GOVERNMENT OF WEST BENGAL
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UG COURSES

DEPARTMENT OF BENGALI

For UG CBCS syllabus of Bengali in Cooch Behar Panchanan Barma University click link below:
https://cbpbu.ac.in/userfiles/file/CBCS/REVISED%20SYLLABUS%20(CBCS)_Bengali.pdf

PROGRAMME OUTCOMES

SL. NO.	PROGRAMME OUTCOMES
1	Literary Sense
2	Language Skills
3	Historical Understanding
4	Understanding of Society and Culture
5	Analytical and Theoretical Understanding
6	Research Orientation
7	Philosophical Understanding
8	Art and Creativity
9	Ethics and Human Values
10	Interdisciplinary Prospect

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COURSE OUTCOMES

Learning Outcome-based Framework for Undergraduate Studies (B.A. Honours) in Bengali Language and Literature

Introduction:

The purpose of the learning outcomes-based curricular framework for a B.A. degree in Bengali Language and Literature is to offer a wide framework within which different related programmes that address student requirements and the subject's dynamic character could be constructed. With a broad framework of agreed-upon expected graduate attributes, qualification descriptors, programme learning outcomes, and course-level learning outcomes, the framework is expected to support the maintenance of the standard of Bengali degrees/programs across the nation and periodic programme review. The framework, however, does not aim to standardise the teaching-learning process or methods for evaluating student learning or the syllabi for a Bengali B.A. programme of study. Instead, the framework is meant to support creativity and flexibility in the syllabi and design of programmes along with assessment of students' learning levels.

Nature and Extent of the B.A. in Bengali degree Programme:

B.A. in Bengali Language and Literature is a vibrant course that opens up many doors for further researches and career opportunities. On the language part, it not only involves a systematic study of development of Bengali language throughout the ages along with a careful focus on the different 'dialects' and local variations, it also involves discussions on different linguistic and stylistics discussions that touches relevant disciplines like linguistics. On the literature part, it ranges from the Middle Ages to the most contemporary times, discussing the development of Bengali literature in various sociocultural, political and religious contexts. It also involves comparative studies with other literatures such as English, Hindi and Sanskrit. Students also continue postgraduate degrees on relevant disciplines such as Comparative Literature and Culture Studies.

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Aims of the Bachelors' Degree programme in Bengali Language and Literature

1. To give students learning opportunities that foster a passion for learning and getting involved into the world of literature with a focus on Bengali, along with broadening and balance their knowledge and understanding of important literary principles, concepts of analysing and understanding literature as a social response to historical situations, along with providing them knowledge of tools, frameworks and theories that would help them understand the literary phenomenon critically.
2. The broader aim of any humanities discipline is to make the students ware of the human condition, which will kindle compassion, introspective intelligence and critical observation power in them, which is needed more than ever at this world of machine and systems. B.A. in Bengali wholly fulfils this commitment.
3. To provide students the knowledge and foundation they need to pursue further studies in multidisciplinary fields of humanities and social sciences. The course also aid in the development of a variety of generic skills that are important for wage employment, self-employment, and entrepreneurship.

Characteristic attributes of a B.A. Honours student in Bengali:

Some of the characteristic attributes of a B.A. Honours in Bengali may include the following:

1. In pursuit of the foundational taught degree in Bengali language and literature, the students acquire fundamental knowledge of the literature discipline along with a specific knowledge of selected papers(s) to proceed with their further postgraduate interests. They learn about different technological tools that could be used in their further academic enedeavours.
2. Students demonstrate skills in writing analytical essays and are equipped with tools to conduct critical investigations into the matters of Language, literature and society.
3. Students are able to use critical thinking and effective problem-solving techniques in different areas of the discipline such as History of Literature; Critical Analysis of Literary texts; Linguistics and studies in grammatical development of the language; contemporary critical theories and theoretical frameworks.

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4. Students possess the ability to organise, carry out, and report the results of an experiment or investigation. They demonstrate capacity to ask pertinent/appropriate questions on difficulties and challenges in the study of Literature and Language.
5. Students are capable of locating, retrieving, and evaluating subject-related material utilising contemporary library search techniques, online resources and digital repositories other technologies.
6. Students refrain from using unethical actions, such as fabricating, falsifying, or misrepresenting facts, or plagiarising, and appreciating environmental and sustainability issues.
7. Students possess ability to learn independently and at their own pace with the goal of boosting knowledge acquisition, skill development, and re-skilling.

Qualification Descriptors for a Undergraduate (B.A. Honours) Degree Programme in Bengali

The qualification descriptors for a B.A. Honours Degree programme in Bengali may include the following:

1. (i) A fundamental/systematic or coherent understanding of the academic field of Bengali language and literature, its various learning areas and applications, and its connections with related disciplinary areas/subjects; (ii) Procedural knowledge that creates various types of professionals related to the area of study, including research and development, teaching, and government and public service; and (iii) Skills in areas related to specialisation area and sub fields associated to Bengali Language, Literature and Culture.
2. Utilise the knowledge, understanding, and skills necessary to recognise subject-related problems and issues, collect pertinent materials, resources and data from a variety of sources, and apply, analyse, and evaluate that data using methodologies that are appropriate to the discipline in order to create solutions and arguments that are supported by evidence as well as rational arguments.
3. Use the key ideas, constructs, and methods of the subject(s) to accurately communicate the findings of studies conducted in a variety of situations.
4. Employ one's specialised knowledge and transferrable abilities to novel or unfamiliar situations in order to recognise problems, examine them, and come up with well-defined solutions.
5. Showcase knowledge of the subject and transferable abilities that are pertinent to careers in academic as well as media and administrative job and higher education prospects related to Bengali language and literature.

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Programme learning outcomes relating to B.A. Honours Degree programme in Bengali Language and Literature:

Certain expected learning outcomes (subject-specific skills, generic/global skills and attributes) that a Honours student of B.A. in Bengali should be able to demonstrate for the award of the qualification may include the following:

1. The students will be able to demonstrate a coherent understanding of the academic and creative field of Bengali Language and Literature, its various learning areas and applications, and its connections with related disciplinary areas/subjects (such as other literary studies, linguistics, philosophy, political and cultural studies, critical social thought and so on). They will possess procedural knowledge that creates various types of professionals related to the disciplinary/subject area of Bengali, including professionals engaged in research and development, teaching, and government/public service; and (iii) skills in areas related to one's specialisation.
2. They will possess the capacity to apply the knowledge of Bengali to a variety of language, literature and culture related problems by articulating and addressing them, as well as by recognising and using the proper concepts and procedures.
3. The students showcase pertinent generic skills and global competences, such as (i) problem-solving abilities needed to address various literature-related problems with clear solutions and handle open-ended challenges that may cross disciplinary boundaries; (ii) investigative skills, including the capacity to independently research Bengali language, literature and culture-related problems and issues; (iii) communication skills, including the capacity to pay close attention, read texts and research papers critically, and succinctly convey complex information to various groups/audiences; (iv) ability to build logical arguments using appropriate literature-related technical language, analytical skills that need close attention to detail; ICT proficiency (v); personal competency (vi), such as the capacity to work both independently and collaboratively.
4. The students will have a deep understanding of the methods and frameworks that literary studies as well as linguistics use to further disciplinary peripheries.
5. The students will have a foundational understanding of the history of Bengali language and literature, also in reference to that of English and other languages, which will help them contextualise the materials they encounter in their further studies.

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6. Although the B.A. Honours course has been designed for students intending to pursue higher postgraduate degrees such as M.A., it eventually prepares students for academic jobs such as teaching in schools along with different administrative and corporate jobs.
7. The students show professionalism by acting in ways such as: (i) remaining impartial, truthful, and objective in all aspects of work; (ii) being able to spot ethical dilemmas in work-related situations; (iii) having an understanding of issues relating to intellectual property, the environment, and sustainability; and (iv) promoting a safe learning and working environment.

Course Learning Outcomes relating to B.A. Honours Degree Programme in Bengali Language and Literature:

Some examples of course-level learning outcomes relating to courses within B.A. Honours degree programme in chemistry are indicated in the following sections. The students of the Bengali Honours discipline are required to study fourteen compulsory core paper spread across six semesters of their study. The papers are as listed below.

BENGALI (HONS.) CORE COURSE

SEMESTER-1

Core Paper C1: History of Bengali Literature (Ancient and Medieval period)

This course introduces to the students about the premodern Bengali literature and society. It helps students to understand the background of the development of Bengali language and literature through general introduction of Caryāpad and Śṛkṛṣṇakīrtan.

Core Paper C2: Bengali Literature of Medieval period

In this course, students will engage in thorough reading of some of the selected texts belonging to middle Bengali language. Students will learn to interpret and analyse some ancient texts like the Ramayana, the Mahabharata both in Bengali translation, selected devotional songs relating to Vishnu and Goddess Kali etc., which have deep rooted religious connections.

SEMESTER-2

Core Paper C3: History of Sanskrit and English Literature, Languages of North Bengal

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Through the study of Sanskrit and English literature students get acquainted with the vast treasure of both enriched literatures. This course also encourages students to develop their interest in literary translation and comparative analysis of literature. Besides, through the study of the languages of North Bengal such as Boro, Rava, Toto etc. students can not only understand the various languages of prescribed area but also get familiarized the indigenous culture of North Bengal.

Core Paper C4: History of Bengali Language

This course provides the students with working knowledge on the origin and development of Bengali language, segmental sounds, language and dialect, spelling rule and problems of orthography and technical terminology. In this course students will understand all the features of Bengali sound, syntactic structure of Bengali sentence, dialect geography and method of field investigation which is fundamental part of core linguistics. By achieving intense knowledge of this paper students can switch linguistics discipline in next higher study.

SEMESTER-3

Core Paper C5: Maṅgal|kābya (Poem in praise of a deity), Hagiography and Royal Court Literature of Ārākān

This course focuses on genre-based medieval texts of Bengali literature. Students will learn to understand different literary genres that defined the middle Bengali literature. They can understand a synthesis of the Aryan and non-Aryan culture through Maṅgal|kābya, divine life of Śrī Caitanya through Hagiography and a romantic poetical works through Ārākān court literature. Students with research interest on Middle Bengali literature and religion find this course tremendously helpful.

Core Paper C6: Ancient Indian Poetics, Prosody and Rhetoric

The study of Sanskrit Poetics embraces all poetic arts and includes concepts like Alaṃkār, Dhvani, Rasa, Rīti and so on. All these concepts develop the +6capacity for creative writing and literary appreciation. The course is also introducing the essential concepts of Stylistics of Poetry for the students. Practically prosody and rhetoric, both are the technical part of poetry. But the technical part of poetry converts into spontaneous part in the glorious creation of genius poet. Student can thoroughly understand these by using the theory of prosody and rhetoric. Besides, they can develop their poetical talent.

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Core Paper C7: Prose and Poetry of Nineteenth Century

This paper offers an overview about the origin and history of Bengali prose literature of 19th century A.D. with the concept of contemporary socio-political-cultural issues of colonial Bengal. It also enlightens the students with the historical tenets of Bengal Renaissance through the 'Bīraṅganā', a magnum opus of poet Madhusudan Datta.

SEMESTER-4

Core Paper C8: Folklore

The paper offers the cumulative overview of Indian folk tradition. Students can understand their own roots through some selected folktale, folksong and folk rhyme. Folklore studies can also be taken as a way to raise one's awareness of culture that one is coming from.

Core Paper C9: Theory of Drama and Bengali Drama

Through this paper students learn some selected Bengali plays like 'Ekei ki bole savyata?', 'Chera Tar', 'Sajano Bagan' and some relevant part of dramaturgy such as tragedy, comedy, melodrama, one-act play etc. It also offers students an overview about the history of Bengali drama as well as dramaturgy. The purpose of the paper is to develop the capacity of creative writing and creative thinking amongst the students for effectiveness at work and in life.

Core Paper C10: Literature of Rabindranath Tagore

All interested students in Bengali literature must be aware of the thoughts and creations of literary genius and thinker Rabindranath Tagore. This course is dedicated to his poems, novels, short stories, dramas and essays. Students learn to read Tagore's writing both as finest literary texts written in any modern language, and as a literature that has vividly captures the culture, society, politics and lifeworld of colonial India.

SEMESTER-5

Core Paper C11: Modern Bengali Poetry

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This paper includes the forms of literature, theoretical aspects of poetry and some selected poems of modern Bengali literature. All these topics make student understand the different forms of poetry like lyrics, epics, sonnets etc. and the theoretical aspects such as romanticism, realism, expressionism etc. Besides, through the critical analysis of the modern Bengali poetry like 'Uṭpākhī' of Sudhindranath Datta, 'Padātik' of Subhash Mukhopadhyay etc. students can achieve a deep insight to think and write by their own.

Core Paper C12: Modern Bengali Novel

This paper is formed to provide learners the basic knowledge of Bengali novel which includes the classification like autobiographical novel, regional novel, stream of consciousness novel etc. It also includes some masterpiece of modern Bengali novel such as 'Padmānadīr Mājhi' of Manik Bandopadhyay, 'Jāgarī' of Satinath Bhaduri . By enhancing the thought process of learners this paper also stimulates students into an understanding of the social, historical and literary trends of the twentieth century.

SEMESTER-6

Core Paper C13: Modern Bengali Short Story

The purpose of the paper is to help the learner to understand the theoretical and historical aspects of Bengali short stories and provide the knowledge of the tradition of the great modern Bengali short stories through the immense study of some significant texts.

Core Paper C14: Essay and Literary Criticism

This paper offers an overview of the basic knowledge and classification of Bengali prose literature through texts composed by Bankimchandra Chattopadhyay, Mahitlal Majumder, Buddhadev Bose and Gopal Halder. It also designed to expose students to the basic principles of criticism of literature and its theoretical frameworks which has become a kind of literary genre itself.

BENGALI (HONS.) DICIPLINE SPECIFIC ELECTIVE (DSE)

Discipline Specific Elective papers helps the students of Bengali Honours to further streamline their research skills by electing four optional papers in the fifth and sixth semester of the Bengali Honours course. According to interest all the students can concentrate such as in-depth analysis of Bengali novel, short story, essay, poetry, drama, fiction, child literature and travel literature.

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SEMESTER-5

DSE-1: Origin and Development of the Bengali Novel or Origin and Development of the Bengali Short Story

DSE-2: Bengali Essay or Bengali Poetry of Twentieth Century

SEMESTER-6

DSE-3: Bengali Drama of Twentieth Century or Bengali Science Fiction and detective novel

DSE-4: Bengali Child and Juvenile literature or Bengali Travel Literature

GENERIC ELECTIVE (GE) FOR OTHER HONS.

SEMESTER-1

Generic-1 (GE-1): History of Bengali Literature and Bengali Language

This course includes the basics of the modern Bengali literature. It provides a fundamental understanding of the shifting sociocultural scenario of colonial Bengal at the wake of modernism, which continues to independence and the development of post-independence contemporary Bengali literature. Besides, the linguistics part provides the students a working knowledge on the origin and development of Bengali language.

SEMESTER-2

Generic-2 (GE-2): Prosody and Rhetoric

The course is an introduction to the essential concepts of Stylistics of Poetry for the students. Practically prosody and rhetoric, both are the technical part of poetry. But the technical part of poetry converts into spontaneous part in the glorious creation of genius poet. Student can thoroughly understand these subjects by using the theory of prosody and rhetoric. Besides, they can develop their poetical talent.

SEMESTER-3

Generic-3 (GE-3): Padābali (A Collection of Devotional Song of Medieval Period) and Modern Sonnet

The paper aims to help students to understand the theological tradition of Bengali poetry through 'Padābali' and western influence to Bengali literature through modern sonnet.

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SEMESTER-4

Generic-4 (GE-4): Poetry of Rabindranath Tagore and Modern Bengali Poetry

This paper involves close reading of select pieces of modern Bengali poetry. The students will understand the development of Bengali poetry in nineteenth century and the influence of modernism on Bengali poets.

SKILL ENHANCEMENT COURSE (SEC)

SEMESTER-3

SEC-1: Applied Bengali: Purpose, Method, Elements and Language of an Advertisement

SEMESTER-4

SEC-2: Creative Writing: Interrelation between Film and Literature

The goal is to identify and discuss the techniques, meaning and message, and at large it should enable students to understand the communicative process of the literature and film. Film and literature are two distinct but nearest extraordinary works of art. Scripts and dialogues are most important part of filmmaking which is closely related to literature. In this course students are initially provided that how literary work transformed into script and what is the basic difference between script and literature. The objective is to make the students enhance their skill set for greater employability.

ABILITY ENHANCEMENT COMPULSORY COURSE (AECC)

SEMESTER-2

AECC-2: Bengali Language, Pronunciation, Spelling Rules, Appreciate the flavor of Literature

This is an optional paper for all Honours students. The major objective of the paper is to enhance the communication skills which should be integral to personal, social and professional interaction. Besides, it will help the students to write idiomatic Bengali by practicing of grammar and to realize the eternal melody of literature.

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DEPARTMENT OF BOTANY

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https://cbpbu.ac.in/userfiles/file/CBCS/Botany%20Program&%20Hons%20UG.pdf

PROGRAMME OUTCOMES

SL. NO.	PROGRAMME OUTCOMES
1	Career opportunities
2	Leadership and Team Work
3	Research Aptitude
4	Interdisciplinary approach
5	Understanding of Environment and ecosystem sustainability
6	Identification of Critical Problems and Issues
7	Innovative & Experiential Field Based Knowledge Development
8	Laboratory Skills & Instrumentation
9	Analytical Skills
10	Social welfare
11	Self-reliance

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PROGRAMME OUTCOMES

INTRODUCTION

B.Sc. Programme in Botany is outlined to afford a skeletal structure within which the programme can be developed to suit the need of the hour, in keeping with the emergence of new areas of life sciences via interdisciplinary address. The B.Sc. Programme in Botany covers a wide range of basic and applied aspects of botany courses as well as courses of interdisciplinary nature. The core courses that are a part of the programme are designed to build knowledge base in the student, and furthermore, acquaints the students with the applied aspects of this fascinating discipline as well. The student is thus furnished to pursue higher studies and to apply the great skills learnt in the programme to solving practical problems. The programme provides a wide range of elective courses of botany. These include skill influenced courses that prepare the student for an eventual job in academia or industry.

CHOICE BASED CREDIT SYSTEM (CBCS):

The CBCS provides an opportunity for the students to choose courses from the prescribed courses comprising elective/minor, core or skill based courses. It gives flexibility of programme structure while entrusting that the student gets a very strong foundation in the subject and gains in-depth knowledge of all aspects of the field. The courses can be evaluated following the grading system, which is considered better than the conventional marks system. Therefore, it is very necessary to introduce uniform grading system in the entire higher education in India. This will be convenient for the students to move across institutions within India to begin with and across countries. The uniform grading system will also authorized potential employers in assessing the performance of the candidates. In order to bring consistency in evaluation system and computation of the Cumulative Grade Point Average (CGPA) based on student's performance in examinations, the UGC has formulated several guidelines.

Design of Program:

The teaching and learning will involve theory classes of one hour duration and practical classes. The curriculum will be delivered via various methods including chalk and talk, audio, power-point presentations, E-learning, video tools, field trips/Industry visits, seminars, projects, workshops, models and class discussions. The assessment broadly will comprise of Internal Assessment (Continuous Evaluation) and End Semester

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Examination. The internal Assessment (CE) will be through MCQ, test, assignment, oral presentation, worksheets and short project.

SEMESTER II

Core Course – III (Theory) (Marks 25)

HBOT-CCT-203

Course Learning Outcomes:

The students will be made aware of the Bryophytes, Paleobotany and Palynology. Through field study they will be able to view Bryophytes grow in nature and become very familiar with the biodiversity. Students would create their small digital reports where they could capture the zoomed in and zoomed out pictures as well as videos. Students would have understand the characteristics features, classification, cell structure and growth and reproduction of Bryophytes and their ecological and economic importance. Upon completion of this course, the students will be able to: Understand the ecological and economic significance of Bryophytes, Understand the application of phyc Bryophytes ology in various fields of economic and ecological Significance, Understand the economic and pathological importance of Bryophytes, Understand the contribution of Birbal Sahni in Indian Paleobotany, students will get a clear view on process of fossilization and importance of palynology.

Core Course – IV (Theory) (Marks 25)

HBOT-CCT-204

Course Learning Outcomes:

Upon completion of this course, the students will be able to: Understand the pteridophytes and Gymnosperms, Recognize the characteristics of the pteridophytes and Gymnosperms, Appreciate the application of pteridophytes and Gymnosperms in various fields of economic and ecological significance, Understand the economic and pathological importance of pteridophytes and Gymnosperms.

The students are evaluated on the basis of weekly practical classes. Students collected their practical samples from different fields. Submission of class records and practical note books are mandatory. This exercise will develops scientific skill as well as methods of presenting and recording scientific data.

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B.Sc. (Program)

Core Course: IV (Marks 25)

(pteridophytes and Gymnosperms and Paleobotany**)**

This course aims at making a familiarity with special groups of pteridophytes and Gymnosperms and Paleobotany. Designing an understanding by observation and table-study of representative members of phylogenetically important groups should be able to make the students learn the process of evolution in a broad perspective. Study of anatomy, morphology, reproduction and developmental changes via typological study should create a knowledge base in understanding economic values, plant diversity, and taxonomy of these group of plants. The students will able to understand the external and internal basic structure and cellular composition of the pteridophytes and Gymnosperms.. To gain knowledge of diversity, life forms, life cycles, morphology and importance of lower group of plants. Upon completion of this course, the students will be able to: Understand the pteridophytes and Gymnosperms, Recognize the characteristics of the pteridophytes and Gymnosperms, Appreciate the application of pteridophytes and Gymnosperms in various fields of economic and ecological significance, Understand the economic and pathological importance of pteridophytes and Gymnosperms, Understand the contribution of Birbal Sahni in Indian Paleobotany, students will get a clear view on process of fossilization and importance of palynology.

All topics are covered in lectures with the help of PowerPoint presentations and the chalkboard. Students are fully encouraged to ask questions. The reading list have to be suitably upgraded. When the full syllabus will be completed, a few lectures are devoted to discuss the previous year's question papers, thus preparing the students for the final examination**.**

SEMESTER III

Core Course – V (Theory) (Marks 25)

HBOT-CCT-305

Course Learning Outcomes:

The students will be made aware of the plant systematics, classification, nomenclature. Through field study they will be able to view and identify plants and become very familiar with the biodiversity. Students would create their small digital reports where they could capture the zoomed in and zoomed out pictures as well as videos. Students would have understand the concept of taxa, categories, hierarchy, ICN, Typication, Author

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Citation, classifications, OTU system, Cluster analysis, APG IV system, Cladograms, Homology and Analogy system, origin and evolution of Angiosperms and many more.

Core Course – VI (Theory) (Marks 25)

HBOT-CCT-306

Course Learning Outcomes:

The students will be made aware of the terrestrial biomes, phytogeographical division of India, Local vegetation In economic botany they will learn about the Origin of cultivated plants, crop domestication, loss of genetic diversity. They will gather knowledge about cereals, legumes, sugars, starches, spices, natural rubbers, Dye and timber yielding plants. In ethnomedicine they will learn about plants like Eclipta, sesbania, Artimisia etc used by tribes of North Bengal.

Core Course – VII (Theory) (Marks 25)

HBOT-CCT-307

Course Learning Outcomes:

They will learn in morphology of Angiosperms i.e. phyllotaxy, stipules,aestivation, types of flowers and fruits, mega and microsporogenesis, fertilization, development of Embryo and endosperms. In Anatomy section they will learn about cell organisation, Tissue and tissue system, Root stem transition ,Anomalous secondary growth of Bignonia, strychnos, Dracaena etc.

The students are evaluated on the basis of weekly practical classes. Students collected their practical samples from different fields. Submission of class records and practical note books are mandatory. This exercise will develops scientific skill as well as methods of presenting and recording scientific data.

B.Sc. (Program)

Core Course: VII (Marks 25) Plant taxonomy and Anatomy

The students will be made aware of the plant systematics, classification, nomenclature. Through field study they will be able to view and identify plants and become very familiar with the biodiversity. Students would create their small digital reports where they could capture the zoomed in and zoomed out pictures as well as videos. Students would have understand the concept of taxa, categories, hierarchy, ICN, Typication, Author

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Citation, classifications, OTU system, Cluster analysis, APG IV system, Cladograms, Homology and Analogy system, origin and evolution of Angiosperms and many more. In Anatomy section they will learn about cell organisation, Tissue and tissue system, Root stem transition ,Anomalous secondary growth of Bignonia, strychnos, Dracaena etc.

SEMESTER IV

Core Course – VIII (Theory) (Marks 25)

HBOT-CCT-408

Course Learning Outcomes:

In this paper they will learn about structure, properties, nomenclature and classification of carbohydrate, protein, fat, amino acids and nucleic acids. They will learn laws of thermodynamics, redox and coupled reactions. In enzymes section they will be taught about the holoenzyme, apoenzyme, michaelis, menten equation, factors affecting enzyme activity etc. In plant metabolism section they will learn about concepts of metabolism, carbon assimilation, carbohydrate metabolism, lipid metabolism, ATP synthesis, Nitrogen metabolism and signal transduction mechanism.

Core Course –IX (Theory) (Marks 25)

HBOT-CCT-409

Course Learning Outcomes:

In this paper they will learn about basic concepts of Ecology, homeostasis, role of climate in soil change, hydrological cycle, water table, light, temperature and wind, biotic interactions, population ecology, ecosystems. In pharmacognosy section they will learn about pharmacopoeias, classification of plant drugs, secondary metabolites.

Core Course –X (Theory) (Marks 25)

HBOT-CCT-410

Course Learning Outcomes:

They will learn biology and diversity of virus, their isolation, purification and identification. structure and chemistry of viruses, viral replication, Transmission of plant virus, management, scope of microbiology, bacterial morphology, growth, nutritional types, bacterial genetics, food, industrial, medical microbiology.

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The students are evaluated on the basis of weekly practical classes. Students collected their practical samples from different fields. Submission of class records and practical note books are mandatory. This exercise will develops scientific skill as well as methods of presenting and recording scientific data.

B.Sc.program

Core Course –XI (Plant physiology and cytogenetics)

In this paper they will learn about basic concepts of plant water relation, water potential, aquaporins, apoplast, symplast, cohesion tension theory, transpiration, stomatal movement, mineral nutrients, nutrient uptake, translocation in phloem, plant growth regulators like auxin, gibberelin, ABA, ethylene,jasmonic acid, physiology of flowering plant, photoperiodism, stimulus, florigen phytochrome, cryptochrome, phototropins. In practical section they will determine osmotic potential by cell sap method, they will do stomatal index and stomatal freequency,effect of light on seed germination, rate of transpiration by themselves.

In this paper they will learn about cell structure and function , difference between eukaryotic and prokaryotic cell, membrane transport, active and passive transport, endocytosis, exocytosis, cell organelles , structure, function and role of nucleus, ER, golgi body, ribosome, cytoskeleton, protein transport, sorting, cell division, cell cycle regulation, protein kinase, demonstration of DNA extraction. In genetics portion they will taught about mendelian genetics and extension, incomplete domonance, codominance, numericals, pleotrophic effects, extrachromosomal inheritance, linkage crossing over, chromosome mapping, chromosome number and structure, gene mutation, fine structure of genes population genetics. In the practical section they will study mitosis and meiosis by aceto orcein and aceto carmine technique, will do karyotype and mitotic index, probability and chi square test.

SEMESTER V

Core Course –XI (Theory) (Marks 25)

HBOT-CCT-511

Course Learning Outcomes:

In this paper they will learn about basic concepts of plant water relation, water potential, aquaporins, apoplast, symplast, cohesion tension theory, transpiration, stomatal movement, mineral nutrients, nutrient uptake, translocation in phloem, plant growth regulators like auxin, gibberelin, ABA, ethylene,jasmonic acid, physiology of flowering plant, photoperiodism, stimulus, florigen phytochrome, cryptochrome, phototropins.

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In practical section they will determine osmotic potential by cell sap method, they will do stomatal index and stomatal freequency,effect of light on seed germination, rate of transpiration by themselves.

Core Course –XII (Theory) (Marks 25)

HBOT-CCT-410

Course Learning Outcomes:

In this paper they will learn about cell structure and function , difference between eukaryotic and prokaryotic cell, membrane transport, active and passive transport, endocytosis, exocytosis, cell organelles , structure, function and role of nucleus, ER, golgi body, ribosome, cytoskeleton, protein transport, sorting, cell division, cell cycle regulation, protein kinase, demonstration of DNA extraction. In genetics portion they will taught about mendelian genetics and extension, incomplete domonance, codominance, numericals, pleotrophic effects, extrachromosomal inheritance, linkage crossing over, chromosome mapping, chromosome number and structure, gene mutation, fine structure of genes population genetics. In the practical section they will study mitosis and meiosis by aceto orcein and aceto carmine technique, will do karyotype and mitotic index, probability and chi square test.

SEMESTER VI

Core Course –XIII (Theory) (Marks 25)

HBOT-CCT-613

Course Learning Outcomes:

In this paper they will learn about carriers of genetic information, DNA, RNA as a genetic material, central dogma, replication, transcription and translation, statistical methods, mean, median, mode, measures of central tendency, correlation, inference. In practical section they will prepare LB medium, isolate genomic DNA from E.coli, study of replication and stahl's experiment by photographs, calculate mean , median, mode, F value, correlation of coefficient.

Core Course –XIV (Theory) (Marks 25)

HBOT-CCT-614

Course Learning Outcomes:

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Students will taught about recombinant DNA technology, Restriction endonucleases, plasmids, cosmids, gene cloning, transfer methods, chromosome mapping, application of biotechnology, plant tissue culture, composition of media, organogenesis, embryogenesis, secondary metabolites production, cryopreservation, germplasm conservation. They will prepare MS media, in vitro sterilization and inoculation.

DICIPLINE SPECIFIC ELECTIVE (DSE)

Discipline specific elective I:

Students will taught about ethnobotany, methodology of ethnobotanical studies, ethnobotany in modern medicine, ethnobotany in eastern himalaya and north bengal, legal aspects.

Discipline specific elective II:

In this paper they will learn about plant breeding technologies, crop improvement methods, quantitative inheritance, inbreeding depression, heterosis.

Discipline specific elective III:

They will learn about basic concepts of research, laboratory practices, data collection, documentation, observation, plant micro techniques, scientific writing and presentation.

