, Maximal Frequent Itemsets, Closed Frequent Itemsets, Association Rules, Confidence of a Rule, Problem of Mining Association Rules, Algorithm for Mining Frequent Itemsets- Apriori Algorithm, Pincer-Search Algorithm, DIC (Dynamic Itemset Counting) Algorithm, Steps of Mining Association Rules.

UNIT 4: Clustering (12 Lectures)

What is Clustering, Partitional vs Hierarchical Clustering, Types of Data in Clustering, Distance Measures used in Clustering- Euclidean Distance, Manhattan Distance, Similarity Measures used in

Clustering- Cosine Similarity, Jacquard Coefficient, Partitional Clustering Methods- K-Means, K-Mediods, PAM, CLARA, CLARANS, Density Based Clustering Methods- DBSCAN, Introduction to Hierarchical Clustering.

UNIT 5: Classification (8 Lectures)

What is Classification? Issues Regarding Classification, K-Nearest Neighbor Classifiers, Bayesian classification, Introduction to Decision Tree.

UNIT 6: Recent Trends and Techniques used in Data Mining (3 Lectures)

Basic Concepts of- Web Mining, Spatial Data Mining, Temporal Data Mining, Big Data Mining, Concept of Neural Network, Genetic Algorithm.

Practical / Lab work to be performed

- Implement ***any one*** from the following-
    - Write a computer program to implement A priori algorithm to mine all frequent itemsets from a transactional dataset. Use hashing to store the item sets in the level wise generation of candidate sets.
    - Write a computer program to implement the Pincer Search algorithm.
    - Write a computer program to implement the DIC (Dynamic Item set) algorithm.
- Implement ***any four*** from the following-
    - Write computer program to implement the K-Means algorithm using different distance measures stated in the syllabus.
    - Write computer program to implement the PAM algorithm using different similarity measures stated in the syllabus.
    - Write a computer program to implement the CLARA algorithm.
    - Write a computer program to implement the CLARANS algorithm.
    - Write a computer program to implement the DBSCAN algorithm.
    - Write a computer program to implement the K-NN algorithm.

Particulars of Course Designer:

Name: Dr Irani Hazarika
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Paper Name: Graph Theory

1. Learning Outcome:

- After completing this course, students will have understanding of graph theoretic concepts, problems and associated algorithmic solutions.

2. Prerequisites: NIL
3. Semester: 6
4. Course Type: Elective
5. Course Level: 300-399
6. Theory Credit: 4
7. Practical Credit: 0
8. No of Hours:

a) Theory: 60 hrs
b) Practical: 0 hrs
c) Non Contact: 5 hrs

9. List of Books:

e) *Introduction to Graph Theory*, Douglas B. West, Pearson
f) *Introduction to Graph Theory*, Robin J. Wilson, Pearson Education Limited
g) *Graph Theory with Applications to Engineering and Computer Science*, Narasingh Deo, PHI

10. Contents of Syllabus:
A. Theory
Detailed Syllabus:

Unit I: Introduction **5 hrs**

Graph, directed and undirected graph, weighted and unweighted graph, simple and multigraph, degree, in degree and out degree, Handshaking theorem, complete graph, bipartite graph, cut set, cut vertices, graph representations: incidence matrix, adjacency matrix and adjacency list, BFS traversal and DFS traversals on a graph using stack and queue data structures, isomorphism, homomorphism

Unit II: Connectivity, paths and cycle **15 hrs**

Walk, path and cycle, connected graphs, disconnected graphs, components, Hamiltonian path, Hamiltonian cycle, Hamiltonian graphs, Dirac's theorem, Eulerian path, Eulerian cycle, Euler graphs, Fleuri's algorithm, 2-connected graphs, connectivity and digraph, k-connected and k-edge connected graphs, application of Menger's theorem, Shortest path problem, variations of shortest path problem: single source shortest path problem, single pair shortest path problem and all pairs shortest path problem, Dijkstra's algorithm, Bellman Ford algorithm, Floyd Warshall's algorithm, Johnson's algorithm

Unit III: Tree **12 hrs**

Tree, forest, properties of tree, spanning tree, spanning forest, counting trees, Cayley's theorem, matrix-tree theorem, minimum spanning tree, Kruskal's algorithm, Prim's algorithm, disjoint spanning trees, graph decomposition, graceful labeling, graceful graph, binary tree, binary search tree, AVL tree, multiway search tree, B tree, B+ tree

Unit IV: Matching and coloring **13 hrs**

Matching, bipartite matching, maximum bipartite matching, Ford Fulkerson's algorithm for finding maximal bipartite matching, perfect bipartite matching, non-bipartite matching, maximal non-bipartite matching, largest maximal matching, perfect non-bipartite matching, Hall's Marriage theorem, vertex cover, vertex cover and matching, independent sets, dominating sets, atable matching, Hungarian algorithm, introduction to Edmonds Blossom shrinking algorithm, vertex coloring, k-colorable graph, chromatic number, Brook’s theorem, clique number, map coloring problem

Unit V: Digraph **7 hrs**

Digraph, simple digraph, connected and strongly connected digraph, orientable graph, Eulerian digraph, Hamiltonian digraph, tournament, Markov chains, Flow networks, residual graph, augmenting path, Ford Fulkerson’s algorithm

Unit VI: Classical problems **8 hrs**

Travelling Salesman Problem, variants of Travelling Salesman Problem, Chinese Postman Problem, variants of Chinese Postman Problem, the minimum connector problem, Huffman coding and Huffman tree, Konisgsberg bridge problem, three utilities problem

Particulars of course designer:

Name: Dr. Hasin Afzal Ahmed
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E-mail id: hasin@gauhati.ac.in

Paper Name: Information Security and Cyber Laws

1. Learning Outcome:

After the completion of the course, the students will be able to develop basic understanding of security, cryptography, system attack and defences against them.

2. Prerequisites: NIL
3. Semester: 6
4. Course Type: Elective
5. Course Level: 300-399
6. Theory Credit: 4
7. Practical Credit: 0
8. No of Hours:

d) Theory: 60 hrs
e) Practical: 0 hrs
f) Non Contact: 5 hrs

9. List of Books:

e) Merkow, M., & Breithaupt, J.(2005) Information Security Principles and Practices. 5th edition. Prentice Hall.
f) Cryptography And Network Security Principles And Practice, Fourth or Fifth Edition, William Stallings, Pearson Edition.
g) Cyber Law & Cyber Crimes, Advocat Prashant Mali; Snow White publications, Mumbai
h) The Information Technology Act, 2000; Bare Act – Professional Book Publishers, New Delhi

10. Contents of Syllabus:

UNIT 1: Introduction (15 Lectures)

Basic components of security (Confidentiality, Integrity and Availability), Attacks, Computer Crime, Security Services, Security Mechanism, Cyber Crimes, information Technology ACT, Cryptography, Substitution Cipher, Transposition Cipher, Block Cipher, Stream Cipher, Confusion, Diffusion, Symmetric Key, Asymmetric Key, Encryption, DES Algorithm, Hash Function, Digital Signature, Digital Certificate.

UNIT 2: Program Security (10 Lectures)

Program Security, Program Errors, Buffer Oveflow, Incomplete mediation, Time-of-check to Time-of- use Errors, Malicious codes, Virus, Threats, Control against Programs, Program Security Issues. Protection in OS: Memory and Address protection, Access control, File protection, User Authentication.

UNIT 3: Database Security (10 Lectures)

Reliability, Integrity, Sensitive Data, Inference, Multilevel Security, Issues regarding the right to access information: Protecting Data, Multiple security level and categorization of data and users, Loss of integrity, Loss of availability, Loss of confidentiality, Access control, Inference control, flow control, data encryption

UNIT 4: Security in Networks (Cyber Attack) (15 Lectures)

Threats in Networks, Security Controls- Architecture, Encryption, Content Integrity, Strong Authentication, Firewalls: Design and Types of Firewalls, Intrusion Detection System, Secure Email, Denial-of-service attacks, Man in the middle Attack, Phishing, Spoofing and Spam Attacks, Drive-by attack, SQL Injection, Birthday attack, Social Engineering attack, Password Attack. Cross site

scripting Attack, Malware Attack, Administering Security, Security Planning, Risk Analysis, Organisational Security Policy, Web Servers and Browsers, HTTP, Cookies, Caching, Secure Socket Layer (SSL), Secure Electronic Transaction (SET), E-mail Risks, Spam, E-mail Protocols, Simple Mail Transfer Protocol (SMTP), Post office Protocol (POP), Internet Access Message protocol (ICMP), Secured Mail: Pretty Good Privacy (PGP), S/MIME (Secure/Multipurpose Internet Mail Extensions)

UNIT 5: Cyber Laws (10 Lectures)

Cyber crime, Types of crimes, Information technology Act 2000: Salient Feature of IT Act 2000, various authorities under IT Act and their powers, Penalties & Offences, amendments, Sections under the Information Technology Act such as:

- [Section 43] Penalty and compensation for damage to computer etc.
- [Section 65] Penalty for temping with the computers source documents
- [Section 66] Punishment for hacking with computer system, data alteration etc
- [Section 66A] Punishment for sending offensive messages through any communication services
- [Section 66B] Receiving stolen computer’s resources or communication devices dishonestly
- [Section 66C] Punishment for identity theft
- [Section 66D] Punishment for cheating by impersonation by using computer resource
- [Section 66E] Punishment for violation of privacy
- [Section 66F] Punishment for cyber terrorism
- [Section 67] Punishment for publishing or transmitting obscene material in electronic form
- [Section 67A] Punishment for publishing or transmitting of material containing sexually explicit act, etc. in electronic form
- [Section 67B] Punishment for publishing or transmitting of material depicting children in sexually explicit act, etc. in electronic form
- [Section 72] Breach of confidentiality and privacy

Particulars of course designer:
Name : Dr. Pranamika Kakati
Contact No.: 9864201965
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Paper Name: Mobile Application Development

1. Learning Outcome: After completing this course, students will know:

- Fundamentals of Mobile Application Development.
- Difference between Native and Cross Platform Applications. Pros and Cons of Each Approach.
- To Design and Build a Complete Native Android Application with Both UI and Backend.
- To Design and Build a Complete Cross Platform Application with Both UI and Backend using Flutter.

2. Prerequisites:

- Solid Understanding of an Object Oriented Programming Language like Java.
- Fundamental Idea of UI Design.

3. Semester: 6

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 3

7. Practical Credit: 1

8. No of Hours:

g) Theory: 45 hrs
h) Practical: 30 hrs
i) Non Contact: 5 hrs

9. List of Books:

i) Android Programming: The Big Nerd Ranch Guide - Bill Phillips, Chris Stewart, Kristin Marsicano, Brian Gardner
j) Professional Android - Reto Meier, Ian Lake
k) Android Documentation - https://developer.android.com/

10. Contents of Syllabus:

a) Theory

Unit I: Introduction to Mobile Application Development 5 hrs

Fundamentals of Mobile Application – Understanding Mobile Application Development Basics, Major Mobile OSs and their market share, Understanding Cross Platform and Native Application Development, The advantages and disadvantages of each approach, Components of a Mobile Application, Basic Design Principles of Mobile UI including Wireframing, Typography and Content Flow.

Unit II: Getting Familiar with Android 5hrs

Introduction to Android Operating System. History and Versions of Android. Understanding the Basics of Android Operating System including OS architecture, Anatomy of an Android Application(apk), learning about various approaches of Android Application development like Native Application Development using Java/Kotlin or Cross Platform Application Development with Flutter/React-Native/Ionic etc. In-depth understanding of each approach and their pros and cons.

Unit III: Getting Started with Native Android Application Development 10 hrs

Setting up Android Studio and getting familiarized with the IDE, Setting up JDK and Android Emulator, Creating the First App – Hello World App, Understanding various essential folders and files associated with an Android App stored inside*manifests, java* and *res* directories. Basic understanding about *Gradle*.Running the App for the first time. Getting started with USB Debugging at a physical Android Device. Understanding debugging facilities available with Android Studio. Getting Started with XML for Android UI Design, Learning Various UI Components of Android. Working with various UI resources like Images, Colors, Fonts etc. Creating a UI oriented App from Scratch. Working withlayout switching in Portrait and Landscape mode. Providing functionality to an Android Application using Java, Understanding Android *Activity* and its lifecycle, various events associated with Activity Lifecycle – *onCreate()*, *onStart()*, *onPause()*, *onResume()*, *onStop()*, *onRestart()*, *onDestroy()* etc. Broadcast Receivers, Intent and Filters. Advanced Layouts in Android including ListView, CardView, RecyclerView etc., Fragments, Material Design in Android – Principles and Implementation, Styles and Themes.

Unit IV: Advanced Android Application Development **10 hrs**

Working with System Components in Android – File System Access, Location based Services, Phone, SMS, Bluetooth, Camera, Sensors etc. and App Permission Management, Working with Multimedia Content like Audio & Video in Android. Working with API Calls and Web Services,Packaging and Publishing Android Applications.

Unit V: Working with Databases in Android **5 hrs**

Building database driven Apps in Android, Working with SQLite, Interacting with Remote Databases using JSON, Performing CRUD operations in both Local and Remote Databases. Understanding Realtime Databases and getting started with Firebase. Implementing Firebase backend in previously developed CRUD application.

Unit VI: Cross Platform Mobile Application Development using Flutter **10 hrs**

Getting Started with Flutter and Dart, Understanding Flutter Architecture, Considering other alternatives, setting up the Development Environment, Material Design and System Services. Working with CRUD and HTTP Requests, Publishing and Packaging Apps for both Android and iOS and publishing at different platforms.

b) Practical Assignments

1) Build a Calculator App in Android.
2) Build a Tic-Tac-Toe Game. The game should keep records of Each Player and Game Time of each match.
3) Build an Android News Reader app which fetches news from an online API like Google News and shows the stories in a list. Whenever the user clicks on the heading of a particular story, the full story appears with the featured image.
4) Build a Simple Chat App in Flutter using Firebase. Export the app to both Android and iOS.

Particulars of course designer:

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Paper Name: Optimization Techniques

1. Learning Outcome:

- On successful completion of the course, students will be able to get thorough knowledge on formulation of optimization model and solution methods on optimization.

2. Prerequisites: NIL

3. Semester: 6

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 4

7. Practical Credit: 0

8. No of Hours:

d) Theory: 60 hrs
e) Practical: 0 hrs
f) Non Contact: 5 hrs

9. List of Books:

h) *Introduction to Graph Theory*, Douglas B. West, Pearson
i) *Introduction to Graph Theory*, Robin J. Wilson, Pearson Education Limited
j) *Graph Theory with Applications to Engineering and Computer Science*, Narasingh Deo, PHI

10. Contents of Syllabus:

Detailed Syllabus:

UNIT 1: Introduction (5 Lectures)

Concept of Optimization- classification of optimization –problems, Simulation of Models, Art of Modeling.

UNIT 2: Modelling with Linear Programming (10 Lectures)

Linear Programming Model, Two variable LP Model, Types of Formulation of Simplex Method, Dual Simplex Method, Sensitivity Analysis, LP Model in Equation Form, Transportation Problem, Network Model, Minimal Spanning Tree Algorithm, Shortest route Problem. Necessary and sufficient conditions for finding extrema point, Bisection method.

UNIT 3: Queuing Theory (10 Lectures)

Queuing Model, Elements of Queuing Model, Pure Birth and Death Models, Queues with combined arrival and departures, random and series queues, Generalized and Specialized Queing Models.

UNIT 4: Unconstrained Optimization (10 Lectures)

Newton and Quasi-Newton methods, Conjugate gradient methods, Linesearch and Trust Region methods Quadratic programming problem-Wolfe's method & Beale's method.

UNIT 5: Constrained Optimization (10 Lectures)

Linear programming, Equality and inequality linear constraints. Barrier and augmented Lagrangian methods, Sequential quadratic programming, Infeasible start Newton method, Interior-point methods (inequality constrained minimization; barrier method; primal-dual interior point method Goal

Programming-Basics of goal programming, goal programming formulation, goal programming algorithms: Weights method & preemptive method, Graphical solution

Particulars of course designer:

Name : Dr. Pranamika Kakati
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E-mail id: pranamikakakati20@gmail.com

Paper Name: System Software

1. Learning Outcome:
After completing this course, students will have understanding of various types of system software.

2. Prerequisites: NIL

3. Semester: 6

4. Course Type: Elective

5. Course Level: 300-399

6. Theory Credit: 3

7. Practical Credit: 1

8. No of Hours:

j) Theory: 45 hrs
k) Practical: 30 hrs
l) Non Contact: 5 hrs

9. List of Books:

l) System Software : An Introduction to Systems Programming, Leland L. Beck, D. Manjula, Pearson

m) Systems Programming, Dhananjay Dhamdhere, McGraw Hill Education

10. Contents of Syllabus:

Unit I: Introduction to Operating System **10 hrs**
Types of software, Application software and system software, examples of system software, system programming, system software and machine architecture, the simplified instructional computer (SIC): *memory, registers, data formats, instruction formats, addressing modes, instruction set, input and output,* programming examples in SIC\
\

Unit II: Assemblers **12 hours**
Assembler definition, basic assembler functions, assembler algorithm and data structure, handling instruction formats and addressing modes, program relocation, handling literals, symbol defining statements, expressions, assembler design options: one pass assemblers and multi pass assemblers, introduction to NASM assembler

Unit III: Loaders and Linkers **7 hours**
Loading, relocation and linking, loader, absolute loader, bootstrap loader, relocating loader, program linking, linking loader, linkage editor, static and dynamic linking

Unit IV: Macro processor **6 hours**
Definition of macro processor, macro definition and expansion, macro processor algorithm and data structures, conditional macro expansion, general purpose macro processors, macro processing within language translators

Unit V: Compilers **10 hours**
Compiler definition, grammars, lexical analysis, syntactic analysis, operator precedence parsing, recursive descent parsing, code generation, intermediate form, code optimization: machine dependent and machine independent, interpreter

(b) Practical

1) Introduction to NASM assembler (1 class/2 hrs)
2) Introduction to segments and registers (1 class/2 hrs)
3) A simple assembly program to print hello (1 class/2 hrs)
4) Input and output in assembly language (1 class/2 hrs)
5) Conditional statements in assembly language (2 classes/4 hrs)
6) Looping in assembly language (3 classes/6 hrs)
7) An assembly language program that accepts two numbers from the user and displays sum of the numbers (1 class/2 hrs)
8) An assembly language program that changes case of accepted characters (1 class/2 hrs)
9) An assembly program that accepts a number and displays whether the number is odd or even (1 class/2 hrs)
10) An assembly program that accepts a number n from the user and displays "hello world" n number of times. (1 class/2 hrs)
11) An assembly program that accepts a number from the user and displays factorial of the number (1 class/2 hrs)
12) An assembly program that accepts a number n from the user and displays whether the number is prime (1 class/2 hrs)

Particulars of course designer:

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NEP 2020 Syllabus

Computer Application
(Non-major)
(Arts/Science/ Commerce)

Paper Name: FUNDAMENTALS OF COMPUTER AND PROGRAMMING

1. **Learning Outcome:**
   - Student will able to learn about basics of computer system, which includes both the concept of computer hardware and software.
   - Student will able to learn about what is programming language, how to design an algorithm to solve a particular problem
   - Student will able to learn about C programming language.
2. **Prerequisite:** NIL
3. **Semester: 1**
4. **Course Type: Compulsory**
5. **Course Level: 100-199**
6. **Theory Credit:** 3
7. **Practical Credit:** 1
8. **Number of required hours:**
   a) Theory: 45 hrs
   b) Practical: 30 hrs
   c) Non Contact: 5 hrs

9. List of reference books

[1] Anita Goel, *Computer Fundamentals*, Pearson.
[2] *Comdex: Hardware and Networking Course Kit*, Dream Tech Press.
[3] V. Rajaraman, Neeharika Adabala, *Fundamentals of Computers*, PHI.
[4] Ron Gilster, *PC hardware: A beginners Guide*, Tata McGraw Hill.
[5] E. Balaguruswamy, *Computer Fundamentals and C Programming*, Tata McGraw Hill.
[6] B.S. Gottfried, *Programming with C*, Tata McGraw Hill.
[7] B.W. Kernighan, D.M. Ritchie, *The C Programming Language*, PHI.