Discipline specific elective IV:

They will learn about statistical methods, mean, median, mode, measures of central tendency, correlation, inference. In practical section they will calculate mean , median, mode, F value, correlation of coefficient.

Skill enhancement course (SEC)

1. Vermi composting and Organic farming

Students will learn about aims and objective of Vermicomposting, its technologies, development of organic farming, types of organic farming, benefits, biodynamic farming, plant protection pesticides, organic production, farm inspection, certification.

2. Cultivation of medicinal plants

Students will learn about scope and importance of medicinal plants, ayurveda, siddhha, unani systems, conservation of endangered and endemic medicinal plants, red list criteria, in situ, ex situ conservation,

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biosphere reserve, sacred grooves, nursery, ethnobotany, folk medicine used by tribal peoples, their importance, ethnic communities of India, ethno medicine helps to cure jaundice, diabetes, blood pressure, infertility.

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DEPARTMENT OF PHYSICS

For UG CBCS syllabus of Physics in Cooch Behar Panchanan Barma University click link below:

https://cbpbu.ac.in/userfiles/file/CBCS/B.SC.HONOURS-PHYSICS_111_2018_12092018.pdf

PROGRAMME OUTCOMES

SL. NO.	PROGRAMME OUTCOMES
1	Fundamental understanding of the field
2	Application of basic Physics concepts
3	Ability to use in Physics problem
4	Skills in Mathematical modeling
5	Develop Technical Communication skills
6	Develop investigative Skills
7	Developing ICT skills
8	Demonstrate Professional behaviour with respect to attribute like objectivity, ethical values, self-reading, etc
9	Skills in performing analysis and interpretation of data

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COURSE OUTCOMES

B.Sc. (Hons.) Physics Core Courses (CC)

C-I: MATHEMATICAL PHYSICS-I

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

·Revise the knowledge of calculus, vectors, vector calculus, probability and probability distributions. These basic mathematical structures are essential in solving problems in various branches of Physics as well as in engineering.

·Learn the curvilinear coordinates which have applications in problems with spherical and cylindrical symmetries.

·Learn the Dirac delta function its properties, which have applications in various branches of Physics, especially quantum mechanics.

·In the laboratory course, learn the fundamentals of the C and C++ programming languages and their applications in solving simple physical problems involving interpolations, differentiations, integrations, differential equations, Random number generation etc.

(ii) Broad contents of the course:

· Calculus

· Vector Calculus

· Orthogonal Curvilinear Coordinates

· Dirac Delta function and its properties

· Introductory theory of probability

(iii) Skills to be learned

·Training in calculus will prepare the student to solve various mathematical problems.

· He / she shall develop an understanding of how to formulate a physics problem and solvegiven mathematical equation risen out of it.

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C-II: MECHANICS

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

After going through the course, the student should be able to

· Understand laws of motion and their application to various dynamical situations, notion ofinertial frames and concept of Galilean invariance. He / she will learn the concept ofconservation of energy, momentum, angular momentum and apply them to basic problems.

· Understand the analogy between translational and rotational dynamics, and application ofboth motions simultaneously in analysing rolling with slipping.

· Write the expression for the moment of inertia about the given axis of symmetry fordifferent uniform mass distributions.

· Understand the phenomena of collisions and idea about centre of mass and laboratoryframes and their correlation.

· Understand the principles of elasticity through the study of Young Modulus and modulus ofrigidity.

· Understand simple principles of fluid flow and the equations governing fluid dynamics.

· Apply Kepler's law to describe the motion of planets and satellite in circular orbit, throughthe study of law of Gravitation.

· Explain the phenomena of simple harmonic motion and the properties of systems executingsuch motions.

· Describe how fictitious forces arise in a non-inertial frame, e.g., why a person sitting in amerry-go-round experiences an outward pull.

· Describe special relativistic effects and their effects on the mass and energy of a movingobject.

· appreciate the nuances of Special Theory of Relativity (STR).

· In the laboratory course, the student shall perform experiments related to mechanics(compound pendulum), rotational dynamics (Flywheel), elastic properties (Young Modulusand Modulus of Rigidity) and fluid dynamics (verification of Stokes law, Searle method) etc.

(ii) Broad contents of the course:

· Fundamental of Dynamics

· Work and Energy

· Collisions

· Rotational Dynamics

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· Elasticity

· Fluid Motion

· Gravitation and cathode force Motion

· Oscillation

· Non-inertial Systems

· Special Theory of Relativity

(iii) Skills to be learned

·Learn basics of the kinematics and dynamics linear and rotational motion.

·Learn the concepts of elastic in constant of solids and viscosity of fluids.

·Develop skills to understand and solve the equations of Newtonian Gravity and central forceproblem.

·Acquire basic knowledge of oscillation.

·Learn about inertial and non-inertial systems and essentials of special theory of relativity.

C-III: ELECTRCITY AND MAGNETISM

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

After going through the course, the student should be able to

· Demonstrate Gauss law, Coulomb's law for the electric field, and apply it to systems ofpoint charges as well as line, surface, and volume distributions of charges.

· Explain and differentiate the vector (electric fields, Coulomb's law) and scalar (electricpotential, electric potential energy) formalisms of electrostatics.

· Apply Gauss's law of electrostatics to solve a variety of problems.

· Articulate knowledge of electric current, resistance and capacitance in terms of electricfield and electric potential.

· Demonstrate a working understanding of capacitors.

· Describe the magnetic field produced by magnetic dipoles and electric currents.

· Explain Faraday-Lenz and Maxwell laws to articulate the relationship between electric andmagnetic fields.

· Understand the dielectric properties, magnetic properties of materials and the phenomenaof electromagnetic induction.

· Describe how magnetism is produced and list examples where its effects are observed.

· Apply Kirchhoff's rules to analyse AC circuits consisting of parallel and/or series

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combinations of voltage sources and resistors and to describe the graphical relationship ofresistance, capacitor and inductor.

· Apply various network theorems such as Superposition, Thevenin, Norton, Reciprocity,Maximum Power Transfer, etc. and their applications in electronics, electrical circuitanalysis, and electrical machines.

· Know about Ballistic Galvanometer, logarithmic damping, CDR for applying in variousexperiments.

· In the laboratory course the student will get an opportunity to verify various laws in electricity and magnetism such as Lenz's law, Faraday's law and learn about the construction, working of various measuring instruments.

· Should be able to verify of various circuit laws, network theorems elaborated above, using simple electric circuits.

(ii) Broad contents of the course:

· Electric Field and Electric Potential

· Conservative nature of Electrostatic Field

· Electrostatic energy of system of charges

· Dielectric Properties of Matter

· Magnetic Field

· Magnetic Properties of Matter

· Electromagnetic Induction

· Electrical Circuits

· Network Theorems

· Ballistic Galvanometer

(iii) Skills to be learned:

· This course will help in understanding basic concepts of electricity and magnetism andtheir applications.

· Basic course in electrostatics will equips the student with required prerequisites tounderstand electrodynamics phenomena.

C-IV: WAVES AND OPTICS

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

This course will enable the student to

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· Recognize and use a mathematical oscillator equation and wave equation, and derive theseequations for certain systems.

· Apply basic knowledge of principles and theories about the behaviour of light and thephysical environment to conduct experiments.

· Understand the principle of superposition of waves, so thus describe the formation ofstanding waves.

· Explain several phenomena we can observe in everyday life that can be explained as wavephenomena.

· Use the principles of wave motion and superposition to explain the Physics of polarisation,interference and diffraction.

· Understand the working of selected optical instruments like biprism, interferometer,diffraction grating, and holograms.

· In the laboratory course, student will gain hands-on experience of using various opticalinstruments and making finer measurements of wavelength of light using Newton Ringsexperiment, Fresnel Biprism etc. Resolving power of optical equipment can be learntfirst-hand.

· The motion of coupled oscillators, study of Lissajous figures and behaviour of transverse,longitudinal waves can be learnt in this laboratory course.

(ii) Broad contents of the course:

· Superposition of Two Collinear Harmonic Oscillations

· Superposition of Two Perpendicular Harmonic Oscillations

·Waves Motion – General

· Velocity of Waves

· Superposition of Two Harmonics Waves

· Wave Optics

· Interference

· Michelson's Interferometer

· Diffraction

· Fraunhofer Diffraction

· Fresnel Diffraction

· Holography

(iii) Skills to be learned:

· He / she shall develop an understanding of various aspects of harmonic oscillations andwaves specially.

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(i) Superposition of collinear and perpendicular harmonic oscillations

(ii) Various types of mechanical waves and their superposition.

· This course in basics of optics will enable the student to understand various opticalphenomena, principles, workings and applications optical instruments.

C-V: MATHEMATICAL PHYSICS-II

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

· Learn the Fourier analysis of periodic functions and their applications in physical problemssuch as vibrating strings etc.

· Learn about the special functions, such as the Hermite polynomial, the Legendrepolynomial, the Laguerre polynomial and Bessel functions and their differential equationsand their applications in various physical problems such as in quantum mechanics whichthey will learn in future courses in detail.

· Learn the beta, gamma and the error functions and their applications in doing integrations.

·Know about the basic theory of errors, their analysis, estimation with examples of simpleexperiments in Physics.

·Acquire knowledge of methods to solve partial differential equations with the examples ofimportant partial differential equations in Physics.

·In the laboratory course, learn the basics of the Scilab software, their utility, advantages anddisadvantages.

· Apply the Scilab software in curve fittings, in solving system of linear equations, generatingand plotting special functions such as Legendre polynomial and Bessel functions, solvingfirst and second order ordinary and partial differential equations.

(ii) Broad contents of the course:

· Fourier Series

·Special Functions

· Special Integrals

· Theory of Errors

· Partial Differential Equation

(iii) Skills to be learned

· Training in mathematical tools like calculus, integration, series solution approach, specialfunction will prepare the student to solve ODE, PDE's which model physical phenomena.

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· He / she shall develop an understanding of how to model a given physical phenomena suchas pendulum motion, rocket motion, stretched string, etc., into set of ODE's, PDE's and solvethem.

·These skills will help in understanding the behaviour of the modelled system/s.

C-VI: THERMAL PHYSICS

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

· Comprehend the basic concepts of thermodynamics, the first and the second law ofthermodynamics, the concept of entropy and the associated theorems, the thermodynamicpotentials and their physical interpretations.

· Learn about Maxwell's thermodynamic relations.

·Learn the basic aspects of kinetic theory of gases, Maxwell-Boltzman distribution law,equitation of energies, mean free path of molecular collisions, viscosity, thermal
conductivity, diffusion and Brownian motion.

· Learn about the real gas equations, Van der Waal equation of state, the Joule- Thompsoneffect.

· In the laboratory course, the students are expected to do some basic experiments inthermal Physics, viz., determinations of Stefan's constant, coefficient of thermal conductivity,temperature coefficient of resistant, variation of thermo-emf of a thermocouple withtemperature difference at its two junctions and calibration of a thermocouple.

(ii) Broad contents of the course:

· Zeroth and First Law of Thermodynamics

· Second Law of Thermodynamics

· Entropy

· Thermodynamic Potentials

· Maxwell's Thermodynamic Relations

· Kinetic Theory of Gases: Distribution of Velocities, Molecular Collisions, Real Gases.

(iii) Skills to be learned

· This basic course in thermodynamics will enable the student to understand variousthermodynamical concepts, principles.

C-VII: DIGITAL SYSTEMS AND APPLICATIONS

(Credits: 06, Theory-04, Practicals-02)

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(i) Course learning outcome:

As the successful completion of the course the student is expected to be conversant with thefollowing.

· Basic working of an oscilloscope including its different components and to employ thesame to study different wave forms and to measure voltage, current, frequency and phase.

· Secure first-hand idea of different components including both active and passivecomponents to gain a insight into circuits using discrete components and also to learn aboutintegrated circuits.

· About analog systems and digital systems and their differences, fundamental logic gates, combinational as well as sequential and number systems.

· Synthesis of Boolean functions, simplification and construction of digital circuits byemploying Boolean algebra.

· Sequential systems by choosing Flip-flop as a building bock- construct multivibrators,counters to provide a basic idea about memory including RAM, ROM and also about memoryorganization.

· Microprocessor and assembly language programming with special reference to Intel µP8085.

· In the laboratory he is expected to construct both combinational circuits and sequential circuits by employing NAND as building blocks and demonstrate Adders, Subtractors, ShiftRegisters, and multivibrators using 555 ICs. He is also expected to use µP 8085 todemonstrate the same simple programme using assembly language and execute theprogramme using a µP kit.

(ii) Broad contents of the course:

· Digital storage oscilloscope.

· Active and passive filters

· Fundamental logic gates, combinational as well as sequential and number systems.

· Synthesis of Boolean functions, simplification and construction of digital circuits byemploying Boolean algebra.

· Sequential systems by choosing Flip Flop as a building bock- construct multivibrators, counters to provide a basic idea about memory including RAM, ROM and also aboutmemory organization.

· Microprocessor and assembly language programming with special reference to Intel µP8085.

(iii) Skills to be learned

· Acquire skills to understanding the functioning and operation of CRO to measurephysical quantities in electrical and electronic circuits.

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· Learn the basics of IC and digital circuits, and difference between analog and digitalcircuits. Various logic GATES and their realization using diodes and transmitters.

· Learn fundamental of Boolean algebra and their role in constructing digital circuits.

· Learn about combinatorial and sequential systems by building block circuits to construct multivibrators and counters.

· Understand basics of microprocessor and assembly language programming with examples.

C-VIII: MATHEMATICAL PHYSICS-III

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

· Learn about the complex numbers and their properties, functions of complex numbers andtheir properties such as analyticity, poles and residues. The students are expected to learnthe residue theorem and its applications in evaluating definite integrals.

· Learn about the Fourier transform, the inverse Fourier transform, their properties and theirapplications in physical problems. They are also expected to learn the Laplace transform, theinverse Laplace transforms, their properties and their applications in solving physicalproblems.

· In the laboratory course, the students should apply their C++/Scilab programming languageto solve the following problems:

(i)Evaluation of trigonometric functions e.g.sinθ, Given Bessel's function at N pointsfind its value at an intermediate point.

(ii)Solve Kirchoff'sCurrent law for any node of an arbitrary circuit using Laplace's transform,

(iii)Solve Kirchoff'sVoltage law for any loop of an arbitrary circuit using Laplace's transform,

(iv) Compute the nth roots of unity for n = 2, 3, and 4,

(v) Perform circuit analysis of a general LCR circuit using Laplace's transform.

(vi) Least square fit of a given data to a graph,

(ii) Broad contents of the course:

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· Complex Analysis

· Integrals Transforms

· Fourier Transforms

· Laplace Transform

(iii) Skills to be learned

·Knowledge of various mathematical tools like complex analysis, integral transform willequip the student with reference to solve a given ODE, PDE.

· These skills will help in understanding the behaviour of the modelled system/s.

C-IX: ELEMENTS OF MODERN PHYSICS

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

· Know main aspects of the inadequacies of classical mechanics and understand historicaldevelopment of quantum mechanics and ability to discuss and interpret experiments thatreveal the dual nature of matter.

· Understand the theory of quantum measurements, wave packets and uncertainty principle.

· Understand the central concepts of quantum mechanics: wave functions, momentum andenergy operator, the Schrodinger equation, time dependent and time independent cases,probability density and the normalization techniques, skill development on problem solvinge.g. one dimensional rigid box, tunneling through potential barrier, step potential,rectangular barrier.

·Understanding the properties of nuclei like density, size, binding energy, nuclear forces andstructure of atomic nucleus, liquid drop model and nuclear shell model and mass formula.

· Ability to calculate the decay rates and lifetime of radioactive decays like alpha, beta,
gamma decay. Neutrinos and its properties and role in theory of beta decay.

· Understand fission and fusion well as nuclear processes to produce nuclear energy innuclear reactor and stellar energy in stars.

·Gamma ray emission, energy momentum conservation: Electron positron pair creation.

· Understand the spontaneous and stimulated emission of radiation, optical pumping andpopulation inversion. Three level and four level lasers. Ruby laser and He-Ne laser in details.

Basic lasing.

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· In the laboratory course, the students will get opportunity to perform the followingexperiments

· Measurement of Planck's constant by more than one method.

· Verification of the photoelectric effect and determination of the work Function of a metal.

· Determination of the charge of electron and e/m of electron.

· Determination of the ionization potential of atoms.

· Determine the wavelength of the emission lines in the spectrum of Hydrogen atom.

· Determine the absorption lines in the rotational spectrum of molecules

·Determine the wavelength of Laser sources by single and Double slit experiments.

· Determine the wavelength and angular spread of He-Ne Laser using plane diffractiongrating.

·Tunneling effect in tunnel diode using I-V characteristics.

· Study diffraction phenomena in LASER.

(ii) Broad contents of the course:

· One dimensional potential problem of bound states and scattering.

· Elementary introduction of nuclear physics with emphasis on

(i) Nuclear Structure

(ii) Nuclear Forces

(iii) Nuclear Decays

(iv) Fission and Fusion

· Introduction to Lasers.

(iii) Skills to be learned

· Comprehend the failure of classical physics and need for quantum physics.

· Grasp the basic foundation of various experiments establishing the quantum physics by doing the experiments in laboratory and interpreting them.

· Formulate the basic theoretical problems in one, two and three dimensional physics and solve them.

· Learning to apply the basic skills developed in quantum physics to various problems in

(i) Nuclear Physics

(ii) Atomic Physics

(iii)Laser Physics

· Learn to apply basic quantum physics to Ruby Laser, He-Ne Laser.

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C-X: ANALOG SYSTEMS AND APPLICATIONS

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

At the end of the course the student is expected to assimilate the following and possessesbasic knowledge of the following.

· N- and P- type semiconductors, mobility, drift velocity, fabrication of P-N junctions; forwardand reverse biased junctions.

· Application of PN junction for different type of rectifiers and voltage regulators.

· NPN and PNP transistors and basic configurations namely common base, common emitterand common collector, and also about current and voltage gain.

· Biasing and equivalent circuits, coupled amplifiers and feedback in amplifiers andoscillators.

· Operational amplifiers and knowledge about different configurations namely inverting andnon-inverting and applications of operational amplifiers in D to A and A to D conversions.

· To characterize various devices namely PN junction diodes, LEDs, Zener diode, solar cells,PNP and NPN transistors. Also construct amplifiers and oscillators using discretecomponents. Demonstrate inverting and non-inverting amplifiers using op-amps.

(ii) Broad contents of the course:

· N- and P- type semiconductors,

· Fabrication of p-n junctions; forward and reverse biased junctions.

· Application of P N junction

· Rectifiers and voltage regulators.

· NPN and PNP transistors and

· Common base, common emitter and common collector

· Current and voltage gain.

· Biasing and equivalent circuits,

· Coupled amplifiers and feedback in amplifiers and oscillators.

· Operational amplifiers and its applications in D to A and A to D convertors

(iii) Skills to be learned:

· Learn basic concepts of semiconductor diodes and their applications to rectifiers.

· Learn about junction transistor and their applications.

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· Learn about different types of amplifiers including operational amplifier. (Op-Amp) andtheir applications.

· Learn about sinusoidal oscillators of various types and A/D conversion.

C-XI: QUANTUM MECHANICS AND APPLICATIONS

QUANTUM MECHANICS

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

This course will enable the student to get familiar with quantum mechanics formulation.

· After an exposition of inadequacies of classical mechanics in explaining microscopic phenomena, quantum theory formulation is introduced through Schrodinger equation.

· The interpretation of wave function of quantum particle and probabilistic nature of itslocation and subtler points of quantum phenomena are exposed to the student.

· Through understanding the behaviour of quantum particle encountering a i) barrier, ii)potential, the student gets exposed to solving non-relativistic hydrogen atom, for itsspectrum and eigenfunctions.

·Study of influence of electric and magnetic fields on atoms will help in understanding Starkeffect and Zeeman Effect respectively.

· Application of Quantum Mechanics to study many electron atoms.

· The experiments using Sci-lab will enable the student to appreciate nuances involved in thetheory.

· This basic course will form a firm basis to understand quantum many body problems.

· In the laboratory course, with the exposure in computational programming in the computerlab, the student will be in a position to solve Schrodinger equation for ground state energyand wave functions of various simple quantum mechanical one dimensional andthree-dimensional potentials.

(ii) Broad contents of the course:

· Time dependent Schrodinger equation

· Time independent Schrodinger equation

· General discussion of bound states in an arbitrary potential

· Quantum Theory of hydrogen-like atoms

· Atoms in Electric and Magnetic Fields

· Atoms in External Magnetic Fields

· Many electron atoms

(iii) Skills to be learned:

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·This course shall develop an understanding of how to model a given problem such asparticle in a box, hydrogen atom, hydrogen atom in electric fields.

· Many electron atoms, L-S and J-J couplings.

· These skills will help in understanding the different Quantum Systems in atomic andnuclear physics.

C-XII: SOLID STATE PHYSICS

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

At the end of the course the student is expected to learn and assimilate the following.

· A brief idea about crystalline and amorphous substances, about lattice, unit cell, millerindices, reciprocal lattice, concept of Brillouin zones and diffraction of X-rays by crystallinematerials.

· Knowledge of lattice vibrations, phonons and in depth of knowledge of Einstein and Debyetheory of specific heat of solids.

·At knowledge of different types of magnetism from diamagnetism to ferromagnetism andhysteresis loops and energy loss.

· Secured an understanding about the dielectric and ferroelectric properties of materials.

· Understanding above the band theory of solids and must be able to differentiate insulators,conductors and semiconductors.

· Understand the basic idea about superconductors and their classifications.

· To carry out experiments based on the theory that they have learned to measure themagnetic susceptibility, dielectric constant, trace hysteresis loop. They will also employ tofour probe methods to measure electrical conductivity and the hall set up to determine thehall coefficient of a semiconductor.

(ii) Broad contents of the course:

· Crystalline and amorphous substances, lattice, unit cell, miller indices, reciprocal lattice.

Brillouin zones and diffraction of X-rays by crystalline materials.

· Lattice vibrations and phonons

·Different types of magnetism

· Dielectric and ferroelectric materials.

· Band theory of solids

· Insulators, conductors and semiconductors.

· Superconductors and their classifications.

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(iii) Skills to be learned

· Learn basics of crystal structure and physics of lattice dynamics

· Learn the physics of different types of material like magnetic materials, dielectric materials,metals and their properties.

· Understand the physics of insulators, semiconductor and conductors with special emphasison the elementary band theory of semiconductors.

· Comprehend the basic theory of superconductors. Type I and IIsuperconductors, theirproperties and physical concept of BCS theory.

C-XIII: ELECTROMAGNETIC THEORY

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

·Achieve an understanding of the Maxwell's equations, role of displacement current, gaugetransformations, scalar and vector potentials, Coulomb and Lorentz gauge, boundaryconditions at the interface between different media.

· Apply Maxwell's equations to deduce wave equation, electromagnetic field energy,momentum and angular momentum density.

· Analyse the phenomena of wave propagation in the unbounded, bounded, vacuum,dielectric, guided and unguided media.

· Understand the laws of reflection and refraction and to calculate the reflection andtransmission coefficients at plane interface in bounded media.

· Understand the linear, circular and elliptical polarisations of EM waves. Production as wellas detection of waves in laboratory.

· Understand propagation of EM waves in anisotropic media, uni-axial and biaxial crystalsphase retardation plates and their uses.

· Understand the concept of optical rotation, theories of optical rotation and their experimental rotation, calculation of angle rotation and specific rotation.

· Understand the features of planar optical wave guide and obtain the Electric fieldcomponents, Eigen value equations, phase and group velocities in a dielectric wave guide.

· Understand the fundamentals of propagation of electromagnetic waves through opticalfibres and calculate numerical apertures for step and graded indices and transmission losses.

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· In the laboratory course, the student gets an opportunity to perform experiments demonstrating principles of Interference, Refraction and diffraction of light using monochromatic sources of light.

· Demonstrate interference, Refraction and Diffraction using microwaves.

· Determine the refractive index of glass and liquid using total internal reflection of light.

· Verify the laws of Polarisation for plane polarised light.

· Determine Polarisation of light by Reflection and determine the polarization angle off orair-glass surface

· Determine the wavelength and velocity of Ultrasonic waves in liquids using diffraction.

·Study specific rotation of sugar using Polarimeter.

· Analyse experimentally the Elliptically Polarised light using Babinet's Compensator

· Study Experimentally the angle dependence of radiation for a simple dipole antenna

· Plan and Execute 2-3 group projects for designing new experiments based on the Syllabi.

(ii) Broad contents of the course:

· Review of Maxwell's equations

· EM wave propagation in unbounded media of various types

· EM wave propagation in bounded media separated by two types of media

· Polarization of electromagnetic waves

· Wave guides

· Optical fibres

(iii) Skills to be learned

· Comprehend the role of Maxwell's equation in unifying electricity and magnetism.

· Derive expression for

(i) Energy density

(ii) Momentum density

(iii) Angular momentum density of the electromagnetic field

·Learn the implications of Gauge invariance in EM theory in solving the wave equations anddevelop the skills to actually solve the wave equation in various media like

(i) Vacuum

(ii) Dielectric medium

(iii) Conducting medium

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(iv) Dilute plasma

· Derive and understand associated with the properties, EM wave passing through theinterface between two media like

(i) Reflection

(ii) Refraction

(iii) Transmission

(iv) EM waves

· Learn the basic physics associated with the polarization of electromagnetic waves by doingvarious experiments for:

(i) Plane polarized light

(ii) Circularly polarized light

(iii) Circularly polarized light

· Learn the application of EM theory to

(i) Wave guides of various types

(ii) Optical fibres in theory and experiment

C-XIV: STATISTICAL MECHANICS

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

· Understand the concepts of microstate, macrostate, ensemble, phase space, thermodynamic probability and partition function.

· Understand the combinatoric studies of particles with their distinguishably or indistinguishably nature and conditions which lead to the three different distribution lawse.g., Maxwell-Boltzmann distribution, Bose-Einstein distribution and Fermi-Diracdistribution laws of particles and their derivation.

· Comprehend and articulate the connection as well as dichotomy between classicalstatistical mechanics and quantum statistical mechanics.

· Learn to apply the classical statistical mechanics to derive the law of equipartition ofenergy and specific heat.

· Understand the Gibbs paradox, equipartition of energy and concept of negative temperature in two level system.

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· Learn to derive classical radiation laws of black body radiation. Wiens law, Rayleigh Jeanslaw, ultraviolet catastrophe. Saha ionization formula.

· Learn to calculate the macroscopic properties of degenerate photon gas using BEdistribution law, understand Bose-Einstein condensation law and liquid Helium. Bosederivation of Plank's law

· Understand the concept of Fermi energy and Fermi level, calculate the macroscopicproperties of completely and strongly degenerate Fermi gas, electronic contribution tospecific heat of metals.

· Understand the application of F-D statistical distribution law to derive thermodynamicfunctions of a degenerate Fermi gas, electron gas in metals and their properties.

· Calculate electron degeneracy pressure and ability to understand the Chandrasekhar masslimit, stability of white dwarfs against gravitational collapse.

· In the laboratory course, the students get an opportunity to verify Stefan's Law of radiationand determine Stefan's constant.

· Design and perform some experiments to determine Boltzmann' Constant.

· Use Computer simulations to study:

(i) Planck's Black Body radiation Law and compare with the Wien's Law and Raleigh -Jean's Law in appropriate temperature region.

(ii) Specific Heat of Solids by comparing, Dulong-Petit, Einstein's and Debye's Lawsand study their temperature dependence

· Compare the following distributions as a function of temperature for various energies andthe parameters of the distribution functions:

(i) Maxwell-Boltzmann distribution

(ii) Bose-Einstein distribution

(iii) Fermi-Dirac distribution

· Do 3-5 assignments given by the course instructor to apply the methods of Statisticalmechanics to simple problems in Solid State Physics and Astrophysics

· Do the regular weekly assignments of at least 2-3 problems given by the course instructor.

(ii) Broad contents of the course:

· Classical Statistics

· Classical Theory of Radiation

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· Quantum Theory of Radiation

· Bose-Einstein Statistics and its Applications

· Fermi-Dirac Statistics and its Applications.

(iii) Skills to be learned

· Learn the basic concepts and definition of physical quantities in classical statistics andclassical distribution law.

·Learn the application of classical statistics to theory of radiation.

· Comprehend the failure of classical statistics and need for quantum statistics.

· Learn the application of quantum statistics to derive and understand.

(i)Bose Einstein statistics and its applications to radiation.

(ii) Fermi-Dirac statistic and its applications to quantum systems.

B.Sc. (Hons.) Physics Discipline Specific Elective Course (DSE)

DSE-I: EXPERIMENTAL TECHNIQUES

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

At the end of the course the student should be conversant with the following.

· About accuracy and precision, different types of errors and statistical analysis of data.

· About Noise and signal, signal to noise ratio, different types of noises and their identification.

· Concept of electromagnetic interference and necessity of grounding.

· About transducers and basic concepts of instrumentation-Different types of transducersand sensors.

· Working of a digital multimeter.

· Vacuum systems including ultrahigh vacuum systems.

· Conduct Experiments using different transducers including LVDT and gain hands onexperience and verify the theory.

(ii) Broad contents of the course:

· Accuracy and precision,

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· Different types of errors and statistical analysis of data.

· Noise and signal, signal to noise ratio, different types of noises

· Electromagnetic interference and necessity of grounding.

· Transducers

· Different types of transducers and sensors.

· Digital multimeter.

· Vacuum systems including ultrahigh vacuum systems.

(iii) Skills to be learned:

· Develop skills to analyse data, make approximation and perform error analysis using basicmethods of statistics.

· Learn the working principle of transduces, their application and study of the efficiency.

· Develop understanding of analog and digital instruments and earn to use them in makingphysical measurements.

· Develop their understanding of signal, noise, and fluctuations in making physical measurements.

· Understanding of Impedances Bridges, Q meters as well as vacuum systems using varioustypes of pumps and pressure gauges.

DSE-II: CLASSICAL DYNAMICS

(Credits: 06, Theory-05, Tutorials -01)

(i) Course learning outcome:

· Revise the knowledge of the Newtonian, the Lagrangian and the Hamiltonian formulationsof classical mechanics and their applications in appropriate physical problems.

· Learn about the small oscillation problems.

· Recapitulate and learn the special theory of relativity- postulates of the special theory ofrelativity, Lorentz transformations on space-time and other four vectors, four-vectornotations, space-time invariant length, length contraction, time dilation, mass-energyrelation, Doppler effect, light cone and its significance, problems involving energymomentum conservations.

· Learn the basics of fluid dynamics, streamline and turbulent flow, Reynolds's number,coefficient of viscosity and Poiseuille's equation.

(ii) Broad contents of the course:

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· Classical mechanics of point particles.

·Lagrangian and Hamiltonians of simple systems and derivations of equation of motion.

· Small amplitude oscillations

· Special theory of relativity

· Relativistic kinematics of one and two particle system.

· Basics of fluid dynamics

(iii) Skills to be learned

· Learn to define generalised coordinates, generalised velocities, generalised force and writeLagrangian for mechanical system in terms of generalised coordinates.

· Learn to derive Euler-Lagrange equation of motion and solve them for simple mechanicalsystems.

· Learn to write Hamiltonian for mechanical systems and derive and solve Hamilton'sequation of motion for simple mechanical systems.

· Formulate the problem of small amplitude oscillation and solve them to obtain normalmodes of oscillation and their frequencies in simple mechanical systems.

· Develop the basic concepts of special theory of relativity and its applications to dynamicalsystems of particles.

· Develop the methods of relativistic kinematics of one and two particle system and itsapplication to two particle decay and scattering.

· Develop and understand the basic concepts of fluid dynamics and its applications to simpleproblems in liquid flow.

DSE-III: COMMUNICATION ELECTRONICS

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

At the end of the course the student is expected to have an idea/concept of the following,

·Electromagnetic spectra and different frequency bands.

· Modulation, different types of modulation and about super heterodyne receivers.

· Concept of sampling, sampling theorem and multiplexing.

· Digital transmission, encoding and decoding.

· Satellite communication including uplinking and downlinking.

· Mobile communication/telephony and concepts of cell telephony.

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· 2G, 3G, 4G and 5G (Quantitative).

· Apply the theory that they have learned in the theory class to gain hands on experience inbuilding modulation and demodulation circuits; Transmitters and Receivers for AM and FM.Also to construct TDM, PAM, PWM, PPM and ASK, PSK and FSK modulator and verify theirresults.

(ii) Broad contents of the course:

· Electromagnetic spectra and different frequency bands.

· Modulation, different types of modulation and super heterodyne receivers.

· Sampling, sampling theorem and multiplexing.

· Digital transmission, encoding and decoding.

· Satellite communication

· Mobile communication/telephony and concepts of cell telephony.

· 2G, 3G, 4G and 5G (Quantitative).

(iii) Skills to be learned:

· Learn the skills to understand the basic concepts of communication.

· Learn the techniques of different types of modulation of electromagnetic signals like

(i) Amplitude Modulation

(ii) Frequency Modulation

(iii) Phase Modulation

(iv) Analog Pulse Modulation

(v) Digital Pulse Modulation

· Learn basics of satellite communication.

· Learn concepts and application of mobile telephony system.

DSE-IV: NUCLEAR & PARTICLE PHYSICS

(Credits: 06, Theory-05, Tutorials-01)

(i) Course learning outcome:

· Learn the ground state properties of a nucleus – the constituents and their properties, massnumber and atomic number, relation between the mass number and the radius and the massnumber, average density, range of force, saturation property, stability curve, the concepts ofpacking fraction and binding energy, binding energy per nucleon vs. mass number graph,explanation of fusion and fission from the nature of the binding energy graph.

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· Know about the nuclear models and their roles in explaining the ground state properties ofthe nucleus –(i) the liquid drop model, its justification so far as the nuclear properties areconcerned, the semi-empirical mass formula, (ii) the shell model, evidence of shell structure,magic numbers, predictions of ground state spin and parity, theoretical deduction of the shellstructure, consistency of the shell structure with the Pauli exclusion principles.

· Learn about the process of radioactivity, the radioactive decay law, the emission of alpha,beta and gamma rays, the properties of the constituents of these rays and the mechanisms ofthe emissions of these rays, outlines of Gamow's theory of alpha decay and Pauli's theory ofbeta decay with the neutrino hypothesis, the electron capture, the fine structure of alphaparticle spectrum, the Geiger-Nuttall law, the radioactive series.

· Learn the basic aspects of nuclear reactions, the Q-value of such reaction and its derivationfrom conservation laws, The reaction cross-sections, the types of nuclear reactions, directand compound nuclear reactions, Rutherford scattering by Coulomb potential.

· Learn some basic aspects of interaction of nuclear radiation with matter- interaction ofgamma ray by photoelectric effect, Compton scattering and pair production, energy loss dueto ionization, Cerenkov radiation.

· Learn about the detectors of nuclear radiations- the Geiger-Mueller counter, the scintillationcounter, the photo-multiplier tube, the solid state and semiconductor detectors.

· The students are expected to learn about the principles and basic constructions of particleaccelerators such as the Van-de-Graff generator, cyclotron, betatron and synchrotron. Theyshould know about the accelerator facilities in India.

·Gain knowledge on the basic aspects of particle Physics – the fundamental interactions,elementary and composite particles, the classifications of particles: leptons, hadrons(baryons and mesons), quarks, gauge bosons. The students should know about the quantumnumbers of particles: energy, linear momentum, angular momentum, isospin, electric charge,colour charge, strangeness, lepton numbers, baryon number and theconservation lawsassociated with them.

(ii) Broad contents of the course:

· General properties of nuclei

· Nuclear models

· Radioactive decays

· Nuclear reactions

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· Interaction of nuclear radiation with matter

· Detectors for nuclear interaction

· Particle accelerators

· Elementary particles and their properties

(iii) Skills to be learned

· Skills to describe and explain the properties of nuclei and derive them fromvarious modelsof nuclear structure.

· To understand, explain and derive the various theoretical formulation of nuclear disintegration like α decay, β decay and □□decays.

· Develop basic understanding of nuclear reactions and decays with help of theoreticalformulate and laboratory experiments.

· Skills to develop basic understanding of the interaction of various nuclear radiation withmatter in low and high energy.

· Ability to understand, construct and operate simple detector systems for nuclear radiationand training to work with various types of nuclear accelerators.

· Develop basic knowledge of elementary particles as fundamental constituent of matter,their properties, conservation laws during their interactions with matter.

B.Sc. (Hons.) Physics and B.Sc. (General) Skill-based Elective Courses (SEC)

SEC-I: PHYSICS WORKSHOP SKILLS

(Credits: 02)

(i) Course learning outcome:

·After the successful completion of the course the student is expected to acquire skills/handson experience / working knowledge on various machine tools, lathes, shapers, drillingmachines, cutting tools, welding sets and also in different gear systems, pulleys etc. He /shewill also acquire skills in the usage ofmultimeters, soldering iron, oscilloscopes, powersupplies and relays.

(ii) Broad contents of the course:

· Introduction to make simple length, height, time, area, volume measurements.

· Mechanical skills needed to the workshop practice.

· Electrical and electronics skills related to the measurement of various electrical and electronics quantities.

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· Introduction to Prime Movers.

(iii) Skills to be learned

· Learn to use mechanical tools to make simple measurement of length, height, time, area and volume.

·Obtain hand on experience of workshop practice by doing casting, foundry, machining, welding and learn to use various machine tool like lathe shaper, milling and drilling machines etc. and working with wooden and metal blocks.

· Learn to use various instruments for making electrical and electronics measurementsusing multimeters, oscilloscopes, power supply, electronic switches and relays.

SEC-II: COMPUTATIONAL PHYSICS

(Credits: 02)

(i) Course learning outcome:

· Learn the importance of computers in solving problems in Physics.

·Learn how to plan for writing the algorithm for solving a problem by drawing the flowchartof simple problems like roots of quadratic equations etc.

·Have a working knowledge about the Linux system, for example, the necessary commands.

·Learn, write and run FORTRAN programs in the Linux system. In particular, they shouldattempt the following exercises:

(i) Exercises on syntax on usage of FORTRAN.

(ii) Usage of GUI windows, Linux commands, familiarity with DOS commands and working in an editor to write sources codes in FORTRAN.

(iii) To print out all natural even/ odd numbers between given limits.

(iv) To find maximum, minimum and range of a given set of numbers.

·The students should also learn “Scientific Word Processing”, particularly, how to use the LaTeX software in writing articles and papers which include mathematical equations and diagrams. Similarly, students should learn the basics of Gnuplot.

·To have hands-on experience on computational tools, students are expected to do the following exercises:

(i) to compile a frequency distribution and evaluate mean, standard deviation etc,

(ii) to evaluate sum of finite series and the area under a curve,

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(iii) to find the product of two matrices

(iv) to find a set of prime numbers and Fibonacci series,

(v) to write program to open a file and generate data for plotting using Gnuplot,

(vi) plotting trajectory of a projectile projected horizontally,

(vii) plotting trajectory of a projectile projected making an angle with the horizontaldirection,

(viii) creating an input Gnuplot file for plotting a data and saving the output for seeingon the screen, saving it as an eps file and as a pdf file,

(ix) to find the roots of a quadratic equation,

(x) numerical solution of equation of motion of simple harmonic oscillator and plot theoutputs for visualization,

(xi) Simulate the motion of a particle in a central force field and plot the output forvisualization.

(ii) Broad contents of the course:

· Introduction

· Scientific Programming

· Control Statements

· Scientific word processing: Introduction to LATEX

· Visualization

(iii) Skills to be learned

·The students should learn the skills for writing a flow chart and then writing the corresponding program for a specific problem using the C/ C++/FORTRAN language.

·The student should also acquire the proficiency in effectively using the GUI Windows, the LINUX operating system and also in using the LaTeX software for wring a text file.

SEC-III: ELECTRICAL CIRCUITS AND NETWORK SKILLS

(Credits: 02)

(i) Course learning outcome:

· After the completion of the course the student will acquire necessary skills/ hands on experience /working knowledge on multimeters, voltmeters, ammeters, electric circuit elements, dc power sources, ac/dc generators, inductors, capacitors, transformers, single phase and three phase motors, interfacing dc/ac motors to control and measure, relays and

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basics of electrical wiring.

(ii) Broad contents of the course:

· Basic principles of electricity, electrical circuits and electrical drawings.

· Physics of generators, transformers, electric motors.

· Solid state devices and their uses.

· Electrical wiring and measures for electrical protection.

(iii) Skills to be learned:

· Skills to understand various types of DC and AC circuits and making electrical drawings with symbols for various systems.

· Skills to understand and operate generators, transformers and electric motors.

· Develop knowledge of solid state devices and their uses.

· Skills to do electrical wiring with assured electrical protection devices.

SEC-IV: BASIC INSTRUMENTATION SKILLS

(Credits: 02)

(i) Course learning outcome:

After the successful completion of the course the student is expected to have the necessary working knowledge on accuracy, precision, resolution, range and errors/uncertainty in measurements. He/she will acquire hands on skills in the usage of oscilloscopes, multimeters, multivibrators, rectifiers, amplifiers, oscillators and high voltage probes. He also would have gained knowledge on the working and operations of LCR Bridge, generators, digital meters and counters.

(ii) Broad contents of the course:

· Basics of measurement

· Electronic voltmeters/multimeters

· Cathode ray oscilloscope

· Impedance Bridges and Q meters.

· Digital instruments, Digital multimeters

(iii) Skills to be learned

· Develop skills to use basic electrical instruments like multimeter, electronic voltmeter, cathode ray, and oscilloscope.

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· Acquire efficiency in making signal generators and analysis of obtained signals.

· Learn to understand and use various types of digital instruments.

· Develop knowledge of making measurements with Impedance Bridges and Q meters.

Generic Elective Courses (GE) for Minor Physics Course in the B.Sc. (Hons.)

for other mains and Core Courses (DSC) & Discipline Specific Elective Courses (DSE) for B.Sc. (General)

DSC-I, GE-I & GE-III : MECHANICS

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

After going through the course, the student should be able to

· Understand the role of vectors and coordinate systems in Physics.

· Write the expression for the moment of inertia about the given axis of symmetry for different uniform mass distributions.

· Explain the conservation of energy, momentum, angular momentum and apply them to basic problems.

· Understand the analogy between translational and rotational dynamics, and application of both motions simultaneously in analysing rolling with slipping.

· Apply Kepler's law to describe the motion of planets and satellite in circular orbit.

· Explain the phenomena of simple harmonic motion and the properties of systems executing such motions.

· Describe how fictitious forces arise in a non-inertial frame, e.g., why a person sitting in a merry-go-round experiences an outward pull.

· Describe special relativistic effects and their effects on the mass and energy of a moving object.

· In the laboratory course, after acquiring knowledge of how to handle measuring instruments (like screw gauge, vernier callipers, travelling microscope) student shall embark on verifying various principles learnt in theory. Measuring 'g' using Bar Pendulum, Kater's pendulum and measuring elastic constants of materials, viscous properties of liquids etc.

(ii) Broad contents of the course:

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· Vectors
· Ordinary Differential Equations
· Laws of Motion
· Momentum and Energy
· Rotational Motion
· Gravitation
· Oscillations
· Elasticity
· Special Theory of Relativity

(iii) Skills to be learned:

· Learn basic mathematics like vectors and ordinary different equation and to understand linear and rotational motion.
· Learn basics of Newtonian gravitation theory and central force problem.
· Learn basic ideas about mechanical oscillators.
· Learn elasticity and elastic constants of material and perform experiments to study them.
· Acquire basic knowledge of special theory of relativity.

DSC-II, GE-II & GE-IV: ELECTRICITY AND MAGNETISM

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

After going through the course, the student should be able to
· Demonstrate Coulomb's law for the electric field, and apply it to systems of point charges as well as line, surface, and volume distributions of charges.
· Explain and differentiate the vector (electric fields, Coulomb's law) and scalar (electric potential, electric potential energy) formalisms of electrostatics.
· Apply Gauss's law of electrostatics to solve a variety of problems.
· Articulate knowledge of electric current, resistance and capacitance in terms of electric field and electric potential.
· Demonstrate a working understanding of capacitors.
· Describe the magnetic field produced by magnetic dipoles and electric currents.
· Explain Faraday-Lenz and Maxwell laws to articulate the relationship between electric and

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magnetic fields.

· Describe how magnetism is produced and list examples where its effects are observed.

· Apply Kirchhoff's rules to analyse AC circuits consisting of parallel and/or series combinations of voltage sources and resistors and to describe the graphical relationship of resistance, capacitor and inductor.

· Apply various network theorems such as Superposition Theorem, Thevenin Theorem, Norton Theorem, Reciprocity Theorem, Maximum Power Transfer, etc. and their applications in electronics, electrical circuit analysis, and electrical machines.

· In the laboratory course the student will get an opportunity to verify all the above mentioned theorems elaborated above, using simple electric circuits.

(ii) Broad contents of the course:

· Vector Analysis

· Electro statistics

· Magnetism

· Electromagnetic Induction

· Maxwell's Equation and EM Wave propagation.

(iii) Skills to be learned:

· This course will help in understanding basic concepts of electricity and magnetism and their applications.

· Basic course in electrostatics will equips the student with required prerequisites to understand electrodynamics phenomena.

DSC-III: THERMAL PHYSICS AND STATISTICAL MECHANICS

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

· Learn the basic concepts of thermodynamics, the first and the second law of thermodynamics, the concept of entropy and the associated theorems, the thermodynamic potentials and their physical interpretations. They are also expected to learn Maxwell's thermodynamic relations.

·Know the fundamentals of the kinetic theory of gases, Maxwell-Boltzman distribution law, equipartition of energies, mean free path of molecular collisions, viscosity, thermal

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conductivity, diffusion and Brownian motion.

· Have a knowledge of the real gas equations, Van der Waal equation of state, the Joule-Thompson effect.

·Learn about the black body radiations, Stefan- Boltzmann's law, Rayleigh-Jean's law and Planck's law and their significances.

· Learn the quantum statistical distributions, viz., the Bose-Einstein statistics and the Fermi-Dirac statistics.

· In the laboratory, the students are expected to perform the following experiments:

(i) Measurement of Planck's constant using black body radiation,

(ii) To determine Stefan's Constant,

(iii) To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method,

(iv) To determine the temperature co-efficient of resistance by Platinum resistance thermometer,

(v) To study the variation of thermo emf across two junctions of a thermocouple with temperature,

(vi) To determine the coefficient of linear expansion by optical lever method.

(vii) To determine the pressure coefficient of air by constant volume method,

(viii) To determine the coefficient of linear expansion by travelling microscope,

(ix) To determine the coefficient of thermal conductivity of a bad conductor by Searle's method.

(ii) Broad contents of the course:

· Laws of Thermodynamics

· Thermodynamic Potentials

· Kinetic Theory of Gases

· Theory of Radiation

· Introduction to Statistical Mechanics

(iii) Skills to be learned:

· In this course the students should skilled in doing calculations in thermodynamics and in statistical mechanics.

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·They should also be proficient in doing calculations with the kinetic theory of ideal and real gases.

· In the laboratory course, the students should acquire the skills of doing basic experiments in thermal physics with the right theoretical explanations of results there from.

DSC-IV: WAVES AND OPTICS

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

This course will enable the student to

· Recognize and use a mathematical oscillator equation and wave equation, and derive these equations for certain systems.

· Apply basic knowledge of principles and theories about the behavior of light and the physical environment to conduct experiments.

· Understand the principle of superposition of waves, so thus describe the formation of standing waves.

· Explain several phenomena we can observe in everyday life that can be explained as wave phenomena.

·Use the principles of wave motion and superposition to explain the Physics of polarisation, interference and diffraction.

· Understand the working of selected optical instruments like biprism, interferometer, diffraction grating, and holograms.

· In the laboratory course, student will gain hands-on experience of using various optical instruments and making finer measurements of wavelength of light using Newton Rings experiment, Fresnel Biprism etc. Resolving power of optical equipment can be learnt first hand.

· The motion of coupled oscillators, study of Lissajous figures and behavior of transverse, longitudinal waves can be learnt in this laboratory course.

(ii) Broad contents of the course:

· Superposition of Two Collinear Harmonic Oscillations

· Superposition of Two Perpendicular Harmonic Oscillations

· Waves Motion – General

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· Velocity of Waves

· Superposition of Two Harmonics Waves

· Wave Optics

· Interference

· Michelson's Interferometer

· Diffraction

· Fraunhofer Diffraction

· Fresnel Diffraction

· Polarization

(iii) Skills to be learned:

· This course in basics of optics will enable the student to understand various optical phenomena, principles, workings and applications optical instruments

· He / she shall develop an understanding of Waves Motion and its properties.

DSE-I: DIGITAL, ANALOG AND INSTRUMENTATION

(Credits: 06, Theory-04, Practicals-02)

(i) Course learning outcome:

After the successful completion of the course the student is expected to master the Following

· Difference between analog and digital circuits, Number systems, their interconversions, Basic logic gates and combinational circuits to construct half adders, full adders, subtractors, 4-bit binary Adder -Subtractor and synthesis of circuits using Boolean algebra.

· Working of P and N type semiconductors, P-N junctions, Forward and Reverse biased junctions, LEDs, photodiode and solar cells, p-n-p, n-p-n transistors, different characteristics of CB, CE and CC configurations, load line, gain and biasing for CE amplifiers and classification of amplifiers.

· Operational amplifiers and its characterization, circuits using Op-Amp for making Summing and subtracting circuits, differentiators and integrators

· Criterion for Oscillations, Oscillators and evaluation of frequency of oscillators.

· Oscilloscope (CRO) and applications and usage of oscilloscopes for measuring voltages, currents and study of waveforms, Different rectifiers and voltage regulation using capacitors,

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Zener diode, Timing IC 555 and to use IC 555 to construct Monostable and Astable multivibrators.

· At the successful completion of the laboratory course the student is expected to acquire hands on skills/ knowledge on the following: -

(i) Measurement of voltage and frequency of a periodic waveform using CRO, construct all logic gates using NAND as a building block, synthesize digital circuits and simplify them using Boolean algebra, construct adders/subtractors and binary adders and Adder-Subtractors

(ii) Design monostable/astable multivibrators using IC555, I-V characterization of PN, Zener diodes, design and build CE amplifiers, build Wein bridge oscillators and construct amplifying circuits using IC 741.

(ii) Broad contents of the course:

· Signals and systems based on the parameters

· Discrete-Time Fourier Transform and Z-transform on signals

· Convolution techniques, filters and their classifications.

· Digital Filters and their classifications based on the response, design and algorithm.

(iii) Skills to be learned:

· Understand the digital and analyse circuits and difference between them. Various logic GATES and their realization using diodes and transistors.

· Conceptualization of Boolean Algebra and its use in constructing logic circuits by various methods and their applications.

· Learn the physics of semiconductor devices. Different types of semiconductors, their use in making transistors and amplifiers and study their characteristics.

· Learn different types of operational amplifiers and oscillators and use them in laboratory experiments to explain their functioning.

· Learn to understand and use various instruments like:

(i) CRO

(ii) Power Supply

(iii) Half wave and full wave rectifiers

(iv) Zener diodes and their applications

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(v) Multivibrators

DSE-II: NUCLEAR & PARTICLE PHYSICS

(Credits: 06, Theory-05, Tutorials-01)

(i) Course learning outcome:

· Learn the ground state properties of a nucleus – the constituents and their properties, mass number and atomic number, relation between the mass number and the radius and the mass number, average density, range of force, saturation property, stability curve, the concepts of packing fraction and binding energy, binding energy per nucleon vs. mass number graph, explanation of fusion and fission from the nature of the binding energy graph.

· Know about the nuclear models and their roles in explaining the ground state properties of the nucleus –(i) the liquid drop model, its justification so far as the nuclear properties are concerned, the semi-empirical mass formula, (ii) the shell model, evidence of shell structure, magic numbers, predictions of ground state spin and parity, theoretical deduction of the shell structure, consistency of the shell structure with the Pauli exclusion principles.

· Learn about the process of radioactivity, the radioactive decay law, the emission of alpha, beta and gamma rays, the properties of the constituents of these rays and the mechanisms of the emissions of these rays, outlines of Gamow's theory of alpha decay and Pauli's theory of beta decay with the neutrino hypothesis, the electron capture, the fine structure of alpha particle spectrum, the Geiger-Nuttall law, the radioactive series.

· Learn the basic aspects of nuclear reactions, the Q-value of such reaction and its derivation from conservation laws, the reaction cross-sections, the types of nuclear reactions, direct and compound nuclear reactions, Rutherford scattering by Coulomb potential.

· Learn some basic aspects of interaction of nuclear radiation with matter- interaction of gamma ray by photoelectric effect, Compton scattering and pair production, energy loss due to ionization, Cerenkov radiation.

· Learn about the detectors of nuclear radiations- the Geiger-Mueller counter, the scintillation counter, the photo-multiplier tube, the solid state and semiconductor detectors.

· The students are expected to learn about the principles and basic constructions of particle accelerators such as the Van-de-Graff generator, cyclotron, betatron and synchrotron. They should know about the accelerator facilities in India.

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·Gain knowledge on the basic aspects of particle Physics – the fundamental interactions, elementary and composite particles, the classifications of particles: leptons, hadrons (baryons and mesons), quarks, gauge bosons. The students should know about the quantum numbers of particles: energy, linear momentum, angular momentum, isospin, electric charge, colour charge, strangeness, lepton numbers, baryon number and the conservation laws associated with them.

(ii) Broad contents of the course:

· General properties of nuclei

· Nuclear models

· Radioactive decays

·Nuclear reactions

· Interaction of nuclear radiation with matter

· Detectors for nuclear interaction

· Particle accelerators

· Elementary particles and their properties

(iii) Skills to be learned:

· Skills to describe and explain the properties of nuclei and derive them from various models of nuclear structure.

· To understand, explain and derive the various theoretical formulation of nuclear disintegration like α decay, β decay and □□decays.

· Develop basic understanding of nuclear reactions and decays with help of theoretical formulate and laboratory experiments.

· Skills to develop basic understanding of the interaction of various nuclear radiation with matter in low and high energy

· Ability to understand, construct and operate simple detector systems for nuclear radiation and training to work with various types of nuclear accelerators.

· Develop basic knowledge of elementary particles as fundamental constituents of matter, their properties, conservation laws during their interactions with matter.

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DEPARTMENT OF CHEMISTRY

For UG CBCS syllabus of Chemistry in Cooch Behar Panchanan Barma University click link below:

https://cbpbu.ac.in/userfiles/file/CBCS/CBCS%20UG%20CHEMISTRY%20SYLLABUS-1.pdf

PROGRAMME OUTCOMES

SL. NO.	PROGRAMME OUTCOMES
1	Disciplinary Knowledge and Skill
2	Critical Thinker and Problem Solver
3	Analytical Skill
4	Team Worker
5	Awareness and handling of Sophisticated Equipments/Instruments
6	Environmental Awareness
7	Develop Laboratory and Research Skill
8	Additional Academic Knowledge
9	develop job potency for research and development institutes/industries

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COURSE OUTCOMES

CORE COURSES

SEMESTER – I

UG/CHEM/101/C-1: ORGANIC CHEMISTRY – I

Module I: Basics of Organic Chemistry

Module I.A: *Organic Compounds:*

Students will learn about the hybridization and the three-dimensional structure of organic molecules.

Module I.B: *Electronic Displacements:*

Students will understand about the various electronic effects like polarization, inductive effect, resonance (resonance energy) and also learn about the acid-base nature of various organic compounds.

Module I.C: *MO theory:*

Students will get a brief idea on molecular orbital theory; π-MOs of cyclic and acyclic conjugated systems, concept of HOMO-LUMO. They will also able to identify the aromatic, non-aromatic, antiaromatic and homoaromatic compounds after adopting the concept of aromaticity.

Module I.D: *Reaction thermodynamics:*

Students will acquire the knowledge on enthalpy, free energy, and energy profile diagram for exothermic and endothermic reaction.

Module I.E: *Tautomerism:*

Students will able to know about the different types of bond cleavage and subsequent stability of the generated intermediates like carbocations, carbanions and radicals and also learn the detail concept on tautomerism.

Module II: Stereochemistry-I

1. After studying basic stereochemistry, students will get the concept of 3D structure of molecule; the way of representation by knowing the different projection formulae, isomerism (enantiomerism and diastereomerism) and nomenclature of stereoisomers.

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2. They will also learn the concept of optical activity, specific rotation of organic compounds, chirality, elements of symmetry.

CHEMISTRY LAB-C I (Practical – P1)

After the course student will be able to do the following-

1. Student will learn the proper protocol for using chemistry laboratory, handling various equipment, disposal techniques of chemicals and also learn to present laboratory work as a scientific report.
2. How to purify an organic compound by filtration, crystallization and determination of melting point.
3. How to identify pure solid and liquid organic compounds by different chemical analysis.

Paper: CC-2 (Physical Chemistry-I)

Module 1: Gaseous state

Students canlearn thatwhy there required various corrected form of equation of state*viz.*van der Waals equation, virial equation, etc. They will get introduce with the concept of critical point and compressibility factor.From this module they will be self-sufficient for understanding the KTG model of gas and Maxwell distribution. Student can surely able to clarify the concept of collision frequency and mean free path. Moreover, various type of gaseous speed and Barometric distribution law will also be clarified. Further, they will able tocalculate the theoretical C_p and $C_v$value of any given molecule.The basic concept of viscosity especially its origin will be appearedin its crystal-clear form. Both mathematical and physical aspect of temperature and pressure dependence on viscosity will be on its forecast.

Module 2: Liquid State

Students can learn about Newtonian fluid (laminar flow).They can learn the detail theory for the experimental determination of viscosity by Ostwald's viscometer and stokes falling sphere method.They will know about phenomenon of capillary cation for both wetting and non-wetting liquid. They learn about for the experimental determination of surface tension of the liquid by capillary rise method, drop count method and drop count method. Finally, they can learn that the effect of temperature on the viscosity and surface tension.

Module 3:Ionic Equilibria

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Students get introduce with Ostwald dilution law for weak electrolyte.They can get a detail idea about pH scale and can learn how to calculate pH for both weak and strong acid/ base, and also for various salt hydrolysis.They will learn the importance and mechanistic action of buffer solution and a detailed theory how to prepare a buffer of given anypH.Student will acquire knowledge on the theory of titration especially acid-base titration,and will surely learn how the choice of indicator play a key role during the titration.

Module 4: ***Experimental***

Students will be expert for preparing any standard solutionof given strength (both primary and secondary).They can perform the conventional acid-base titrimetricprocedure and can find the strength of any unknown secondary solution by applying this method.They can confidently prepare a buffer solution (*viz.* acetic acid buffer) of any given pH. Moreover, they will be self-sufficient to set the pH-meter for checking the experimental pH of the prepared solution.

Students will able to handle the Ostwald viscometer and can measure the coefficient of viscosity of any liquid.

Students will able to handle the Stalagmometer and can measure the surface tension of any liquid.

SEMESTER-II

CC-3 Inorganic Chemistry-I:

On completion of this course, the students will be able to understand:

1. Atomic theory and its evolution.
2. Scientific theory of atoms, concept of wave function.
3. Elements in periodic table; physical and chemical characteristics, periodicity.
4. To predict the atomic structure, chemical bonding, and molecular geometry based on accepted models.
5. Atomic theory of matter, composition of atom.
6. Identity of given element, relative size, charges of proton, neutron and electrons, and their assembly to form different atoms.
7. How to define isotopes, isobar and isotone.
8. Physical and chemical characteristics of elements in various groups and periods according to ionic size, charge, etc. and position in periodic table.
9. Characterize bonding between atoms, molecules, interaction and energetics (ii) hybridization and shapes of atomic, molecular orbitals, bond parameters, bond- distances

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and energies.

10. Oxidation-Reductions and their use.

UG/CHEM/202/C-4: ORGANIC CHEMISTRY – II

Module I: Stereochemistry-II

Module IA: *Chirality arising out of stereoaxis:*

After studying this module student will able to gain the concept of

1. axial chirality in allene and distinguish between asymmetric & dissymmetric allenes,
2. atropisomerism in biaryl compounds,
3. conditions for atropisomersim in biphenyls,
4. absolute configuration (R/S) nomenclature procedure for allene & biaryl compounds.

Module IB: *Concept of prostereoisomerism:*

After studying this topic, students will understand the connection between molecular symmetry and chirality, differentiate between chiral and prochiral molecule and difference between homotopic and heterotopic ligands and faces.

Module IC: *Conformation:*

After studying this module student may able to acquire the knowledge on different conformations (eclipsed, staggered, gauche, syn and anti), different types of strains and interactions (torsional strains, steric strains, gauche-butane interaction etc.), conformers and conformational analysis of different alkanes, haloalkanes, 1,2-halohydrins etc.