10. Detailed Syllabus

Unit no.	Unit content	No.of classes
1	**Basics of Computer System** Evolution of Computer System, Classification of Computer, Modern Computer, Hardware and Software, Major components of a computer (A brief introduction of CPU, Main Memory, I/O units), Keyboard, Display, Mouse, Printers etc, Secondary Storage Devices (Hard Disks, Optical Disks, Flash Memory), Cache Memory and Virtual Memory concepts, Backup Devices, SMPS, BIOS, Processor,	7

	Motherboard, Sockets and Slots, Power Connectors, Peripheral Connectors. Bus Slots, USB, Pin Connectors, Network Interface Card, Network Cabling, I/O Box, Switches, RJ 45 Connectors, Patch Panel, Patch Cord, Racks, Evolution of OS, Types of OS, Functions of OS.	
2	**Hard Disk Drive** Logical Structure and File System, FAT, NTFS. Hard Disk Tools: Disk Cleanup, Error Checking, Defragmentation, Scanning for Virus, Formatting, Installing Additional HDD, New trends in HDD, Optical Media, CDROM, Theory of Operation, Drive Speed, Buffer, CD-R, CD-RW, DVD ROM, DVD Technology, Preventive Maintenance for DVD and CD Drives, Driver Installation, Writing-Cleaning CD and DVD.	5
3	**Number System** Representation of Numbers and Characters in Computer, Binary, Hexadecimal, Octal, BCD, ASCII, EDCDIC and Gray codes, Conversion of Bases, Representation of Signed Integers, Sign and Magnitude, 1's Complement and 2's Complement Representation, Arithmetic Operations using 2's Complement Representation, Conditions for Overflow/Underflow and Its Detection.	7
4	**Concept of Algorithm** Programming Language, Bootstrapping, Assembler, Compiler, Interpreter, Linker and Loader, Definition and Concept of Algorithm and Flow Chart, Writing Simple Algorithms and Drawing Flow Charts for Simple Problems like Finding Sum, Max, Min, Average of a List of Numbers etc.	6
5	**Introduction to C Programming** **(20 Lectures)** Elementary Data Types, Variables, Constants, Identifiers and Reserved Word, Constant Data Types, Syntax and Semantics, Variable Declarations, Initialization of Variable during Declarations, Scope and Lifetime of Variables, Operand, Operators in C: Definition of Unary, Binary and Ternary Operators, Arithmetic Operators, Assignment Operators, Relational Operators, Logical Operators and Bitwise Operators, Precedence and Associatively of C Operators, Expression in C, L-value and R-value, Side Effects of Operators, Cast and Sizeof Operator, Type Conversion.	20

	Expression Statement, Conditional Statement: if, if-else, switch, Iterative Statement: white, do-while, for, Other Statement: break, continue, goto, return, null Statement, block Statement. Definition and Declaration of Array, Accessing Elements in One Dimensional and Two Dimensional Arrays Function Declaration, Function Declaration and Definition, Calling a Function, Parameters Passing Methods: Call by Value and Call by Address, Recursive Function. Basic Concept of Strings, Pointer and Structure in C, Different Storage Classes, Basic Concept of Files in C	

Practical Part

Part A: Computer Fundamentals **(5 Classes/10 hours)**

1. Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.
2. Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva.
3. Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.
4. Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva
5. Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Part B: Programming in C **(10 Classes/20 hours)**

(This is a suggestive list only. Questions are not limited to this list)

6. Write a program to display ASCII value of a character.
7. Write a program to check whether a number is perfect or not.
8. Write a program to find out the biggest of three numbers using nested if.

9. Write a program to read a list of positive integers terminated by -1 and display the odd and even numbers separately and also their respective counts.
10. Write a program to read values of n and x and print the value of y using switch case where
    - i. $y=n+x$ when $n=1$
    - ii. $y=1+x/n$ when $n=2$
    - iii. $y=n+3x$ when $n=3$
    - iv. $y=1+nx$ when $n>3$ or $n<1$.
11. Write a program to find out minimum, maximum, sum and average of n numbers without using array.
12. Write a program to find out minimum, maximum, sum and average of n numbers using array.
13. Write a program to display the prime numbers within a given range.
14. Write a program to print the digits of a number in words. (e.g. if a number 841 is entered through the keyboard, your program should print "Eight Four One".)
15. Write a program to read n numbers in a sorted array and insert a given element in a particular position.
16. Write functions to compute the factorial of a number using both recursive and non-recursive procedure.
17. Write a program to display the first n Fibonacci numbers using both recursive and non-recursive procedure.
18. Write a function to check whether a given integer is prime or not and use it.
19. Write a program to multiply two matrices using function.
20. Write a program to read a m x n matrix and calculate the Row sum and Column sum of the matrix.
21. Write a program to concatenate two strings using function (without using library function).
22. Write a program to convert a string from upper case to lower case and vice versa.
23. Write a program to swap two numbers using function (pass the pointers).
24. Declare a structure of a student with details like roll number, student name and total marks. Using this, declare an array with 50 elements. Write a program to read details of n students and print the list of students who have scored 75 marks and above.

Write a program to copy a text file to another file.

Course Designer:
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Paper Name: DATABASE MANAGEMENT SYSTEM

1. **Learning Outcome:**
    - Learn database concepts and its architectural components.
    - Describe different data models used for designing a database.
    - To create a database using relational models and entity relationships concepts
    - Normalize a database into various normal forms
    - Design SQL queries to handle a relational database.
2. **Prerequisite:** NIL
3. **Semester: II**
4. **Course Type: Compulsory**
5. **Course Level: 100-199**
6. **Theory Credit:** 3
7. **Practical Credit:** 1
8. **Number of required hours:**
    - d) Theory: 45 hrs
    - e) Practical: 30 hrs
    - f) Non Contact: 5 hrs

9. List of reference books

a) Dr. Satinder Bal Gupta and Aditya Mittal, *Introduction to Database Management System*, University Science Press

b) A. Silberschatz, H.F. Korth, S. Sudarshan, *Database System Concepts*, McGraw Hill

c) R. Elmasri, S.B. Navathe, *Fundamentals of Database Systems*, Pearson Education

d) Dr. Rajive Chopra, *Database Management System (DBMS): A Practical Approach*, S. Chand Publication

10. Detailed Syllabus

Unit no.	Unit content	No.of classes
1	**Introduction to Database Management Systems** Data and Information, Concepts of Fields, Records and Files, Definition of DBMS, Traditional File approach, Traditional file approach versus database management system approach, Disadvantages of Traditional File System, Need of a DBMS, Components of a DBMS, Advantages of DBMS, Disadvantages of Database Systems, Various uses of database System Applications, Database Users: *end users or naive users*, *Online users*, *Application Programmers*, *Database Administrator*(*DBA*), Responsibilities of DBA	7
2	**Database Management System Architecture**	4

	Data Independence and Three-tier architecture of DBMS, basic concept of data model, Database Languages (Data Definition Languages, Data Manipulation Languages),	
3	**E-R Model** Entity, Strong and weak entities, Entity Sets, Attributes, various attribute types: *Simple and Composite Attributes*, *Single Valued and Multi-valued Attributes*, *Derived Attributes and Stored Attributes,* Domain of an attribute, Concept of Relationship, Types of Relationship: One-to-One, One-to-Many, Many-to-One and Many-to Many, Various Symbols used in ER Diagram, Mapping constraints: *Mapping Cardinalities* and *Participation Constraints* in ER diagram	7
4	**Relational Model** Database Schema, sub schema and Instances, Attributes, Attribute domains, Relations, Tuples, Relational Schema, Column, Properties of Relations, Degree of a Relation, Constraints in Relational Model: *Domain Constraints, Key Integrity, Referential Integrity*. Keys: Primary keys, Foreign keys, Candidate Keys, Super Keys, Alternative Keys, Advantages of relational model	8
5	**Normalization for Relational Databases** Definition of Functional Dependency, Armstrong's Axioms in Functional Dependency, Types of Functional Dependency: *Partial Dependency, Full Functional Dependency, Transitive and Non-transitive Functional Dependency*, anomalies In relational database*: Insertion*, *Deletion* and *Update* anomalies, Concepts of Normalization, benefits of Normalization, Types of Normal Forms: First Normal Form (1NF), Second Normal Form (2NF), Third Normal Form (3NF) and Boyce–Codd Normal Form (BCNF)	7
6	**SQL queries** Characteristics of SQL, Basic data types in SQL, Data-definition language (DDL) commands: *Create Database, Create Table*, *Drop Table*, *Alter Table*. SQL Constraints: *Primary Key, Foreign Key, Not Null, Unique, Check, Defaul,*. Data Manipulation Language (DML) commands: *Insert Into*, Delete, *Select*, *Update*. SQL clauses: *Where, Order By, Having, Group By* and *Like*. SQL join operations: *Inner Join, Left Outer Join, Right Outer Join* and *Full Join*. SQL aggregate functions: *sum(), count(), max(), min()* and *avg()*	12

1. Lab Content

Practical / Lab work to be performed:

Lab No	Topics to be of the Laboratory work	No of contact Classes (1 Class=2 hours)
1	Implementation of SQL DDL statements in MySQL DBMS: CREATE DATABASE, CREATE TABLE, ALTER TABLE, RENAME, DROP DATABASE/TABLE	3

2	Use of SQL DML statements in MySQL DBMS: INSERT, SELECT, UPDATE, DELETE SQL commands	3
3	Implementing following constraints in MySQL DBMS: PRIMARY KEY, FOREIGN KEY, NOT NULL, UNIQUE and DEFAULT	3
4	Handling following SQL clauses in MySQL DBMS: WHERE, GROUP BY, ORDER BY, HAVING, IN, BETWEEN, LIKE	3
5	Working with following aggregate functions in MySQL DBMS: COUNT, AVG, MAX, MIN and SUM	3
	Total Contact Classes:	15

Course Designer:

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Paper Name: BASIC OF OPERATING SYSTEM AND NETWORKING

1. **Learning Outcome:**
    - To give students the role of operating system in computer.
    - To provide students the concept of process management
    - To familiarize students with the concept of Networking
    - To provide the practical concept of OS and Networking..
2. **Prerequisite:** NIL
3. **Semester: III**
4. **Course Type: Compulsory**
5. **Course Level: 100-199**
6. **Theory Credit:** 3
7. **Practical Credit:** 1
8. **Number of required hours:**
    - g) Theory: 45 hrs
    - h) Practical: 30 hrs
    - i) Non Contact: 5 hrs

9. List of reference books

(a) Operating System Concepts, Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Wiley

(b) Data Communications and Networking, Behrouz A. Forouzan, Sophia Chung Fegan, McGraw-Hill,

(c) Operating Systems: Internals and Design Principles, William Stallings, Pearson

(d) Computer Networks, Andrew Stuart Tanenbaum, Pearson Education

10. Detailed Syllabus

Unit no.	Unit content	No.of classes
1	Introduction to Operating System Types of software, application software, system software, operating system, types of operating systems, operating system structure, system calls, protection and security, history and generations of operating system, Open source operating systems	5
2	Process and Memory Management Process, process states, process scheduling algorithms, scheduling criteria, turn around time, waiting time, response time, First Come First	14

	Serve (FCFS) scheduling, Shortest-Job-First (SJF) Scheduling, Shortest Remaining Time First scheduling, Priority Scheduling, Round Robin Scheduling, thread, deadlock, memory mnagement, swapping, contiguous memory allocation, first fit strategy, best fit strategy, worst fit strategy, paging, segmentation, page replacement algorithms, internal fragmentation, external fragmentation, virtual memory, demand paging	
3	Networking Introduction Computer network, network topologies, LAN and WAN, internet, network models: ISO OSI, TCP/IP, protocols and standards, transmission media: guided and unguided transmission media, twisted pair cable, co-axial cable, fiber optic cable, radio waves, micro waves, infrared	5
4	Networking concepts Analog and digital signal, error detetion and correction, Ipv4 addressing, dotted decimal notation, classful addressing, classless addressing, Ipv6 addresses, routing protocols, distance vector routing protocol, link state routing protocol, physical address, ARP, RARP, ports, sockets, frames and packets, TCP and UDP protocols, hub, repeater, bridge, router, gateway	14
5	Internet and services Internet, ISP, types of ISPs, WWW, web server, web client, HTTP, HTTPS, web browsers, domain name, URL, DNS, hierarchy of name servers, root servers, primary and secondary servers, telnet, electronic mail, e-mail architecture, SMTP, POP, IMAP, FTP	7

(b) Practical

1. Installation of Windows operating system 2 classes

2. Commands in windows: cd, mkdir, ren, assoc, attrib, mv, cp, cls, del, dir, rmdir etc. 1 class

3. Installation of Linux operating system 2 classes

4. Commands in linux: ls, mkdir, cd, touch, pwd, chmod, cat, echo, su, rm, mv, cp, locate, ps, top, man etc. 3 classes

5. Installing open source software in linux 3 classes

6. Networking commands and tools in windows: ipconfig, nslookup, ping, netstat, arp, tracert, getmac etc. 2 classes

7. Networking commands and tools in linux: ifconfig, ip, traceroute, tracepath, ping, netstat, ss,

dig, nslookup, arp, hostname, whois etc.	2 classes
8. How to fix a slow computer	2 class

Course Designer:

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(b) Contact No.: 8011810533

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Paper Name: INTERNET AND WEB TECHNOLOGIES

1. **Learning Outcome:**
   At the end of the course, students will be able to
   - Understand the concept of Internet and the World Wide Web
   - Understand the basic concept of web applications and web services.
   - Design basic well-structured web page using HTML and CSS

2. **Prerequisite:** NIL
3. **Semester: IV**
4. **Course Type: Compulsory**
5. **Course Level: 100-199**
6. **Theory Credit:** 3
7. **Practical Credit:** 1
8. **Number of required hours:**
   j) Theory: 45 hrs
   k) Practical: 30 hrs
   l) Non Contact: 5 hrs

9. List of reference books

a) Deitel, P. (2021) 5th ed. Internet and World Wide Web How to Program. Pearson.
b) Jackson J.C. (2007). Web Technologies: A Computer Science Perspective. Pearson.
c) Duckett, J. (2011). HTML and CSS: Design and Build Websites. John Wiley & Sons.
d) Robbins, J. N. (2018). Learning Web Design: A Beginner's Guide. O'Reilly Media.

10. Detailed Syllabus

Unit no.	Unit content	No.of classes
1	**Computer Networks and the Internet** Concepts of the Internet and its evolution. Review of Networking basics – LANs and WANs, Network topologies, protocols and layers. Different networking devices – End devices, Hub, Switch, Router, Server. Brief concept of Internet Protocol and addressing. Concept of DNS and NAT – their role in the Internet. Proxy and VPN. Browsers and their add-ons. Brief concept of Cloud Computing and CDN.	8
2	**Introduction to Web Technologies** Concept of World Wide Web (WWW), Overview of web browsers and their functionalities. Client-Server Architecture in Web Applications. Communication Protocols – HTTP, HTTPS, FTP. URI and URL. Request Response cycle. Working of DNS. Brief concepts of port, cache and cookies. Introduction to Web Hosting and control panels.	8

3	**Front End Development using HTML** Website and Webpage. Basic concept of Markup Language. Introduction to HTML. Basic HTML structure. Text formatting Tags – headings, paragraph, line break, horizontal rule. Link and Navigation – anchor tags. Lists - ordered, unordered, definition list. Image and multimedia tags. Tables in HTML. Forms and Input types – text, email, password, radio, select, checkbox, textarea, date, url, submit, button. Brief concept of Semantic HTML – header, nav, main, section, article, aside, footer.	10
4	**Front End Design using CSS** Introduction to CSS. CSS syntax and rule structure. Inline, Internal and External CSS. CSS selectors – element, class, ID, attribute. Understanding the CSS Box Model – content, padding, border, margin. CSS colours and backgrounds – background-color, background-image, background-repeat. CSS typography – font properties, text properties.	9
5	**XML and Client-Server Computing** Basics of SGML. Understanding DTD and its role in validating markup languages. Introduction to XML. Creating XML DTDs. Concept of Client-Server Computing. 2-tier, 3-tier architecture. Fat client vs Fat server. Overview of CGI and JSP. Brief concept of JavaScript.	5
6	**Web Security** Understanding network security and Firewalls. Proxy Servers and their role in caching and security. Common web security vulnerabilities – XSS, SQL injection. Brief concept of SSL/TLS and HTTPS for secure communication.	5

List of Practical 30 hours

(This is a suggestive list only. Questions need not be restricted to this list.)

1. Create a basic HTML webpage structure with a heading, paragraph, and an image.
2. Build a navigation menu using an unordered list (<ul>) with clickable links.
3. Create a multi-level list of items.
4. Implement a form with input fields for name, email, and a submit button.
5. Create a table with multiple rows and columns to display tabular data.
6. Design an image gallery using HTML and CSS.
7. Implement an ordered list (<ol>) to display a step-by-step tutorial or instructions.
8. Create a dropdown select menu (<select>) with multiple options.
9. Use HTML5 semantic tags (such as <header>, <nav>, <section>, <article>, <footer>) to structure and organize content on a webpage.

10. Build a registration form with fields for name, email, password, date of birth, address and other such fields with a submit button. Include appropriate input types, labels and placeholders.
11. Style a heading element with a custom font, colour and background.
12. Apply different background colors to alternate rows in a table.
13. Implement a hover effect on a button that changes its background colour or adds a solid border.
14. Style a form input field with custom border, padding, and background color.
15. Build a form with input fields for name and email. Design the form with CSS. Use an alert to display a success message when the form is submitted successfully, otherwise show an error alert. Use JavaScript for the validation.
16. Create a simple web portfolio having the details of a candidate. Use proper HTML elements and apply styles using CSS.

Particulars of Course Designer:

Name : Risheraj Baruah
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Email id : rishirajbaruah@gauhati.ac.in

Paper Name: PYTHON PROGRAMMING

1. **Learning Outcome:**
   At the end of the course, students will be able to
   - Understand the basic problem solving techniques using Python which helps in research and commercial application development.
   - After completing this course, students will know about fundamentals of Python Programming and Problem Solving.
2. **Prerequisite:** Basic programming concept
3. **Semester: V**
4. **Course Type: Compulsory**
5. **Course Level: 100-199**
6. **Theory Credit:** 3
7. **Practical Credit:** 1
8. **Number of required hours:**
   m) Theory: 45 hrs
   n) Practical: 30 hrs
   o) Non Contact: 5 hrs

9. List of reference books

(a) Core Python Programming, R. Nageswara Rao, Dreamtech Press.

(b) Python: The Complete Reference, Martin C. Brown, McGraw Hill Education.

(c) http://docs.python.org/3/tutorial/index.html

10. Detailed Syllabus

Unit no.	Unit content	No.of classes
1	**Introduction to Python Programming** Introduction, Installation of Python Interpreter, Python Shell, Code Indentation, Identifiers and Keywords, Literals, Strings, Operators (Arithmetic, Relational, Logical, Assignment, Ternary, Bitwise, Increment and Decrement Operators), Input and output statements, Output Formatting.	7
2	**Control Statements and Functions** Branching, Looping, Conditional Statement, Exit Functions, Break, Continue, Pass, Defining Functions, Default Arguments. Scope of	7

	Functions, Function Documentation, Lambda Functions & Map.	
3	**Python Data Structures** List (List, Nested List, List as Matrix), Tuple, Set, Dictionary.	5
4	**Exception Handing** Errors, Exception Handling with try, Multiple Exception Handling, Writing own Exception	5
5	**File Handling** Understanding read function, read(), readline() and readlines(), Understanding write functions, write() and writelines(), Programming using file operations, Reading config files, Writing log files in python	5
6	**OOP in Python** Creating Classes in Python, Instance Methods, Inheritance, Polymorphism, Exception Classes and Custom Exceptions	5
7	**Introduction to Libraries in Python** NumPy, Matplotlib, OpenCV, Tkinter	7
8	**Python SQL Database Access** Introduction to database driven program, Database Connection, Database Operations: INSERT, READ, UPDATE, DELETE, COMMIT AND ROLLBACK.	4

(b)	Practical	30 hours
i.	Introduction to Python console, operators, input and output statements.	1 class
ii.	Python control statements and functions	3 classes
iii.	Data Structures in python	2 classes
iv.	Exception Handling	1 class
v.	File Handling	2 classes
vi.	Object Oriented Python programming	2 classes
vii.	Introduction to libraries (NumPy, Matplotlib, OpenCV)	1 class
viii.	Python SQL Database Connection and database operations	3 classes

Course Designer:

(a) Name: Dr. Sanjib Kr kalita

(b) Contact No.: 8812051150

(c) E-mail id: sanjib959@gauhati.ac.in

Paper Name: SOFTWARE ENGINEERING

1. Learning Outcome

On successful completion of this course, the student should be able to:

- Determine the primary problems that impact all software development processes.
- Choose relevant software development processes models, methodologies, and strategies for managing a specific software development process, and justify the choices
- Implement different software estimation metrics such as cost, effort size, staffing etc.
- Describe various software design approaches and various coding, and testing strategies used in software engineering principles

2. **Prerequisite:** Nil
3. **Semester: VI**
4. **Course Type: Compulsory**
5. **Course Level: 100-199**
6. **Theory Credit:** 4
7. **Practical Credit:** 0
8. **Number of required hours:**
    p) Theory: 60 hrs
    q) Practical: 0 hrs
    r) Non Contact: 5 hrs

9. List of reference books

a) Rajib Mall: *Fundamentals of Software Engineering*; PHI Learning Pvt. Ltd.

b) Roger S. Pressman: *Software Engineering: A practitioner's Approach*; McGraw Hill.

Unit no.	Unit content	No.of classes
1	**Introduction** Definition of Software Engineering, differentiation between Computer Science, Software Engineering and System Engineering, Program V/s software product, Exploratory style and modern style of software development, need of software engineering, characteristics of good software product	8
2	**Software Development Life Cycle models** Definition of software development Life cycle models, Various life cycle modes: Classical Waterfall model, Iterative Waterfall model, Prototyping model, Evolutionary (Incremental) model, Spiral model, Advantages and disadvantages of each of these cycle models.	10
3	**Software specification and Project Management** Concept and Importance of Feasibility Study in Software design, Types of Feasibility: *Technical*, *Economical* and *Operational* feasibility, Requirement	14

	gathering and Analysis process, Components of an SRS (Software Requirement Specification), Properties of a good SRS, Different users of SRS, Basic idea of Software Project Management, Job Responsibilities of a Software Project Manager, Need of SPMP (Software Project Management Plan) document, Need of Software documentation, Internal and External documentation, Software size estimation using Lines of Code (LOC), Merits and Demerits of LOC metric.	
4	**Software Design principles and Methodology** Top down and bottom up approach, External Design, Architectural Design and Detailed design, Concept of Cohesion in software design, Classification of Cohesion, Basic concept of Coupling, Classification of Coupling, Introduction to software Analysis and Software Design (SA/SD), Introduction to Data Flow Diagram, Symbols used in DFD, Context Diagram in DFD, Advantages and Disadvantages of DFDs.	14
5	**Coding and Testing** Goals of coding, Code Review techniques: Code Walkthrough, Code Inspection, Definition of Test cases, test suits, negative testing and positive testing. Different levels of software testing: unit testing, Integration Testing, System Testing and acceptance testing. Basic concept of Black box testing approach, Idea of White Box testing approach, Statement Coverage, Branch Coverage approach	14

Course Designer:

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c) Email-id : laskardwipen@gauhati.ac.in

SYLLABUS FOR
Four-year Undergraduate Programme
Electronics Science

Under
New Education Policy (NEP)
2020

Committee for Courses and Studies (CCS) in Electronics UG

Department of Electronics and Communication Technology
Gauhati University, Guwahati-781014, Assam

Four-year Undergraduate Programme

Subject: Electronics Science

Existing Base Syllabus: UG CBCS Syllabus

Program Outcomes: The proposed B.Sc. (Honours) Electronic Science program will:

- Create basic know how and training to pursue higher study in the field of electronics and related discipline and provide them a dignified way of livelihood.
- Generate skilled manpower for industrial and research organizations in the field of electronics and related areas.
- Enable development of small- and large-scale entrepreneurship and management projects for startup programs and self-employment generation schemes.

Program Specific Outcomes: B.Sc. (Honours) Electronic Science Passed out Students will be

- Able to design and fabricate electronic systems that can be used for solving real life problems
- Capable of pursuing related professional assignments and confident enough to take up electronics as a career and contribute towards the well-being of the society.

Total No. of Credits: 60

- 1 Credit = 1 Theory period of one-hour duration
- 1 Credit = 1 Tutorial period of one-hour duration
- 1 Credit = 1 Practical period of three-hour duration

Marks Distribution for Paper(s) with Practical

End Semester Examination Marks	Theory	60
	Practical	20
Internal Examination Marks	Theory	10
	Practical	06
	Attendance	04
	Total Marks	100

Marks Distribution for Paper(s) without Practical

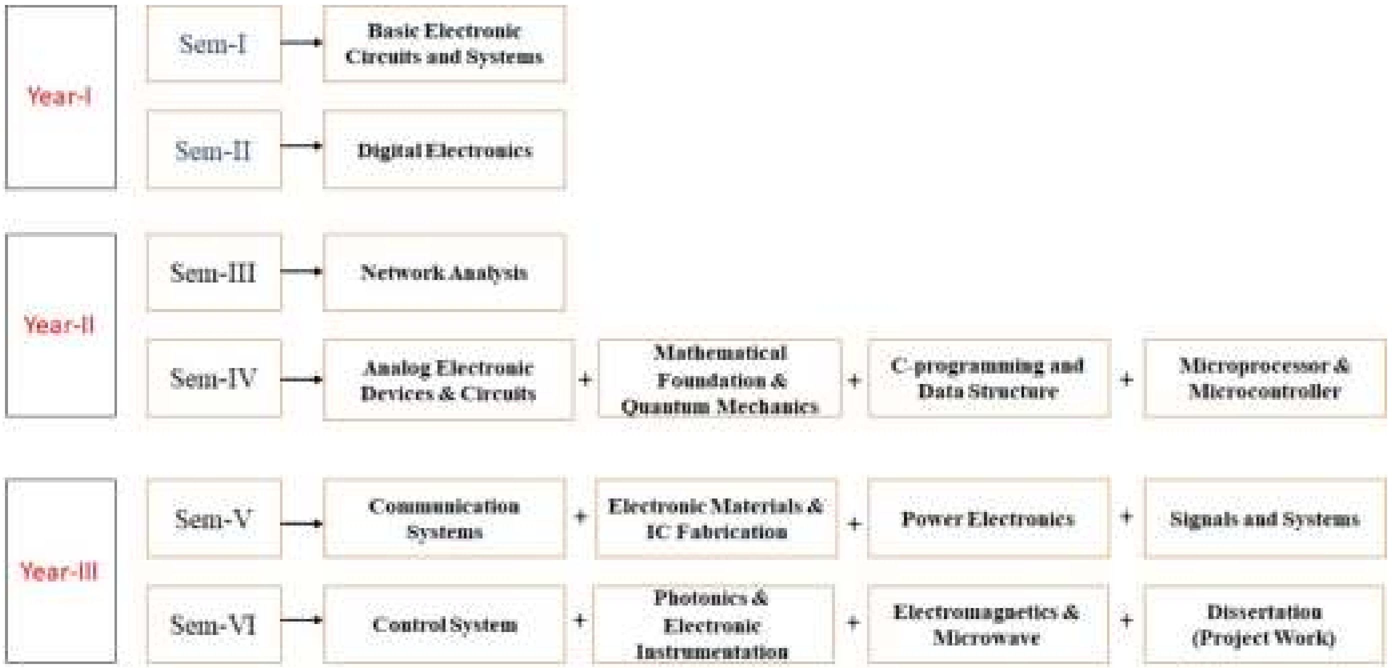
End Semester Examination Marks	Theory	80
Internal Examination Marks	Theory	10
	Assignment	06
	Attendance	04
	Total Marks	100

Core Papers for B.Sc. (Honours) Electronic Science under NEP

Serial No.	Type of Paper	Offered in Semester	Name of the paper	Credit
1	Core A-I	I	Basic Electronic Circuits and Systems	4 (3+1)
2	Core A-2	II	Digital Electronics	4 (3+1)

Major Papers for B.Sc. (Honours) Electronic Science under NEP

Serial No.	Type of Paper	Offered in Semester	Name of the paper	Credit
3	Major-1	III	Network Analysis	4 (3+1)
4	Major-2	IV	Analog Electronic Devices & Circuits	4 (3+1)
5	Major-3	IV	Mathematical Foundation & Quantum Mechanics	4
6	Major-4	IV	C-programming and Data Structure	4 (3+1)
7	Major-5	IV	Microprocessor & Microcontroller	4 (3+1)
8	Major-6	V	Communication Systems	4 (3+1)
9	Major-7	V	Electronic Materials & I.C Fabrication	4
10	Major-8	V	Power Electronics	4 (3+1)
11	Major-9	V	Signals and Systems	4 (3+1)
12	Major-10	VI	Control System	4 (3+1)
13	Major-11	VI	Photonics & Electronic Instrumentation	4
14	Major-12	VI	Electromagnetics & Microwave	4 (3+1)
15	Major-13	VI	Dissertation (Project Work)	4


Year-I
Sem-I
Basic Electronic Circuits and Systems
Sem-II
Digital Electronics
Year-II
Sem-III
Network Analysis
Sem-IV
Analog Electronic Devices & Circuits
+
Mathematical Foundation & Quantum Mechanics
+
C-programming and Data Structure
+
Microprocessor & Microcontroller
Year-III
Sem-V
Communication Systems
+
Electronic Materials & IC Fabrication
+
Power Electronics
+
Signals and Systems
Sem-VI
Control System
+
Photonics & Electronic Instrumentation
+
Electromagnetics & Microwave
+
Dissertation (Project Work)

Semester I

Core Paper A-1: Basic Electronic Circuits and Systems (100 Marks, Credit 3+1 =4)

Course Level: 100-199

Distribution of marks: (Internal:20, External: Theory:60 + Practical:20)

Internal Assessment: (Sessional:10+ Practical:06 + Attendence:04 = 20 Marks)
End Semester Examination: (Theory: 60, Practical: 20)

Course Objectives: To make the students able to apply concepts of basic electronic components and active electronic devices in solving engineering problems.

Learning Outcome: By the end of this course, students will be able to

- ➢ explain basics of electrical circuits and calculate node voltage and branch current of circuits with KVL and KCL
- ➢ knowledge about passive and active electronic components.
- ➢ Operation of basic electronic circuits.
- ➢ Application of electronics components in real life situations.

Unit-I: (No. of classes: 10 Lectures, Marks: 15)

Basic Circuit Concepts: Voltage and Current Sources, Resistors: Fixed and Variable resistors, Construction and Characteristics, Color coding of resistors, resistors in series and parallel. Inductor and Capacitor. DC Circuit Analysis: Kirchhoff's Current Law (KCL), Kirchhoff's Voltage Law (KVL), Node Analysis, Mesh Analysis.

Unit-II: (No. of classes: 15 Lectures, Marks: 20)

PN junction diode, Zener Diode and their I-V characteristics. Rectifiers- Half wave rectifier, Full wave rectifiers, circuit diagrams, working and waveforms, ripple factor and efficiency with capacitor filter. Zener diode as voltage regulator, and explanation for load and line regulation.

Unit-III: (No. of classes: 20 Lectures, Marks: 25)

Bipolar Junction Transistor CE and CB configurations, Regions of operation (active, cut off and saturation), Current gains α and β. Relations between α and β. dc load line and Q point. Transistor biasing and Stabilization circuits - Fixed Current Bias and Voltage Divider Bias. Unipolar Devices: JFET and MOSFET. Construction, working and I-V characteristics. OP-AMP and its applications as amplifier: adder and subtractor, Integrator & Differentiator. Basic concepts of PCB based circuit design.

Unit-IV: Practical (30 Hours; Marks:20)

List of Experiments:

Familiarization with a) Resistance in series, parallel and series – Parallel. b) Capacitors & Inductors in series & Parallel. c) Multimeter – Checking of components.

1. Measurement of Amplitude, Frequency & Phase difference of signals using CRO.
2. Verification of Kirchhoff's Laws.
3. Verification of voltage division and current division rules.
4. V-I characteristics of P-N Junction Diode
5. V-I characteristics of Zener Diode
6. Design of half-wave rectifier with filter
7. Design of full-wave rectifier with filter
8. CE/CB/CC characteristics of BJT
9. Design of an inverting and non-inverting amplifier using OP-AMP
10. Design of a Zener regulated power supply.

Suggested Books

1. S. A. Nasar, Electric Circuits, Schaum's outline series, Tata McGraw Hill (2004)
2. Electrical Circuits, M. Nahvi and J. Edminister, Schaum's Outline Series, Tata McGrawHill.(2005)
3. Robert L. Boylestad, Essentials of Circuit Analysis, Pearson Education (2004)
4. W. H. Hayt, J. E. Kemmerly, S. M. Durbin, Engineering Circuit Analysis, Tata McGrawHill(2005)
5. Alexander and M. Sadiku, Fundamentals of Electric Circuits, McGraw Hill (2008)

No. of Required Classes: 75

No. of Contact Classes: 70

No. of Non-Contact Classes: 05

Particulars of Course Designer (Name, Institution, email id):

Serial No	Name	Name of Institute	Email	Phone
1	Prof. Tulshi Bezboruah	Dept. of ECT, GU	zbt@gauhati.ac.in	9435109486
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6	Dr. Mitamoni Sarma	Dept. of Electronics Science, L.C.B College	sarmamitamoni2005@gmail.com	9864041335
7	Dr. Kakoli Kalita	Dept. of Electronics Science, L.C.B College	kalita.kakali@gmail.com	7896621580
8	Dr. Monalisha Goswami	Dept. of Electronics Science, L.C.B College	monalishagoswami7@gmail.com	8638441047

Semester II

Core Paper A-2: Digital Electronics (100 Marks, Credit 3+1 =4)

Course Level: 200-299

Distribution of marks: (Internal:20, External: Theory:60 + Practical:20)

Internal Assessment: (Sessional:10+ Practical:06 + Attendence:04 = 20 Marks)
End Semester Examination: (Theory: 60, Practical: 20)

Course Objectives: This course will enable the students to learn fundamentals of number system, digital logic circuits and hardware description language for digital system design.

Learning Outcome: By the end of this course, students will be able to

- Explain number system and operation of combinational and sequential logic circuits
- Design combinational and sequential logic circuits
- Design basic units of A/D and D/A converters

Unit I: (No. of classes:10 Lectures, Marks:15)

Number System and Codes: Decimal, Binary, Hexadecimal and Octal number systems, base conversions, Binary, octal and hexadecimal arithmetic, representation of signed and unsigned numbers, Binary Coded Decimal code. Logic Gates and Boolean algebra: Introduction to Boolean Algebra and Boolean operators, Truth Tables of OR, AND, NOT, Basic postulates and fundamental theorems of Boolean algebra, and Universal gates.

Unit- II: (No. of classes:15 Lectures, Marks:20)

Combinational Logic Analysis and Design: Standard representation of logic functions (SOP and POS), Karnaugh map, Encoder and Decoder, Multiplexers and Demultiplexers, binary Adder, binary subtractor, parallel adder/subtractor.