Module II: Chemistry of Aliphatic Hydrocarbons

Module IIA: *Carbon-Carbon sigma bonds:*

After studying this topic, students will able to know the different methods of synthesis of alkanes, various reactions of alkanes specially the halogenation reactions in terms of reactivity and selectivity.

Module IIB: *Carbon-Carbon pi bonds:*

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1. Student will able to get the detail idea on elimination reaction along with mechanisms (E1, E2, E1CB) and also acquire knowledge on Saytzeff and Hofmann elimination reactions.
2. Students will learn about the important electrophilic addition reactions of alkenes, alkynes with mechanism (oxymercuration-demercuration, hydroboration-oxidation, ozonolysis, syn and anti-hydroxylation, 1,2-and 1,4-addition reactions in conjugated dienes etc.) and nucleophilic additions of alkynes.

Module IIC: *Chemistry of Halogenated Hydrocarbons:*

1. After studying this topic student will get a brief idea on different mechanistic approach with stereochemical aspects on nucleophilic substation reaction (SN1, SN2, SNi) of alkyl halides.
2. They will get idea on nucleophilic aromatic substitution (SNAr) and Benzyne mechanism.

Module IID: *Alcohols, Phenols, Ethers and Epoxides:*

1. Student will able to understand the difference between alcohols and phenols; importance and reactions of ethers and epoxides.
2. They will also learn some important reactions with mechanism like Bouvaelt-Blanc Reduction, Pinacol-Pinacolone rearrangement, Reimer–Tiemann and Kolbe's–Schmidt Reactions, Fries and Claisen rearrangements etc.

Module IIE: *Aromatic Hydrocarbons:*

Students will get some basic idea on electrophilic aromatic substitution reactions with their mechanisms like halogenation, nitration, sulphonation and Friedel-Craft's alkylation/acylation.

CHEMISTRY LAB- C4 (PRACTICAL – P4

After the course student will be able to

1. Identify the functional group/s (nitrogeneous and non-nitrogeneous) present in a pure solid unknown organic compound by systematic chemical tests *i.e.* by Lassaigne's test, Solubility test, and functional groups detection tests (Aromatic amino ($-NH_2$), aromatic nitro (-NO2), amido ($-CONH_2$, including imide), phenolic –OH, carboxylic acid (-COOH), carbonyl (-CHO and >C=O) etc.

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2. They will also capable to synthesize the required derivative (benzoyl, hydrolysis, 2,4-DNP, bromo etc.) of the identified functional group and also able to check the melting point of the crude compound and the recrystallized derivative.

SEMESTER-III

Paper: CC-5 (Physical Chemistry-II)

Module 1: Chemical Thermodynamics

Students will learn various mathematical tools for chemist *viz.* partial derivative, cyclic rule, exact differentials,cross-derivative rule, and ideas on state and path function, extensive and intensive variable of the system. They will get a detail idea about various thermodynamic process *viz.* isothermal, isobaric, isochoric, adiabatic, reversible and irreversible process.

First law

They will learn on a detail about internal energy, heat content and work. They can also learn about Joule experiment and Joule-Thomson experiment and hence inversion temperature.

Thermochemistry

They will get a detailed qualitative idea on exothermic and endothermic reaction. They will learn about the calculation of the enthalpy of any reaction from simple addition subtraction method. They will also learn about various types of heat of reaction.

Second Law

They will learn about entropy and thequalitative idea on the spontaneity of any process. Further they will learn about Carnot cycle and will know about the principle behind the operation of heat engine, refrigerator, heat pump and can calculate the efficiency of the same.

Free Energy Functions

They will introduce with the two important energy function G and A and will understand its physical significance. They will come know about the Maxwellrelations and the thermodynamic equation of state. Moreover, they will learn Gibbs-Helmoholtz equation and its physical significance.

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Module 2: Systems of Variable Composition

Students will know the concept of partial molar quantity and chemical potential. Further they will learn the brief mathematical manipulation during mixing of ideal gases especially change in entropy and free energy during the mixing. They can know about the relation between chemical potential and partial pressure of the gases and hence know about the modification required for the real system. Moreover, they will understand about activity and activity coefficient for real system.

Module 3: Chemical Equilibrium

Students will know about various from of equilibrium constant K_p, K_c, K_a, K_N and K_f and their inter relation with one another. They will learn both qualitative and quantitative about the influence of various external parameter on the equilibrium. They will learn about reaction isothermand its importance regarding spontaneity of the reaction. They will also learn a detail about vant Hoff reaction isotherm and isochore. They will further know how equilibrium constant is effect by temperature both separately for exothermic and endothermic reaction.They further learn on qualitative treatment on Lechatelier principle. They can express the degree of dissociation in terms of equilibrium constant for various type of reaction. They will also introduce with the concept of exoergic and endoergic reaction.

Module 4: Solutions and Colligative Properties

They will learn about the thermodynamics of ideal solution (dilute solution). They know a details onRaoults law and Henry law, including its applicability and limitations for ideal solution. They will also understand a detail about four colligative properties*viz.* lowering of vapour pressure, elevation of bp, depression of fp and osmotic pressure. They will learn on the molecular origin of the colligative property. They can compute the detail derivation and mathematical manipulation of the associated problems of colligative properties. They will be self-sufficient to compute the molecular weight of any solute form the above two principle with the help of ebullocrospic and crysoscopicconstant. They will also get a qualitative and a quantitative discussion on osmosis, reverse osmosis is given and also its parallelism with ideal gas. Further they will understand aboutvant Hoff factor for electrolyte solution and learn that the colligative property is also depend on the degree of dissociation. Finally, they will know about Trouton's rule.

Module 5: *Experimental*

They will able to handle mechanical shaker.

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They will know about various calorimetric experiment by calorimeter and can calculate enthalpy of various chemical transformation/ neutralisation/ solution/ etc.

They can perform the experiment of partition coefficient and equilibrium constant.

CC-6 Inorganic -II

After completion of the course, the learner shall be able to understand:

1. General principles of metallurgy and their application in different metal extraction from their ores.
2. Chemistry of s and p-block elements.
3. Chemistry of noble gases.
4. Inorganic polymers and their use.
5. Redox reactions in hydrometallurgy processes.
6. Structure, bonding of s and p block materials and their oxides/compounds.
7. Chemistry of boron compounds and their structures.
8. Chemistry of noble gases and their compounds; application of VSEPR theory in explaining structure and bonding.
9. Chemistry of inorganic polymers, their structures and uses.

UG/CHEM/101/C-7: ORGANIC CHEMISTRY – III

Module I: *Carbonyl Compounds:*

Students will able to

1. explain the relative reactivity of carbonyl compounds toward nucleophilic addition.
2. write the mechanism for nucleophilic addition and nucleophilic addition-elimination reactions of aldehydes, ketones and α, β-unsaturated carbonyl compounds.
3. predict the products of such reactions.
4. describe mechanism and predict the products of different rearrangement reactions.

Module II: *Organomettalics:*

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Students will understand about the stability, reactivity and synthetic utility along with various reactions of simple organometallic compounds like organomagnesium (Grignard reagents), organolithium and organocopper (Gillman reagents) compounds.

Module III: *Carboxylic Acids and their Derivatives:*

1. Students will get a brief idea on preparation, physical properties, reactions and reactivity order of monocarboxylic acids and their derivatives.
2. They will also learn the different mechanistic approach of ester hydrolysis along with some rearrangement and name reactions *e.g.* Claisen condensation, Reformatsky reactions, Hofmannbromamide degradation and Curtius rearrangement.

Module IV: *Nitrogen Containing Functional Groups:*

Students will acquire the knowledge on

1. Preparation and important reactions of nitro, nitriles and isonitriles compounds.
2. Basicity of different amines and their methods of preparation.
3. Separation procedures of mixture of different amines (primary, secondary and tertiary) and rearrangement reactions.

Module V: *Polynuclear Hydrocarbons:*

After studying this topic, students will get the concept on structure elucidation, preparation and various reactions of naphthalene, phenanthrene and anthracene.

Module VI: *Sulphur containing compounds:*

They will get the concept on preparation and reactions of thiols, thioethers& sulphonic acids.

CHEMISTRY LAB-C I (Practical – P7)

After the course student will be able to do the following-

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1. How to set or perform any reaction at laboratory using different glass apparatus, reagents and substrates under room temperature and also at refluxing condition.
2. The workup procedure for the reactions like acetylation, bromination, nitrartion, reduction, hydrolysis, aldol condensation, Benzil-Benzilic acid rearrangement etc.
3. How to purify an organic compound by filtration, crystallization and determination of melting point.
4. Purity level of the prepared compounds can be checked by TLC.

SEMESTER-IV

Paper: CC-8 (Physical Chemistry-III)

Module 1: Phase equilibria

They can learn about phase diagram of one component system, two component system involving solid-liquid, liquid-liquid equilibria, and its application including the calculation of degree of freedoms in the various point of graph. They will underhand about critical solution temperature, triple point, eutectic and thermal analysis. Further they can be familiar with a brief idea of three component system. They can learn about the principle of fractional distillation and steam distillation. They further come to know about the non-ideal system *viz.* aeolotropism. They also learn about the principle and process of solvent extraction.

Module 2: Solid state

They know about various basic laws of crystallography and its implication. They learn about the classification of crystal on the basis of symmetry. They can explain treatment both qualitative and quantitative about the symmetry, crystal parameter, imperfection of cubic crystal. They can learn about Braggs law and its implication. Further they can get a brief account on powder diffraction analysis.

Module 3: Chemical Kinetics

The module covers all most all ground level aspect of the kinetics of any chemical reaction. This includes a details treatment of zero/ first/ second/ n^{th} order reaction. This further extended to opposing, consecutive and parallel reaction. They can also learn about the steady state approximation.They can compute various problems on order of reaction, rate constant, etc. they further learn on the temperature effect on rate constant and its

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implication. They come to know about details on activation energy and its key role on the reaction mechanism. Next, they come to know about various quantitative theory including transition state theory, collision theory etc. Further they come to know about ionic reaction and its associated outcomes.

Module 4: Catalyst

Students will learn about the Physical concept of catalyst and itsinfluences on reaction rate. They come to know about its distinction from inhibitor. They learn on the detail kinetics on enzyme catalysed reaction, acid-base catalysed reaction and reaction on solid surface.

Module 5: Surface Chemistry

They learn about the adsorption and how it influences by external parameter like temp. and pressure. They learn on various adsorption isotherm. This module extends by Gibbs's adsorption isotherm. They further learn about surfactant antsurface excess.They will also know about the concept of micelle and its chemistry. They also learn on the various type of colloid including sol and emulsion. They also learn on Hardy-Schulze rule, flocculation value, zeta potential and electrical double layer.

Module 6: *Experimental*

Student will be able to perform the experiment of the kinetics of ester hydrolysis and its equivalent with details theoretical treatment.

Students will be able to perform the experiment on Freundlich adsorption isotherm.

CC-9: Inorganic Chemistry-III

After completion of the course, the learner shall be able to understand:

1. Coordination compounds – its nomenclature, theories, d-orbital splitting in complexes, chelate.
2. Transition metals, its stability, color, oxidation states and complexes.
3. Lanthanides, Actinides – separation, color, spectra and magnetic behavior
4. Bioinorganic chemistry – metal ions in biological system, its toxicity; hemoglobin.
5. The nomenclature of coordination compounds/complexes, Molecular orbital theory, d-orbital splitting in tetrahedral, octahedral, square planar complexes,

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chelate effects.

6. The transition metals stability in reactions, origin of colour and magnetic properties.

7. The separation of Lanthanoids and Actinoids, its color, spectra and magnetic behavior.

8. The bioinorganic chemistry of metals in biological systems.

9. Hemoglobin and its importance in biological systems.

UG/CHEM/403/C-10: ORGANIC CHEMISTRY – IV

Module I: *Cycloalkanes and Conformational Analysis:*

After studying this module, students will able to gain the knowledge on-

1. three dimensional structures of alicyclic compounds and on the concept of conformation.
2. Baeyer strain theory for predicting stability of ring compounds.
3. different types of strains in conformations of Cycloalkanes.
4. energy profile diagrams for various conformations of cyclohexane.
5. preferred configuration of substituted cyclohexanes.
6. dynamic stereochemistry of cyclic and acyclic systems.
7. varied reaction rate with respect to different stereochemistry of reactants and reaction intermediates.

Module II: *Nucleic Acids*

Upon successful completion of the course, the student will be able to draw or describe the structure of enzymes, lipids, and nucleic acids. They will able to explain the function of the above listed biomolecules.

Module III: *Amino Acids, Peptides and Proteins:*

Upon successful completion of this module, the student will be able to draw or describe the structure of amino acids, peptides and proteins. They will gain knowledge on chemical as well as bio-synthesis of amino acids and peptides. Student will also know the C-terminal or N-terminal residue analysis method of the peptide/protein molecule.

Module IV: *Heterocyclic Compounds*

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1. After studying this topic, the students will gain essential theoretical understanding of heterocyclic chemistry.
2. They will also able to learn the general methods for heterocyclic ring synthesis (furan, pyrrole, thiophene, indole etc.) and application of such methods for the preparation of specific groups of heterocyclic systems.
3. The student will also get familiarized with the properties and reactions for the most important heterocycles like furan, pyrrole, thiophene, indole.

Module V: *Carbohydrates*

1. After completion of this module, the student will gain an understanding of immense chemistry constituting carbohydrates.
2. The student will able to distinguish between monosaccharides, disaccharides, and polysaccharides
3. They will learn different reactions of monosaccharides.
4. They will able to identify several major functions of carbohydrates.

CHEMISTRY LAB-C10 (PRACTICAL- P10)

After the course student will be able to do the following:

1. Students will gain the knowledge on quantitative estimation methods of organic molecules like aniline, phenol etc. and will able to determine the saponification value of oil/ester or fat.
2. Student will acquire knowledge on extraction procedure of natural products from natural resources.
3. They will also able to synthesize some important organic molecules like urea formaldehyde resin and methyl orange.

SEMESTER-V

Paper: CC-11 (Physical Chemistry-IV)

Module 1: Conductance

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Students can learn the details concept of specific conductance, molar conductance. They can learn the variation of molar conductivity upon dilution for both strong and weak electrolyte. With the help of Kohlrausch law they will be expert on calculating the equivalent conductance at infinite dilution for strong and weak electrolyte. They also understand about transport number and its experimental determination by moving boundary and Hittrof method. They will learn on a detail on Faradays' law of electrolysis and its application. Most interesting portion they learnis conductometric titration,its principle and advantages over ordinary titration. With the conductometric measurement they can calculate ionic product of water, solubility product, hydrolysis constant, etc.

Module 2: Electrochemistry

Students will learn about electrochemical cell and electrolytic cell. They will know about half cell, electrode, electrolysis and electrolyte. They will know the concept of oxidation and reduction with the connection of cathode and anode and hence cell representation. They come to know about Nernst equation and it application in electrochemistry. Further they learn about reference electrode, calomelelectrode and SHE. They learn about various kind of electrode including quinhydrone electrode, pH electrode and glass electrode. They alsolearn on concentration cell with a and wot transference number.Finally, they further introduce another type of titration viz. potentiometric titration, its principle and advantages.

Module 3: Statistical Thermodynamics

Quantum mechanicalconcept-based module provide a qualitative idea on microstate, microstate, degeneracy, distinguishable and indistinguishable particles. Students will know about Boltzmann distribution law and partition function. They will further know about translational, rotational and vibrational partition function and will be able to express various thermodynamic parameters in terms of partition function. They will also come to know about Nernst Heat theorem and third law of thermodynamics. Finally, they also know the comparison between absolute entropy and residual entropy.

Module 4: Electrical & Magnetic Properties of Atoms and Molecules

They can acquire a very basic knowledge on electrostatic. Know about the concept of orientation polarization. They learn about various equation expressing the polarity of molecule. They will getaqualitative idea on para, di and ferro magnetic molecule. Further they will learn about Curie equation and molecular susceptibility.

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Module 5: ***Experimental***

Students will be able to handle conductivity meter and its associated kit.

They can perform the conductometric titration of any pair.

They can also perform s experiment based on conductance measurement.

UG/CHEM/502/C-12: ORGANIC CHEMISTRY – V

Module I: *Pericyclic reactions*

On completion of this course, student will able to:

1. distinguish between thermal reactions and photochemical reactions.
2. understand pericyclic reactions (Electrocyclic, Cycloaddition and Sigmatropic reaction) and the mechanisms of pericyclic reactions.
3. gain knowledge on Frontier molecular orbital theory approaches to analyzing pericyclic reactions.

Module II: Organic Spectroscopy

Module IIA: *UV Spectroscopy:*

After studying this topic student will know

1. the difference between absorption and emission spectroscopy.
2. general concept of electronic transitions and some basic terminology of UV-VIS spectroscopy like Chromophores and Auxochromes, Bathochromic and Hypsochromic shifts.
3. how to calculate λ_{max} value employing the Woodward Rules.

Module IIB: *IR Spectroscopy:*

After studying this topic student will know the fundamental concept of IR spectroscopy and will able to identify the functional group present in a molecule with the help of their corresponding stretching frequency data.

Module IIC: *NMR Spectroscopy:*

After completion of this module, the student will gain knowledge on

1. basic principles of ^{1}H-NMR, chemical shift and factors influencing it;

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2. Spin – Spin coupling and coupling constant; Anisotropic effects,

Student will able to interpret NMR spectra of simple compounds and also able to apply IR, UV and NMR for identification of simple organic molecules.

Module III: *Dyes:*

After this course, the student will get a brief idea on classification of dyes, reason for showing coloration, chemistry of dyeing, synthesis and applications of azo dyes, triphenyl methane dyes and edible dyes.

CHEMISTRY LAB-C12 (PRACTICAL – P12)

1. After completion of this course, students will able to know the principle, types and uses of chromatography (Paper chromatography, TLC, and Column chromatography).
2. By employing the gained knowledge on chromatography, they will able to separate mixture of two amino acids by paper chromatography, mixture of two phenols by TLC. They will also capable to separate the leaf pigments from green vegetables and mixture of dyes with the help of column chromatography.
3. Based upon solubility of organic compounds in basic laboratory reagents (NaOH, HCl, $NaHCO_3$), students will capable to separate binary mixture of two solid compounds (neutral+acidic, neutral +basic etc.) and after separation they will capable to check the purity of the separated components.

SEMESTER- VI

CC-13: INORGANIC CHEMISTRY – IV

After completion of the course, the learner shall be able to understand:

1. Definition and classification organometallic compounds.
2. Structural features of Metal carbonyls and their preparations.
3. VBT and MO theory in connection with structures of different metal carbonyls.
4. Structure of metal alkyls, their preparation and applications.

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5. Inorganic reaction mechanism and reaction kinetics.
6. Mechanism and kinetics of substitution reactions in square planar and octahedral complexes.
7. Mechanism of Organometallic catalysis and their application in different industrial process.

Paper: CC-14 (Physical Chemistry-V)

Module 1: Quantum Chemistry

Students will learn about the background for the development of quantum theory. They will understand the elementary concept about basic mathematics for quantum, like operators, eigen function, eigen values, etc.They will come to know about the concept of wavefunction, nodal plane, normalization, orthogonality, etc. They will learn about Schrodinger equation and its application. They will understand the ideas of particle in 1d, 2d and 3d box and its associated application. They will also learn on degeneracy and zero-point energy. Further they will also learn on wave particle duality and uncertainty principle. They can also solve the energy computation of vibrational and rotational energy. They will learn about polar co-ordinateand can solving the problem of H and H-like atoms using polar co-ordinate. Further they will get a brief ideal of variation method and perturbation theory, and problems on many electrons system. They can also be expert on setting up Schrodinger equation and its computation.

Module 2: Spectroscopy

They will learn about Born-Oppenheimer approximation and its accountability on molecular spectroscopy.They will understand on very details about rotational spectroscopy and vibrational spectroscopy,including selection rule, essential condition and applications. Students will further learn on vibrational-rotational spectrum and the P, Q, R branches. They will also learn about Morse potential, hot band and group frequencies. They will be able to calculate fundamental modes of vibration for polyatomic molecules.Next, they will come to introduce with Raman spectroscopy and its quantum mechanical explanation. They will learn about stokes anti-stokes and Raileigh lines. They also learn on various modes of vibration and its activity towards IR and Raman spectroscopy. They also learn on mutual exclusion principle. They learn about electronic spectra and its application in molecular system. They can acquire a details knowledge on Jablonski's diagram, fluorescence and phosphorescence, and several associated phenomena in electronic spectrum. They will alsolearnvery brief on NMR and EPR spectroscopy

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Module 3: Photochemistry

They will learn a very details on Lambert-Beers law and its application in solution Chemistry. They learn on molar extinctioncoefficient and its physical significance. They learn on various laws of photochemistry and quantum yield. They will able to compute the kinetics of photochemical reaction. They will learn the concept of chemical actinometer. They will further know the concept of photo stationary states and its application.

Module 4: *Experimental*

They will be able to handle calorimeter and *UV-Vis* spectrophotometer.

Student can perform the experiment of verification of lambert-beers law and determination of unknown concentration from OD value measurement.

DSE

DSE-1: Analytical Chemistry

After completion of the course, the student shall be able to understand:

1. Familiarization with fundamentals of analytical chemistry.
2. Basics of spectroscopic, thermal, electrochemical techniques
3. Basics of separation techniques and its applications.
4. Analytical tools, statistical methods applied to analytical chemistry.
5. Principle of UV-Vis spectroscopy and its applications.
6. Principles of thermo-gravimetric analysis and study of thermal decomposition of materials/characterization of materials.
7. Basics of electro-analytical techniques and its applications.
8. Principles of separation technology and its use in advanced instrumentations.

DSE-2 : INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE

After completion of the course, the student shall be able to understand:

1. Silicate materials: glass ceramic and cement.
2. Properties, classifications, manufacturing processes and applications of glass ceramics and cement.
3. Classifications, manufacture and application of different fertilizers.

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4. Surface coatings and their applications.
5. Preparation, classification and application of paints.
6. Batteries and their components.
7. Working process of different types of batteries.
8. Alloys and their classification.
9. Preparation procedure of different types of steels.
10. Classifications of Catalysis and their properties.
11. Applications of homogenous and heterogeneous catalysis.
12. Chemical explosives originated from organic compounds.
13. Properties and preparation of some explosive chemicals.

Paper: DSE-3 (Polymer Chemistry)

Module 1: Introduction and history of polymeric materials

Students will learn the basic elementary conceptabout the polymers. They also learn about the various type of classification of polymer.

Module 2: Functionality and its importance

They will learn about functionality principle.Students also introduce with Carothers equation andthe implication of the equation on the polymerisation

Module 3: Kinetics of Polymerization

They will learn on details on various modes of polymerization *viz.* radical, cationic, anionic and its associated mechanism. They will alsolearn on details kinetic of condensation polymerization both in presence and absence of mineral acid.

Module 4: Crystallization and crystallinity

They will learn about the morphology of the polymer. They learn how the polymer is different fromtraditional molecular system in crystalline nature.

Module 5: Nature and structure of polymers

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They will understand about Structure Property relationships among the polymers.

Module 6: Determination of molecular weight of polymers

They will come to the importance of averaging the molecular weight of polymer. Next, they know aboutthe four types of avg. molecular weight *viz.* number-, mass-, viscosity- and z- avg. molecular weight of polymer. They will further learn how each of thus can be determined graphically from various tools, techniques and procedure.

Module 7: Glass transition temperature (Tg) and determination of Tg

Students come to know about glass transition temperature and crystalline melting point.

Module 8: Polymer Solution

They will learn detailson the thermodynamics behind the polymeric solution and the related parameters govern the solubility. They will learn about Flory-Huggins theory and its implication.

Module 9: Properties of Polymers

Learns about on a plenty of literature reported polymer: synthesis, structure and uses.

Module 10: *Experimental*

They can prepare urea-formaldehyde resins

They can performviscometry experiment and average molecular weight determination.

CHEMISTRY-DSE 4: GREEN CHEMISTRY

After completion of this course, student will able to

1. Know what is Green Chemistry? and why do we need Green Chemistry?
2. know the twelve principles of green chemistry and will gain the basic understanding of toxicity, threat and risk of chemical compounds.

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3. understand the stoichiometric calculations and relate them to various green chemistry metrics. They will also learn about atom economy, its calculation for different types of reactions and how it is different from percentage yield.
4. design safer chemicals, products and processes that are less toxic, than current alternatives.
5. familiar with the green solvents and auxiliary substances.
6. understand the profits of use of catalyst as well as bio catalyst, use of renewable feed stock and renewable energy sources.
7. practical application of green synthesis using MW irradiation, Ultrasound etc.
8. know how can chemistry help to achieve sustainable civilization

CHEMISTRY PRACTICAL - DSE LAB: GREEN CHEMISTRY

After completion of this course, students will able to acquire some practical knowledge regarding synthetic methodology, work up procedure and recrystallization on the following aspects:

1. application of multicomponent reactions (Biginelli reaction, Hantzsch 1,4-dihydropyridine synthesis etc.),
2. use of renewable resources (Preparation of biodiesel from vegetable/ waste cooking oil),
3. use of safer starting materials (Preparation and characterization of nanoparticles of gold using tea leaves),
4. Use of enzyme as catalyst (Preparation and characterization of nanoparticles of gold using tea leaves),
5. use of alternative sources of energy (Photoreduction of benzophenone to benzopinacol in the presence of sunlight).

SEC

SEC-1 (FUEL CHEMISTRY)

After completion of the course, the learner shall be able to understand:

1. Renewable and non-renewable sources of energy.
2. Classification of fuels and their calorific value.
3. Use of coal and coal-related materials.

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4. Petroleum and petrochemicals.
5. Refining process and applications of different petrochemicals.
6. Properties and classifications of lubricants.

PHARMACEUTICAL CHEMISTRY (SEC-2)

Upon successful completion of this course, the student will be able to

1. know the history of drug discovery and development.
2. classification of drug categories with examples.
3. knowledge on the method of preparation of different drugs (analgesics agents, antipyretic agents, anti-inflammatory agents; antibiotics, Cardiovascular, antilaprosy and HIV-AIDS related drugs).
4. understand the chemistry and role of various biomolecules.
5. Understand the basic idea of Aerobic and anaerobic fermentation.

PRACTICAL

After the course student will be able to prepare some important drug molecules in laboratory with proper precautions e.g. Aspirin.

GE and DSC

Semester-I

GE-1 and DSC 1 (Inorganic Chemistry-1, Organic Chemistry-1)

On completion of this course, the students will be able to learn and understand about:

1. Atomic theory and its evolution.
2. Learning scientific theory of atoms, concept of wave function.
3. How to predict the atomic structure, chemical bonding, and molecular geometry based on accepted models.
4. Atomic theory of matter, composition of atom.
5. Identity of given element, relative size, charges of proton, neutron and electrons, and

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their assembly to form different atoms.

6. Definition of isotopes, isobar and isotone.

7. Characterize bonding between atoms, molecules, interaction and energies.

8. hybridization and shapes of atomic, molecular orbitals, bond parameters, bond- distances and energies.

9. Valence bond theory incorporating concepts of hybridization predicting geometry of molecules.

10. Molecular orbital approach related to homonuclear and heteronuclear diatomic molecules.

11. Basic of organic molecules, structure, bonding, reactivity and reaction mechanisms.

12. Stereochemistry of organic molecules – conformation and configuration, asymmetric molecules and nomenclature.

13. Aromatic compounds and aromaticity, mechanism of aromatic reactions.

14. Understanding hybridization and geometry of atoms, 3-D structure of organic molecules, identifying chiral centers.

15. Reactivity, stability of organic molecules, structure, stereochemistry.

16. Electrophile, nucleophiles, free radicals, electronegativity, resonance, and intermediates along the reaction pathways.

Semester- II

GE-2 and DSC 2 (Physical Chemistry-1, Organic Chemistry -2)

On completion of this course, the students will be able to learn and understand about:

1. Laws of thermodynamics and concepts.

2. The concept of system, variables, heat, work, and laws of thermodynamics.

3. The concept of heat of reactions and use of equations in calculations of bond energy, enthalpy, etc.

4. The concept of entropy; reversible, irreversible processes. Calculation of entropy using 3nd law of thermodynamics.

5. Chemical equilibrium and Le Chatelier's principle.

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6. Gibbers free energy, equilibrium constants and their relations.
7. Ionic equilibria – electrolyte, ionization, dissociation.
8. Salt hydrolysis (acid-base hydrolysis) and its application in chemistry.
9. Familiarization about classes of organic compounds and their methods of preparation.
10. Basic uses of reaction mechanisms.
11.Mechanism of organic reactions (effect of nucleophile/leaving group, solvent), substitution vs. elimination.
12. Name reactions, uses of various reagents and the mechanism of their action.
13. Preparation and uses of various classes of organic compounds.
14. Organometallic compounds and their uses.
15. Organic chemistry reactions and reaction mechanisms.
16. Use of reagents in various organic transformation reactions.

Semester- III

GE-3 and DSC 3(Physical Chemistry-2, Organic Chemistry-3)

On completion of this course, the students will be able to learn and understand about:

1. The theories/thermodynamics of solutions.
2. Phases, components, Gibb's phase rule and its applications, construction of phase diagram of different systems, the application of phase diagram.
3. Laws of conductivity, transference number, ionic mobility and their applications.
4. Applications of conductance measurement and condutometric titrations.
5. Electrochemistry: cells, electrode, EMF, standard electrode potential, Nernst equation and its application and thermodynamic relations with the term involved in electrochemistry.
6. pH determination using different electrodes and potentiometric titrations.
7. Preparation and reactions of carboxylic acids and carboxylic acid derivatives.
8. Preparation and reactions of amines and diazonium salts.
9. The properties, classifications and synthesis of amino acids, peptides and proteins.
10. The properties, classifications and synthesis of carbohydrates.