Unit-III: (No. of classes:20 Lectures, Marks:25)

Sequential logic design: Latches and Flip flops, S-R Flip flop, J-K Flip flop, T and D Type Flip flop, Clocked and edge triggered Flip flops, master slave flip flop, Registers, Counters (synchronous and asynchronous and modulo-N), Basic concepts of Semiconductor memories. Basic concepts of A/D and D/A converters and its types. Basics of 555 timers and its application in digital system design.

Unit-IV: Practical (30 Hours, Marks:20)

List of Experiments:

1. To verify and design AND, OR, NOT, XOR, NAND and NOR gates.
2. Realization of logic circuit from Boolean expressions.

3. Design a Half and Full Adder.
4. Design a Half and Full Subtractor.
5. Design a 4:1 Multiplexer using gates.
6. Design a 8:1 Multiplexer using IC 74151A.
7. Design a clocked S-R Flip Flop by using NAND/NOR gates.
8. Design a clocked J-K Flip Flop by using NAND/NOR gates.
9. Design a counter using D/T/JK Flip-Flop.
10. Design of frequency divider circuit by using J-K Flip Flop.

Suggested Books:

1. M. Morris Mano, Digital System Design, Pearson Education Asia, (Fourth Edition)
2. Thomas L. Flyod, Digital Fundamentals, Pearson Education Asia (1994)
3. W. H. Gothmann, Digital Electronics: An Introduction To Theory And Practice, Prentice Hall of India (2000)
4. R. L. Tokheim, Digital Principles, Schaum's Outline Series, Tata McGraw- Hill (1994)

No. of Required Classes: 75

No. of Contact Classes: 70

No. of Non-Contact Classes: 05

Particulars of Course Designer (Name, Institution, email id):

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1	Prof. Tulshi Bezboruah	Dept. of ECT, GU	zbt@gauhati.ac.in	9435109486
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8	Dr. Monalisha Goswami	Dept. of Electronics	monalishagoswami7@gmail.com	8638441047

		Science, L.C.B College		

Semester III

Major-1: Network Analysis (100 Marks, Credit 3+1 =4)

Course Level: 200-299

Distribution of marks: (Internal:20, External: Theory:60 + Practical:20)

Internal Assessment: (Sessional:10+ Practical:06 + Attendence:04 = 20 Marks)
End Semester Examination: (Theory: 60, Practical: 20)

Course Objectives: To make the students able to apply concepts of circuit theory and network theorems in solving engineering problems in DC and AC circuits

Learning Outcome: By the end of this course, students will be able to

- explain basics of electrical circuits and calculate node voltage and branch current of circuits with KVL and KCL
- simplify complex network to simpler equivalents by employing network theorems
- determine time response of circuits with Classical as well as Laplace transform methods
- analyze 2 port networks, transfer functions and frequency response of passive filters

Unit-I: (No. of Classes:10 Lectures, Marks:20)

Network analysis & review of network theorems: Elements of a Network, Network geometry;Graph and Tree of a network, Node and Mesh Analysis, Star and Delta networks, Star-Delta Conversion, Thevenin's theorem, Norton's theorem Superposition, Reciprocity and Maximum Power Transfer theorem.

Unit-II: (No. of Classes:20 Lectures, Marks:25)

Step function response of linear R-L, R-C, and R-L-C network. Network analysis using Laplace transformation: Laplace Transformation and inverse Laplace transformation, Application of Laplace transformation in R-L, R-C and R-L-C networks; Response to R-L, R-C and R-L-C networks to step & sinusoidal voltage, impedance and transfer function of a two port network.

Unit-III: (No. of Classes:15 Lectures, Marks:15)

Two port Networks**,** Network Filters: Passive Filters, High pass, Low pass, Band pass and band elimination filters, m-derived filters, Butterworth approximation; Chebychev and Bessel response; Filter Approximation and Frequency Transformation.

Unit-IV: Practical (30 Hours, Marks:20)

List of Experiments:

1. Verification of Thevenin's theorem.
2. Verification of Norton's theorem.

3. Verification of Superposition Theorem.
4. Verification of Reciprocity Theorem.
5. Verification of the Maximum Power Transfer Theorem.
6. Design and study of first & second order passive low pass RC filter circuits.
7. Design and study of first & second order passive high pass RC filter circuits.
8. Design and study of first & second order passive band pass RC filter circuits.
9. Design and study of first & second order passive band elimination RC filter circuits.

Suggested Books

1. Network analysis – G.K. Mittal, Khanna Publishers.
2. Network Theory and filters Design – V.K. Aatre, Wily Eastern Ltd.
3. Engineering Circuit Analysis – W.H. Hayt and J.E. Kemmerly, McGraw Hill.
4. Network Analysis – M.E. Van Valkenberg, Prentice Hall of India Pvt. Ltd,
5. Network Analysis – Ghosh, PHI

No. of Required Classes: 75

No. of Contact Classes: 70

No. of Non-Contact Classes: 05

Particulars of Course Designer (Name, Institution, email id):

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7	Dr. Kakoli Kalita	Dept. of Electronics Science, L.C.B College	kalita.kakali@gmail.com	7896621580
8	Dr. Monalisha Goswami	Dept. of Electronics	monalishagoswami7@gmail.com	8638441047

		Science, L.C.B College		

Semester IV

Major-2: Analog Electronic Devices & Circuits (100 Marks, Credit 3+1 =4)

Course Level: 200-299

Distribution of marks: (Internal:20, External: Theory:60 + Practical:20)

Internal Assessment: (Sessional:10+ Practical:06 + Attendence:04 = 20 Marks)
End Semester Examination: (Theory: 60, Practical: 20)

Course Objectives: This course will enable students to learn basic of semiconductor devices and design amplifier circuit by using transistor and operational amplifier.

Learning Outcome: By the end of this course, students will be able to

- Understand the working principles of BJT, JFET & MOSFET
- Design amplifier circuit by using transistors and Operational amplifiers
- Design Comparator, Adder, subtractors, basic filters Oscillator circuits by using Operational amplifiers

Unit-I: (No. of Classes:10 Lectures, Marks:15)

Physics of operation and structure of basic electronic devices such as PN-junction diodes, Formation of depletion region, barrier potential, junction capacitance, reverse recovery time, Schottky diodes; Bipolar Junction Transistor (BJT), Junction Field Effect Transistors (JFET) & Metal Oxide Field Effect Transistors (MOSFET); their I-V characteristic curves. Base width modulation and early effect in BJT and channel length modulation in JFET & MOSFET.

Unit-II: (No. of Classes:15 lectures, Marks:20)

Different methods of biasing BJT & MOSFET; Small signal models of BJT: Ebers–Moll model h-parameter & hybrid pi-model), small signal models of MOSFET (transconductance model). Small signal analysis of BJT & MOSFET amplifiers to find Z_{IN}, Z_{OUT}, A_V, A_I. Frequency response of amplifier. Multistage amplifiers and Power amplifiers: Class A, Class B, Class C & Class AB.

Unit-III: (No. of Classes:20 Lectures, Marks:25)

Basic Topologies of feedback amplifiers, Difference between positive and negative feedback, Electronic Oscillators, Working of Wein Bridge Oscillator, RC phase shift oscillator, Colpitts, Heartley & Crystal oscillators. Concept of differential amplifier, Operational amplifier (OP-Amp): Integrator, Differentiator, Active filters, Voltage to current converter, Current to voltage converter. Comparators: Basic comparator, Level detector, Voltage limiters, Schmitt Trigger. IC 555 as multivibrator circuit, Voltage controlled oscillator, Phase locked loops (PLL).

Unit-IV: Practical (30 Hours, Marks:20)

List of Experiments:

1. Design of DC voltage regulator by using Zener diode.
2. Design & study of single stage RC coupled BJT/MOSFET amplifier.
3. Design & study of voltage follower circuit by using BJT/MOSFET.
4. Design & study of Non-Inverting Op-Amp amplifier.
5. Design & study of inverting Op-Amp amplifier.
6. Design & study of comparator circuit with Op-Amp.
7. Design and study of adder circuit with Op-Amp.
8. Design & study of First order Butterworth active low pass filter with Op-Amp.
9. Design & study of First order Butterworth active high pass filter with Op-Amp.
10. Design & study of RC Phase shift oscillator with Op-Amp.
11. Design & study of Wein bridge oscillator with Op-Amp.

Suggested Books:

1. S. M. Sze, Semiconductor Devices: Physics and Technology, 2ndEdition, Wiley India edition (2002).
2. Ben G Streetman and S. Banerjee, Solid State Electronic Devices, Pearson Education (2006).
3. Dennis Le Croissette, Transistors, Pearson Education (1989).
4. Jasprit Singh, Semiconductor Devices: Basic Principles, John Wiley and Sons (2001).
5. Kanaan Kano, Semiconductor Devices, Pearson Education (2004).
6. Robert F. Pierret, Semiconductor Device Fundamentals, Pearson Education (2006).
7. Robert L. Boylestad, Essentials of Circuit Analysis, Pearson Education (2004).

No. of Required Classes: 75

No. of Contact Classes: 70

No. of Non-Contact Classes: 05

Semester IV

Major-3: Mathematical Foundation & Quantum Mechanics (100 Marks, Credit 2+2 =4)

Course Level: 200-299

Distribution of marks: (Internal:20, External: Theory:80)

Internal Assessment: (Sessional:16 + Attendance: 04 = 20 Marks)
End Semester Examination: (Theory: 80)

Course Objectives: To impart basic mathematical concepts, problem solving skills and basic of Quantum Mechanics to the students.

Learning Outcome: By the end of this course, students will be able to

- Solve basic mathematical problems on vectors, matrics, differential equation & probability
- Apply the mathematical concepts in solving problems in electronic devices and circuits
- Understand the difference between classical & quantum physics
- Apply the quantum physics in understanding energy band theory and working of electronic devices.

Unit-I: (No. of Classes:15 Lectures, Marks:20)

Vector: Operations with vectors. Scalar and vector product; Vector Calculus. Scalar-valued functions, Vector function of a scalar variable: Vector differentiation & integration; gradient, divergence, and curl. Green, Gauss, Stokes Theorem. **Matrices**: Addition & multiplication of Matrices. Transpose of matrix, singular matrix, diagonal matrix, Symmetric and Skew – Symmetric matrices. Orthogonal matrix, solution of a system of linear equations by matrix method.

Unit-II: (No. of Classes:15 Lectures, Marks: 20)

Differential Equations: First Order Ordinary Differential Equations, Separable Ordinary Differential Equations, Exact Ordinary Differential Equations, Linear Ordinary Differential Equations. Second Order homogeneous and non-homogeneous Differential Equations. Complex Variables: Complex Variable, Complex Function, Continuity, Differentiability, Analyticity. Probability: continuous & random variables, Conditional probability, Bayes Theorem, Sum of random variables, the laws of large numbers, central limit theorem.

Unit-III: (No. of Classes:10 Lectures, Marks: 15)

Origin of quantum mechanics, wave particle duality, De Broglie’s hypothesis, Wave packet, Heisenberg Uncertainty Principle, Pauli’s exclusion principle, Wave function. General postulates of quantum mechanics, Time dependent & Time independent Schrödinger equation.

Unit-IV: (No. of Classes: 20 Lectures, Marks: 25)

Schrödinger equations of Free and confined electrons, potential well problems & Quantization of energy, Quantum tunneling, Kronig-penny model & energy band theory of solids, E-k band diagrams, density of states, basics of quantum dots, quantum wires and quantum wells.

Suggested Books:

1. Advanced Engineering Mathematics, Erwin Kryszig, Wiley India.
2. Fundamentals of Nanoelectronics, George W. Hanson, Pearson.
3. Introduction to Quantum Mechanics, D. J. Griffiths & D. F. Schroeter, Cambridge University.
4. R. K. Jain, and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publishing House (2007).
5. C .R. Wylie and L. C. Barrett, Advanced Engineering Mathematics, Tata McGraw-Hill (2004).

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 00

Semester IV

Major-4: C-Programming & Data Structure (100 Marks, Credit 3+1 =4)

Course Level: 200-299

Distribution of marks: (Internal:20, External: Theory:60 + Practical:20)

Internal Assessment: (Sessional:10+ Practical:06 + Attendence:04 = 20 Marks)
End Semester Examination: (Theory: 60, Practical: 20)

Course Objectives: This course will enable the students to learn basic programming skills of C language and its application in solving science /engineering problems.

Learning Outcome: By the end of this course, students will be able to

- Explain syntax of C language, data types and various operators etc.
- Develop algorithm and flowchart of different problems and write corresponding program in C
- Write C programs for data structure related applications

Unit-I: (No. of Classes:10 Lectures, Marks: 15)

C Programming Language: Introduction of C, Character set, Tokens, keywords, identifier, constants, basic data types in C, Concept of variables. Structure of Cprogram Arithmetic operators, relational operators, logical operators, assignment operators, incrementand decrement operators, conditional operators, bit wise operators, expressions and evaluation of expressions, precedence of operators. Arrays-concepts, declaration, accessing elements, storing elements, two-dimensional and multi-dimensional arrays.

Unit-II: (No. of Classes:15 Lectures, Marks: 20)

Decision making, branching & looping: if-else, nested if- else, switch-case statement, definition of loop, categories of loops, for loop, while loop and do-while loop, break statement, continue statement. Functions: Defining a function, function argument and passing, returning values from functions. Structures: defining and declaring structure variables, accessing structure members, initialization and comparison of structure variables.

Unit-III: (No. of Classes:20 Lectures, Marks: 25)

Data Structures: Definition of stack, array implementation of stack, conversion of infix expression to prefix, postfix expressions, evaluation of postfix expression. Definition of Queue, Circular queues, Array implementation of queues. Linked List and its implementation, Link listimplementation of stack and queue, Circular and doubly linked list. Searching and sorting: Insertion sort, selection sort, bubble sort, merge sort, linear Search, binary search. Trees: Introduction to trees, Binary search tree, Insertion and searching in a BST.

Unit-IV: Practical (30 Hours, Marks:20)

List of Experiments:

1. Find factorial of a number using & without using recursion.
2. Calculate factorial of a given number.
3. Find all the roots of a quadratic equation Ax2 + Bx + C = 0 for non – zero coefficients A, B and C.
4. Find the sum & difference of two matrices of order MxN and PxQ.
5. Find the product of two matrices of order MxN and PxQ.
6. Find the transpose of given MxN matrix.
7. Calculate the subject wise and student wise totals and store them as a part of the structure.
8. Implement linear and circular linked lists using single and double pointers.
9. Create circular linked list having information about a college and perform Insertion at front, Deletion at end.
10. Create a Linear Queue using Linked List and implement different operations such as Insert, Delete, and Display the queue elements.

Suggested Books:

1. Yashavant Kanetkar, Let Us C, BPB Publications.
2. Programming in ANSI C, Balagurusamy, 2nd edition, TMH.
3. Byron S Gottfried, Programming with C, Schaum Series.
4. Brian W. Kernighan, Dennis M. Ritchie, The C Programming Language, Prentice Hall.
5. Yashavant Kanetkar, Pointers in C, BPB Publications.
6. S. Sahni and E. Horowitz, "Data Structures", Galgotia Publications.
7. Tanenbaum: "Data Structures using C", Pearson/PHI.
8. Ellis Horowitz and Sartaz Sahani "Fundamentals of Computer Algorithms", ComputerScience Press.

No. of Required Classes: 75

No. of Contact Classes: 70

No. of Non-Contact Classes: 05

Semester IV

Major-5: Microprocessor and Microcontroller (100 Marks, Credit 3+1 =4)

Course Level: 300-399

Distribution of marks: (Internal:20, External: Theory:60 + Practical:20)

Internal Assessment: (Sessional:10+ Practical:06 + Attendence:04 = 20 Marks)
End Semester Examination: (Theory: 60, Practical: 20)

Course Objectives: This course will enable students to learn architecture and programming of microprocessors and microcontrollers.

Learning Outcome: By the end of this course, students will be able to

- Compare and contrast microprocessor and microcontroller
- Develop algorithm and write assembly language program for 8085 and 8051
- Interface basic I/O devices with microprocessor and microcontroller
- Design microcontroller-based circuits

Unit-1: (No. of Classes:15 Lectures, Marks:20)

Microcomputer Organization: Input/Output Devices. Data storage (idea of Semiconductor Memories). Classification of Computer memory. Introduction to embedded systems, architecture and classifications of embedded system, applications and purpose of embedded systems. 8085 and 8086 Microprocessors Architecture: Main features of 8085 and 8086. Block diagram and Pin-out diagram of 8085 and 8086. Data and address buses. Registers. ALU. Stack Pointer. Program counter.

Unit-2: (No. of Classes:15 Lectures, Marks:20)

8051 Microcontroller: Introduction and block diagram of 8051 Microcontroller, architecture of 8051, overview of 8051 families. 8051 Programming: 8051 addressing modes and accessing memory locations using various addressingmodes, assembly language instructions using each addressing mode. Introduction of I/O port programming pin out diagram of 8051 Microcontroller, I/O port programming in 8051. 8051 programming in C. Discussion on use of Keil and 8051. Assemblers for 8051 Programming.

Unit-3: (No. of Classes:15 Lectures, Marks:20)

8051 Timer/counter: Introduction to Timer/Counter of 8051, Programming of 8051 Timer/Counters. 8051 Serial Com: Introduction to serial communication of 8051, Baud rate programming, Programming 8051 for serial communication. 8051 Interrupts: Introduction to Interrupts of 8051, Programming of 8051 Interrupts. Interfacing of 8051: Interfacing of 8051 with ADC, and LCD. Discussion on use of Proteus software for simulation of 8051 based systems. Arduino: Introduction to Arduino, Pin diagram of Arduino and its Programming.

Unit-IV: Practical (30 Hours, Marks:20)

List of Experiments:

1. To find that the given numbers is prime/odd/even or not.

2. To find the factorial of a number.
3. Program to glow the first four LEDs then next four using TIMER application.
4. Program to rotate the contents of the accumulator first right and then left.
5. Program using Proteus software to toggle LED's connected across P1.2 pin.
6. Program to count frequency of the square signal applied to one of the counter pins of 8051.
7. Program to rotate the motor through a given angle in clockwise and anti-clockwise direction interface to 8051.
8. Program to display "HELLO" in the LCD interface to 8051.
9. Program to read the data of ADC interface with 8051.
10. Program to monitor temperature using LM35 sensor interface with 8051 and display the monitor temperature in LCD interface with 8051.