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Semester- IV

GE-4 and DSC 4 (Inorganic Chemistry -2, Physical Chemistry-3)

On completion of this course, the students will be able to learn and understand about:

1. Transition metals, its stability, color, oxidation states, complexes and magnetic properties.
2. Coordination compounds – its nomenclature, theories, d-orbital splitting in complexes, chelate.
3. Lanthanides, Actinides – separation, color, spectra and magnetic behavior
4. The separation of Lanthanoids and Actinoids, its color, spectra and magnetic behavior.
5. The nomenclature of coordination compounds/complexes, Molecular
6. orbital theory, d-orbital splitting in tetrahedral, octahedral, square planar complexes, chelate effects.
7. Familiarization with various states of matter.
8. Physical properties of each state of matter and laws related to describe the states.
9. Calculation of lattice parameters.
4. Understanding Kinetic model of gas and its properties.
10. Maxwell distribution, mean-free path, kinetic energies.
11. Behavior of real gases, its deviation from ideal behavior, equation of state, isotherm, and law of corresponding states.
12. Liquid state and its physical properties related to temperature and pressure variation.
13. Properties of liquid as solvent for various household and commercial use.
14. Solids, lattice parameters – its calculation, application of symmetry, solid characteristics of simple salts.
15. The basics of chemical kinetics: rate and order, determination of order, molecularity, and theories of reaction rates.

SEMESTER V (Programme course)

DSE-1 : INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE

After completion of the course, the student shall be able to understand:

1. Silicate materials: glass ceramic and cement.

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2. Properties, classifications, manufacturing processes and applications of glass ceramics and cement.
3. Classifications, manufacture and application of different fertilizers.
4. Surface coatings and their applications.
5. Preparation, classification and application of paints.
6. Batteries and their components.
7. Alloys and their classification.
8. Preparation procedure of different types of steels.
9. Classifications of Catalysis and their properties.
10. Chemical explosives originated from organic compounds.
11. Properties and preparation of some explosive chemicals.

SEMESTER VI (Programme course)

Paper: DSE-2 (Polymer Chemistry)

1. Students will learn the basic elementary conceptabout the polymers. They also learn about the various type of classification of polymer.
2. They will learn about functionality principle.Students also introduce with Carothers equation andthe implication of the equation on the polymerisation
3. They will learn on details on various modes of polymerization *viz.* radical, cationic, anionic and its associated mechanism.
4. They will understand about Structure Property relationships among the polymers.
5. They will come to the importance of averaging the molecular weight of polymer. Next, they know about the four types of avg. molecular weight *viz.* number-, mass-, viscosity- and z- avg. molecular weight of polymer.
6. Students come to know about glass transition temperature and crystalline melting point.

7. ***Experimental:*** They can prepare urea-formaldehyde resins and They can perform viscometry experiment and average molecular weight determination.

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https://cbpbu.ac.in/userfiles/file/CBCS/REVISED%20NEW%20%20CBCS%20SYLLABUS%20-ECONOMICS.pdf

PROGRAMME OUTCOMES

Sl No.	PROGRAMME OUTCOMES
1	Fundamental Concepts
2	Critical thinking skills
3	Analytical reasoning
4	Problem solving skills
5	Scientific reasoning
6	Application skills
7	Decision making skills
8	Employability options
9	Interdisciplinary learning
10	Moral and Ethical awareness
11	Learning Government policy and interventions
12	Market behaviour analysis
13	Research related skills
14	Communication skills

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COURSE OUTCOMES

1. COURSE LEARNING OUTCOMES(CLO)

1.1. B.A.(Hons.) Economics Core Courses

C-1: MICROECONOMICS-I(Credit: 06)

Course Objective

This course is designed to expose the students to the basic principles of microeconomic theory. The emphasis will be on thinking like an economist and the course will illustrate how microeconomic concepts can be applied to analyze real-life situations.

Course Learning Outcomes

The course introduces the students to the first course in economics from the perspective of individual decision making as consumers and producers. On successful completion of this course students would be able to learn

- some basic principles of microeconomics,
- interactions of supply and demand
- consumer and firm behaviour
- cost functions and different shapes of cost curves

C-2: MATHEMATICAL METHODS FOR ECONOMICS-I(Credit: 06)

Course Objective

This is the first of a compulsory two-course sequence. The objective of this sequence is to transmit the body of basic mathematics that enables the study of economic theory at the under undergraduate level, specifically the courses on microeconomic theory, macroeconomic theory, statistics and econometrics set out in this syllabus. In this course, particular economic models are not the ends, but the means for illustrating the method of applying mathematical techniques to economic theory in general. The level of sophistication at which the material is to be taught is indicated by the contents of the prescribed textbook.

Course Learning Outcomes

On successful completion of this course students would be able to

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- have a good knowledge about functions, matrices, differentiation and integration.
- get a thorough knowledge about the various mathematical tools used in the economic analysis.
- manage complicated real life economics problems using mathematical tools learned from this course.

C-3: MACROECONOMICS-I(Credit: 06)

Course Objective

This course plans to introduce the students to the basic concepts of Macroeconomics and discusses the preliminary concepts associated with the determination & measurement of aggregate Macroeconomic variables like savings, investment, GDP, money, inflation and the balance of payments. It also gives students an exposure of macroeconomic policies in the IS-LM framework.

Course Learning Outcomes

On successful completion of this course students would be able to

- understand basic concepts of macroeconomics
- interpret various measures of National income accounting
- explain various principles and theories of employment
- know the Macroeconomic Policies, namely, Fiscal Policy & Monetary Policy

C-4: STATISTICAL METHODS FOR ECONOMICS-I(Credit: 06)

Course Objective

This is a course on statistical methods for economics. It begins with some basic concepts and terminology that are fundamental to statistical analysis of real –life economic problems.

Course Learning Outcomes

On successful completion of this course students would be able to

- know the concept of statistical data, their classification, tabulation and graphical and diagrammatic representation of statistical data.
- understand different descriptive statistical theories like, measures of central tendency, measures of dispersion, correlation and regression.
- develop competence in using indices for data analysis and its interpretation.
- get an elementary idea about theory of probability.

C-5: MICROECONOMICS-II(Credit: 06)

Course Objective

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The course is designed to provide a sound training in microeconomic theory to formally analyze the behaviour of individual agents under competitive and non-competitive market structure, factor pricing under different market conditions, general equilibrium analysis and welfare economics. Since students are already familiar with the quantitative techniques in the previous semesters, mathematical tools are used to facilitate understanding of the basic concepts.

Course Learning Outcomes

On successful completion of this course students would be able to

- understand different types of market structures prevailing in the world.
- analyse factor pricing and point out reasons for wage differential on social perspective.
- learn the practical relevance of general equilibrium analysis and welfare economics.

C-6: INDIAN ECONOMIC HISTORY DURING BRITISH RULE(Credit: 06)

Course Objective

This course analyses key aspects of Indian economic development during the British colonial rule. In doing so, it investigates the place of the Indian economy in the wider colonial context, and the mechanisms that linked economic development in India to the compulsions of colonial rule.

Course Learning Outcomes

On successful completion of this course students would be able to comprehend

- the intricacies of India's economic, political and social developments during the British era.
- evolution of industrial entrepreneurship and money market during the British rule.

C-7: MATHEMATICAL METHODS FOR ECONOMICS-II (Credit: 06)

Course Objective

This course is the second part of a compulsory two-course sequence. The objective of this sequence is to transmit the body of basic mathematics that enables the study of economic theory at the undergraduate level, specifically the courses on microeconomic theory, macroeconomic theory, statistics and econometrics set out in this Syllabus. In this course, particular economic models are not the ends, but the means for illustrating the method of applying mathematical techniques to economic theory in general. The level of sophistication at which the material is to be taught is indicated by the contents of the prescribed textbook.

Course Learning Outcomes

On successful completion of this course students would be able to

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- associate mathematical techniques like differential and difference equations, linear programming and game theory in economic models.
- acquainted with the mathematical foundations necessary for further study of a variety of disciplines including postgraduate economics, statistics, finance and data analytics.
- build proficiency in optimization techniques which would be essential in decision making for managers and entrepreneurs.

C-8: MACROECONOMICS-II(Credit: 06)

Course Objective

This course is designed to introduce advanced topics in the Macroeconomics. The course will focus on the development of various schools of thoughts in macroeconomic theory. Further,in this course students areintroduced to long run issues like growth, technical progress, economics of ideas,R&D, innovation and knowledge creation. This course also provides insights into
modern business cycle analysis.

Course Learning Outcomes

On successful completion of this course students would be able to

- understand different consumption and investment theories
- infer the performances of expectations in unemployment and inflation.
- combine their knowledge of the working of the macro economy with long run economic phenomena like economic growth,technological progress, R&D and innovation
- explain the various phases of Business cycle.

C-9: INDIAN ECONOMY SINCE INDEPENDENCE(Credit: 06)

Course Objective

Using appropriate analytical frameworks, this course reviews major trends in economic indicators and policy debates in India in the post-Independence period, with particular emphasis on paradigm shifts and turning points.This course examines sector-specific polices and their impact in shaping trends in key economic indicators in India. It highlights major policy debates and evaluates the Indian empirical evidence. Given the rapid changes taking place in the country, the reading list will have to be updated annually.

Course Learning Outcomes

On successful completion of this course students would be able to

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- understand the role of economic policies in shaping and improving economic performance in agriculture,manufacturing and services.
- get idea about the importance of agricultural development and industrial policy for economic development of India.
- understand the importance of external sector for economic development

C-10: STATISTICAL METHODS FOR ECONOMICS-II(Credit: 06)

Course Objective

This course is designed to begin with some basic conceptsand terminology that are fundamental to statistical analysis and inference. It thendevelops the notion of probability distributions of discrete andcontinuous random variables and of joint distributions. This is followed by a discussionon sampling techniques used to collect survey data. The course introduces the notion ofsampling distributions that act as a bridge between probability theory and statisticalinference. The semester concludes with some analysis of index number and time series.

Course Learning Outcomes

On successful completion of this course students would be able to

- acquaint with random variables, its different types and probability distributions.
- understand the difference between population and sample and various sampling techniques.
- to apply statistics in everydaylife to distinguish systematic differences among populations from those that resultfrom random sampling.
- infer the implications of index number and time series in economic analysis.

C-11: DEVELOPMENT ECONOMICS(Credit: 06)

Course Objective

The course begins with a discussion of alternative conceptions of development and their justification. It then proceeds to aggregate models of growth and cross-national comparisons of the growth experience that can help evaluate these models. The axiomatic basis for inequality measurement is used to develop measures of inequality and connections between growth and inequality are explored. The course ends by delineating role of planning and different planning techniques in economic development with a focus on Indian Plan models.

Course Learning Outcomes

On successful completion of this course students would be able to

- distinguish between economic growth and development

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- learn about various development and growth theories
- the implications of economic planning in development economics.

C-12: PUBLIC ECONOMICS(Credit: 06)

Course Objective

Public economics is the study of government policy from the points of view of economicefficiency and equity. The paper deals with the nature of government intervention and itsimplications for allocation, distribution and stabilization. Inherently, this study involves a formal analysis of government taxation and expenditures. The subject encompasses a host of topics including public goods, market failures, externalities, public expenditure, public revenue and public debt.

Course Learning Outcomes

On successful completion of this course students would be able to

- learn different concepts associated with public economics
- understand the analysis of government taxation and expenditures
- grasp the notions of the public budget and debt.

C-13: INTERNATIONAL ECONOMICS(Credit: 06)

Course Objective

This course develops a systematic exposition of models that try to explain the composition, direction and consequences of international trade and the determinants and effects of trade policy. It then builds on the models of open economy macroeconomics developed in courses focusing on national 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.

Course Learning Outcomes

On successful completion of this course students would be able to

- understand the concepts and theories of international trade.
- identify the principles that govern the free flow of goods and services at the international level.
- learn the major components of the balance of payment of a country
- analyse the functions of international economic institutions.

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C-14: ENVIRONMENTAL ECONOMICS(Credit: 06)

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 as well as valuation of environmental quality, quantification of environmental damages, tools for evaluation of environmental projects such as cost-benefit analysis and environmental impact assessments. Indian environmental issues and legislation are also discussed.

Course Learning Outcomes

On successful completion of this course students would be able to

- have a detailed understanding of the discipline of environmental economics, including its key principles and methods.
- describe the basics of environmental and energy economics.
- be able to use economic techniques to analyze environmental problems and to assess environmental policies.
- illustrate the details of environmental policies in India.

1.2. B.A.(Hons.) Economics Discipline Specific Elective Courses

DSE(1-A): INTRODUCTORY ECONOMETRICS(Credit: 06)

Course Objective

This course provides a comprehensive introduction to basic econometric concepts and
techniques. It covers statistical concepts of hypothesis testing, estimation and diagnostic testing of simple regression models. The course also covers the consequences of and tests for misspecification of regression models.

Course Learning Outcomes

On successful completion of this course students would be able to

- acquire a preliminary idea about the nature and scope of econometrics.
- understand two variable CLRM model
- estimate linear models using ordinary least squares and makeinferences about population parameters.

DSE (2-A):MONEY AND BANKING(Credit: 06)

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Course Objective

This course exposes students to the theory and functioning of the banking sector of an economy. It highlights the organization, structure and role of money market and institutions. It also discusses interest rates, monetary management andinstruments of monetary control. Financial and banking sector reforms and monetarypolicy with special reference to India are also covered.

Course Learning Outcomes

On successful completion of this course students would be able to

- understand about the functions of money and measures of money supply.
- get an in-depth knowledge about the functions of central bank and commercial banks in an economy.
- know various monetary policies and the banking sector reforms in India after independence.

DSE(1-B): FINANCIAL ECONOMICS(Credit: 06)

Course Objective

This course would enable students to acquaint with the basic principles of financial economics. The financial system, banking and non-banking financial institutions, financial services and operation activity are covered. It should provide an understanding of financial institutions, various operations of capital market and their regulatory framework. Also, this course provides an idea about the valuation of financial securities and detailed understanding of the functions of the Multinational corporations.

Course Learning Outcomes

On successful completion of this course students would be able to

- have an insight of the basic theoretical framework of the financial system.
- know about evolution of NBFCs, its regulatory frameworks and markets.
- explore the various operations of capital market and their regulatory framework
- learn how to value different financial instruments in practice.
- understand different elements of International finance.

DSE (2-B):RURAL DEVELOPMENT(Credit: 06)

Course Objective

The objective of this course is to appraise students about background and different theories of rural development. It also focuses on different policies and programmes of rural development in vogue in India.

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Also, this course provides an idea about resources and livelihoods and stakeholdersofrural development in India.

Course Learning Outcomes

On successful completion of this course students would be able to

- understand decentralized governance, decentralized planning and participatory approach to rural development.
- familiar with different policies and programmes for rural development.
- comprehend importance of development of non-farm sector and essence of rural industrialization programme
- figure out role of stakeholders like, cooperatives and other formal and informal organizations.

1.3. B.A.(Hons.) Economics Skill Enhancement Courses

SEC-1A: FOUNDATION COURSE IN MATHE MATICS-I(Credit: 02)

Course Objective

This course is designed to rigorously introduce several areas of mathematics particularly algebra and analytical geometry that are widely-used in the domain of Economics.

Course Learning Outcomes

On successful completion of this course students would be able to

- get a thorough knowledge about the various mathematical concepts related with algebra and analytical geometry.
- execute complicated real life economics problems using mathematical tools learned from this course.

SEC-2A: FOUNDATION COURSE IN STATISTICS-I(Credit: 02)

Course Objective

The objective of this course is to familiarize students with the basic Statistical Tools used in Economics.

Course Learning Outcomes

On successful completion of this course students would be able to

- know the concept of statistical data, their classification, tabulation and graphical and diagrammatic representation of statistical data.
- understand different descriptive statistical theories like, measures of central tendency, measures of dispersion, correlation and regression.
- use of time series analysis tools and techniques in decision-making process.

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SEC-1B: FOUNDATION COURSE IN MATHE MATICS-II(Credit: 02)

Course Objective

This course is designed to rigorously introduce several areas of mathematics differential and integral calculus that are widely-used in the domain of Economics.

Course Learning Outcomes

On successful completion of this course students would be able to

- associate mathematical techniques like differential and integral calculus in economic models.
- build proficiency in optimization techniques which would be essential in solving real-life economic problems.

SEC-2B: FOUNDATION COURSE IN STATISTICS -II(Credit: 02)

Course Objective

The objective of this course is foster ideas which are fundamental to statistical analysis and inference.The course introduces the notion ofsampling distributions that act as a bridge between probability theory and statisticalinference.

Course Learning Outcomes

On successful completion of this course students would be able to

- understand the concept of random variables and be familiar with some commonly used discrete and continuous distributions of random variables.
- T estimate population parametersbased on random samples and test hypotheses about these parameters.

1.4. Generic Elective Courses in Economics for other Hons. Departments

GE III: Indian Economy-I(Credit: 06)

Course Objective

This course examines sector-specific polices and their impact in shaping trends in key economic indicators in India. It highlights major policy debates and evaluates the Indian empirical evidence.

Course Learning Outcomes

On successful completion of this course students would be able to

- develop ideas of the basic characteristics of Indian economy and its potential.

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- understand agriculture as the foundation of economic growth and development; analyze the progress and changing nature of agricultural sector and its contribution to the economy as a whole.
- acquire knowledge about land reforms in India.

GE IV: Indian Economy-II(Credit: 06)

Course Objective

This course will nurture students understanding Indian demographic composition, monetary systems and public finance. Students will be educated on the role of private sector, public sector, and external sector for India's growth and stability.

Course Learning Outcomes

On successful completion of this course students would be able to

- understand key issues related to the Indian economy.
- broaden their horizons and enable them to analyze current economicpolicy effectively.

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DEPARTMENT OF EDUCATION

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PROGRAMME OUTCOMES

Sl No.	PROGRAMME OUTCOME
1	Professional competency
2	Research and Higher education
3	Diverse leadership
4	Placement preparation
5	Creative learning environment
6	Value added and ethical skills

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COURSE OUTCOMES

SEMESTER-I

The CBCS Education syllabus of the first semester provides two core courses/major papers. The first core paper **(CE-1)** is concerned with some Indian& WesternSchool of Philosophy like Sankhya, Yoga, Jainism, Buddhism, Idealism, Naturalism, Pragmatism and realism. Also, Course Objectives: On completion of the course the students will be able to state and analyse the Meaning, Nature and Scope of Education, Know the aims of education and the report of International Commission on Education (1996), establish the relationship between Education and Philosophy, understand the various Factors of Education, comprehend Indian schools of philosophy and be aware of Western schools of Philosophy and be aware of the importance of freedom and discipline in education and realize the National values as enshrined in the Indian Constitution.

And the second core paper **(CE-2)** is concerned with the Psychological Foundation of Education-I. The study of these core course deals with understanding the concept, nature and scope of Educational Psychology, recognize the concept of growth and development of child, the characteristics of different stages of development in human life, the concept of cognitive structure and functions. Such study will help students to comprehend the application of Piaget's theory of cognitive development. The will be able to develop understanding the concept of constructivism in psychology and realize the psycho-physiological basis of human life and mechanism of sensation and perception.

The study of this two-core course altogether makes students aware about the philosophical concepts and psychological concepts.

SEMESTER-II

The CBCS Education syllabus of the Second semester provides two core courses/major papers. The first core paper **(CE-3)** of this semester is concerned with Sociological Foundation of Education. Through this paper the students of this department make themselves aware about the meaning, nature and scope of Educational Sociology, understand the relationship between Education and Sociology, acquire knowledge and

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understand the concept and role of Social Groups, be familiar with the Meaning, Process and Factors of Socialization and the role of the family and school in Socialization. The study of these core course will help students comprehend the role of different social agencies in Education, understand the concept, types and agencies of social control, realize the meaning of social stratification and social mobility in Indian society, be acquainted with and understand the definition, characteristics, factors, constraints of Social Change and understand the interdependency between education and culture. The course will also help students to identify various social issues in Indian Scenario.

The second core paper (**CE-4)** of this semester is concerned with thePsychological Foundation of Education-II. In this paper students will study about some Learning theory of Pavlov, Skinner, Thorndike and Gestalt. This paper provides a wide overview on Personality, Memory and Forgetting. Such study helps the students to have an understanding about the process of learning and transfer of learning, appreciate the individual differences like intelligence, creativity etc. In learning, understand different aspects of personality and how to assess an individual's personality and grasp the process of memorization and causes of forgetting.

SEMESTER-III

The CBCS Education syllabus of the third semester provides three core papers and one skill Enhancement (SEC) paper. The **first core paper (CE-5)** of the third semester is concerned with the Development of Education in Ancient and Medieval India. This paper provides a wide overview on Educational Development of Ancient and Medieval India learning of which will help the students to have an understanding about the development of education in India historical perspective, development of education in India during Ancient period and the development of education in India during medieval period.

The **Second paper core (CE-6)** of this semester is concerned with the Development of Education in British India. The study of this paper will enable students to be aware of the development of Education in British period, understand the missionary educational activities in India during early 19th century, be acquainted with the Charter Act (1813) and its significance, understand the contributions of Raja Rammohan Roy, Vidyasagar, Derozio in education during Bengal Renaissance. The students will learn the causes of controversy between oriental and occidental, be acquainted with the recommendation given in Adam's Report, and understand the significance of recommendation of Indian Education Commission. They will be able to comprehend the National Education Movement and Gokhale's Bill on primary education and enumerate the recommendations

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of Sadler Commission in 1917 and will also be able to analyse the significance of Gandhiji's Basic Education and Sargent Report.

The **third core paper (CE-7)** of this semester is concerned with the development of Education in Post Independence India. The study makes students aware about the Preamble and various Articles on Education in Indian Constitution, be acquainted with the RTE Act-2009, the Development of Education under Five Years. The course will enable students to describe major recommendations of different Education Commissions in Post Independent India and learn the various National Policies and committees on Education in Post Independent India.

The **Skill Enhancement paper (SEC-I)** is concerned with School Based Activities & Education. The study of this paper makes students aware about some practical work knowledge of School and also makes them aware about the responsibility of school. Learners also will be able to be familiar with the preparation of learning design and apply their knowledge of designing learning material in education. The will be able to learn to record different kinds of activities conducted in school.

The CBCS Education syllabus of the third semester honours also provides one **Generic Elective paper (GE-I)** for the students of other than Education Honours. This GE paper is concerned with the Adult and Continuing Education. This paper helps to make students aware about some concepts about the basics of adult education, continuing education, life-long education, non-formal approaches in adult education, understand the history of adult education in ancient times, Middle Ages and pre-independence India and be aware of the development of adult education in post-independence India. They will also be acquainted with the current trends of adult education and UNESCO's effort in relation to this.

SEMESTER-IV

The CBCS Education syllabus of the fourth semester provides **three core papers** and **one skill enhancement (SEC)** paper.

The first paper **(CE-8)** deals with Educational Management and Administration. This paper contains some notions of Educational Management and Administration, Supervision and Inspection, Educational Leadership, and Educational Planning, which helps students to become aware of the Meaning and Functions of Educational Administration. They will understand the meaning and scope of Educational Management,

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learn the Meaning and Purpose of Supervision, recognize the various Factors affecting Managerial behaviour of teachers, be familiar with the Meaning, Need and Significance of Educational Planning and recognize the Strategies and Steps in Educational Planning. They will be acquainted with the last Five-Year Plan in Primary and Secondary Education and understand the functions of various Agencies / Bodies of Administration and as well will be able to comprehend the differences between Inspection and supervision.

The second core paper **(CE-9)** of this semester is concerned with Curriculum Studies. After a successful study of this paper students will become aware of Curriculum, the nature and functions of Curriculum. They will be able to describe the various principles of Curriculum Construction, explain various types of curriculums, understand the bases of Curriculum, the process of curriculum development and also be able to realize the Concept, Characteristics and Utility of Curriculum Evaluation and Differentiate between Formative and Summative Evaluation. They will understand the curriculum recommended by Indian Education Commission (1964-66).

The third core paper **(CE-10)** is concerned with the – Educational Technology.The knowledge about the Educational Technology makes students able to understand the Concept, Nature, Need and Scope of Educational Technology, Problems of Educational Technology, Approaches of Educational Technology, understand the Concept, Nature, Types, and Components of Communication. They will be acquainted with the concept of Barriers of Classroom communication and strategies of overcoming barriers in communication, know the various Media used in Education, recognize the Concept of Teaching, Learning and Instruction, understand the various Phases of Teaching such as Pre-active, Inter-active &post-active, appreciate the various Levels of Teaching, identify the families of Models of Teaching and be aware of the concept and principles of Programmed Learning and Computer Assisted Learning.

The **Skill Enhancement** paper of this semester **(SEC-II)** is concerned with Community Outreach Activities & Education. It helps students to get an idea about the community and its developmental process, learn to study the community and understand the importance of the study and comprehend the meaning of community outreach activity. They will be empowered to organize community outreach activity in society.

The CBCS Education syllabus of the fourth semester also provides one **Generic Elective paper (GE-II)** for the students of other than Education Honours. This paper is concerned with Yoga Education.Through this paper students will be able to understand the Concept of Yoga and Yoga Education, comprehend the Role

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of Yoga in Education, describe Yoga education with special reference to Aims, Curriculum, Role of Teacher and Educational Implications, be aware of the History of Yoga and the contributions of Sagacious Yogis for the development and promotion of Yoga. They will be able to explain the various Types of Yoga, identify and understand the various techniques or methods of practicing Yoga and appreciate the Asans / Mudras and their effects to promote a sound physical and mental health.

SEMESTER-V

The CBCS Education syllabus of the fifth semester provides two core papers and two **Discipline Specific Courses (DSE).**

Among the two core courses the first one **(CE-11)** of these semesters is about– Comparative Education. The study of this paper makes students aware about Comparative Education, its Nature, Scope and Importanceand Methods. The students will be acquainted with the various Factors of Comparative Education, the Aims and Objectives of Education at various levels in India, USA and UK and comprehend the Structure and Curriculum of Education at various levels in India, USA and UK. They will also recognize the Administration System of Education in India, USA and UK., and make comparison among the countries like India, USA and UK with respect to their Educational Aims, Objectives, Structure, Curriculum, Administration system of Education.

The second core course **(CE-12)** of this semester is concerned with notion of - Measurement and Evaluation in Education.The successful study of this paper makes students aware about the concept of Measurement and Evaluation, understand the relationship between Measurement and Evaluation, be familiar with, understand and differentiate various scales of measurement from each other and understand the different tools and techniques of evaluation used in education and recognize the various important characteristics of a good test.

The first **DSE syllabus (DSE-I)** of the fifth semester provides Inclusive Education.After completion of the course the students shall be able to be acquainted with the concept, meaning and need of Inclusive Education, explain the causes of inequality in education and role of education to remove inequality in education and understand the importance of students' prior knowledge, life experiences, and interests in achieving learning goals. They will be aware of how to create and maintain effective environments in

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classroom as well as in school and understand how to plan instruction and design learning experiences for learners.

The second DSE syllabus **(DSE-II)** of the fifth semester provides Educational Guidance and Counselling.The study of this paper makes students aware about such analytical approaches like the concept, meaning, nature and importance of guidance and be familiar with the meaning, purposes and functions of different types of guidance. They will be able to explain the necessities of guidance at different stages of education and learn the concept, meaning, nature and importance of counselling and explain the meaning, purposes and functions of different types of counselling. They will recognize and appreciate the characteristics of a good Counsellor and will be able to identify and understand the different Tools and Techniques of Guidance and Counselling and as well can distinguish between guidance, counselling and teaching.

SEMESTER-VI

The CBCS Education syllabus of the sixth semester provides two core papers and two Discipline Specific Courses (DSE).

Among the two core courses the first one (**CE-13**) is about the Research Methodology in Education.This paper covers a wide concept of different research. The study of this paper helps students to be familiar with the Concept, Nature, Scope and Importance of Educational Research, identify the sources of Knowledge, and recognize the Need of Research in Education, recognize the various Methods and Types of Educational Research, identify the criteria of good Research Problem, be familiar with the Concept, Characteristics and Types of hypothesis, the concept of Population, Sample and Sampling Techniques and be acquainted with the Concept, Nature and Sources of Qualitative and Quantitative Data, the Research Tools and also be able to write and evaluate the Research Proposal.

The second core course **(CE-14)** of this semester is concerned with the Statistics in Education.This text provides certain intellectual frame work which helps students to interpret value and understand use of statistic in education. After completion of the course, the students will be able to be acquainted with the Concept Scope and Need of Educational statistics, make organization, tabulation and graphical representation of Data, measure Central Tendency, Variability, calculate the Percentile and Percentile Rank, compute Coefficient of Correlation by using various methods and recognize the Concept of Normal Distribution, its Properties and Uses and calculate the Skewness and Kurtosis and Derived Scores.

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The first DSE syllabus **(DSE-III)** of the sixth semester provides Teacher Education. After completion of the course the students shall be able to understand the Meaning, Nature and Scope of Teacher Education, its Need and importance and understand the Changing Context of Teacher Education in Indian Scenario. They will be able to explain Historical Development of Teacher Education in India, understand the problems of Teacher Education in India and give some suggestions to improve the conditions of Teacher Education in India. They will also be able to explain the role of various agencies of Teacher Education, know and understand the concept of profession and professionalism and justify teaching as a noblest profession and learn the characteristics of professional teaching.

The second **DSE (DSE-IV)** syllabus provides Distance Education. The study of this DSE course will help students to state the meaning and characteristic features of distance education in India, state the significance of distance education, are acquainted with the present status of distance education, understand the concept of information and communication technologies and their application in distance education. The students will also be able to describe the media for distance education-print and electronic, understand the management of student-support services and explain the distance mode for technical and vocational education programmes for rural development and appreciate the quality assurance of distance education.

(PROGRAM COURSE)

The CBCS Program Course in Education under Cooch Behar Panchanan Barma University provides scope of learning in Discipline Specific Courses (DSC) along with Discipline Specific Electives (DSE) in different semesters. It also includes courses in Generic Electives (GE) as well as Skill Enhancement Courses (SEC). All these courses in under graduate level and the possible outcomes in this regard may be stated as below:

SEMESTER-1

The students will study **DSC-1**: Philosophical and Sociological Basis of Education. After completion of the course the students shall be able to know the meaning, nature and scope of Educational Philosophy. They will understand and explain the relationship between Education & Philosophy and comprehend the

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different Individualistic and Socialistic aims of education. They will know and understand the different Western schools of philosophy and their contributions in various aspects of education and be aware of the different Indian schools of philosophy and their contributions in various aspects of education and as well understand the educational philosophy of great Indian and foreign educators, the meaning, nature and scope of Educational Sociology, classify social groups with their nature. They will recognize the definition, characteristics, factors and constraints of social change and explain the role of education in social change and social mobility.