Suggested Books:

1. Microprocessor Architecture Programming & applications with 8085, 2002, R.S. Goankar, Prentice Hall.
2. Embedded Systems: Architecture, Programming & Design, Raj Kamal, 2008, Tata McGraw Hill.
3. The 8051 Microcontroller and Embedded Systems Using Assembly and C, M.A. Mazidi, J.G. Mazidi, and R.D. McKinlay, 2nd Ed., 2007, Pearson Education India.
4. Microprocessor and Microcontrollers, N. Senthil Kumar, 2010, Oxford University Press.
5. 8051 microcontrollers, Satish Shah, 2010, Oxford University Press.
6. Embedded Systems: Design & applications, S.F. Barrett, 2008, Pearson Education India.
7. Introduction to embedded system, K.V. Shibu, 1st edition, 2009, McGraw Hill.

No. of Required Classes: 75

No. of Contact Classes: 70

No. of Non-Contact Classes: 05

Particulars of Course Designer (Name, Institution, email id):

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4	Dr. Ram Kishore Roy	Dept. of ECT, GU	ram_kishore@gauhati.ac.in	9854549598
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6	Dr. Mitamoni Sarma	Dept. of Electronics Science, L.C.B College	sarmamitamoni2005@gmail.com	9864041335
7	Dr. Kakoli Kalita	Dept. of Electronics Science, L.C.B College	kalita.kakali@gmail.com	7896621580
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Semester V

Major-6: Communication Systems (100 Marks, Credit 3+1=4)

Course Level: 300-399

Distribution of marks: (Internal:20, External: Theory:60 + Practical:20)

Internal Assessment: (Sessional:10+ Practical:06 + Attendence:04 = 20 Marks)
End Semester Examination: (Theory: 60, Practical: 20)

Course objective: This course will enable students to understand fundamental of electroniccommunication process and communication systems.

Learning outcomes: By the end of this course, students will be able to

- Describe functional blocks of electronic communication system and sources of noise
- Compare and contrast amplitude, frequency and angle modulation systems
- Illustrate pulse modulation and digital communication techniques
- Design basic circuits for communication system

Unit-I: (No. of Classes:20 Lectures, Marks:25)

Analog communication: Block diagram of an electronic communication system, electromagnetic spectrum-band designations and applications, need for modulation, concept of channels, Concept of Noise, Amplitude Modulation: Amplitude Modulation, modulation index .Generation of AM, Amplitude Demodulation (diode detector), Concept of Double side band suppressed carrier, Single side band suppressed carrier, other forms of AM (Pilot Carrier Modulation, Vestigial Side Band modulation, Independent Side Band Modulation). Block diagram of AM Transmitter and Receiver, Angle modulation: Frequency and Phase modulation, modulation index andfrequency spectrum, equivalence between FM and PM, Generation of FM (direct and indirect methods), FM detector (PLL). Block diagram of FM Transmitter and Receiver Comparison between AM, FM and PM.

Unit-II: (No. of Classes:20 Lectures, Marks: 25)

Digital Communication: Block diagram of digital transmission and reception, Channel capacity, Sampling theorem, PAM, PDM, PPM modulation and detection techniques, Multiplexing, TDM and FDM. Pulse Code Modulation: Need for digital transmission, Quantizing, Uniform and Non- uniform Quantization, Quantization Noise, Companding,Coding, Decoding, Regeneration., Information capacity, Bit Rate, Baud Rate and M-array coding. Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), Binary Phase Shift Keying (BPSK) and Quadrature Phase Shift Keying (QPSK); TDMA, FDMA, CDMA concepts, comparison of TDMA and FDMA.

Unit-III: (No. of Classes: 5 Lectures, Marks:10)

Cellular Communication: Concept of cellular mobile communication – cell and cell splitting, frequency bands used in cellular communication, absolute RF channel numbers (ARFCN), frequency reuse, roaming and hand off, CDMA technology, simplified block diagram of cellular phone handset, Comparative studyof GSM and CDMA, 2G, 3G, 4G and 5G concepts.

Unit-IV: Practical (30 Hours, Marks: 20)

List of Experiments:

1. Study of Amplitude Modulation
2. Study of Amplitude Demodulation
3. Study of Frequency Modulation
4. Study of Frequency Demodulation
5. Study of Pulse Amplitude Modulation
6. Study of Pulse Width Modulation
7. Study of Pulse Position Modulation
8. Study of Pulse Code Modulation
9. Study of Amplitude Shift Keying
10. Study of Phase Shift Keying,
11. Study of Frequency Shift Keying.

Suggested Books:

1. Electronic communication systems- Kennedy, 3rd edition, McGraw international publications.
2. Principles of Electronic communication systems – Frenzel, 3rd edition, McGraw Hill.
3. Communication Systems, S. Haykin, Wiley India (2006).
4. Advanced electronic communications systems – Tomasi, 6th edition, PHI.
5. Communication Systems, S. Haykin, Wiley India (2006).

No. of Required Classes: 75

No. of Contact Classes: 70

No. of Non-Contact Classes: 05

Semester V

Major-7: Electronic Materials & I.C Fabrication (100 Marks, Credit 2+2=4)

Course Level: 300-399

Distribution of marks: (Internal:20, External: Theory:60 + Practical:20)

Internal Assessment: (Sessional:16 + Attendence:04 = 20 Marks)
End Semester Examination: (Theory: 80)

Course objective: This course will enable students to understand fundamental of electronic materials and Integrated circuit fabrication technology.

Learning Outcome: By the end of this course, students will be able to learn

- Knowledge of the different types and its operations of electronic materials.
- Different types of electronic materials and its applications
- Basics of I.C process technology and its applications

Unit-I: (No. of Classes:15 Lectures, Marks:20)

Classification of solids - insulator, semiconductor and conductors; Intrinsic and extrinsic Semiconductors, Compound semiconductors – binary, ternary and quaternary types and their properties; carrier generation and recombination, carrier scattering in semiconductors. Electronic properties and application of semiconductor – semiconductor junction, metal – semiconductor junction, metal – insulator junction, insulator – semiconductor junction in electronic device fabrication.

Unit-II: (No. of Classes:15 Lectures, Marks:20)

Conductors: Free electron theory of metals, Electrical conductivity and resistance, Boltzmann transport equation, thermionic emission and photoelectric effect, contact potential between metals, metallic alloys. Dielectric polarizations - electronic, ionic, orientation types, dielectric breakdown; dielectric loss and relaxation time. Theory of ferromagnetic, anti-ferromagnetic, ferromagnetic, paramagnetic and diamagnetic materials; their properties and application in electrical and electronic engineering. Physics of superconductors and superconducting materials.

Unit-III: (No. of Classes:15 Lectures, Marks:20)

Introduction to I.C s: Definition, scale of integration, types-monolithic, hybrid, thick & thin films; capacitance & resistance formation in ICs, idea of IC packages; Thin Film: Basic definitions- thin and thick films, properties of thin films, thin film deposition methods- PVD, CVD, Epitaxy theory of nucleation and growth in thin films; VPE, LPE, MOCVD, MBE techniques.

Unit-IV: (No. of Classes:15 Lectures, Marks:20)

Introduction to silicon planar technology. Fabrication of Diode, BJT, FET & MOSFET in ICs; Bulk semiconductor growth: zone refining technique Czochralski growth, vertical and horizontal Bridgman technique. Wafer preparation, oxidation, diffusion, ion implantation, metallization, pattern definition, encapsulation, lithography: advanced processing technique.

Suggested Books:

1. Solid State Physics - A J Dekker, McMillan Publisher, India.
2. An Introduction to Solid State Physics - Charles Kittel, Wiley Publishers.
3. Semiconductor Devices – Physics and Technology - S.M.Sze, Wiley.
4. Electrical properties of materials - L.Solymar and D Walsh.
5. CMOS VLSI design – Circuits and System perpectives, Neil H.E.Weste, David H., A.Banerjee, Pearson Ed.
6. Microelectronics – B. Razavi.

No. of Required Classes: 60

No. of Contact Classes: 60

No. of Non-Contact Classes: 00

Semester V

Major-8: Power Electronics (100 Marks, Credit 3+1=4)

Course Level: 300-399

Distribution of marks: (Internal:20, External: Theory:60 + Practical:20)

Internal Assessment: (Sessional:10+ Practical:06 + Attendence:04 = 20 Marks)
End Semester Examination: (Theory: 60, Practical: 20)

Course Objectives: This course will be able to make students understand fundamentals of power electronic devices and systems.

Learning Outcome: By the end of this course, students will be able to

- Explain characteristics of power electronics devices
- Design power converter circuits, choppers etc.
- Analyze performance of basic electrical machines related to power electronics

Unit- I: **(No. of Classes:10 Lectures, Marks: 15)**

Power Devices: Need for semiconductor power devices, Power diodes, Power transistor, Power MOSFETs, Introduction to family of thyristors. Silicon Controlled Rectifier (SCR): structure, I-V characteristics, Turn-On and Turn-Off characteristics, ratings, Factors affecting the characteristics/ratings of SCR, Gate-triggering circuits, Triggering and protection circuit: Thyristor firing, circuit- using transistor, UJT, PUT etc. thyristor gate protection circuit, di/dt and dv/dt protection for thyristors, Snubber circuit.

Unit- II: **(No. of Classes:15 Lectures, Marks: 20)**

Diac and Triac: Basic structure, working and V-I characteristic, Diac as a triggering device for a Triac. Insulated Gate Bipolar Transistors, AC voltage control using SCR and Triac as a switch. Application of SCR: SCR as a static switch, phase-controlled rectification, single phase half wave, fullwave -Semi converter and full converter, simple LC and cascaded LC filters, Power factor improvement.

Unit-III: **(No. of Classes:20 Lectures, Marks: 25)**

Power Inverters: Need for commutating circuits and their various types, Principle of operation, voltage driven inverters, current driven inverters, Choppers: basic chopper circuit and principles, choppers(Type A-D), step-down chopper, step-up chopper, Jones Chopper, Morgan's chopper, AC power supply systems: CVTs, Stabilizers, tap changers, UPS types (on-lineand off line) etc; Special application DC power supplies: CVCC, voltage mode and current mode SMPS, DC Motors, Basic understanding of field and armature, Principle of operation, EMF equation, Back EMF, Factors controlling motor speed, Thyristor based speed control of dc motors, AC motor.

Unit-IV: Practical **(30 hours, Marks: 20)**

List of Experiments:

1. Study of I-V characteristics of DIAC.

2. Study of I-V characteristics of a TRIAC.
3. Study of I-V characteristics of a SCR.
4. SCR as a half wave and full wave rectifiers with R and RL loads.
5. DC motor control using SCR.
6. DC motor control using TRIAC.
7. AC voltage controller using TRIAC with UJT triggering.
8. Study of parallel and bridge inverter.
9. Design of snubber circuit.
10. VI Characteristic of MOSFET and IGBT (Both).

Suggested Books:

1. Power Electronics – Rashid, PHI
2. Power Electronics- P.C. Sen, TMH Ltd.
3. Thyristor engineering- M.S. Berdi, Khanna publications.
4. Thyristors and their applications - N.Rammurthy

No. of Required Classes: 75

No. of Contact Classes: 70

No. of Non-Contact Classes: 05

Semester V

Major-9: Signals and Systems (100 Marks, Credit 3+1=4)

Course Level: 300-399

Distribution of marks: (Internal:20, External: Theory:60 + Practical:20)

Internal Assessment: (Sessional:10+ Practical:06 + Attendence:04 = 20 Marks)
End Semester Examination: (Theory: 60, Practical: 20)

Course Objectives: This course will make the students able to understand fundamentals of signals and systems needed to take up advanced courses in digital signal processing.

Learning Outcome: By the end of this course, students will be able to

- Explain different types of signals
- Determine Laplace transform, and Fourier series and transform of different signals
- Describe and analyze properties of LTI systems and their responses

Unit-I: (No. of Classes:15 Lectures, Marks:20)

Signals and Systems: Continuous-Time and Discrete-Time signals, Classification of Signals, Continuous-Time and Discrete-Time Systems, Classification of Systems, Basic System Properties. Laplace Transform: Laplace Transform, Inverse Laplace Transform, Properties of the LaplaceTransform, Laplace Transform of important signals, examples of RC, RL, RLC circuits as systems.

Unit-II: (No. of Classes:15 Lectures, Marks:20)

Fourier Analysis of Periodic and Aperiodic Continuous-Time Signals: Trigonometric Fourier Series, Exponential Form of Fourier Series, Parseval's Identity for Fourier Series, Power Spectrum of a Periodic Signal, Fourier Transform, Properties of Fourier Transform, Fourier Transform of important signals. Discrete Signals: Discrete Fourier Series, Discrete-Time Fourier Transform, Fast Fourier Transform. z-Transform & Inverse-z Transform, Properties of z-transform and evaluation of the Inverse z-Transform.

Unit-III: (No. of Classes:15 Lectures, Marks:20)

Linear Time -Invariant Systems (LTI): Discrete time LTI systems, Continuous time LTI systems, the Convolution integral. Linear and Circular Convolution. Properties of LTI systems, LTI systems with and without memory, Differential and Difference equation formulation, Block diagram representation of first order systems. Digital Filters: Basic concept of Digital Filters, Magnitude and phase responses, Finite Impulse Response Filters (FIR), Infinite Impulse Response Filters (IIR). Design Technique for FIR and IIR Filters.

Unit-IV: Practical (30 hours, Marks: 20)

List of Experiments:

1. Generation of Continuous-time Signals.
2. Generation of discrete -time Signals.
3. Time shifting and time scaling of continuous-time and discrete-time signals.
4. Convolution of two given x(t) and h(t) continuous time Signals.
5. Fourier series representation of continuous time signals.

6. Fourier transform of continuous time signals.
7. Laplace transform of continuous time signals.
8. Generate and plot sequences over an interval.
9. For a given sequence x[n], write program to find its z-transform X[z].
10. Convolution of two given x(n) and h(n) discrete time sequences.
11. Design of digital filters.

Suggested Books:

1. V. Oppenheim, A. S. Wilsky and S. H. Nawab, Signals and Systems, Pearson Education (2007).
2. S. Haykin and B. V. Veen, Signal and Systems, John Wiley & Sons (2004).
3. C. Alexander and M. Sadiku, Fundamentals of Electric Circuits, McGraw Hill (2008).
4. H. P. Hsu, Signals and Systems, Tata McGraw Hill (2007).
5. S. T. Karris, Signal and Systems: with MATLAB Computing and Simulink Modelling, Orchard Publications (2008).
6. W. Y. Young, Signals and Systems with MATLAB, Springer (2009).
7. M. Roberts, Fundamentals of Signals and Systems, Tata McGraw Hill (2007).

No. of Required Classes: 75

No. of Contact Classes: 70

No. of Non-Contact Classes: 05

Particulars of Course Designer (Name, Institution, email id):

Serial No	Name	Name of Institute	Email	Phone
1	Prof. Tulshi Bezboruah	Dept. of ECT, GU	zbt@gauhati.ac.in	9435109486
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5	Dr. Hirendra Das	Dept. of ECT, GU	hirendra@gauhati.ac.in	8638978914
6	Dr. Mitamoni Sarma	Dept. of Electronics Science, L.C.B College	sarmamitamoni2005@gmail.com	9864041335
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		L.C.B College		
8	Dr. Monalisha Goswami	Dept. of Electronics Science, L.C.B College	monalishagoswami7@gmail.com	8638441047

Semester VI

Major-10: Control Systems (100 Marks, Credit 3+1 =4)

Course Level: 300-399

Distribution of marks: (Internal:20, External: Theory:60 + Practical:20)

Internal Assessment: (Sessional:10+ Practical:06 + Attendence:04 = 20 Marks)
End Semester Examination: (Theory: 60, Practical: 20)

Course Objectives: This course will be providing fundamentals of closed loop control system and their stability criterion and time domain responses.

Learning Outcome: By the end of this course, students will be able to

- Explain difference between open loop and closed loop control systems, signal flow graph and reduction techniques
- analyze time domain and frequency domain response of control systems and their stability
- Illustrate state variable analysis of control system

Unit- I: (No. of Classes: 15 lectures, Marks: 20)

Introduction to Control Systems: Open loop and Closed loop control systems, Mathematical modelingof physical systems (Electrical, Mechanical and Thermal), Derivation of transfer function, Armature controlled and field-controlled DC servomotors, AC servomotors, block diagram representation & signal flow graph, Reduction Technique, Mason's Gain Formula. Effect of feedback on control systems.

Unit- II: (No. of Classes: 15 lectures, Marks: 20)

Time Domain Analysis: Time domain performance criteria, transient response of first and order systems, steady state errors and static error constants. Concept ofStability: Asymptotic stability and conditional stability, Routh – Hurwitz criterion, relative stability analysis, Root Locus plots and their applications. Frequency Domain Analysis: Correlation between time and frequency response, Polar plots, frequency domain specifications, Bode Plots, gain and phase margins,Nyquist stability criterion, relative stability using Nyquist criterion.

Unit III: (No. of Classes: 15 lectures, Marks: 20)

State Space Analysis: Definitions of state, state variables, state space, representation of systems, Solution of time invariant, homogeneous state equation, state transition matrix and its properties. Controllers and Compensation Techniques: Response with P, PI and PID Controllers, Concept of compensation, Lag, Lead and Lag-Lead networks.

Unit-IV: Practical (30 Hours, Marks: 20)

List of experiments:

1. To study characteristics of: (a). Synchro transmitter receiver, (b). Synchro as an error detector.
2. To study position control of DC motor.
3. To study speed control of DC motor.
4. To find characteristics of AC servo motor.
5. To study time response of type 0, 1 and 2 systems.
6. To study frequency response of first and second order systems.

7. To study time response characteristics of a second order system.
8. To study effect of damping factor on performance of second order system.
9. To study frequency response of Lead and Lag networks.
10. Study of P, PI and PIDcontroller.

Suggested Books:

1. J. Nagrath & M. Gopal, Control System Engineering, New Age International, 2000
2. K. Ogata, Modern Control Engineering, PHI 2002
3. B. C. Kuo, "Automatic control system", Prentice Hall of India, 2000

No. of Required Classes: 75

No. of Contact Classes: 70

No. of Non-Contact Classes: 05

Semester VI

Major-11: Photonics and Electronics Instrumentations (100 Marks, Credit 4)

Course Level: 300-399

Distribution of marks: (Internal:20, External: Theory:80)

Internal Assessment: (Sessional:16 + Attendence:04 = 20 Marks)
End Semester Examination: (Theory: 80)

Course Objectives: This paper will make students able to understand the fundamentals of light propagation in different media, interference, diffraction, and principles of other optoelectronic devices and optical communication. This course will also enable the students to learn fundamental concepts of test and measuring electronic instrumentation.