SEMESTER-2

The students will study **DSC-2**: Psychological Basis of Education wherein the students shall be able to know and understand Learning, its characteristics and influencing factors of learning and explain the different theories of learning and their educational implications, the relationship between Attention and Interest. They will understand the different Stages and aspects of human development and recognize of how Physical, Social, Emotional and Cognitive development of a child take place during different stages of development. Understand of how learning is related with the development of a learner. They will explain the various theories of human development and their educational implications.

SEMESTER-3

The students will learn **DSC-3**: Development of Education in India–I the system of Indian education during Vedic, Buddhist and Medieval periods and explain the different educational initiatives taken in 19th Century in India and their impacts on Indian education system.

In **SEC-1(PRG)** the learners will learn Life Skill Education in which they will acquire knowledge about the concept of life skill education, understand the concept, processes and various skills of communication. They will acquire knowledge about the language usage skill, understand the process of critical thinking and problem solving and recognize the process of team formation, team work and group activities. They will be familiar with how to manage team performance and team conflicts and identify and understand the concept and different types of leadership. Develop leadership skills.

SEMESTER-4

The learners will be able to learn in DSC-4: Development of Education in India –II about the development of education in India during British Period and understand the educational system after

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independence of India. They will be acquainted with the recommendations of different Education Commissions in Post-Independence India

After completion of the course in **SEC-2 (PRG)**: Yoga Education the students shall be able to learn the Concept of Yoga and Yoga Education, be aware of the Role of Yoga in Education. They will be able to describe Yoga education with special reference to Aims, Curriculum, Role of Teacher and Educational Implications. Know and understand the various techniques or methods of practicing Yoga and be acquainted with and understand the Asans / Mudras and their effects to promote a sound physical and mental health.

SEMESTER-5

The students will learn **DSC-5**: Educational Measurement and Evaluation wherein they shall be able to acquire knowledge about the concept of Measurement and Evaluation, understand the relationship between Measurement and Evaluation, identify, understand and differentiate various scales of measurement from each other. They will be able to discern and understand the different tools and techniques of evaluation used in education and value the various important characteristics of a good test.

After completion of the course in **SEC-3**: Statistics in Education, the students will be able to learn the Concept, Scope and Need of Educational statistics, make organization, tabulation and graphical representation of Data and measure the Central Tendency, Measure the Variability and as well compute Coefficient of Correlation by using various methods.

In **GE-1**: Contemporary Issues in Indian Education

The students will be able to recognize and understand the concept and objectives of Universalization of Elementary Education, Secondary Education and Higher Education and explain the role of RTE Act, DPEP, and SSA-SSM in Universalization of Elementary Education. Hey will be able to comprehend the role of RMSA in Universalization of Secondary Education and explain the role of RUSA in Higher Education. Know and understand the problems of Elementary Education, Secondary Education and Higher Education.

SEMESTER: 6

DSC-6: Educational Technology, after completion of the course, the students will be able to be acquainted with the Concept, Nature, Need and Scope of Educational Technology, learn the Problems of Educational Technology. Know the Approaches of Educational Technology, understand the Concept, Nature,

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Types, and Components of Communication. They will be familiar with the Barriers of Classroom communication and strategies of overcoming barriers in communication and learn the various Media used in Education.

In **SEC-4**: Distance Education the learners will be able to state the meaning and characteristic features of distance education in India, explain the significance of distance education, recognize the present status of distance education. They will be able to state the concept of information and communication technologies and their application in distance education, describe the media for distance education-print and electronic, and understand the management of student-support services; They will also be able to describe the distance mode for technical and vocational education programmes for rural development; and appreciate the quality assurance of distance education.

In **GE-2:** Teacher Education, after completion of the course the students shall be able to understand the Meaning, Nature and Scope of Teacher Education, comprehend the Need and Importance of Teacher Education. They will identify and understand the Changing Context of Teacher Education in Indian Scenario, explain Historical Development of Teacher Education in India, realize the problems of Teacher Education in India and give some suggestions to improve the conditions of Teacher Education in India. They will be able to explain the role of various agencies of Teacher Education and appreciate the concept of profession and professionalism. They will be able to justify and appreciate teaching as a noblest profession. The students will be acquainted with the characteristics of professional teaching.

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DEPARTMENT OF HISTORY

For UG CBCS syllabus of History in Cooch Behar Panchanan Barma University click the following link:

https://cbpbu.ac.in/userfiles/file/CBCS/History%20CBCSUG.pdf

PROGRAMME OUTCOMES

Sl No.	PROGRAMME OUTCOME
1	Understanding Historical Methodology
2	Understanding of Physical/Cultural Landscape
3	Philosophical thinking and Ethical Values
4	Understanding of Social, Political and Economic Development
5	Interdisciplinary approach
6	Notion about Nation State and Nationalism
7	Ability to conduct independent research
8	Critical Analysis
9	Understanding Regional Contexts
10	Liberal Mindset

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COURSE OUTCOMES

COURSE OUTCOME: HISTORY

B.A. HONOURS IN HISTORY: 1st SEMESTER

Learning Outcome:

Students will acquire knowledge regarding the primitive life and cultural status of the people of ancient India. They can gather knowledge about the society, culture, religion and political history of ancient India. Besides as a student of history he/she will learn about the historiographical trends, interpretation of the historical sources of ancient India as well. They can acquire knowledge about the Vedic Period and the rise of Jainism and Buddhism in ancient times of India

CORE COURSE -1: HISTORY OF INDIA UP to 650 A.D. (Pre-history to Mahajanapadas)

Unit 1: Reconstructing Ancient Indian history.

a. Geographical background; physiographic'; major routes of communication and environment.

b. Sources and tools of historical reconstruction; literature; archaeology; epigraphy and numismatics.

c. Historical interpretations with special reference to gender, technology,environment and religion.

Unit 2 : Pre-historic Age.

a. Paleolithic culture-sequence and geographical distribution; topographic and climatic changes; evolution and uses of stone industries and other technological developments.

b. Mesolithic culture-regional and chronological distribution; new developments in technology and economy; rock art.

c. food production-concept of the Neolithic; understanding the complexities of its beginnings.

Unit 3: Proto-historic Age.

a. Growth of Chalcolithic cultures and its distribution.

b. the Harappan civilization-origin, distribution, major sites (Mahenjodaro, Harappa,

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Kalibangan, Lothal, Dholavira, Rupar); agrarian base; craft production and trade; social and political organization; religious beliefs and practices; art and architecture; the problem of urban decline and the post-Harappan cultures.

c. Neolithic and Chalcolithic cultures in non-Harappan India.

Unit 4: Vedic Civilisation.

a. The Aryans; The Aryan problem; original homeland; spread of the Aryans and Vedic literature; epics-Ramayana and Mahabharata.

b. Society, economy, polity, religion and military techniques of the Aryans.

c. Varna system and position of women; Iron Age.

Unit 5: Religion and Philosophy.

a. Material and ideological background.

b. Jainism, Buddhism, Ajivikas and other systems.

c. Settlements and urbanization.

Unit 6: Mahajanapadas to Magadhan Empire.

a. Sixteen Mahajanapadas and its location; polity.

b. growth of Magadhan Empire; Its dynasties.

c. Social Structure; trade and commerce and economy.

Learning outcome:

Students will learn the reconstruction of early medieval Indian History. They'll be able to acquire knowledge regarding the changes in the realm of polity and culture, economy and society of the early medieval period. They will gather the knowledge of different trends of Indian philosophy, art and culture.

CORE COURSE-2 : HISTORY OF INDIA A.D. 650-A.D. 1526 (Up to 1206 A.D.)

Unit 1: Reconstructing of Early Medieval Indian History.

a. Historical sources and their interpretation- literature, epigraphy and numismatics.

b. Polity- the political conditions of India and Northern India; Early Arab contact with India; Arab conquest and its impact; Hindu resistance to the Muslims and its failure.

c. Political developments; nature of the regional politics with special reference to the Pratiharas, Palas, Senas, Rastrakutas, Cholas, Pallavas and other contemporary dynasties.

d. Early Turkish invasions; sultan Mahmud and Muhammad Ghuri; nature and impact.

Unit 2: Economy and Society.

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a. Land grants and agrarian expansion; changes in land tenure; peasants; intermediaries and landed magnates; their regional variations.

b. Indian feudalism and debates.

c. Social Stratification: class, varna, jati, untouchability, gender, marriage and slavery.

Unit 3: Trade and Commerce.

a. Urban centre; trade and trade networks; internal trade; maritime trade.

b. Forms of exchange; coinage and currencies.

c. Guilds and industries.

Unit 4: Culture

a. Literature-rise and growth of regional languages.

b. Schools of Indian Philosophy; Bhakti; Tantrism; Puranic traditions; Buddhism and Jainism; popular religious cults.

c. Science and technology.

Unit 5: Art and Architecture.

a. Art and architecture.

b. Painting; sculpture; arts and crafts.

c. Evolution of regional styles.

B.A. HONOURS IN HISTORY: 2ND SEMESTER

Learning Outcome:

As a student of history he or she will learn about the political development of northern and southern India during Maurya period to post gupta period. They will also learn about the social, economical and cultural developments of India for different span of time.

Core Course-3: History of India up to 650 A.D.(Age of Maurya to Post Gupta Period

Unit 1: The Mauryan Empire

Empire - its nature and bases; political and cultural relations with special reference to Sri Lanka and West Asia; Ashoka's dhamma- its nature and propagation; society and economy; art and architecture are to be studied in detail.

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Unit 2: Post-Mauryan developments (c. 200 BC- c. 300 AD)

a. Invasions and their impact: Bactrian Greeks; Scythians; Kushanas.

b. Polity, Economy, Society, Religion and Culture.

i. Polity: Post Mauryan politics with special reference to the Kushanas and Satavahans; Tamil Chieftaincies - Chera, Chola, Pandya.

ii. Economy: Land grants and agricultural expansion; urban growth; craft production; trade and trade routes; coinage and currency; Indo-Roman trade.

iii. Society: peasanization of tribes; assimilation of incoming people.

iv. Religion: spread of Jainism and Buddhism: emergence of Mahayana Buddhism; Vaisnava and Saiva forms of worship.

v. Culture : art and architecture; sculpture; literature;

vi. Sangam Age: Society, language and literature, Megaliths, Tamilagam.

Unit 3: Age of the Guptas

a. State and administrative institutions.

b. Social and economic change with special reference to urban patterns; Agrarian structure; land grants; coinage and currency system; trade.

c. Cultural developments : art; architecture; sculpture; painting; literature; religion; Sanskrit theatre

d. Culture Contracts with Central Asia.

e. Maukharis, Vakatakas, Sasanka and later Guptas.

Unit 4: Post-Gupta period

a. Harshavardhana: political system and administrative institutions.

b. Peninsular India: Chalukyas, Pallavas; polity, society and economy. Culture developments with special reference to art and religion.

Learning outcome:

Students will learn and analyze about the transition from historic centuries to the early medieval period. They'll be able to delineate changes in the realm of polity and culture; religion; the growth of vernacular languages and newer forms of art and architecture

Students will also be able to identify the major political developments in the History of India during the period between the seventh to sixteenth centuries. They will capable to outline the changes and continuities in the

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field of culture, especially with regard to art, architecture, and different religious movements. They can perceive the development of trade and urban complexities during this period.

Core Course-4: History of India A.D.650 to 1526A.D.(Sultanate Period-1206-1526)

Full Marks-50

Unit 1: Sultanate

i. Historiography and Sources.

ii. Political Structure: 1206-1290, 1290-1450, and 1450-1526.

Ruling elites; central structure and military organization; iqta; territorial changes; Mongol Threat; relations with rural intermediaries; legitimation of political authority; theories of Kingship; symbols and rituals of sovereignty; relations with autonomous chieftains; Sufis, Bhaktas and political authority.

b. Society and economy in north India

i. Environmental context; agricultural production; technology.
ii. Rural society: revenue system.

iii. Urbanization, technology and agricultural production.

iv. Monetization, market regulations; and trade.

c. Religion and Culture:

i. Sufism: doctrines Silsilas; and practices.

ii. Bhakti movements: Nathpanthis; Kabir; Nanak; and the Sant tradition.

iii. Sultanate architecture.

iv. Literature: Persian and indigenous.

Unit 2: Regions

a. Historiographical issues: sources: regional chronicles; bardic narratives; Sufi and Bhakti texts; and travelogues.

b. Societies and Political Formations: A Regional Perspective:-

i. Bengal: Bengal under the Delhi Sultans -- emergence as an independent Kingdom - the rule of the IlliusSahi dynasty and the Hussain Sahi dynasty with special reference to society, economic and culture of the region.

ii. Vijayanagar &Bahamanii.

iii. Warfare and Society.

c. Society and Economy; a regional Perspective:-

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i. Vijayanagar.

ii. Vaisnabism in Bengal and its impact on the Bengal society- the nature of the Hindu-Muslim understanding during the Sultanate period- an assessment. ii.

iii. Trade and urbanization with special reference to South India.

iv. Indian Ocean Trade.

d. Religion, Culture and Regional Identities:-

i. Religious Cults.: Vaishnavite movements in eastern India

ii. Regional art and architectural forms; regional literature. (Eastern India).

B.A. HONOURS IN HISTORY: 3RD SEMESTER

Learning outcome:

Students will be able to identify the major political developments in the History of India during the period between the sixteenth to the eighteenth century. They will be able to outline the changes and continuities in the field of polity, economy and culture. They will acquire the knowledge about how the Mughals built an empire through their military campaigns and conquest and how they had given the people of India a good administrative and revenue system.

Core Course 05: History of India 1526-1757A.D.(Historiography ,Sources And Polity)

I. Sources and Historiography (In the time of the Mughals):

a) Historiography ; Different approaches

b) An overview of sources including : Abul Fazal , Badauni, Abdul Hamid Lahori, Bernier

c) Biography as Sources :Tuzuk-i-Babari ; Humayunnama; Tuzuk –i- Jahangiri

II. Establishment of Mughal rule:

(a) India on the eve of Babur's invasion

(b) Fire arms, military technology and warfare

(c) Humayun's struggle for empire

(d) Sher Shah and his administrative and revenue reforms

III. Consolidation of Mughal rule under Akbar, Zahangir , Shahjahan & Aurangzeb:

(a) Campaigns and conquests;

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(b) Evolution of administrative institutions: mansab, jagir, madad-i-maash,
Zaminders;
(c) Formation and evolution of the Mughal ruling class,
IV. Expansion and Integration:
(a) Incorporation of Rajputs and other indigenous groups in Mughal nobility
(b) Policy of North-West frontier, Central Asian policy and the Deccan Policy
V. Patterns of Regional Polity : a) Bengal , b) Maharastra
VI. Decline of the Mughal Empire :
(a) Crisis of the Mughal Empire,
(b) Parties and Politics at the Mughal Court,
(c) Administrative and economic causes of the Mughal decline.

Learning outcome:

Students will be able to identify the major political developments in the History of India during Mughal period.They will acquire the knowledge the changes and continuities in the field of rural society, changes in the urban development, about trade and traders and trade routes during the Mughal period. They will also gather the ideas about the agricultural technologies, markets, monetary system of Mughals.

Core Course 06 : History of India 1526-1757A.D.
(Society, Economy, Culture and Regional Development)

I. Society in Mughal India- structure and growth
1.1. Rural society and agrarian relations: i) land ownership and nature of land rights,
ii)zamindars and peasantry; iii) rural tensions
1.2. Urban society: i) towns and town life, ii) Urban Social Structure, merchant
communities, artisans, bankers, craftsman and labourers.
II. Rural and Urban Economy
(a) Environmental context, forests and agricultural zones;
(b) Extension of agriculture; agricultural production; crop patterns, agricultural technology;
growth of cash nexus and rural credits
(c) Water resources and water management
(c) Trade routes and patterns of internal commerce; overseas trade;

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(d) Markets ;monetory system

(e) Urban economy, industries, organisation of production, imperial karkhanas

III. Political and religious ideals:

(a) Inclusive political ideas: theory and practice

(b) Religious tolerance and sulh-i-kul; Sufi mystical and intellectual interventions

(c) Formation of religious identities, Sikh; Kabirpathis and Dadupanthis

IV. Cultural Developments:

a. Languages and Literatures with special reference to the Bengali Literature.

b. Architectures

c. Visual and Performing arts

Learning outcome:

The students will be able to trace the British colonial expansion in the political contexts of eighteenth century India. They will learn about the changes in society, politics, religion and economy during this period. They'll also acquire knowledge about the different popular struggle against the British Raj.

Core Course 07 : History of India 1757-1857A.D.

I. Sources and Historiography

II. India in the mid 18th Century; Society, Economy, Polity; Different views and interpretations

III. Ideology of the Britidh Raj

IV. Expansion and Consolidation of colonial Power: [a] Mercantilism, foreign trade and early forms of exactions from Bengal. [b] Dynamics of expansion, with special reference to Bengal, Mysore, Western India, Awadh, Punjab, and Sindh.

V. Colonial State and Ideology: [a] Arms of the colonial state: army, police, law.

[b] Ideologies of the Raj and racial attitudes.

[c] Orientalism, Utilitarianism, Evangalicalism,

[d] Education: indigenous and modern.

VI. Rural Economy and Society: [a] Land revenue systems and forest policy.

[b] Commercialization of agriculture and rural

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indebtedness.

[c] Rural society: change and continuity.

[d] Famines.
[e] Pastoral economy and shifting cultivation.

VII. Trade and Industry [a] De industrialization

[b] Trade and fiscal policy

[c] Drain of Wealth

[d] Growth of modern industry – Cotton, Jute, Steel

VIII. Popular Resistance: [a] Santhal uprising (1857); Indigo rebellion (1860); Pabna agrarian Leagues (1873); Deccan riots (1875). [b] Uprising of 1857

Learning outcome:

The purpose of this course is to introduce students to Indian art and architecture from ancient to contemporary times, in order to understand and appreciate its diversity and its aesthetic richness. The course will equip students with the abilities to understand art as a medium of cultural expression.

Skill Enhancement Courses (SEC)-1: Art, Architecture & Culture of India
(From Delhi Sultanate to Mughal Period)

I. Indian Art in Early Medieval Period: Early medieval sculpture: style and iconography Indian bronzes or metal icons

II.Indian Art and Architecture in the Delhi Sultanate:

a. Architecture,

b.Fine arts,

c.Literature- Sanskrit, Arabic ,Persian and Regional Language,

d.Music

III.Indian art and architecture in the Mughal Period:

a. Architecture

b . P a i n t i n g : E a r l y M u g h a l P a i n t i n g , N e w T r a d i t i o n u n d e r J a h a n g i r , R e g i o n a l C e n t r e s

c.Music and Major Musicians at Mughal Court

d. Literature:- Arabic, Bengali, Persian, Hindi, Sanskrit, Regional

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Learning outcome:

The students will be able to trace the British colonial expansion in the political contexts of eighteenth century India. They will learn about the changes in society, politics, religion and economy during this period. They'll also acquire knowledge about the different popular struggle against the British Raj till independence.

COURSE: Generic Elective (GE)- 3: Modern History of Bengal (Colonial and Post- Colonial)

I. The making of the colonial expansion in Bengal : Plassey to Dewani

II. Impact of Western Ideas and the new Intelligentsia:

[a] Impact of Western Education and its Response

[b] Renaissance and Reformation.

(i) Raja Rammohan Roy

(ii) Iswar Chandra Vidyasagar

(iii) Dirozeo

III. Political Scenario of Colonial Bengal : Nationalism and National Movements in Colonial Bengal ; Muslim Politics and question of Nationalism; Rise of Left Parties ; Caste Identity and Politics – Namasudra and Rajbanshi 'Kshatriya' Identity Movements; Partition of Bengal (1947)

IV. Bengal after Partition : Migration Problem and rehabilitation Process; Workers' and Peasants' Movements –Tebhaga movement and its impact; Naxalbari Movement.

B.A. HONOURS IN HISTORY: 4TH SEMESTER

Learning outcome:

The students will be able to trace the British colonial expansion and exploitation in the political contexts of eighteenth century India. They will learn about the changes in society, politics, religion and economy during

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this period. They'll also acquire knowledge about the constitutional development and social reforms in terms of renaissance.

CORE COURSE-8: History of India (1757-1857 A.D): Society, Culture and Constitutional Development.

I. Constitutional Development up to 1857: Regulating Act 1772, Pit's India Act 1793, Charter Act 1813, Wood's Despatch, 1854.
II. Society: Change and Continuity- Caste and class, position of women,
III. Education, Press and its Impact on society and culture: Indigenous education, Western education, Role of the Missionaries, Anglicists Vs Orientalists.
IV. Religion and culture: Different religions organizations and their activities.
V. Social reform movements: Raja Rammohan Roy, Iswar Chandra Vidyasagar, Derozio
VI. Renaissance: Its impact and debates.

Learning outcome:

The contents of the syllabus are designed to cover core issues pertaining to vast canvass of nationalist history so that the student at the under graduate level is equipped to focus upon the core ideas of national movement in its conceptuality. India's quest for independence and nation building are interwoven script of history, debated most widely at global level with various angles. Indeed, India's national movement has vast and divergent ideological base with inner contradictions.

CORE COURSE-9: History of India (1858-1950 A.D)

I. Cultural changes and Social and Religious Reform Movements:

[a] The advent of printing and its implications
[b] Reform and Revival: Brahmo Samaj, Prarthna Samaj, and Ramakrishna and Vivekananda, Arya Samaj, Wahabi, Deoband, Aligarh and Singh Sabha Movements.
[c] Debates around gender
[d] Making of religious and linguistic identities
[e] Caste: sanskritising and anti Brahminical trends

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II. Nationalism: Trends up to 1919:

[a] Political ideology and organizations, formation of INC

[b] Moderates and extremists.

[c] Swedish movement

[d] Revolutionaries

III. Gandhian nationalism after 1919: Ideas and Movements:

[a] Mahatma Gandhi: his Perspectives and Methods

[b] (i) Impact of the First World War

(ii) Rowlett Satyagraha and Jallianwala Bagh

(iii)Non- Cooperative and Civil Disobedience (iv)Provincial

Autonomy, Quit India and INA

[c]Left Wing Movements

[d] Princely India: States' People Movements

[e] Nationalism and Culture: literature and art

Learning outcome:

The purpose of this course is to introduce students with the emergence of different groups and classes which developed during British period in India and the interfaces among different groups. The students will gather the knowledge of different ideologies which emerged before and after India got independence.

CORE COURSE-10: History of India (1858-1950 A.D)

I Nationalism and Social Groups: Interfaces:

[a] Landlords, Professionals and Middle Classes

[b] Peasants,[c] Tribal,[d] Labour, [e] Dalits, [f] Women,[g] Business groups

II Communalism: Ideologies and practices, Muslim League, Hindu Maha Sabha, RSS

III Independence and Partition

[a] Negotiations for independence, and partition,[b] popular movements

[c] Partition riots

VII. Emergence of a New State:

[a] Making of the Constitution [b] Integration

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of princely states

[c] Land reform and beginnings of planning

Learning Outcome:

The course prepares the students for their careers as leaders in understanding and addressing complex environmental issues from a problem-oriented, interdisciplinary perspective. They will learn to appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems. They will also understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.

COURSE: GENERIC ELECTIVE (GE)-4: Environmental Issues in India

I. The importance of Environment.

2. Geography, Ecology and Cultures in Pre-Colonial India

-Land, Forests, Dams, Water, Pastures, Ecology of Hills and Mountains

3. Colonialism and developments in the Environment

-New Regimes of land, Forests, Water and Irrigation

-Resistance: Peasants, Tribals and Pastoralists.

4. Environmental Issues in Independent India

-Forests, Dams, Displacement, Pollution, Degradation.

5.Environmental Movements in Independent India

-Forests, Dams, Displacement, Pollution.

6.Enviornmental concerns in a Globalizing World.

Learning outcome:

The aim of the course is to provide students with an introduction to research methods and report writing. After successful completion of the course students are expected to develop understanding on various kinds of research problems, objectives of doing research, research process, research designs and sampling. They will improve the basic knowledge on qualitative research techniques through this course.

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COURSE: SKILL ENHANCEMENT COURSE(SEC)-2: Research Methodology in History(Theory and Practices)

I [a] Meaning and Nature of History, Time and space

[b] Sources as authority and sources in context: written, oral, visual, archaeological, Primary and Secondary

[c] Facts and historical facts; interpretation and meaning

[d] Hypothesis, and argumentation

[e] Objectivity, Subjectivity, historical imagination

[f] Narrative and history

II History as interdisciplinary practice: [a] History and Archaeology [b] History and Anthropology [c] History and Psychology [d] History and Literature

III Historians at work:

Representative writings of any two major historians are to be critically evaluated on the parameters of the research methodology with an emphasis on the use of the sources, methodology, arguments and conclusion.

(a) Western Historians: Leopold von Ranke, Karl Marx, George Macauley Trevelyan, R.G.Collingwood, George Lefebvre, E.H.Carr, Marc Bloch, Edward Said, E.H. Hobsbawm;

(b) Indian Historians: Sir J. N. Sarkar, Ramesh Chandra Majumder, D.D.

B.A. HONOURS IN HISTORY: 5TH SEMESTER

Learning outcome:

The course is designed to develop the understanding of Europe from a theocratic society to modern Nation state system. The students will acquire the knowledge about European Renaissance and its aftermaths on European Society leading to subsequent development of Nation State and emergence of new ideologies culminating in the form of French Revolution.

Core Course- 11:Renaissance and Reformation in Europe

Unit –I : Renaissance: its social roots, city-states of Italy; spread of humanism in Europe; Art and Literature

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Unit- II : Origins, course and results of the European Reformation in the 16th century

Uinit-III: Economic developments of the sixteenth century: Shift of economic balance from the Mediterranean to the Atlantic; the Price Revolution, Transition Debate- Feudalism to Capitalism.

Unit-IV: Rise of modern science in relation to European society from the Renaissance to the 17th Century

Learning outcome:

The objective of this course is to develop the understanding among students about the European ideology of mercantilism and European economy of 17th and 18th century. The students will gather the knowledge about Napoleonic reform and different phases of restoration and revolution indifferent European states.

Core Course -12: Mid 18thCentury to 1871 Europe

Unit-I: Mercantilism and European economics; 17th and 18th
Unit-II: Political and economic issues in the American Revolution.

Unit-III: The Industrial Revolution and its Impact.

Unit-IV: The French Revolution and its European repercussions, Intellectual currents, Social classes and emerging gender relations, Phases of the French Revolution 1789 – 99

Unit-V: Napoleonic consolidation - reform and empire.

Unit-VI: Restoration and Revolution: c. 1815 - 1848:

Unit-VII: Varieties of Nationalism and the Remaking of States in the 19th National identities in Germany, Italy

Learning outcome:

Students will learn from this course about the nature and structure of the traditional Chinese and Japanese society and how both of them transformed from the traditional to modern cultures. They will be aware how the Chinese were united towards the foreign colonial powers and defeated them and ultimately gain to freedom. They will also know about the emergence of Japan from a tiny state to world power.

Discipline Specific Elective (DSE)-1: Modern China & Modern Japan

China

Unit-I: Pre-modern Social Structure of China and the Canton commercial system.

Unit-II:The transformation of China into an informal colony; the Opium Wars; the Unequal

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Treaties; the Open Door policy.

Unit-III: Agrarian and Popular Movements: Taiping and Boxer Movement

Attempts at Self-Strengthening (Tzu-chiang): Reforms of 1860- 95; 1898

Unit-IV: The Revolution of 1911:; Sun Yat-sen and his contribution; the formation of the Republic; Yuan Shih Kai; Warlordism.

Unit-V: May Fourth Movement of 1919: Nature and significance Formation of CCP; and the Kuomintang (National Party of KMT)

Unit-VI: The Communist Movement (1938-1949) and the rise of Mao Tse Tung

Japan

Unit-I: Meiji Restoration : Its nature and Significance

Unit-II:Meiji Constitution

Unit-III: Japanese Imperialism and Second World War

Learning outcome:

The course is designed to develop the understanding of North Bengal in colonial period. The students will gather the knowledge about the emergence of northern part of Bengal as North Bengal and about the princely state of Cooch Behar. They will also know about the land system of Northern part of Bengal and different protest movements of North Bengal.

Discipline Specific Elective (DSE)-- 2 :History of North Bengal (Colonial Period)

1. Pre-colonial North Bengal; North Bengal and Sub-Himalayan Region, adjoining areas; Ethno, Socio-Religious confluence.
2. Colonial penetration; Colonial administration; Re-organisation of North Bengal.
3. History of the Cooch Behar Raj since 1772: Cultural Response and Reaction.
4. Introduction of colonial Economy: Land Revenue Settlement; Plantation Economy; Forestry; Commercialization of Agriculture
5 **:**Saga of National Movement and North Bengal
6. Protest Movement: Peasant movement; Plantation worker movement
7. Social Movement with special reference to Rai Saheb PanchananBarma

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B.A. HONOURS IN HISTORY: 6TH SEMESTER

Learning outcome:

The students will be able to analyze the historical developments in Europe between 1871-1919, as it focuses on the democratic & socialist foundations of modern Europe. They will be able to situate historical developments of socialist upsurge & the economic forces of the wars, other ideological shifts.

CORE COURSE-13: Europe from 1871 to 1919 A.D.

Unit-I: Early socialist thought; Marxian Socialism

Unit-II: Revolutions of 1905; the Bolshevik Revolution of 1917.

Unit-III: Theories and mechanisms of imperialism; growth of Militarism; Power blocks and alliances: expansion of European empires – War of 1914 – 1918,

Unit-IV: Peace Settlement of 1919

Learning outcome:

This course aims to provide an understanding of an era of shifting history from Euro centric to World. It discusses the turbulent times when totalitarianism rose as an alternative to democratic and liberal ideal and also the growing desire for peace through formation of organizations such as United Nations.

CORE COURSE -14: Europe from 1919 up to Cold War

Unit-I: League of Nations and Collective Security
Unit-II: The post 1919 World Order: economic crisis, the Great Depression and Recovery.
Unit-III: Fascism and Nazism.
Unit-IV: The Spanish Civil War.
Unit-V: Origins of the Second World War.
Unit-VI: Process of Decolonization
Unit-VII: UNO (Formation and its Objectives)

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Learning outcome:

The course enables the students to identify the contemporary challenges like social transformation, liberalization, privatization and globalization in perspective of contemporary world.

Discipline Specific Elective (DSE)-3: Contemporary World after Cold War

Unit-I: Origin of Cold war, Power Bloks NATO, SEATO, Warsaw Pact , Bipolarism

Unit-II : De-statinisation and its effects

Unit-III: NAM and Third World

Unit-IV: Korean Crisis, Vietnam Issue,SuezCrisis,Cuban crisis

Unit-V: Détente, Glasnost and Perestroika

Unit-VI: Aparthied

Unit-VII: Globalization and its impact

Unit-VIII: Human Rights

Learning outcome:

The course is designed to develop the understanding of North Bengal in post colonial period. The students will gather the knowledge about the re organization of northern part of Bengal, demographic changes and different ethno-political movement of North Bengal. The objective of this course is also to highlight the regional history of North Bengal and make the students aware about the facts and figures of different places such as Hill, Tarai and Plain land of North Bengal.

Discipline Specific Elective (DSE)- 4 : History of North Bengal (Post- Colonial Period)

Unit-I: History of Migration : Demographic Changes : New Social Structure
Unit-II: Post Colonial Re-organisation of North Bengal.

Unit-III: Post Colonial Ethno-Political Movements in North Bengal

Unit-IV: Political Senerio of the Hill area of North Bengal:The All India Gorkha League, The Gorkha National Liberation Front, The foundation of the Gorkha Autonomous District Hill Council

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DEPARTMENT OF GEOGRAPHY

For UG CBCS syllabus of Geography in Cooch Behar Panchanan Barma University click the following link:

https://cbpbu.ac.in/userfiles/file/CBCS/Geography%20CBCS%20NEW%20(1).pdf

PROGRAMME OUTCOMES

Sl No.	PROGRAMME OUTCOMES
1	Understanding of basic concepts
2	Understandng of Physical/ Cultural Landscape
3	Understanding of Environment, Ecosystem structure and Potential
4	Understanding of Human Perception and Behaviour
5	Identification of Critical Problems and Issues
6	Development of Field Based Knowledge through innovative & experiential learning
7	Applied Dimensions:Spatial Data and Statistical Techniques
8	Approaches towards Case Studies
9	Public Policy management learning
10	Communication & Presentation Skills
11	Philosophical knowledge base
12	Interdisciplinary approach

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COURSE OUTCOMES

B.A. (Hons.)Geography Core Course (CC)

Semester-I

CC-I (Geomorphology)

(Credit:6, Theory- 6, Practical-0)

Learning Outcomes

- This course helps to nurture the basic concepts ofGeomorphologyandPhysical Geography
- Thismodulealsohelpstobuildastrongfoundation especially about the classical theoriesrelated to diastrophism, mountain building andcycleoferosion
- The students develop an understanding about theunderlyingstructuresandtheirtopographicexpressionwhichhelpsthemtogainpracticalknowledgerelatedtoavailabilityofvariedmineralresource
- Thispaperalsogivesideasabouttheprocessesoflandsculpturingbydifferentexogeneticagents

Broad Content

- Basic ideas of Geomorphology
- The constitution of Earth's interior
- Concept of Earth's Movement: Diastrophism and Mountain Building
- Geomorphic Processes
- Evolution of Landforms

Semester-I

CC-II

(CartographicTechniques andIdentification ofsamples ofRocks andMinerals)

(Credit: 6, Theory- 0, Practical-6)

Learning Outcomes

- The topic 'Scale' helps the students to learn about the different types of scales and the ability to develop the skill of finer measurement. This also enables them to read maps.
- The topic 'Projection' deals with the drawing of graticules which help them to understand about the cardinal positions of places and conversion of 3-D spheres to 2-D planes.
- The students uses different statistical data and learns to represent them using proper cartographic

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techniques

- Identificationofthesamplesofrocksandmineralsand their megascopic study enables thestudents to have a practical knowledge in thisfield. They will be able to identify the differentrocksinthefieldandtheirprocess offormation.

Broad Content

- Scales
- Map Projections
- Presentation of Data Using Different Cartographic Techniques
- Identification of the samples of the following Rocks and Minerals (Megascopic Study)

Semester-II

CC- III (Human Geography)

(Credit: 6, Theory- 6, Practical-0)

Learning Outcomes

- This paper contains topics like culture, Race, Religion, Language and different Societal processes which help students to understand the people, their cultural and ethnic diversity, society and their process of development in different parts of the world including India
- This unit focuses on population and its various characteristics like growth, distribution, composition and population resource relationship which help students to get a clear idea about the human resources of world as well as in India
- This unit helps students to understand the nature and type of rural and urban settlement in different parts of the world as well as the theory of the settlement development and function of differentsettlementunits

Broad Content

- **Human Geography:** Definition and Major Elements
- **Culture and Society**
- **Population**
- **Settlements**

Semester-II

CC- IV

(Statistics, Topographical Map Interpretation & Analysis of Geological Maps)

(Credit: 6, Theory- 0, Practical-6)

Learning Outcomes

- Students learn various statistical techniques in this paper which is used for analysis of spatial data

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and to interpret the possible outcome of geographic phenomena.

- Students develop the skill of analysis and interpretation of SOI Topographical Maps which help them to identify various physical and cultural features and to explore the relationship between them
- Drawing and interpretation of Geological Maps help students to understand about rock stratigraphy, geological time scale and the relationship of topography and underlying geological structure.

Broad Content

- **Statistical Methods in Geography**
  - **Descriptive Statistics**
  - **Applied Statistics**
- **Analysis and interpretation of S.O.I. Maps of Plateau area under the following heads**
- **Drawing of Geological sections and Interpretation of Geological Map**

Semester-III

CC- V (Climatology)

(Credit: 6, Theory- 6, Practical-0)

Learning Outcomes

- This paper will give a broad idea about atmosphere and various atmospheric processes which are responsible for daily weather and average climate.
- Students will understand the latitudinal variation of temperature and its factors, green house effect and global warming and mechanism of heat balance of the planet.
- Students will also be able to understand about high pressure and low pressure, circulation of wind, origin of monsoon, tropical and temperate cyclone and their areas of origin and affected areas.
- Students will understand different forms of precipitation and mechanism of rainfall in tropical and temperate region.

Broad Content

- Composition and structure of the atmosphere
- Heat budget of the earth; Latitudinal and seasonal variation of Insolation; Distribution oftemperature; Inversion of Temperature, Greenhouse gases and global warming
- Atmospheric pressure and general circulation of winds
- Monsoons, Jet streams; El-Nino, La-Nina, ENSO; Air masses and Fronts
- Temperate and Tropical cyclones
- Humidity, Condensation and Precipitation
- Koppen's and Thornthwaite's scheme of classification; Climate change

Semester-III

CC- VI (Soil Geography and Biogeography)

(Credit: 6, Theory- 6, Practical-0)

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Learning Outcomes

- This paper gives complete understanding of soil formation processes, factors, development of soil profiles, properties of soil as well as genetic classification of soil which help students to gain complete knowledge about this important natural resource.
- This paper also covers important topics like ecosystem, biogeochemical cycle, biome, and biodiversity which help students to understand about the natural habitat of the world, process of species formation and the importance of biodiversityconservation.

Course Content

- **Soil Geography**
  - Factors and Processes of soil formation
  - Development of an idealized soil profile,
  - Physical and Chemical properties and Genetic Classification of Soil
- **Bio-Geography**
  - Some Concepts
  - Ecosystem
  - Bio-geo-chemical cycles
  - Concept of Biome, Ecotone and Community, etc.

Semester-III

CC-VII(Statistical Methods in Geography and Meteorological Data Interpretation)

(Credit: 6, Theory- 0, Practical-6)

Learning Outcomes

- Applied statistical techniques help students to understand the relationship among the variables and to find out inequality in distribution
- Techniques of Thematic Mapping given in this paper help students to measure the functions of cities, to understand accessibility of road and zone of concentration
- Meteorological data interpretation helps students to gain knowledge about the daily weather and climatic elements as well as the methods of their representation. This also help students to find out various climatic types and their characteristics.

Broad Content

- **Statistical Methods in Geography**
  - Applied Statistics:Measures of Dispersion: Range, Mean Deviation, Quartile Deviation, Standard Deviation, Coefficient of variation and Variance
  - Simple Bi-variate Analysis: Fitting of Regression Trend Line by Least Square Method; Residual Mapping

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- Rank Co-relation (Spearman's Method) and Product Moment Co-relation (Pearson's Method)
- Measures of Inequalities: Lorenz Curve and Gini's Co-efficient (1)
  - **Techniques of Thematic Mapping**
  - **Meteorological Data Interpretation**

Semester IV
CC-VIII (Geographical Thought)
(Credit: 6, Theory- 6, Practical-0)

Learning Outcomes

- This paper helps students to understand the origin and evolution of the subject Geography as a spatial science
- This paper also focuses on the major themes of Geography like determinism and possibilism, positivism, pragmatism, regional and systematic approach, quantitative revolution and radicalism which are the philosophical bases of the discipline.

Broad Content

- Origin and evolution of Geographical Thinking
- Debates: Environmental Determinism vs Possibilism, Positivism vs Humanism, Systematic vs Regional, Ideographic vs Nomothetic
- Trends: Quantitative Revolution and its Impact, Systems Approach, Radicalism, Man- environment relationship

Semester IV
CC-IX (Economic and Environmental Geography)
(Credit: 6, Theory- 6, Practical-0)

Learning Outcomes

- The unit Economic Geography gives students proper understanding about various economic activities
  Students also learn theories explaining real life situations for the location of agricultural and industrial units Students also gain knowledge about some modern economic zones like SEZ, EEZ, TP and Industrial Regions
- This paper also covers important topics like biome and biodiversity which help students to understand about the natural habitat of the world
- Students understand about current Environmental problems of the world and the initiatives taken by various nations to solve these problems through international treaty.

Broad Content

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- **Economic Geography**

➢ Economic Activities: Concept and classification

➢ Factors affecting location of economic activity

➢ Some concepts: Special Economic Zone, Exclusive Economic Zone, Technological Parks, Industrial regions in India.

- **Environmental Geography**

➢ Concept and components of Environment:

➢ Physical Environmentand Socio-cultural Environment

➢ Environmental Geography: Definition and its relevance

➢ Man-Environment Relationship

➢ Environmental Programmes in the World

Semester IV

CC-X (Remote Sensing and Surveying)

(Credit: 6, Theory- 0, Practical-6)

Learning Outcomes

- Remote Sensing is the modern technique to acquire geographical information in exsitu conditions which is also very much essential for development of spatial science
- Students learn the theoretical background about the process of collection of Remotely Sensed data, its resolutions, sensors and applications in various sectors
- Students learn the three types of data collections i.e. Satellite, Areal and Ground based Remote Sensing
- Students learn various techniques of surveying and leveling using instruments like Prismatic Compass and Dumpy Level which are used for preparation of contour plans and measurement of bearings.

Broad Content

- **Remote Sensing**

➢ Definition, scope, development and types of remote sensing, etc.

➢ Aerial photograph: types, scale and features identification by Mirror Stereoscope

➢ Satellite imagery

- **Surveying**

➢ Concept of surveying

➢ Open and Closed Traverse Survey by Prismatic Compass

➢ Preparation of Contour Plan byDumpy Level

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Semester V

CC-XI (Regional Planning and Transport Geography)

(Credit: 6, Theory- 6, Practical-0)

Learning Outcomes

- Students learn about the concept of Region and regionalization, Hierarchy of Regions, Definition, Principles and types of Regional Planning.
- In Transport Geography, the students study the evolution of transport network, spatial analysis of transport network, different existing models and issues related to urban and rural transportation.

Broad Content

- **Regional Planning**
  - Region: Definition; Types and Characteristics
  - Schemes of Regionalization in India
  - Regional Planning: Definition; Basic Principles; Types of Planning
- **Transport Geography**
  - Introduction of Transportation: Nature and Scope
  - Historical Development of Transport Geography
  - Models and Importance of Transportation
  - Structural Analysis of Transport Network
  - Transport Problems: Problems of Urban and Rural Transport

Semester V

CC-XII (Computer Application in Geography, GIS and GPS)

(Credit: 6, Theory- 0, Practical-6)

Learning Outcomes

- In this paper, the students, learn representation of geographical data using MS-Excel software
- In Geographical Information System (GIS), the Students learn theoretical aspects such as components, application of GIS, vector and raster data model, data base management systems as well as practical aspects like preparation of GIS data base, digital map making, etc by using QGIS software
- They also learn to prepare land use and landcover map using Remote Sensing data.
- In this paper students learn the basics of GPS aswellasuseofGPSinstrumentstorecordGeographical Coordinates

Broad Content

- **Computer Application in Geography**
  - Demographic data, Weather and Climatic data and Socio-economic data processing and Thematic Diagrams using Basic Calculations and interpretation using by MS– Excel

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- **Geographical Information System**
- Definition, evolution, components of GIS: Components of GIS;
- Geographical data: types and characteristics;
- Applications of GIS
- Digital representation of geographical data: database management systems, raster and vector models
- GIS Data Analysis: Input; Geo-Referencing, Editing, Output and Query and Overlays by QGIS Software
- Application of Remote Sensing: Land Use Land Cover by QGIS Software
- **Global Positioning System**

Semester VI

CC-XIII (Regional Geography of India)

(Credit: 6, Theory- 6, Practical-0)

Learning Outcomes

- Our country has rich and varied endowments in every respect, this paper facilitates the students to gain knowledge about the Physical, Cultural, Social, Economic, Political and Demographic aspects of our country.

Broad Content

- Physical: Structure, relief, soil, vegetation, climate (characteristics and classification)
- Economic: Agricultural & Industrial Regionalization
- Social: Social regions of India (regions of attraction & isolation)
- Political: Geo-political importance of India
- Geographical account of some type regions of India: The Ganga Plain (Upper, Middle and Lower), Marusthali and Chotonagpur Region

Semester VI

CC-XIV (Field Work)

(Credit: 6, Theory- 0, Practical-6)

Learning Outcomes

- This paper is application oriented wherein it entails ground study of any rural or urban unit focusing on to its problems. This paper paves the foundation of Research work including collection of data, preparation of questionnaire, survey work, tabulation, presentation and analysis of data and finally report writing.

Broad Content

- Preparation of a Field Report including preparation of Questionnaire/Schedule and data Collection from the field.

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B.A. (Hons.) Geography Discipline Specific Elective Course (DSE)

Semester V

DSE I: A1 (Urban Geography)

(Credit: 6, Theory- 6, Practical-0)

Learning Outcomes

- Study of Urban Geography students complete understanding of patterns of urbanization in the world as well as in India
- Students learn to classify towns and cities and also get idea about the morphology of the cities as well as they get clear idea about concepts like Primate City, CBD, Rank Size Rule, Metropolis, Megalopolis, Ecumenopolis, etc.
- Students also get clear idea about various urbanissuesin thispaper.

Broad Content

- **Urban Geography**: Introduction, nature and scope
- **Process of Urbanisation**: Patterns of Urbanisation in the world with special reference to India
- **Functional classification** of town and cities and **Theories of Urban Morphology** (Burges's, Hoyt's & Harris and Ullman's theory)
- **Urban Issues**: problems of housing, slums, civic amenities
- Some Concepts: Primate City, CBD, Rank Size Rule, Metropolis, Megalopolis, Ecumenopolis, Metropolitan Regions, Satellite Town

Semester V

DSE I: Group A2 (Population Geography)

(Credit: 6, Theory- 6, Practical-0)

Learning Outcomes

- Population Geography give students clear about the spatial and temporal changes in population size, composition, structure etc.
- The important concepts related to Fertility, Mortality and Migration throws light to the dynamic nature of demographic studies.
- Theoriesconcerningpopulationgrowthandmigrationare alsotaughtinthis section.

Broad Content

- **Nature and Scope of Population Geography &Sources of Data with special reference to India.**
- **Population Dynamics and Composition**

➢ Spatial and temporal changes in the size

➢ Composition and distribution of Population

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- Population Structure: Age-Sex Specific; Population Composition: Economic and Ethnic (in India).
- **Demographic Attributes**
- Fertility, Mortality and Migration
- Concepts of ageing
- Stationary and Stable population
- **Theories of Population Growth and Migration**

Semester V

DSE 2: Group A3 (Cartography)

(Credit: 6, Theory- 6, Practical-0)

Learning Outcomes

- Students learn the idea of generating map
- Learn to calculate distance and angular distance between two places on earth
- Learnabout vertical leveling andsurveying.

Broad Content

- **History, Nature and Scope of Cartography**
- **Map Projections**
- **Principles and Method of the following Surveying**: Method of Triangulation for Determination of height and distance by Transit Theodolite (same vertical plane)
- **Choropleth Map**

Semester V

DSE 2: Group A4 (Fluvial Geomorphology)

(Credit: 6, Theory- 6, Practical-0)

Learning Outcomes

- Students learn about the different types of fluvial landforms, their origin & their spatio-
- Geomorphic significance They also learn about morphometric techniques which help in better understanding of landforms
- Students also get the idea of different Channelpatterns,theirformations&Significance.

Broad Content

- **Scope and Content** of Fluvial Geomorphology and **Flow Velocity** (Factors and measurement velocity and water discharge)
- **Fluvial Processes**(Erosional and Depositional) and **Landform Development**.
- **Channel Patterns:** Straight channel, braided channel,meandering channel and floodplain

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channels.

- **River Profiles**: longitudinal and transverse.
- **Drainage Basin Morphometry**: Definition, Function and Characteristics of drainage basin & morphometric units (Areal, Linear, and Relief Units)

Semester VI

DSE 3: Group B1 (RegionalPlanning)

(Credit: 6, Theory- 6, Practical-0)

Learning Outcomes

- Apart from the basic concept building regarding Regional Planning as Discipline Specific Elective Course the concepts like Urban Primacy, Rural-Urban Continuum, Megacity, Metropolis, Metropolitan Region, Metropolitan Area, Megalopolis, Conurbation, Ecumenopolis etc. are included here.
- Furthermore, they also learn theories of Perroux's Growth Pole, Myrdal's Cumulative Causation, Rostow's stages of economic growth.
- Rural Development Programmes are also studied whereby the students get to know about the process of development disseminated from the centre to the block levels.

Broad Content

- **Region:** Definition; Types, Hierarchy of Planning regions (Macro, Meso, Micro) and Delineation of Regions.
- Schemes of Regionalization in India
- **Regional Planning**: Definition; Basic Principles; Types of Planning.
- **Metropolis and Metropolitan Concept**
- **Theories of Economic Growth**: Myrdal's Cumulative Causation, Rostow's Stages of Economic Growth and Perroux's Growth Pole theory.
- Rural Development Programmes.

Semester VI

DSE 3: Group B2 (Agricultural Geography)

(Credit: 6, Theory- 6, Practical-0)

Learning Outcomes

- This branch of study helps the students to develop a clear concept regarding Land use and Landcover. Since our subject has a spatial connotation, this is very relevant in the true sense.
- Agricultural regionalization and various theories related to the agricultural landuse are also taught in this module.

Broad Content

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- **Introduction, nature and scope**
- **Land use/ land cover** definition and classification.
- **Determinants of Agriculture**: Physical, Technological and Institutional
- **Agricultural Regions of India**
- **Agricultural Systems** of the World (Whittlesey's classification) and Agricultural Land use model (Von Thunen, modification and relevance).
- **Agricultural Revolutions in India**

Semester VI

DSE 4: Group B3 (Political Geography)

(Credit: 6, Theory- 6, Practical-0)

Learning Outcome

- The understanding regarding the key concepts like Nation, State, Frontiers, Boundaries, Sovereignty, Geopolitics, Electoral Geography, Gerrymandering etc. also helps to build a contemporary knowledge.

Broad Content

- Introduction: Concepts, Nature and Scope.
- State, Nation and Nation-State: Concept and Theories (Heartland and Rimland)
- Electoral Geography.
- Politics of Displacement: Issues of relief, compensation and rehabilitation in India.

Semester VI

DSE 4: Group B4 (Hydrology and Oceanography)

(Credit: 6, Theory- 6, Practical-0)

Learning Outcome

- The concepts of Hydrology and Oceanography is very relevant in the present time specially as we are very much concerned about environment, global hydrological cycle, recharge and discharge of the groundwater, watershed management, conservation of water etc.
- The nature of submarine reliefs, oceanic circulation, and marine deposits helps to build knowledge about the utilization, conservation and management of the marine resources with sustainability.

Broad Content

- **Hydrological Cycle**: Systems approach in hydrology, human impact on the hydrological cycle; Precipitation, interception, evaporation, evapo-transpiration, infiltration, ground-water, run off and over land flow.

- **River Basin and Problemsof Regional Hydrology**

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- **Ocean Floor Topography and Oceanic Movements**: Atlantic and Indian Ocean

- **Coral Reefs and Marine Deposits and Ocean Resources**: Types and Theories of Origin; Biotic, Mineral**.**

B.A. (Hons.) Geography Skill Enhancement Course (SEC)

Semester III

SEC1: (EnvironmentalImpactAssessment)

(Credit: 2, Theory- 0, Practical-2)

Learning Outcome

- Study of Environmental Impact Assessment helps students to understand the importance as well as processes of evaluation of environmental impacts of a proposed project or development.
- The students will be able to understand the hazardous impacts of natural events and human developmental projects as well as the possible solution of those events
- Preparation of project report helps students to gain practical knowledge about the causes and solutions of natural and man-made hazards.

Broad Content

- **Theoretical:**Concept of disaster & hazard, effect of disaster on environment
- Concept, stages, principles & importance of Environmental Impact Assessment(EIA)

- **Practical**: The Project Report based on case studies– Flood/ Drought/ Cyclone/ Earthquake/ Landslides/ Human Induced Disasters: Fire Hazards, Chemical, Industrial accidents

Semester III

SEC2: (ResearchMethodology)

(Credit: 2, Theory- 0, Practical-2)

Learning Outcome

- This paper focuses on Research Methodology and facilitates to gain knowledge about Research design covering identification of research problems, surfing through the available literature, framing of research objectives, preparation of questionnaire schedule and methods of data collection, hypothesis testing, Summary & conclusion, presentation & analysis of data, Report Writing, etc.

Broad Content

- **Research Methodology**
  - Research: Definition, Concept, Types & Methods.
  - Structure of a Research Report: Abstract, Introduction, Identification of research problems,

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Literature Review, Objectives, Rationale of the study, Hypothesis, Selection of Sample Size, Data collection (Methodology), Result and Discussion, Major Findings, Conclusion, Reference and Bibliography(APA 6th Edition).

- **Preparation of Research Report**
  - Project Report on Research Methodology: a. Framing of research objectives on any particular research problem b. Data Collection, c. Literature Review, d. Questionnaire framing e. Reference and Bibliography

B.A. (Hons.) Geography General Elective (GE)

Semester III
GE-3: Disaster Management
(Credit: 6, Theory- 6, Practical-0)

Learning Outcome

- This paper focuses on concepts and classification of hazards, disasters, risks and vulnerability
- In this paper students also learn about various disasters in India along with response and mitigation of disasters, disaster management.

Broad Content

- **Disasters**: Definition and Concepts
- **Disasters in India**: Flood, Landslide, Drought, Earthquake and Tsunami, Cyclone, Manmade disasters
- **Response and Mitigation** to Disasters

Semester III
GE-4: Industrial Geography
(Credit: 6, Theory- 6, Practical-0)

Learning Outcome

- Industrial Geography helps students to get ideas about types and characteristics of industries, location of industries, etc.
- In this paper pupils also get knowledge about mega industrial complexes located in India,
- Students also learn about impact of industrialization on environment, society and economy of India

Course Content

- Nature and Scope of Industrial Geography
- Types, Geographical Characteristics and Location of Industries
- Mega Industrial Complexes
- Impact of Industrialisation

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DEPARTMENT OF PHILOSOPHY

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https://www.cbpbu.ac.in/userfiles/file/CBCS/CBPBU%20CBCS%20UG%20Philosophy%20Syllabus-EDITED%20(24092021),100122%20(1).pdf

https://www.cbpbu.ac.in/userfiles/file/CBCS/GE%202_Philosophy.pdf

PROGRAMME OUTCOMES

Sl. No.	PROGRAMME OUTCOMES
1	Critical Thinking
2	logical thinking
3	practical reasoning
4	thinking analytically
5	psycho-analysis
6	basics of counselling
7	rational-spiritual outlook
8	understanding of key ethical theories and their application

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COURSE OUTCOMES

SEMESTER-I

The CBCS Philosophy syllabus of the first semester provides two core courses/major papers. The first core paper (CE-1) is concerned with some Indian Philosophical schools like Carvaka, Jainism and Buddhism.

And the second core paper(CE-2) is concerned with the History of Western Philosophical Thoughts. The study of these two core course altogether makes students aware about the philosophical concepts of both Indian and Western philosophical traditions.

The CBCS Philosophy syllabus of the first semester honours also provides one Generic Elective paper (GE-I) for the students of other than philosophy honours. This GE paper is concerned with the Philosophy, Society and Ethics. This paper makes students aware about some concepts about society, community, custom and law, morality and the theories of punishment.

SEMESTER-II

The CBCS Philosophy syllabus of the second semester provides two core courses/major papers. The first core paper (CE-3) of this semester is concerned with some Indian Philosophical Traditions like Vaisesika, Samkhya, Yoga, Mimamsa and Vedanta. Through this paper the students of this department make themselves aware about the thoughts of ancient India.

The second core paper (CE-4) of this semester is concerned with the History of Western Philosophical Thoughts-II. In this paper students studied about some thoughts of Locke, Berkeley and Hume. This paper provides a wide overview on Philosophical issues of medieval and modern western arena. Such study also helps the students to have an understanding about the meaning of life and reality.

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The CBCS Philosophy syllabus of the second semester also provides one Generic Elective paper (GE-II) for the students of other than Philosophy honours. This paper is concerned with Philosophy of Religion.Through this paper students will be able to understand the notion of religion and also the role of religion.

SEMESTER-III

The CBCS Philosophy syllabus of the third semester provides three core papers and one skill Enhancement (SEC) paper. The first core paper (i.e. C E-5) of the third semester is concerned with the notion of Indian Ethics. The Study of ethics makes students aware about the meaning and purpose of ethical principles which ultimately helps students to live a sound life

The Second paper core (i.e. CE-6) of this semester is concerned with the notion of Western Ethics. The study of this paper makes student aware about some ethical doctrines, the question regarding morality etc. This paper will help a student to build a moral character.

The third core paper (CE-7) of this semester is concerned about one of the most fundamental text of Nyaya Philosophy namely, *Tarkasamgrah*. The study of *Tarkasamgrah* makes students aware about some certain epistemological concern of Nyaya Philosophy.

The skill enhancement paper (SEC-I) is concerned is concerned with some Basics of Counselling. The study of this paper makes students aware about some methods of counselling and also makes them aware about the phenomena of mental health.

SEMESTER-IV

The CBCS Philosophy syllabus of the fourth semester provides three core papers and one skill enhancement (SEC) paper. Among the three core papers the first one (CE-8) of this semester deals with the western logic. This paper contains some notions of western logic like Aristotelian logic, propositional logic etc. which helps students to become aware the developments into the field of logic.

The second core paper (CE-9) of this semester is concerned with Psychology. After a successful study of this paper students become aware many of psychological ideas or notion.

The third core paper (CE-10) is concerned with the Philosophy of Religion.The understanding about the nature of religion makes students able to understand the role of religion in human life.

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The skill enhancement paper of this semester (SEC-II) is concerned with Critical Thinking. It helps students to develop the ability of critical understanding, analysing etc.

SEMESTER-V

The CBCS Philosophy syllabus of the fifth semester provides two core papers and two Discipline Specific Courses (DSE).

Among the two core courses the first one (CE-11) of this semester is aboutSocio-Political Philosophy. The study of this paper makes students aware about the social and political relationship, notion, ideas etc.

The second core course (CE-12) of this semester is concerned with notion of Western Logic-II. . This paper contains some advance notions of western logic like quantification logic, Stroke Function etc. The successful study of this paper makes students aware about some advanced logical changes in the field of western logic.

The first DSE syllabus (DSE-I) of the fifth semester provides two philosophical texts namely, *Philosophy of Mind* and *Kathopanisad*. Among these two texts the students have to choose any one of them. Both texts provide certain intellectual frame work to see things in different manners

The second DSE syllabus (DSE-II) of the fifth semester provides one philosophical text which is *Nyayabindu* and one paper which is Feminist Philosophy. Students had to choose one of them.This paper contains certain analytical approaches towards some philosophical problems in the field of epistemology. The study of this paper makes students aware about such analytical approaches.

SEMESTER-VI

The CBCS Philosophy syllabus of the sixth semester provides two core papers and two Discipline Specific Courses (DSE).

Among the two core courses the first one (CE-13) is about the Philosophy in 20th century: Indian.This paper covers a number of renowned Indian Thinkers like Swami Vivekananda, Rabindranath Tagore, Mahatma Gandhiji etc. The study of this paper helps students to be acquainted with the minds of such great Indian thinkers.

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The second core course (CE-14) of this semester is concerned with the Philosophy of 20th century: Western.This paper provides one text namely Problems of Philosophy by B. Russell. This text provides certain intellectual frame work which helps students to interpret and understand philosophical issues and their solutions.

The first DSE syllabus (DSE-III) of the sixth semester provides two philosophical text namely, *Practical Ethics* and *Samkhyakarika*. Students had to choose one of them.

The second DSE (DSE-IV) syllabus provides two text among which students have to choose one. These two books are *Introduction to Logic* and *An Enquiry Concerning HumanUnderstandingthe.*Study of this DSE course makes students acquainted with the changing histories and their impacts in the human life and society

COURSE OUTCOMES: PHILOSOPHY
(PROGRAM COURSE)

The CBCS Program Course in Philosophy under Cooch Behar PanchananBarma University provides scope of learning in Discipline Specific Courses (DSC) along with Discipline Specific Electives (DSE) in different semesters. It also includes courses in Generic Electives (GE) as well as Skill Enhancement Courses (SEC). All these courses in under graduate level and the possible outcomes in this regard may be stated as below:

SEMESTER-I

The syllabus of the first semester program course providesone Discipline Specific Courseunder the heading DSC -1A which deals with one part of Indian Philosophy (Part-A) that includes the basic introduction to Indian Philosophy and the important concepts and approaches of the three heterodox or non-Vedic philosophical schools of traditional India, namely, Carvaka, Jaina and Buddha.

The purpose and the possible outcome of this paper are to introduce the basic outline of Indian philosophical thoughts along with a systematic understanding of the same with the deal of the heterodox schools and their approaches to Indian Philosophy. The focus on the heterodox schools here in this paper prepares the new

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learner in philosophy in a way that may help them analyse and interpret the traditional philosophical systems clearly, distinctly and systematically.