Learning Outcome: By the end of this course, students will be able to

- Explain propagation of light wave in different media
- Illustrate interference and diffraction of light waves
- Demonstrate use of LED, LASER, photodetectors and optical fiber
- explain accuracy, precision, sources of error in measurement
- demonstrate the working principle and application of basic test and measuring instruments
- describe fundamentals of sensors and transducers

Unit-I: (No. of Classes:15 Lectures, Marks: 20)

Light as an Electromagnetic Wave: Plane waves in homogeneous media, concept of spherical waves. Reflection and transmission at an interface, total internal reflection, Brewster's Law. Interaction of electromagnetic waves with dielectrics: origin of refractive index, dispersion. Interference: Superposition of waves of same frequency, Concept of coherence, Interference by division of wave front, Young's double slit, Newton's rings; Michelson interferometer. Holography.

Unit-II: (No. of Classes:15 Lectures, Marks: 20)

Light Emitting Diodes: Construction, materials and operation. Lasers: Interaction of radiation and matter, Einstein coefficients, Condition for amplification, laser cavity, threshold for laser oscillation, line shape function. Diode laser. Photodetectors: Photomultiplier tube, Charge Coupled Device. Phototransistors and Photodiodes (p-i-n, avalanche), quantum efficiency and responsivity. LCD Displays: Types of liquid crystals, Principle of Liquid Crystal Displays, applications, advantages over LED displays. Optical Fiber: Step index and graded index optical fiber, Single mode and multimode fiber, total internal reflection of light in fiber, power losses in fiber & dispersion.

Unit-III: (No. of Classes:15 Lectures, Marks: 20)

Electronic instruments & their characteristics, a generalized instrumentation scheme, classification of instrumentation error & their statistical behaviour; Basic instrumentation circuits- voltmeter, digital voltmeter, Q-meter, watt meter; DC ammeters; ohmmeter, multimeter-analog & digital. CRO and Function generator. Block diagram of CRO & DSO. Frequency domain measurements-Distortion analyzer, Wave and spectrum analyzer spectrum analyzer.

Unit-IV: (No. of Classes:15 Lectures, Marks:20)

Transducers & Sensors: Definition, types-active & passive, analog & digital; active-thermocouple & piezoelectric transducers, passive- potentiometric devices, thermistors, RTD, LVDT; displacement & temperature sensors; Digital measurement techniques, Time and frequency measurements, Interface of instruments with computer, Virtual Instruments. Digital transducers; Sensors- conventional and bio-sensors, Fiber optic sensors.

Suggested Books:

1. Fundamentals of photonics – B.E.A. Saleh, M.C.Teich, Wiley Interscience.
2. Principles of Nanophotonics – E.R. Pike, R.G.W. Brown, Taylor and Francis.
3. Photonic crystal – J.D.Joannopolous et. al, Princeton Univ. Press.
4. Integrated Optics – K. Iga, Y. Kokobun, Taylor and Francis.
5. Instrumentation, Measurement and Feedback- B.E. Jones, Tata McGraw Hill.
6. Electronics Measurements and Instrumentation- B.E. Oliver and J.M. Cage, McGraw Hill.
7. Electrical & Electronic Measurements- Sawhnay….,Dhanpat Rai Publications.
8. Process Control- Johnson, Pearson Education.

No. of Required Classes: 75

No. of Contact Classes: 70

No. of Non-Contact Classes: 05

Semester VI

Major-12: Electromagnetics & Microwave (100 Marks, Credit 3+1=4)

Course Level: 300-399

Distribution of marks: (Internal:20, External: Theory:60 + Practical:20)

Internal Assessment: (Sessional:10 + practical: 06+Attendence:04 = 20 Marks)
End Semester Examination: (Theory: 60, Practical: 20)

Course Objectives: This paper will make students able to understand fundamentals of Electromagnetics that will be needed for courses on Applied electromagnetics and microwaves.

Learning Outcome: By the end of this course, students will be able to

- Solve electrostatic and magneto static problems based on Poisson's and Laplace equations
- Describe physical significance of Maxwell's equations and applications in plane wavepropagation and guidance
- Discuss the basics of microwave devices and its characteristics.

Unit-I: (No. of Classes:15 Lectures, Marks:20)

Electrostatic Fields: Coulomb's Law and Electric Field, Field due to Discrete and Continuous Charge Distributions, Electric Flux Density, Gauss's Law and Applications, Divergence Theorem and Maxwell's First Equation. Electric Potential, Potential due to a Charge and Charge distribution, Electric dipole. Electric Fields in Conductors, Current and Current Density, Continuity of Current, Metallic Conductor Properties and Boundary Conditions, Method of Images. Dielectric materials, Polarization, Dielectric Constant, Isotropic and Anisotropic dielectrics, Boundary conditions, Capacitance and Capacitors. Electrostatic Energy and Forces.

Unit-II: (No. of Classes:15 Lectures, Marks:20)

Magnetostatics: Biot Savert's law and Applications, Magnetic dipole, Ampere's Circuital Law, Divergence and Stoke's Theorem, Maxwell's Equation, Magnetic Flux and Magnetic Flux Density, Scalar and Vector Magnetic Potentials. Magnetization in Materials and Permeability, Anisotropic materials, Magnetic Boundary Conditions, Inductors and Inductances, Magnetic Energy, Magnetic Circuits. Inductances and Inductors, Magnetic Energy, Forces and Torques. Time-Varying Fields and Maxwell's Equations: Faraday's Law of Electromagnetic Induction, Maxwell's Equations in differential and integral form and Constitutive Relations.

Unit-III: (No. of Classes:15 Lectures, Marks:20)

Microwave transmission line: Basic equations, Solution of transmission line equation, Reflection and transmission co-efficient, Voltage Standing wave ratio (VSWR), Line impedance and admittance, Transmission and Reflection co-efficient. Microwave wave guide: Introduction to microwave wave guides, Solution of wave equation in Rectangular and Circular Wave guides, attenuation in waveguides, propagation modes, TE, TM, and TEM, Wave guide impedance. Basics of microwave antenna and its applications.

Unit-IV: Practical (30 hours, Marks: 20)

List of Experiments:

1. Understanding and Plotting Vectors.
2. Transformation of vectors into various coordinate systems.
3. 2D and 3D Graphical plotting with change of view and rotation.
4. Representation of the Gradient of a scalar field, Divergence and Curl of Vector Fields.
5. Plots of Electric field and Electric Potential due to charge distributions.
6. Plots of Magnetic Flux Density due to current carrying wire.
7. Programs and Contour Plots to illustrate Method of Images
8. Solutions of Poisson and Laplace Equations – contour plots of charge and potential
9. Introduction to Computational Electromagnetics: Simple Boundary Value Problems by Finite Difference/Finite Element Methods**.**

Suggested Books:

1. D. C. Cheng, Field and Wave Electromagnetics, Pearson Education (2001).
2. J. A. Edminster, Electromagnetics, Schaum Series, Tata McGraw Hill (2006).
3. N. Narayan Rao, Elements of Engineering Electromagnetics, Pearson Education (2006).
4. Introduction to Electrodynamics, D.J. Griffiths, Pearson Education (2012).
5. Electromagnetic Wave and Radiating System, Jordan and Balmain, Prentice Hall (1979).
6. Foundations for Microwave Engineering, Collin, McGraw Hill.
7. Microwave Engineering by Annapurna Das & Sisir K. Das, Tata McGraw Hill.
8. Radio Frequency & Microwave Electronics by Matthew M. Radmanesh, Pearson Education Asia.

No. of Required Classes: 75

No. of Contact Classes: 70

No. of Non-Contact Classes: 05

Semester VI

Major-12: Dissertation (Project Work) (100 Marks & Credits:04)

Course Level: 300-399

Distribution of marks: 100 Marks

End Semester Examination: (Practical: 80 Marks)
Internal Assessment: (Practical:16 + Attendence:04 = 20 Marks)

Course Objectives: This elective course is meant for students to acquire advanced practical skill / knowledge by doing experimental investigation on a given topic of Electronics with an advisory support from a teacher / faculty member. It involves application of knowledge in solving / analyzing /exploring a real-life situation / difficult problem. This paper is meant to be introduction of research component/concept in Under-Graduate Courses.

Learning Outcome: By the end of this course, students will be able to

- demonstrate creativity and critical thinking ability
- gain confidence in application of theoretical knowledge to practical aspects
- Design circuits, PCB and solder components on the PCB

Process of doing Project/Dissertation

- Familiarity with research ethics & plagiarism
- Choosing a research area
- Literature review
- Problem formulation and definition of the project work
- Generation of innovative ideas for solving the solving
- Modular design, implementation and testing
- System integration & testing
- PCB design and soldering of the tested circuit
- Report writing
- Correction by Supervisor Printing & Hard binding

Other information

- ✓ There may be maximum number of 2 students in a project group.
- ✓ Supervisor is supposed to assign different parts of the project works to each student of the group so that each student remains actively engaged.
- ✓ Weekly interaction between students and respective Supervisor should be done to ensure progress of the work.
- ✓ Supervisor should help the students in a way to generate and unleash creativity and critical thinking ability of students.
- ✓ Group discussion should be encouraged by supervisors about their research/design problems

Particulars of Course Designer (Name, Institution, email id):

Serial No	Name	Name of Institute	Email	Phone
1	Prof. Tulshi Bezboruah	Dept. of ECT, GU	zbt@gauhati.ac.in	9435109486
2	Dr. Hidam Kumarjit Singh	Dept. of ECT, GU	kumarjit_hidam@gauhati.ac.in	9706006963

3	Dr. Kumaresh Sarmah	Dept. of ECT, GU	kumaresh@gauhati.ac.in	9854660415
4	Dr. Ram Kishore Roy	Dept. of ECT, GU	ram_kishore@gauhati.ac.in	9854549598
5	Dr. Hirendra Das	Dept. of ECT, GU	hirendra@gauhati.ac.in	8638978914
6	Dr. Mitamoni Sarma	Dept. of Electronics Science, L.C.B College	sarmamitamoni2005@gmail.com	9864041335
7	Dr. Kakoli Kalita	Dept. of Electronics Science, L.C.B College	kalita.kakali@gmail.com	7896621580
8	Dr. Monalisha Goswami	Dept. of Electronics Science, L.C.B College	monalishagoswami7@gmail.com	8638441047

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INS-101 (INS-RC-1016) Basic Circuit Theory and Network Analysis

Total Credits : 4 (Theory : 03, Lab : 01)
Hours : 75 (Theory : 45, Lab Contact : 30)

Prerequisites:

- None

Course Outcomes

- CO1: Describe the basic network theorem.
- CO2: Explain the basics of analog electronics (BJT, FET, MOSFET)
- CO3: Describe boolean algebra, combinational and sequential logic.

A Theory

A.1 Unit I : *Circuit Concepts and Circuit Analysis*

Voltage and Current Sources, Resistors.
Inductors: Fixed and Variable inductors, Self and mutual inductance.
Capacitors: Principles of capacitance, Parallel plate capacitor, Permittivity, Definition of Dielectric Constant, Dielectric strength, Energy stored in a capacitor, Air, Paper, Mica, Teflon, Ceramic, Plastic and Electrolytic capacitor, capacitors in series and parallel.
Kirchhof's Current Law (KCL), Kirchhof's Voltage Law (KVL), Node Analysis, Mesh Analysis.
RC Circuit, RL Circuit, RLC Circuits.
Sinusoidal Voltage and Current, AC/DC power source and power distribution. Definition of Instantaneous, Peak, Peak to Peak, Root Mean Square and Average Values. Voltage-Current relationship in Resistor, Inductor and Capacitor.
Passive Filters: Low Pass, High Pass, Band Pass and Band Stop.

A.2 Unit II : *Network Theorems*

Principal of Duality, Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Reciprocity Theorem, Millman's Theorem, Maximum Power Transfer Theorem.

A.3 Unit III : *Analog Electronics*

PN Junction diode and device power rating, Basic transistor action, Transistor current components and amplification. Transistor configurations: Common Base (CB), Common Emitter (CE) and Common Collector (CC) configuration, I-V characteristics.
Concept of feedback, negative and positive feedback, Negative feedback, advantages and disadvantages of negative feedback, Barkhausen criteria for oscillations.
Junction Field Effect Transistor (JFET), Construction of JFET, Construction of MOSFET.

A.4 Unit IV : *Digital Electronics*

Decimal, Binary, Hexadecimal and Octal number systems, base conversions, Truth Tables of OR, AND, NOT, XOR, XNOR, Universal (NOR and NAND) Gates, Basic postulates and fundamental theorems of Boolean algebra, Combinational Logic Analysis and Design, Adder, Subtractor, Encoder and Decoder, Multiplexers and Demultiplexers, Sequential logic design, Latches and Flip flops , S-R Flip flop, J-K Flip flop, T and D type Flip flops, Introduction to registers and counters.

B Basic Circuit Theory and Network Analysis Lab

1. Familiarisation with
   (a) Resistance in series, parallel and series-parallel. Type, wattage, tolerance, and temperature coefficient.
   (b) Capacitors- Tolerance,voltage rating, type of capacitors, capacitors & inductors in series & parallel.
   (c) Multimeter (Analog and Digital) - Checking of components.
   (d) Voltage sources in series, parallel and series-parallel.
   (e) Voltage and current dividers.
2. To study the Half wave rectifier and Full wave rectifier.
3. To study power supply using Zener diode and regulated power supply.
4. To verify and design AND, OR, NOT and XOR gates using NAND gates.
5. Design a Half and Full Adder.
6. Design a Half and Full Subtractor.
7. Flip Flop Type and its uses.

C *Suggested books*

1. Robert L. Boylestad, Louis Nashelsky, Electronic Devices and Circuit Theory, Prentice-Hall.
2. Albert Paul Malvino, Donald P. Leach, Digital principles and applications, McGraw-Hill.
3. Horowitz and Hill: Art of electronics, Cambridge University Press.
4. R. F. Coughlin and Driscoll, Op-amps and linear ICs, Prentice Hall.
5. A.P.Godse, U.A.Bakshi,Electronics Devices and Circuits, Technical Publications.
6. Millman and Halkias, Electronic devices and circuits, McGraw-Hill.

2

INS-151 (INS-HC-2026)
Transducers and Sensors

Total Credits : 4 (Theory : 03, Lab : 01)
Hours : 75 (Theory : 45, Lab Contact : 30)

Prerequisites:

- Class XII Mathematics and Physics
- Idea of units and measurement

Course Outcomes

- CO1: Describe the generalised instrumentation system and its different characteristics.
- CO2: Explain different types of errors associated with measurement systems.
- CO3: Categorise and compare different sensors and transducers and illustrate its applications.

A Theory

A.1 Unit I : *Instrumentation & Measurement Systems*

Generalised instrumentation systems block diagram representation, scope of instrumentation in Industrial organisation.
Measurement systems: static (accuracy, sensitivity, linearity, precision, resolution, threshold, range, hysteresis, dead band, backlash, drift), impedance matching and loading, dynamic characteristics (types, fidelity, speed of response, dynamic error).

A.2 Unit II : *Errors*

Systematic errors, instrumental errors, environmental errors, random errors, loading errors, source of errors in measuring instruments, Uncertainties types, propagation of uncertainties.

A.3 Unit III : *Transducers*

Classification- Active, Passive, Mechanical, Electrical, their comparison. Selection of Transducers, Principle and working of following types: Displacement transducers - Resistive (Potentiometric, Strain Gauges - Types, Gauge Factor, bridge circuits, Semi-conductor strain gauge) Capacitive (diaphragm), Inductive (LVDT-Principle and characteristics, Hall effect sensors).

A.4 Unit IV : *Sensors*

Piezoelectric (Element and their properties, Piezo Electric coefficients Equivalent circuit), light (photo -conductive, photo emissive, photo voltaic, semiconductor, LDR), Temperature (electrical and non-electrical) Pressure (load cell).

B Transducers and Sensors Lab

1. Measurement of pressure, strain and torque using strain gauge.
2. Measurement of speed using Electromagnetic transducer.
3. Measurement of speed using photoelectric transducers
4. Measurement of angular displacement using Potentiometer.
5. Measurement of displacement using LVDT.
6. Measurement using load cells.
7. Measurement using capacitive transducer.
8. Measurement using inductive transducer.
9. Measurement of Temperature using Temperature Sensors/RTD.
10. Characteristics of Hall effect sensor.
11. Measuring change in resistance using LDR.

C Suggested books

1. Doeblin & Manek, Measurement Systems, McGraw Hill.
2. Nakra & Choudhary, Instrumentation Measurements and Analysis, Tata McGraw-Hill.
3. A.K. Sawhney, Electrical & Electronic Measurements & Instrumentation.
4. Rangan, Sarma, and Mani, Instrumentation- Devices and Systems, Tata-McGraw Hill.
5. H.S Kalsi, Electronic Instrumentation, McGraw Hill.
6. DVS Murthy, Measurement & Instrumentation, PHI.
7. D. Patranabis, Sensors and Transducers, PHI.
8. Arun K. Ghosh, Introduction to Measurements and Instrumentation, PHI.

3

INS-201 (INS-HC-2016)
Analog Devices and Circuits

Total Credits : 4 (Theory : 03, Lab : 01)
Hours : 75 (Theory : 45, Lab Contact : 30)

Prerequisites:

- Class XII Mathematics

Course Outcomes

- CO1: Explain the properties of intrinsic and extrinsic semiconductors and analyse the behaviour of p-n junction diodes in clipper circuits, clamping circuits, and rectifiers.
- CO2: Analyse the basic operation of BJTs and identify the different configurations, including Common Base, Common Emitter, and Common Collector.
- CO3: Differentiate between negative and positive feedback and analyse the performance of voltage and current feedback amplifiers.
- CO4: Analyse the characteristics of JFETs , including the construction, working, and I-V characteristics, and explain the operation of MOSFET amplifiers.

A Theory

A.1 Unit I : *Semiconductor Basics*

Introduction to semiconductor materials, intrinsic & extrinsic semiconductors. p-n junction diode: Ideal diode, Formation of depletion layer, space charge at a junction, Diode Circuits: clipper circuits, clamping circuits. Half wave rectifier, Center tapped and bridge full wave rectifiers, calculation of efficiency and ripple factor. DC power supply: Block diagram of a power supply, Zener diode as voltage regulator, temperature coefficient of Zener diode.

A.2 Unit II : *The BJT*

Basic transistor action, Transistor current components and amplification. Transistor configurations: Common Base (CB), Common Emitter (CE) and Common Collector (CC) configuration, I-V characteristics and hybrid parameters, regions of operation, dc load line, Q point. CE amplifier: Self bias arrangement of CE, dc and ac load line analysis, Hybrid equivalent of CE, frequency response of CE amplifier.

A.3 Unit III : *Feedback Amplifiers*

Concept of feedback, negative and positive feedback, Negative feedback: advantages and disadvantages of negative feedback, voltage (series and shunt), current (series and shunt) feedback amplifiers, derivation of gain, input and output impedances for feedback amplifiers. Positive feedback: Barkhausen criteria for oscillations, Study of phase shift oscillator, Colpitts oscillator and Crystal oscillator.

A.4 Unit IV : *Junction Field Effect Transistor(JFET)*

Construction of JFET, idea of channel formation, pinch-off and saturation voltage, current-voltage output characteristics. Metal Oxide Field Effect Transistor (MOSFET): Basic construction and working.

B Analog Devices and Circuits Lab

1. To study the Half wave rectifier and Full wave rectifier.
2. To study power supply using C filter and zener diode.
3. To study Fixed Bias and Voltage divide Feedback configuration for transistor.
4. To design a Single Stage CE amplifier.
5. To study Class A, B and C Power Amplifier.
6. To study clipping circuits
7. To study clamping circuits
8. To study the Colpitt's Oscillator.
9. To study the Phase Shift Oscillator.
10. To study the frequency response of Common Source FET amplifier.

C Suggested books

1. R. L. Boylestad, L. Nashelsky, K. L. Kishore, *Electronic Devices and Circuit Theory*, Pearson Education.
2. Albert Paul Malvino, *Electronic Principles*, McGraw-Hill.
3. J. Millman and C. Halkias, *Integrated Electronics*, Tata McGraw Hill.
4. J. Cathey, *2000 Solved Problems in Electronics*, Schaum's outline Series, Tata McGraw Hill.

4

INS-251 (INS-HC-6026)
Control Systems

Total Credits : 4 (Theory : 03, Lab : 01)
Hours : 75 (Theory : 45, Lab Contact : 30)

Prerequisites:

- Applied Mathematics (of 1st semester) or equivalent

Course Outcomes

- CO1: Understand open loop and closed loop control systems, derive transfer function and apply basic control actions.
- CO2: Analyse transient and steady-state response of systems, design controllers with stability analysis and understand Root Locus plots.
- CO3: Correlate time and frequency response, design and analyse systems using Bode plots, Nyquist stability criterion, and gain and phase margins.

A Theory

A.1 Unit I : *Introduction to Control System*

Introduction of open loop and closed loop control systems, mathematical modelling of physical systems (Electrical, Mechanical and Thermal), derivation of transfer function, block diagram representation & signal flow graph, Reduction Technique, Mason's Gain Formula. Effect of feedback on control systems, Basic Control Actions: ON-OFF and Proportional.

A.2 Unit II : *Time Domain Analysis*

Time - Domain Analysis:-Time domain performance criteria, transient response of first, second & higher order systems, steady state errors and static error constants, performance indices, response with Proportional Controllers. Concept of Stability: Asymptotic stability and conditional stability, Routh - Hurwitz criterion, relative stability analysis, Root Locus plots and their applications.

A.3 Unit III : *Frequency Domain Analysis*

Frequency Domain Analysis: Correlation between time and frequency response, Polar and inverse polar plots, frequency domain specifications, Logarithmic plots (Bode Plots), gain and phase margins, Nyquist stability criterion, relative stability using Nyquist criterion, constant M & N circles.

B Control Systems Lab

1. To study characteristics of :
    (a) Synchro transmitter receiver
    (b) Synchro as an error detector
2. To study position control of DC motor
3. To study speed control of DC motor
4. To study time response of type 0,1 and 2 systems
5. To study frequency response of first and second order systems
6. To study time response characteristics of a second order system.
7. To study effect of damping factor on performance of second order system
8. Study of ON-OFF and Proportional Controllers.

C Suggested books

1. K. Ogata, *Modern Control Engineering*, Prentice Hall of India.
2. B. C. Kuo , *Automatic control system*, Prentice Hall of India.
3. J. Nagrath & M. Gopal, Control System Engineering, New Age International.

5

INS-252 (INS-HC-4016)
Operational Amplifiers and Applications

Total Credits : 4 (Theory : 03, Lab : 01)
Hours : 75 (Theory : 45, Lab Contact : 30)

Prerequisites:

- Class XII Physics
- Knowledge of Semiconductor devices
- Knowledge of BJT and UJT and their related parameters

Course Outcomes

- CO1: Students will be able to define opamps and its different parameters and configurations.
- CO2: Students will be able to explain the working of opamp based circuits.
- CO3: Students will be able to implement and make simple working circuits.

A Theory

A.1 Unit I : *Operational Amplifier*

Basic Operational Amplifier: Concept of differential amplifiers (Dual input balanced and unbalanced output), constant current bias, current mirror, blockdiagram of an operational amplifier (IC 741). Op-Amp parameters: input offset voltage, input offset current, input bias current, differential input resistance,input capacitance, offset voltage adjustment range, input voltage range, common mode rejection ratio, slew rate,supply voltage rejection ratio.

A.2 Unit II : *Op-Amp Circuits*

Op-Amp Circuits: Open and closed loop configuration, Frequency response of an op-amp in open loop and closed loop configurations, Inverting, Non-inverting, Summing and difference amplifier, Differential amplifier, Instrumentation Amplifier, Integrator, Differentiator, Voltage to current converter, Current to voltage converter. Comparators, Voltage limiters, Schmitt Trigger. Signal generators: Phase shift oscillator, Wein bridge oscillator, Square wave generator, triangle wave generator and Voltage controlled oscillator.

A.3 Unit III : *Opamp Based Devices*

Multivibrators (IC 555): Block diagram, Astable and monostable multivibrator circuit, Applications of Monostable and Astable multivibrators. Introduction to Phase locked loops (PLL): Block diagram, phase detectors, IC565.

Fixed and variable IC regulators: IC 78xx and IC 79xx -concepts only, IC LM317- output voltage equation.

A.4 Unit IV : *Signal Conditioning circuits*

Sample and hold systems, Active filters: First order low pass and high pass butterworth filter, Second order filters, Band pass filter, Band reject filter, All pass filter, Log and antilog amplifiers.

B Operational Amplifiers and Applications Lab

1. Study of op-amp characteristics: CMRR and Slew rate.
2. Designing of an amplifier of given gain for an inverting and non-inverting configuration using an op-amp.
3. Designing of analog adder and subtractor circuit.
4. Designing of an integrator using op-amp for a given specification and study its frequency response.
5. Designing of a differentiator using op-amp for a given specification and study its frequency response.
6. Designing of a First Order Low-pass filter using op-amp.
7. Designing of a First Order High-pass filter using op-amp.
8. Designing of a RC Phase Shift Oscillator using op-amp.
9. Study of IC 555 as an astable multivibrator.
10. Study of IC 555 as monostable multivibrator.
11. Designing of Fixed voltage power supply using IC regulators using 78 series and 79 series.

C Suggested books

1. R. A. Gayakwad, Op-Amps and Linear IC's, Pearson Education.
2. R. F. Coughlin and F. F. Driscoll, Operational amplifiers and Linear Integrated circuits, Pearson Education.
3. J. Millman and C.C. Halkias, Integrated Electronics, Tata McGraw-Hill.
4. A.P. Malvino, Electronic Principles, Tata McGraw-Hill.
5. K.L. Kishore, OP-AMP and Linear Integrated Circuits, Pearson.

6

INS-253 (INS-HE-5016) Signals and Systems

Total Credits : 4 (Theory : 03, Lab : 01)
Hours : 75 (Theory : 45, Lab Contact : 30)

Prerequisites:

- Class XII Mathematics
- Knowledge of Differential and Integral Equations
- Knowledge of Fourier Transforms

Course Outcomes

- CO1: Students will be able to define discrete and continuous signals.
- CO2: Students will be able to explain the basics of time variant and invariant systems.
- CO3: Students will be able to solve and find the output of mentioned systems for given input.

A Theory

A.1 Unit I : *Signals and Systems*

Continuous and discrete time signals, Transformation of the independent variable, Exponential and sinusoidal signals, Impulse and Unit step functions, Continuous-Time and Discrete-Time Systems, Basic System Proper- ties.

A.2 Unit II : *Linear Time-Invariant Systems (LTI)*

Discrete time LTI systems, the Convolution Sum, Continuous time LTI systems, the Convolution integral, Propertiesof LTI systems, Commutative, Distributive and Associative.

A.3 Unit III : *Properties of LTI System*

LTI systems with and without memory, Invariability, Causality (Causal systems), Stability, Unit Step response, Differential and Difference equation formulation, Block diagram representation of first order systems.

A.4 Unit IV : *Laplace Transform*

Laplace Transform, Inverse Laplace Transform, Properties of the Laplace Transform, Laplace Transform Pairs, Laplace Transform Methods in Circuit Analysis, Impulse and Step response of R, L and C circuits. Introduction to FIR systems.

B *Suggested books*

1. H. P. Hsu, Signals and Systems, Tata McGraw Hill.
2. S. T. Karris, Signal and Systems: with MATLAB, Computing and Simulink Modelling, Publications.
3. W. Y. Young, Signals and Systems with MATLAB, Springer.
4. M. Roberts, Fundamentals of Signals and Systems, Tata McGraw Hill.

C Signals and Systems Lab

1. Learning Scilab/MATLAB/Python (Experiments based on available system)
2. Explorations of Signals and Systems using Scilab/MATLAB/Python
3. Generation of Signals: continuous time
4. Generation of Signals: discrete time
5. Convolution of Signals
6. Solution of Difference equations.
7. Introduction to SIMULINK or open-source alternatives, and calculation of output of systems represented by block diagrams.

7

INS-254 (INS-HC-5026) Microprocessors

Total Credits : 4 (Theory : 03, Lab : 01)
Hours : 75 (Theory : 45, Lab Contact : 30)

Prerequisites:

- Good knowledge on digital electronics
- Basic knowledge on programming techniques

Course Outcomes

- CO1: Describe internal mechanism of 8085 microprocessor system.
- CO2: Discuss the programming techniques of 8085 microprocessor.
- CO3: Illustrate different peripheral devices and interfacing techniques.
- CO4: Explain briefly the 8086 microprocessor and its interfacing.

A Theory

A.1 Unit I : *8085 Microprocessor*

Introduction to 8085 Microprocessor, Pin description of 8085, Architecture, register of 8085, addressing mode. Instruction Type and Instruction Set, Machine Cycle, Instruction Cycle, Timing Diagram, Memory System, internal and external memory and concept of Virtual Memory. Hardware Interfacing or Types of I/O addressing-Interfacing Memory and Peripheral (I/o Mapped I/O and memory mapped I/O).

A.2 Unit II : *Programming*

Assembly Language Programming, Stacks and Subroutine, Interrupts of 8085-Hardware and Software interrupts. Difference between RISC and CISC Processor.

A.3 Unit III : *Peripherals*

Interfacing ICs- Programmable Peripheral Interface: Intel 8155, 8253, 8255, programmable Interrupt Controller: Intel 8259.

A.4 Unit IV : *Interfacing*

Application of Microprocessor 8085 in Instrumentation: Interfacing of Stepper Motor. Introduction to 8086 Microprocessor: keyboard Basics of 8086 (16 bit Microprocessor), Architecture of 8086, Concept of parallel processing in 8086.

B Microprocessors Lab

1. To write an assembly language program to perform basic mathematical operations (addition, subtraction, multiplication, division)
2. To write an assembly language program to generate first N terms of an A.P. / G.P. series
3. To write an assembly language program to generate first N terms of Fibonacci series
4. To write an assembly language program to arrange the given list of number in ascending / descending order
5. To write an assembly language program to calculate N!
6. To write an assembly language program to separate prime numbers in a given list of number
7. To write an assembly language program to convert a number from one number system to another

C Suggested books

1. Ramesh Gaonkar, Microprocessors architecture, programming and Applications, Wiley Eastern Ltd.
2. Liu Gibson, Microprocessor Systems: The 8086/8088 family Architecture, Programming & Design, PHI.
3. Barry B. Brey, The Intel Microprocessors, Pearson Education India.
4. Walter Triebel & Avtar A.Singh, 8088 and 8086 Microprocessors: Programming, Interfacing, Software Hardware and Applications, Pearson Education.
5. D. V. Hall, Microprocessors and Interfacing, Tata McGraw Hill.

9

INS-301 (INS-HC-4026) Analytical Instrumentation

Total Credits : 4 (Theory : 03, Lab : 01)
Hours : 75 (Theory : 45, Lab Contact : 30)

Prerequisites:

- A paper on Sensors and Transducers. In addition, a course on materials science or solid state physics or condensed matter physics will be advantageous.

Course Outcomes

- CO1: Students will gain an understanding of the theory and principles behind various spectro-analytical methods.
- CO2: Students will able to discuss and explain the theory and principles behind various chromatographic separation methods.
- CO3: Students will be able to describe the fundamental principles and theory behind various diffraction techniques used in materials analysis.
- CO4: Students will be able to understand and identify the thermo analytical methods to be used for thermal analysis of materials.
- CO5: Students will learn about the instrumentation and applications of these methods in qualitative and quantitative analysis.

A Theory

A.1 Unit I : *Analytical Instruments and Diffraction Techniques*

Classification of instrumental methods, physical principles behind diffraction techniques, X-ray source and detectors, X-ray diffraction methods, single crystal diffraction, powder X-ray diffraction, elements of neutron diffraction, electron diffraction, applications of diffraction techniques.

A.2 Unit II : *Atomic and Molecular Spectroscopy*

Interaction of electromagnetic waves and matter; Colorimetry and Spectrophotometry ; Beer-Lambertâs law; principles of atomic emission and absorption spectroscopy; rotational, vibrational and electronic transitions in molecules; optical systems used in spectroscopy â radiation sources, wavelength selectors, detectors; spectroscopic techniques and instruments used; comparison of atomic and molecular spectroscopy; applications.

A.3 Unit III : *Chromatography and Mass Spectrometry*

Principles of chromatography; instrumentation and applications of Thin layer chromatography (TLC). Column chromatography: Principle, process of elution through a column, chromatogram, band broadening, capacity factor, selectivity factor , Column efficiency, number of plates, plate height, column resolution. Gas Chromatography, instrumentation and applications; Principles of High Performance Liquid Chromatography (HPLC). Theory of mass spectrometer, components of mass spectrometer and applications.

A.4 Unit IV : *Thermal Analysis*

Introduction to thermal methods of analysis, thermo gravimetric analysis (TGA), differential thermal analysis (DTA), differential scanning calorimetry (DSC). Instrumentation and applications.

B Analytical Instrumentation Lab

1. Determination of pKa value for a dye using double beam spectrophotometer.
2. Spectrometric determination of iron in water sample using double beam spectrophotometer.
3. Determination of concentrations of sodium, calcium, lithium and potassium in sample using flame photometer.
4. Determination of concentration of potassium ions in sample by standard addition method using flame photometer
5. Spectrum interpretation using FT-IR.
6. Analysis of various ions using atomic absorption system.
7. Thin layer chromatographic (TLC) separation of samples from different origins (Biological / Pharmaceutical / Food).
8. Qualitative analysis of samples using Gas Chromatography.
9. Qualitative analysis of samples using High Performance Liquid Chromatography.

C Suggested books

1. Skoog & Lerry, Instrumental Methods of Analysis, Saunders College Publications.
2. H.H. Willard, Instrumental Methods of Analysis, CBS Publishers.
3. D.C. Harris, Quantitate Chemical Analysis, W.H. Freeman.
4. G. D. Christian, Analytical Chemistry, John Wiley & Sons.
5. Skoog, West and Holler, Analytical Chemistry, Saunders College Publications.
6. Vogel's Textbook of Qualitative Chemical Analysis, ELBS.
7. J.A. Dean, Analytical Chemistry Notebook, McGraw Hill.
8. John H. Kennedy, Analytical Chemistry: Principles, Saunders College Publication.
9. W. Kemp, Organic Spectroscopy, ELBS.
10. Frank Settle (ed.), Hand book of Instrumental Techniques for Analytical Chemistry, Prentice Hall.
11. James W. Robinson, Undergraduate Instrumental Analysis, CRC Press.

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INS-302 (INS-HE-5036)
Communication systems

Total Credits : 4 (Theory : 03, Lab : 01)
Hours : 75 (Theory : 45, Lab Contact : 30)

Prerequisites:

- Knowledge of different kind of signal waveforms and their properties
- Knowledge of Semiconductor devices
- Knowledge of Mathematical transformations

Course Outcomes

- CO1: Students will be able to define transmitter, receiver, channel etc. of communication system.
- CO2: Students will be able to define and explain various modes of communication.
- CO3: Students will be able to understand and design simple communication circuits.
- CO4: Students will be able to understand the basic principles and differences of different modulation schemes.

A Theory

A.1 Unit I : *Basic communication system*

Block diagram, Information source and input transducer, Transmitter medium (introduction to guided and unguided medium), Noise, Receiver, Destination, Necessity for modulation, Pass-band Signals, Base-band signals, Types of communication systems.

A.2 Unit II : *Analog Modulation*

Definition - AM waveforms - Frequency spectrum and band width - Modulation index - DSB-SC, SSB, Independent SB, Vestigial SB - Comparison and application of various AM schemes, Definition-Relationship between FM PM-Frequency deviation - Spectrum and transmission BW of FM, comparison of AM and FM systems.

A.3 Unit III : *Radio Transmitter and Receiver*

AM transmitters-High level and low level transmitters - SSB transmitters. FM transmitters - Block diagram.AM receivers âoperation, SSB receiver-Block diagram, FM receivers - Block diagram, Discriminator circuit, Automatic gain control, TV transmission and reception (monochromatic and coloured)

A.4 Unit IV : *Digital Communication*

Pulse Analog Modulation: Sampling theorem, Errors in Sampling. Pulse Amplitude Modulation (PAM), Pulse Width Modulation (PWM) and Pulse Position Modulation (PPM). Generationand detection of PAM, PWM, PPM. Need for digital transmission, Quantizing, Uniform and Non-uniform. Quantization, Quantization Noise, Companding, Concept of - Line encoding. Decoding, Regeneration, Transmission noise and Bit Error Rate,PCM. Concept of âTime Division Multiplexing (TDM), Frequency Division Multiplexing (FDM) and CDMA

B Suggested books

1. G. Kennedy and B. Davis, Electronic Communication Systems, Tata McGraw Hill.
2. R. P. Singh and S. D. Sapre, Communication Systems: Analog and Digital, Tata McGraw Hill.
3. L. E. Frenzel, Communication Electronics: Principles and Applications, Tata McGraw Hill.
4. L. W. Couch II, Digital and Analog Communication Systems, Pearson Education.
5. T. G. Thomas and S. Chandra Sekhar, Communication Theory, Tata McGraw Hill.
6. L. Temes and M. E. Schultz, Schaum's outline of theory and problems of Electronic Communication.
7. H. Taub and D. Schilling, Principles of Communication Systems, Tata McGraw Hill.
8. W. Tomasi, Electronic Communication Systems: Fundamentals through Advanced, Pearson Education.
9. H. P. Hsu, Analog and Digital Communications, Tata McGraw Hill.
10. S. Haykin, Communication Systems, Wiley India.

C Communication systems Lab

1. Study of Amplitude Modulation and Demodulation.
2. Study of Frequency Modulation and Demodulation.
3. Study of Pulse Amplitude Modulation.
4. Study of Pulse Width Modulation.
5. Study of Pulse Position Modulation.
6. Study of Pulse Code Modulation.

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INS-303 (INS-HE-6026)
Embedded System and Robotics

Total Lectures : 40 Credits : 4 (Theory : 03, Lab : 01)

Prerequisites:

- Programming in C
- Digital Electronics
- Microprocessor

Course Outcomes

- CO1: Program and debug basic microcontroller systems using 8051 architecture, including interfacing with external devices and memory, and using 8051 C programming language.
- CO2: Design and implement embedded systems using 8051 microcontroller, including interfacing with various input/output devices, memory and communication links such as UART, SPI and RS232.
- CO3: Understand the basics of robotics and how to integrate embedded systems in robotic applications.

A Theory (Lectures 40)

A.1 Unit I : *8051 Microcontroller*

Introduction to RISC and CISC microcontrollers, architecture of 8051 microcontroller, microcontroller hardware, program and data memory. External memory, counters, timers, serial data I/O, interrupts. Addressing modes, Instructions - data transfer instructions, logical, arithmetic, jump and call instructions. Programming using 8051 C.

A.2 Unit II : *Embedded System Design*

8051 interfacing with Keyboard, display Units (LED, 7-segment display, LCD), ADC, DAC, Stepper motor, Introduction to AVR family (Atmega328 and Arduino) and its architecture.

Interfacing and Communication Links Serial Interfacing: UART, SPI and RS232.

A.3 Unit III : *Robotics*

Definition of Robotics and its applications, overview of Robotics systems and components, role of Embedded Systems in Robotics, overview of Robot programming languages (C, Python and ROS-Robot Operating System).

Introduction to Robot kinematics and dynamics, forward and inverse kinematics, trajectory planning and control, sensors and actuators used in Robotics.

B Embedded System and Robotics Lab

1. Write a program to multiply two 16 bit unsigned numbers.
2. Write a program to add N 8 bit unsigned integer numbers.
3. Write a program to arrange the unsigned integer numbers in ascending/descending order.
4. Write a program for LED blinking in a predetermined fashion using 8051 microcontrollers.
5. Write a Program to OUT an 8 - bit value on a 8051.
6. Write a program for interfacing LCD display using 8051.
7. Write a program to convert an analog voltage to digital bits using 8051.
8. Write a program to convert a digital signal to analog signal using 8051.
9. Write a program for temperature sensor interfacing through serial port on 8051 and AVR (Arduino) microcontroller kits.
10. Write a program for PWM control of DC motor using 8051 and AVR (Arduino) microcontrollers.
11. Write a program to drive a stepper motor using 8051 and AVR (Arduino) microcontrollers.

C Suggested books

1. Muhammad Ali Mazidi, Janice Gillispie Mazidi, *The 8051 Microcontroller and Embedded Systems*, Pearson Education.
2. Muhammad Ali Mazidi, Sepehr Naimi, Sarmad Naimi, *The AVR Microcontroller and Embedded Systems Using Assembly and C*,
3. Robotic Engineering - An Integrated Approach by Richard D Klafter, Thomas A. Chmielewski and Michael Negin (PHI).

12

INS-304 (INS-HG-4026) Nuclear Instrumentation

Total Credits : 4 (Theory : 03, Lab : 01)
Hours : 75 (Theory : 45, Lab Contact : 30)

Prerequisites:

- Either of Electronic Instrumentation, Analog Devices and Circuits or Operational Amplifiers and Applications.

Course Outcomes

- CO1: Students will be able to explain the principles and applications of gas-filled detectors and scintillation counters.
- CO2: Students will learn about the safe and effective use of nuclear techniques through reliable instrumentation for measurement, diagnostic and control.
- CO3: Students will be able to describe the principles behind solid state detectors.

A Theory

A.1 Unit I : *Introduction*

Nuclei and Nuclear Decay, Alpha particle, beta particle, gamma ray, neutron. Electron Capture and Internal Conversion, radioactive decay law, the nuclear level diagram, interactions of radiation with matter, Neutrino interactions, natural and man-made sources of radiation, units of radiation and radiation protection.

A.2 Unit II : *Gas and Semiconductor Detectors*

Gas filled detectors, ionization chambers, counters with gas amplification, proportional counters, and micro-strip gas counters (MSC), GEM and MICROMEGAS counters, Resistive plate chambers. Semiconductor detectors- Si and Ge semiconductor detectors, other semiconductor detector materials.

A.3 Unit III : *Scintillation Detectors*

Scintillation detectors, Organic scintillators, Inorganic Scintillators, Photomultiplier Tubes and Photo detectors, Radiation spectroscopy with scintillators, Applications of Scintillators in nuclear physics, high energy physics and medicine, slow and fast neutron detection

A.4 Unit IV : *Nuclear Medicine System*

Nuclear electronics, pulse processing, pulse shaping counting and timing, single channel and multichannel pulse analysis. Electrostatic accelerators, Cyclotrons, Synchrotrons and Colliders, Linear accelerators, Secondary beams, applications of accelerators. Nuclear Reactors.

B Nuclear & Biomedical Instrumentation Lab

(a) Characterization of bio potential amplifier for ECG signals.

(b) Study on ECG simulator

(c) Recording of EEG

(d) Measurement of heart sound using electronic stethoscope.

(e) Study of pulse rate monitor with alarm system

(f) Determination of pulmonary function.

(g) Study on ultrasound transducers based on medical system

C Suggested books

(a) G. F. Knoll, Radiation Detection and Measurements, Wiley.

(b) S. Tavernier, Experimental Techniques in Nuclear and Particle Physics, Springer

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INS-351
Process Control Instrumentation

Total Credits : 4 (Theory : 03, Lab : 01)
Hours : 75 (Theory : 45, Lab Contact : 30)

Prerequisites:

- Good knowledge on Control system engineering
- Good knowledge on Measurement Techniques

Course Outcomes

- CO1: Describe Process control principles and its different characteristics.
- CO2: Discuss controller principles.
- CO3: Explain different control modes.
- CO4: Illustrate PLC basics.

A Theory

A.1 Unit I : *Introduction to Process control*

Process control principles, servomechanisms, process control block diagram, Control system evaluation, stability, steady state response, Transient response, supervisory control, direct digital control, Final control operation- Pneumatic control, principles, amplification and conversion, pneumatic actuator.

A.2 Unit II : *Controller Principles*

Process Characteristics - process equation, process load, process lag, self-regulation, Control system parameters-Error, variable range, control parameter range, control lag, dead time, cycling.

A.3 Unit III : *Control modes*

Discontinuous- two positions, multi position, floating control, introduction to continuous control modes- proportional, integral, derivative composite modes.

A.4 Unit IV : ***PLC Basics***

Programmable Controllers - functional diagram, operation, programming, PLC system, I/O modules and interfacing, CPU processor, programming equipment, programming formats, construction of PLC ladder diagrams, devices connected to I/O modules.

B Process Control Instrumentation Lab

(a) Measure the water level using air-bubble method and calibrate it.

(b) Calibrate the turbine flow sensors used in the process control board.

(c) Study the characteristics of an ON-OFF controller with error band at different set points.

C Suggested books

(a) Curtis Johnson, Process Control Instrumentation Technology.

(b) Donald P Eckman, Automatic Process Control.

(c) Katsuhiko Ogata, Modern Control Engineering

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INS-352 (INS-HC-3016) Biomedical Instrumentation

Total Credits : 4 (Theory : 03, Lab : 01)
Hours : 75 (Theory : 45, Lab Contact : 30)

Prerequisites:

- A paper on Sensors and Transducers is desirable.

Course Outcomes

- CO1: Students will gain an understanding of the fundamental concepts and principles behind bioelectric potentials and their measurement.
- CO2: Students will be able to discuss cardiovascular system and related issues.
- CO3: Students will be able to explain the fundamental concepts and principles behind ultrasound imaging and its applications.
- CO4: Students will be able to explain the magnetic resonance imaging systems.

A Theory

A.1 Unit I : *Introduction*

Introduction to bioelectric potential, bio-amplifier, components of man Instrument system, design factors of biomedical instruments, types of bio potential electrodes.

A.2 Unit II : *Cardio Vascular System*

Origin of (Electrocardiography) ECG signals, Instruments of ECG, bipolar system lead system I, II, III, Eithoven triangle, Augmented lead system, unipolar chest lead system, types of display. Respiratory system: Types of volume, types of measurements, Instrumentations of respiratory system, pneu

A.3 Unit III : *Medical Imaging System*

Ultra sound, properties, beam width, its generation detection, types of transducers, diagnostic application - A Scan, B Scan, M Scan. Radiography- conventional X ray, properties, generation of X-ray, X ray computed tomography (CT scanner) and computer-aided tomography (CAT).

A.4 Unit IV : *Magnetic Resonance Imaging*

Principles of NMR, NMR Imaging system - Image reconstruction Techniques - Basic NMR components - Biological efforts of NMR Imaging - Advantages of NMR Imaging System. Principles of EMR/EPR/ESR. Biomedical EMR.

A.5 Unit IV : *Advanced Bio Medical Systems*

Pacemakers- Need for Cardiac pacemaker - External Pace makers - Implantable Pace makers - Pacing system Analyzer - Defibrillators - Need for a Defibrillator - DC Defibrillator - Implantable Defibrillators - Pacer - Cardioverter - Defibrillator Analyzers - Physio therapy and electro-therapy equipment- High frequency heat therapy - short wave diathermy- microwave and ultrasonic therapy - pain relief through electrical stimulation.

B Biomedical Instrumentation Lab

(a) Characterisation of bio potential amplifier for ECG signals.

(b) Study on ECG simulator.

(c) Recording of EEG

(d) Measurement of heart sound using electronic stethoscope.

(e) Study of pulse rate monitor with alarm system.

(f) Determination pulmonary function.

(g) Study on ultrasound transducers based on medical system.

C Suggested books

(a) Cromwell L., Wiebell F. J., Pfeiffer EA, Biomedical Instrumentation and Measurements, Second edition, Prentice Hall.

(b) Carr J. J, Brown J. M. Introduction to Biomedical Equipment Technology, Fourth edition, Pearson Education Inc.

(c) Khandpur R.S., Handbook of Biomedical Instrumentation, Second edition, Tata McGraw-Hill Publishin..

(d) Joseph D. Bronzino, The Biomedical Engineering Handbook, IEEE Press.

(e) J S Webster, Medical Instrumentation-Application and Design

(f) Richard Aston, Principles of Biomedical Instrumentation & Measurement, Merrill Publishing Company.

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INS-353 (INS-HG-4036) Machine Intelligence

Total Credits : 4 (Theory : 03, Lab : 01)
Hours : 75 (Theory : 45, Lab Contact : 30)

Prerequisites:

- Basic programming knowledge in C and Python / Matlab

Course Outcomes

- CO1: Understand the components of AI, differences between human and machine intelligence, and structured knowledge representation using semantic networks, frames, and expert system architecture.
- CO2: Develop the ability to apply supervised and unsupervised learning techniques using linear and logistic regression, decision trees, k-nearest neighbors, and clustering algorithms.
- CO3: Gain knowledge on the history and development of neural networks, types of activation functions, architectures of fully connected and layered neural networks, and training and validation techniques using backpropagation algorithm.
- CO4: Acquire knowledge on fuzzy logic operations on fuzzy sets, temperature control system using fuzzy logic, and introduction to genetic algorithms including reproduction, cross-over, mutation, scaling, and fitness.

A Theory

A.1 Unit I : *Introduction*

Components of AI, human intelligence vs. machine intelligence, Knowledge Acquisition, Representation and organisation: Structured Knowledge representation using Semantic Networks, Frames, Expert system architecture, functions of various parts, Mechanism and role of inference engine, Types of expert systems.

A.2 Unit II : *Machine Learning*

Supervised Learning: Concept of labelled data, training data, and testing data. Linear regression, logistic regression, decision trees, and k-nearest neighbours. Unsupervised Learning: Concept of unlabelled data, clustering, k-means, and principal component analysis (PCA). Evaluation Metrics: Confusion matrix, accuracy, precision, recall, F1 score, and ROC curve. Cross Validation and tuning of hyper-parameters.

A.3 Unit III : *Artificial Neural Networks*

History and development of neural networks. Introduction to perceptrons, Perceptron learning algorithm, Structure and function of a single neuron, artificial neuron models, Types of activation functions, Neural network architectures: Fully connected, layered, acyclic, feed forward. Back-propagation algorithm, training and validation techniques. Application areas of neural networks.

A.4 Unit IV : *Fuzzy Logic & Genetic algorithms*

Fuzziness vs. probability, Crisp logic vs. fuzzy logic, Fuzzy sets and systems, operations on sets, fuzzy relations, membership functions, fuzzification interface, knowledge/rule base, decision making logic, defuzzification interface, Applications of Fuzzy Logic in process Control and motion control. Introduction to Genetic algorithms. Reproduction, cross-over, mutation, scaling, and fitness of Genetic algorithms.

B Machine Intelligence Lab

Implement programs using Python or Matlab Fuzzy logic and Neural Network toolbox exemplifying

(a) Implement a linear regression model and train it on a given dataset. Evaluate the model's performance using various metrics like mean squared error and R-squared.

(b) Implement a logistic regression model and train it on a given dataset. Evaluate the model's performance using various metrics like accuracy, precision, recall, and F1 score.

(c) Implement a k-Nearest Neighbors (k-NN) algorithm and use it for classification on a given dataset. Evaluate the model's performance using various metrics like accuracy, precision, recall, and F1 score.

(d) Implement a decision tree algorithm and use it for classification on a given dataset. Evaluate the model's performance using various metrics like accuracy, precision, recall, and F1 score.

(e) Implement a multi-layer perceptron (MLP) neural network. Train the network on a given dataset and evaluate its performance using various metrics like accuracy, precision, recall, and F1 score.

(f) Implement basic fuzzy logic operations (AND, OR, NOT)

(g) Implement fuzzy logic operations for linguistic variables (e.g. age, temperature, etc.)

(h) Design a fuzzy logic based temperature control system using Python.

(i) Implement a simple temperature sensor using a microcontroller and Python.

C Suggested books

(a) Gareth James, Daniela Witten, Trevor Hastie, Rob Tibshirani, *An Introduction to Statistical Learning*, Springer. Free eBook available at https://www.statlearning.com/

(b) Timothy J. Ross, *Fuzzy logic with Engineering Applications*, McGraw Hill.

(c) S. Rajasekaran, G. A. Vijayalakshmi Pai, *Neural Networks, Fuzzy Logic And Genetic Algorithm: Synthesis and Applications*, PHI Learning Pvt. Ltd.

(d) Martin T. Hagan, Howard B. Demuth, Mark H. Beale, *Neural Network Design*, PWS Publishing Company, Thomson Learning.

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INS-354 (INS-SE-4024) Virtual Instrumentation

Total Credits : 4 (Theory : 03, Lab : 01)
Hours : 75 (Theory : 45, Lab Contact : 30)

Prerequisites:

- Good knowledge on analog and digital electronics
- Basic knowledge on control system
- Basic knowledge on programming techniques

Course Outcomes

- CO1: Describe Virtual instrumentation, its architecture, types and advantages.
- CO2: Discuss implementation of LabVIEW in VI design.
- CO3: Discuss LabVIEW programming techniques.
- CO4: Explain the implementation strategy of Different simulation software.

A Theory

A.1 Unit I : *Introduction*

Evolution of Virtual Instruments, architecture of virtual Instruments, Definition, Distributed virtual instrumentation, Virtual instruments vs Traditional instruments, Advantages of VI, Evolution of LabVIEW, Creating VI using LabVIEW.

A.2 Unit II : *The LabVIEW Programming Environment*

Controls/ Indicators, Simple programming structures and Timing Issues, Basic operations, controls and indicators.

A.3 Unit III : *ProgrammingTechniques*

VIs and sub-VIs, Debugging a VI and Sub-VIs, loops & charts, arrays, clusters, graphs, case & sequence structures, formula modes, local and global variable, string & file input, Graphical programming in data flow.

A.4 Unit IV : *Introduction to Simulation*

Introduction to circuit simulation (Multisim or scilab G2 for basic circuit simulation- transistor and opamp), Introduction to Design, analyze, and test system and software architectures (Simulink or Xcos (Scilab) for control system- basic block diagram), Introduction to MATLAB/ SCILAB coding techniques.

B Virtual Instrumentation Lab

(a) Find whether the given number is odd or even.

(b) Develop a VI to see sin wave and cosine wave in the same graphical plot.

(c) Write a LabVIEW programme to find the sum of first 10 natural numbers using while loop.

(d) Write a LabVIEW programme to find the factorial of a given number using while loop.

(e) IWrite a LabVIEW programme to find the sum of first 10 natural numbers using for loop.

(f) Write a LabVIEW programme to find the factorial of a given number using for loop.

C Suggested books

(a) S. Sumathi and P. Surekha, LabVIEW based Advanced Instrumentation Systems.

(b) John Essick, Hands on Introduction to LabVIEW for Scientists and Engineers.

(c) S. Gupta, J.P. Gupta, PC Interfacing for Data Acquisition and Process Control, ISA.

(d) Gary Johnson, LABVIEW Graphical Programming, McGraw Hill.

(e) Technical Manuals for DAS Modules of Advantech and National Instruments. L.T. Amy, Automation System for Control and Data Acquisition, ISA.

(f) For MATLAB/SIMULINK/MULTISIM visit https://in.mathworks.com/