SEMESTER-II

There is a Discipline Specific Course for the students of second semester program in Philosophy that offers another part of Indian Philosophy (Part-B) under the heading DSC -1B which widens the knowledge of the students with regard to Indian Philosophical schools by understanding some of the important orthodox schools of Indian Philosophy like, Nyaya, Vaisesika, and Samkhya.

The outcome of this course is planned to acquaint the budding learners of philosophy with those orthodox or the Vedic systems of India that do not directly emerge from the Vedic traditions, although they are not in confront with the Vedas. This paper helps the students of philosophy to understand the originality as well as the variety of Philosophical systems of ancient India.

SEMESTER-III

The third semester program course in philosophy offers one Discipline Specific Course (DSC -1C) under the heading Western Metaphysics and Epistemology in which the basic and important metaphysical as well as epistemological traditions and principles of the West like Rationalism, Empiricism, Realism, Idealism, Causality, Mind-body relations and etc. are taught. There is also a Skill Enhancement Course in this semester, namely, SEC-1 which offers the study of the social and practical role of religion.

The outcome of the DSC syllabus is designed to make the students aware of the fundamental issues of Western metaphysics and epistemology so as to let them advance in knowledge in the significant philosophical issues of the West. The design of this course at this level also provides scope for understanding the comparative points of Indianas well as Western metaphysical and the epistemological trends.

The SEC-1 syllabus is aimed at building a philosophical outline of religious knowledge so as to let the students know the significance of religion and its role in social phenomena apart from enhancing the skill of comparing methodically the study, need and relevance of religious philosophy. Thus, this SEC syllabus would ensure not only the acquisition of knowledge in the religious field but also practice of the same in order to fulfil the need of the society in general and the individual in particular.

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SEMESTER-IV

In its Discipline Specific Course (DSC -1D) under the heading Social and Political Philosophy the program course in Philosophy fourth semester gives the students another scope of knowing and learning different social and political concepts and principles from the philosophical perspectives**.**

This semester, further, offers a Skill Enhancement Course (SEC-2) in Value Educationwhere starting from the concept of Values to the components of Value education through the teachings of the Upanishads, Gita, Jaina, Buddha, Sufism as well as the role, relevance and practice of Value education in present age comprise the significant concerns of this paper.

Now, so far the DSC syllabus is concerned, it offers a philosophical platform to the learners where important concepts and issues of social and political philosophy are analysed. Hence, the course in this regard is developed to successfully provide the students clear concepts and points of differentiations between many basic issues like society, community, association, institution, class and caste, social groups, political ideals of equality, justice, liberty, Democracy, Socialism, Marxism etc. by understanding which the students would, on the one hand, be aware of the significance or the appropriate relevance of these terms as well as principles within their social and political structures, and would use these in their real life situationsappropriately, on the other.

The SEC syllabus on Value education, again, aims to teach the students the role and relevance of values in our everyday life. It, in fact, seems to be a very significant area of study to balance the spiritual aspects of our lives and the present day mechanistic world order. For, education with regard to the necessary values for sustainable living is prescribed in this course in such a way that not only assures the physical, mental and the spiritual upgrading of an individual but also the health and hygiene of the surrounding environment at a larger scale.

SEMESTER-V

The fifth semester program course in Philosophy offers one Discipline Specific Elective (DSE -1A) course under the titleWestern Logic in which some important concepts of traditional logic of the West like Quality, Quantity, Square of Opposition, Immediate as well as Mediate Deductive Inferences, Figure, Mood, etc. along with some basic concepts of modern Symbolic logic like Variables, Truth-functions, Argument and Argument Forms etc. are introduced. There is also scope for testing the validity of arguments here byfollowing some

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rules and also by following some diagrammatic representations. This paper, further, gives a basic outline of the Inductive inferences and the various methods of Induction too.

There is also a Generic Elective (GE-1) in this semester under the title Practical Ethics which provides the scope of studying different ethical issues related to our practical lives like the issues of suicide, abortion, euthanasia and etc. Besides these, this paper also aims to highlight many other areas and concerns of ethics of practice like human rights, environmental ethics, feminism, Gandhi's ethics of ends and means etc.

In this semester, there is further a provision for Skill Enhancement Course (SEC-3) under the title Basics of Counselling. This course introduces before the students the role, relevance and potentials of counselling in the life of a healthy individual, where 'healthy' stands for not only physical fitness but also mental wellbeing.

Of these three different course designs in this semester the possible outcome of the DSE course is to develop logical reasoning skills in the students in such a way so that they can form valid arguments and can avoid possible fallacies not only in their daily life of potential reasoning but also in many of their professional fields, for instance, in the practice of law as a lawyer in a court of justice.

Again, the course outcome of theGeneric Elective course is to offer an understanding of the multiple issues of applied ethics as relevant to our practical lives. It, further, awakens the students on their human rights as well as responsibilities. The study of this course brings much confidence to the students in choosing their course of actions under different situations with carefulness such that they may avoid any contradictory acts that may affect themselves, their surrounding natural environment, or even the society at large. This course, actually, aims to make the students morally aware of the different situations of their surroundings and develops in them the ability to act responsibly as a member of the society.

The outcome of the SECsyllabus is to deal with the psychologicalissues of the students who are in their adolescent period of life such that they may develop the appropriate attitude towards sorting out their psychological problems as much common to their ages. This may, in fact, solve different psychological problems of the students concerned as well as that of any otherpersons living in societies.This course, moreover, offers an alternative prospect of carrier opportunity of a counsellor to thestudents with theirapproaches towards understanding and practice of counselling in their higher studies and researches.

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SEMESTER-VI

The semester six designs the syllabus of Philosophy with a Discipline Specific Elective (DSE-1B), a Generic Elective (GE-2) and a Skill Enhancement Course (SEC-4).

The Discipline Specific Elective under the title Theoretical Ethics deals with some basic concepts and issues of ethics like the nature of ethics, moral and non-moral actions, problem of freedom of will, Utilitarianism of Bentham and Mill, Kant's deontological ethics, the ethics of Niskama karma, issues of crime and punishment etc.

The Generic Elective under the title Psychology offers a preliminary understanding of the issues of psychology like sensation, perception, attention, memory, learning, emotion, consciousness and its different levels, intelligence and its measurement and etc.

The extension of the Skill Enhancement Course under the title Critical Thinking may be seen here to introduce various approaches to develop our ordinary thinking to the level of systematic logical / critical thinking. This includes the method of analysis, deductions, inductions, and the like. It suggests the norms as well as criteria of critical thinking and offers before the students the wide possible range of logical fallacies ofpractical forms that may occur in our everyday situations.

Now, the outcome of the Discipline Specific Elective course is to build moral insights among the students of philosophy with the understanding of the important theoretical aspects of ethics as leading to the moral living of them in an enlightened, conscious and careful way.

The Generic Elective aims at approaching the students with more or less an empirical understanding of their psyche so as to satisfy different unanswered queries of their ages along with the culture and possible control of their psychological states. In other words, this paper gives an exposure to understand different psychological phenomena of the teenaged students, apart from a scope to look forward the career options of psychologists.

The SEC syllabus, on the other hand, develops the attitude of critical thinking in the undergraduate students of philosophy in a way so as to grow in them the power of analysis of facts and theorems such that they may be aware of the notable flaws involved in reasoning or argumentation and may apply their critical thinking in different phases of their lives like decision-making and etc. This is precious for any budding students of philosophy to present or represent their points of view before the world in a precise way that would display their worthy living as humans or rational beings.

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https://www.cbpbu.ac.in/userfiles/file/CBCS/FINAL%20UG-CBCS%20SYLLABUS%20MATHEMATICS%20HONOURS%20with%20objectives_11.1.2020.pdf

https://www.cbpbu.ac.in/userfiles/file/CBCS/FINAL%20UG-CBCS%20SYLLABUS%20B.Sc.%20(Programme)%20with%20MATHEMATICS%20with%20objectives_11.01.2020.pdf

PROGRAMME OUTCOMES

Sl. No.	PROGRAMME OUTCOMES
1	Application of fundamental mathematics
2	Skills in Programming languages
3	Development of critical thinking
4	Ability to use in Mathematical real life problems
5	Skills in performing analysis and interpretation of data
6	Interdisciplinary approach
7	To inculcate awareness on environment and inclusive growth
8	Motivate towards higher studies and self reliance
9	Development of ict skills

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COURSE OUTCOMES

❖ Semester-1:

CoreCourse-1(Calculus,Geometry&Differential Equation:Unit-1,2,3,4)

Unit-1,2:Calculus

LearningOutcomes: On completion of this area of the course, the student will beable to

- UnderstandthenatureofHyperbolicfunctions.
- FindhigherorderderivativesandapplytheLeibnitzruletosolveproblemsrelated to such derivatives.
- Plotthegraphsofpolynomialsofdegree4and5,thederivativegraph,thesecondderivativegrapha nd comparethem.
- Apply the conceptand principles ofdifferential calculus to find the curvature,concavity and points of inflection, envelopes, rectilinear asymptotes (Cartesian &parametricformonly)ofdifferentcurves.
- TracestandardcurvesinCartesiancoordinatesandpolarcoordinates.
- Sketchparametriccurves(Ex.trochoid,cycloid,epicycloids,hypocycloid).
- Applytheconceptandprinciplesofdifferentialcalculustosolvedifferentgeometric and physical problems that may arise in business, economics and lifesciences.
- SolvevariouslimitproblemsusingL'Hospital'srule·
- DeriveReductionformulaeforsomecomplexintegrationsandhenceIntegratefunctionsofamuc hhigherdegreewhichareapplicableinreallifesituations.
- Apply theintegralcalculustofindarclengthofacurve,arclengthofparametriccurves,areaunderacur ve,surfaceareaandvolumeofsurfaceofrevolution.
- Graphicallyobtainthesurfaceofrevolutionofcurves.

Unit-3:Geometry

LearningOutcomes: Oncompletionofthisareaofthecourse,thestudentwillbeable to

- Transformtheco-ordinatesystemespeciallybyRotationofaxes,thusreducingdifferentsecond-degreeequationstotheircorrespondingsimplestformsandalsoclassifytheconicsusingthediscri minant.
- Becomefamiliarwiththepolarequationsofconics&theirtangentsandnormals
- Understand the geometrical terminology and have a detailed clear-cut idea of thePlanes,Straightlinesin 3D,Spheres,Cylindricalsurfaces,Centralconicoids,Paraboloids, Plane sections ofconicoids along with the Tangent and normals ofthe conicoids.
- Haveanideaofclassificationofquadrics.
- Developanideaofthegeneratinglines.
- Be familiar with the illustrations of graphing standard quadric surfaces like cones,paraboloids,hyperboloidsandellipsoids.

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- Visualizeandgraphically demonstrategeometricfiguresandclassifydifferentgeometricsolidsusingteachingaid-preferably freesoftwares:
  - ✓Tracingofconicsincartesiancoordinates/polarcoordinates.
  - ✓ Sketching ellipsoid, hyperboloid of one and two sheets, elliptic cone,elliptic,paraboloid,andhyperbolicparaboloidusingcartesiancoordinates.

Unit-4:Ordinarydifferentialequation

LearningOutcomes:

On completion of this course, the student will be able to identify the type of agivendifferentialequationandselectandapplytheappropriateanalyticaltechnique for finding the solution. The students will be well conversant with thefollowing typesofdifferentialequations:

- Firstorderdifferentialequations:Exactdifferentialequationsandintegrating factors, special integrating factors and transformations, linearequationsandBernoulliequations,theexistenceanduniquenesstheoremofPicard (Statementonly).
- Linear equations and equations reducible to linear form. First order higherdegreeequationssolvableforx,yandp.Clairaut'sequationsandsingularsolution.
- BasicTheoryoflinearsystemsinnormalform,homogeneouslinearsystemswithconstantcoefficients:TwoEquationsintwounknownfunctions.
- Lineardifferentialequationsofsecond order, Wronskian:itspropertiesandapplications,Eulerequation,methodofundeterminedcoefficients,method ofvariationofparameters.

CoreCourse-2(ALGEBRA:Unit-1,2,3, 4 & 5)

LearningOutcomes:Oncompletionofthiscourse,thestudentwillhaveaclear-cutunderstandingofsomeimportantconceptsofClassicalAlgebra,AbstractAlgebra&LinearAlgebraasfollows:

Unit-1:

- Polarrepresentationofcomplexnumbers,*n*-throotsofunity,DeMoivre'stheoremforrationalindicesanditsapplications.Exponential,logarithmic,trigonometricandhyperbolicfunctionsofthe complexvariable.
- Theory ofequations:Relationbetweenroots andcoefficients,transformation oftheequation,Descartesruleofsigns,Sturm'stheorem,cubicequation(solutionbyCardan'smethod)andbiquadraticequation(solutionbyFerrari's method).
- Inequality:Theinequalityinvolving$AM \geq GM \geq HM$,Cauchy-Schwartzinequality.
- Lineardifferenceequationswithconstantcoefficients(upto2ndorder).

Unit-2:

- Relation:equivalencerelation,equivalenceclasses&partition,partialorderrelation,poset,linear orderrelation.
- Mapping:injective,surjective,onetoonecorrespondence,invertiblemapping,compositionofm

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appings,relationbetweenthecompositionofmappingsandvarioussettheoreticoperations.Meaningandpropertiesof $f^{-1}(B)$,foranymapping $f:X\to Y$ and $B\subseteq Y$.

- Well-ordering property of positive integers, Principles of Mathematical induction,division algorithm, di-visibility and Euclidean algorithm. Prime numbers and theirproperties, Euclid's theorem. Congruence relation between integers. FundamentalTheorem of Arithmetic. Chinese remainder theorem. Arithmetic functions, somearithmeticfunctionssuchas φ,τ,σ andtheirproperties.

Unit-3,4 & 5

- Rankofamatrix,inverseofamatrix,characterizationsofinvertiblematrices.
- Systems of linear equations, row reduction and echelon forms, vector equations,the matrix equation $AX = B$, solution sets of linear systems, applications of linearsystems.

❖ Semester2:

CoreCourse-3(RealAnalysis:Unit-1,2,3)

LearningOutcomes:

After completion of this course, the students will be able to think about the basicproof techniques and fundamental definitions related to the real number system.Theycandemonstratesomeofthefundamentaltheoremsofanalysis.Thestudentswillgradually developAnalysisskillsinsets,sequencesandinfiniteseriesofRealNumberscoveredbytheth reerespectiveunitsasfollows:

Unit-1:

- Intuitive idea of real numbers. Mathematical operations and usual order of realnumbersrevisitedwiththeirproperties(closure,commutative,associative,identity, inverse, distributive). Idea of countable sets, un-countable sets anduncountability ofR.Conceptofbounded andunbounded setsin R.L.U.B.(supremum),G.L.B. (infimum) ofa setand their properties.L.U.B. axiom ororder completenessaxiom.Archimedeanpropertyof R.Densityofrational(and Irrational)numbersin R.
- Intervals.Neighbourhoodofapoint.Interiorpoint.Openset.Union,intersectionofopensets.Limitpointandisolatedpointofaset.Bolzano-Weirstrass theoremfor sets. Existence oflimit pointofevery uncountable setas a consequence of Bolzano-Weirstrass theorem. Derived set. Closed set.Complementofopensetandclosedset.Unionandintersectionofclosedsetsas a consequence. No nonempty proper subset of R is both open and closed.DensesetinRasasethavingnon-emptyintersectionwitheveryopeninterval.

Unit-2:

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- Realsequence.Boundedsequence.Convergenceandnon-convergence.Examples. Boundedness of convergent sequence. Uniqueness of limit. Algebraof limits.
- Relation between the limit point of a set and the limit of a convergent sequenceof distinct elements. Monotone sequences and their convergence. Sandwichrule.Nestedintervaltheorem.Limitofsomeimportantsequences.Cauchy'sfirst and secondlimittheorems.
- Subsequence, Subsequential limits. Aboundedsequence $\{x_n\}$ isconvergentif andonlyiflimsupx_n=liminfx_n.Everysequencehasamonotonesubsequence. Bolzano-Weirstrasstheoremforsequence.Cauchy'sconvergencecriterion.Cauchysequence.

Unit-3

- Infiniteseries,convergenceandnon-convergenceofinfiniteseries.
- Cauchy criterion, tests for convergence: comparison test, limit comparison test, ratio test.
- Cauchy'sn-throottest,Kummer'stestandGausstest(statementsonly).Alternatingseries.
- Leibniztest.Absoluteandconditionalconvergence.

CoreCourse-4(Differential Equations:Unit-1,2,3 & 4)

LearningOutcomes:

Unit-1

- BasicTheoryoflinearsystemsinnormalform,homogeneouslinearsystemswithconstantcoefficients:TwoEquationsintwounknownfunctions.
- Lineardifferentialequationsofsecond order, Wronskian:itspropertiesandapplications,Eulerequation,methodofundeterminedcoefficients,method ofvariationofparameters.

Unit-2 & 3

- System of linear differential equations, types of linear systems, differentialoperators,anoperatormethodforlinearsystemswithconstantcoefficients.
- Planarlinearautonomoussystems:Equilibrium(critical)points,Interpretationofthephaseplaneandphaseportraits.
  - Power series solution of a differential equation about an ordinary point,solutionaboutaregularsingularpoint(uptosecondorder).

Unit-4

GraphicalDemonstration(TeachingAid-Preferablybycomputersoftwares)

Thestudentswillgainhandsonexpertiseingraphicaldemonstrationofthefollowing, usingcomputer softwareorotherwise:

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1. Plotting of second order solution family of differential equation.
2. Plotting of third order solution family of differential equation.
3. Growth model (exponential case only).
4. Decay model (exponential case only).
5. Lake pollution model (with constant/seasonal flow and pollution concentration).
6. Case of single cold pill and a course of cold pills.
7. Limited growth of population (with and without harvesting).
8. Predatory-prey model (basic volterra model, with density dependence, effect of DDT, two prey one predator).
9. Epidemic model of influenza (basic epidemic model, contagious for life, disease with carriers).
10. Battle model (basic battle model, jungle warfare, long range weapons).
11. Plotting of recursive sequences.
12. Study the convergence of sequences through plotting.
13. Verify Bolzano-Weierstrass theorem through plotting of sequences and hence identify convergent subsequences from the plot.
14. Study the convergence/divergence of infinite series by plotting their sequences of partial sum.
15. Cauchy's root test by plotting nth roots.

❖ Semester 3:

CoreCourse-5(TheoryofRealFunctions:Unit-1,2 & 3)

Learning Outcomes: After completion of this course, the students will be able tounderstandtheconceptofreal-valuedfunctions,limit,continuity,anddifferentiability in detail. They can find expansions of real functions in series forms.Thestudentswillbecomeconversantwithmanyoftheimportanttheoremsof DifferentialCalculus afterthecompletionofthisCoreCoursewhichhasbeencovered in thefollowing twounits:

Unit-1:

- Limits of functions, sequential criterion for limits. Algebra of limits for functions,effect of limit on inequality involving functions, one sided limit. Infinite limits andlimits atinfinity.SomeImportantexamplesoflimits.
- Continuity ofa function on an intervalandatan isolated point.Sequentialcriteria for continuity. Conceptofoscillation ofa function ata point.A functioniscontinuousat$x$ifandonlyifitsoscillationat$x$iszero.Familiaritywiththe figuresofsomewell-knownfunctions:$y=x^a$(a=2,3,−1,-2),$|x|$,sin$x$,cos$x$, tan$x$,log$x$,e^x.Algebraofcontinuousfunctionsasaconsequenceofalgebraof limits.Continuityofcompositefunctions.Examplesofcontinuousfunctions. Continuityofafunctionatapointdoesnotnecessarilyimplythecontinuityin someneighbourhoodofthatpoint.
- Boundedfunctions.Neighbourhoodpropertiesofcontinuousfunctionsregardingboundedne

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ssandmaintenanceofthesamesign.Continuousfunctionon[a,b]isboundedandattainsitsbounds.Intermediatevaluetheorem.

- Discontinuityoffunctions,typeofdiscontinuity.Stepfunctions.Piecewisecontinuity.Monotonefunctions.Monotonefunctionscanhaveonlyjumpdiscontinuity. Monotone functions can have at most countably many points ofdiscontinuity.Monotonebijectivefunctionfromanintervaltoanintervaliscontinuousanditsinverseisalsocontinuous.
- Uniformcontinuity.Functionscontinuousonaclosedandboundedintervalisuniformlycontinuous.Anecessaryandsufficientconditionunderwhichacontinuous function on a bounded open interval will be uniformly continuous. Asufficientconditionunderwhichacontinuousfunctiononanunboundedopenintervalwillbeuniformlycontinuous(statementonly).Lipschitzconditionanduniformcontinuity.

Unit-2:

- Differentiabilityofafunctionatapointandinaninterval,algebraofdifferentiablefunctions.Meaningofsignofderivative.Chainrule.
- Darbouxtheorem,Rolle'stheorem,MeanvaluetheoremsofLagrangeandCauchy—asanapplicationofRolle'stheorem.

Unit-3:

- Taylor'stheoremonclosed and boundedintervalwithLagrange'sandCauchy'sformofremainderdeducedfromLagrange'sandCauchy'smeanvaluetheoremrespectively.Expansionofe^x,log(1+x),$(1+x)^m$,sin$x$,cos$x$withtheirrangeofvalidity (assumingrelevanttheorems).ApplicationofTaylor'stheoremtoinequalities.
- Statement of L' Hospital's rule and its consequences. Point of local extremum(maximum, minimum) of a function in an interval. Sufficient condition for theexistenceofa localmaximum/minimum ofafunction ata point(statementonly).Determinationoflocalextremumusingfirstorderderivative.Applicationoftheprincipleofmaximum/minimumingeometricalproblems.

CoreCourse-6:(GroupTheory:Unit-1,2,3 & 4)

LearningOutcomes:Onthecompletionofthiscourse,thestudentswillunderstandthebasicconceptsofGroupTheoryinAbstract/ModernAlgebracovered by the followingthreeunits:

Unit-1:

Symmetriesofasquare,definitionofgroup,examplesofgroupsincludingpermutation groups, dihedral groups and quaternion groups (through matrices),elementary properties of groups, examples of commutative and non-commutativegroups.Subgroupsandexamplesofsubgroups,necessaryandsufficientconditionforanonemptysubsetofagrouptobeasubgroup.Normalizer,centralizer,center ofagroup,productoftwosubgroups.

Unit-2:

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Propertiesofcyclicgroups,classificationofsubgroupsofcyclicgroups. Cyclenotation for permutations, properties of permutations, even and odd permutations,alternating group, properties ofcosets, order ofan element, order ofa group.Lagrange'stheoremandconsequencesincludingFermat'sLittletheorem.

Unit-3 & 4:

Normalsubgroupanditsproperties.Quotientgroup.Grouphomomorphisms,propertiesofhomo morphisms,correspondencetheoremandone-onecorrespondence between the set of all normal subgroups of a group and the set ofallcongruencesonthatgroup,Cayley'stheorem,propertiesofisomorphisms.First,Secondand Thirdisomorphismtheorems.

CoreCourse-7:(Partial Differential Equation:Unit-1,2,3 & 4)

LearningOutcomes:

On completion of this unit of the course, the student will be able tounderstand,deriveandsolvedifferenttypesofpartialdifferentialequationswhichm ayariseinreallifeproblems:

Unit-1 & 2:

- Partialdifferentialequationsofthefirstorder,Lagrange'ssolution, non- linear first order partial differential equations, Charpit's generalmethod of solution, some special types of equations which can besolvedeasilybymethodsotherthanthegeneralmethod.
- Derivationofheatequation,waveequationandLaplaceequation.Classificationofsecondo rderlinearequationsashyperbolic,parabolicorelliptic.Reductionofsecondorderlineareq uationstocanonicalforms.
- TheCauchyproblem,Cauchy-Kowalewskayatheorem,Cauchyproblem of finite and infinite string. Initial boundary value problems.Semi-infinite string with a fixed end, semi-infinite string with a free end.Equationswithnon-homogeneousboundaryconditions.Non-homogeneouswaveequation.Methodofseparationofvariables,solvingthevibratingstrin gproblem.Solvingtheheatconductionproblem.

Unit-3:

GraphicalDemonstration(TeachingAid-Preferablybycomputersoftwares)

Thestudentswillgainhandsonexpertiseingraphicaldemonstrationofthefollowing, usingcomputer softwareorotherwise:

1. Plotting of a 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. Plotting of a solution of wave equation for different initial and boundary conditions
5. Plotting of a solution of heat equation for different initial and boundary conditions**.**

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6. Plotting of a solution of Laplace's equation for different initial and boundary conditions.

SECCourse-1(Logic ans sets:Unit-1,2 & 3)

LearningOutcomes:

Introduction of logic and sets has been discussed. Students will learn about truth table, different propositions, predicates and quantifiers, various operations between two sets and logical equivalences etc in this course.

- Introduction, propositions, truth table, negation, conjunction and disjunction. Implications, biconditional propositions, converse, contra positive and inverse propositions and precedence of logical operators. Propositional equivalence: Logical equivalences. Predicates and quantifiers: Introduction, quantifiers, binding variables and negations.
- Sets, subsets, set operations and the laws of set theory and Venn diagrams. Examples of finite and infinite sets. Finite sets and counting principle. Empty set, properties of empty set. Standard set operations. classes of sets. Power set of a set.
- Difference and Symmetric difference of two sets. Set identities, generalized union and intersections. Relation: Product set. Composition of relations, types of relations, partitions, equivalence Relations with example of congruence modulo relation. Partial ordering relations, n- ary relations.

❖ Semester 4:

CoreCourse-8(Multivariate Calculus & Vector Analysis:Unit-1,2, 3 & 4)

Unit-1 & 2:MultivariateCalculus

LearningOutcomes:

Oncompletionofthiscourse,thestudentwillbeableto

- UnderstandtheconceptofneighbourhoodofapointinR^n(n>1),interior point,limitpoint,opensetandclosedsetinR^n(n>1).
- IdentifyfunctionsfromR^n(n>1)toR^m(m≥1) Developconceptsonlimitandcontinuityoffunctionsoftwoormorevariables,theirpartialderivatives,totalderivativeanddifferentiability, alongwiththesufficientconditionfordifferentiability,Chainruleforoneandtwoindependentparameters,directionalderivatives,thegradient,maximalandnormalpropertyofthegradient,tangentplanes.
- Find Extrema of functions of two variables & understand the use of themethodofLagrangemultipliers&solveconstrainedoptimizationproblems.

Unit-3 & 4:Vector Analysis

LearningOutcomes:

After completion of this unit of the course which covers the followingtopics on multiple integrals, line integrals etc., the student will be able toapply these concepts to solve many real-life problems that may arise indifferentfields:

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- Multiple integral: Concept of upper sum, lower sum, upper integral,lower-integralanddoubleintegral(norigoroustreatmentisneeded). Statement of existence theorem for continuous functions.Iterated or repeated integral, change of order of integration. Tripleintegral. Cylindricaland sphericalcoordinates. Change of variablesindoubleintegralsandtripleintegrals.Transformationofdoubleand triple inte-grals (problems only). Determination of volume andsurface area by multiple integrals (problems only). Differentiationunderthe integralsign,Leibniz'srule(problemsonly).
- Definitionofvectorfield,divergenceandcurl.Lineintegrals,applicationsoflin eintegral:massandwork.Fundamentaltheoremforlineintegrals,conservative vectorfields,independenceofpath.
- Green'stheorem,surfaceintegrals,integralsoverparametricallydefinedsurfaces.St oke'stheorem,TheDivergencetheorem.

CoreCourse-9(Complex Analysis:Unit-1,2, 3 & 4)

LearningOutcomes:

Students will grasp the idea of complex functions, its derivatives and integrations. Also, in the practical classes, they will learn how to represent complex numbers, to find line integrals, contour integration, plotting of complex functions etc by using mathematical software.

Unit-1:

Limits, Limits involving the point at infinity, continuity. Properties of complex numbers, regions in the complex plane, functions of complex variable, mappings. Derivatives, differentiation formulas, Cauchy-Riemann equations, sufficient conditions for differentiability. Milne's method.

Unit-2:

Analytic functions, examples of analytic functions, exponential function, Logarithmic function, trigonometric function, derivatives of functions, definite integrals of functions. Contours, Contour integrals and its examples, upper bounds for moduli of contour integrals. Antiderivatives, proof of antiderivative theorem, Cauchy-Goursat theorem, Cauchy integral formula

Unit-3:

An extension of Cauchy integral formula, consequences of Cauchy integral formula.
Mobius transformations.

Unit-4:

Declaring a complex number e.g.$z1=3+4i$, $z2=4-7i$ Discussing their algebra $z1+z2$, $z1-z2$, $z1*z2 and z1/z2$ and then plotting them.
(ii) Finding conjugate, modulus and phase angle of an array of complex numbers.
(iii) Compute the integral over a straight line path between the two specified end points
(iv) Perform contour integration
(v) Plotting of the complex functions

CoreCourse-10(Ring theory, Linear Algebra & Metric spaces)

LearningOutcomes:

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Introduction of Ring theory should be the next step when the concepts of group theory has been build up. That's why, basic concepts of Ring theory and Metric spaces, further idea of inner product spaces and linear transformations have been introduced in this course.

Unit-1:

Ring theory: Definition and examples of rings, properties of rings, sub rings, integral domains and fields, characteristic of a ring. Ideal, ideal generated by a subset of a ring, factor rings, prime and maximal ideals, ring isomorphism(statement only).

Unit-2:

Linear algebra: Inner product space. Linear transformations, null space, range, rank and nullity of a linear transformation, matrix representation of a linear transformation, algebra of linear transformations. Isomorphism, Isomorphism theorems, invertibility and isomorphism, change of coordinate matrix.

Unit-3:

Metric spaces: Definition and examples of Metric Spaces. Neighbourhoods. Limit points. Interior points. Open and closed sets. Closure and Interior. Boundary points. Subspace of Metric Space.

Cauchy Sequence. Completeness. Cantor Intersection Theorem. Construction of R as the completion of incomplete Metric Space Q (Deduction of no other completion process is required). Real number as a complete ordered field (No proof of the theorem).

SECCourse-2(Graph theory:Unit-1,2 & 3)

LearningOutcomes:

Basic concepts of graphs, Eulerian circuits, Eulerian graphs, Hamiltonian cycles, representation of a graph by matrix etc. has been introduced in this course. Also, students shall learn the different applications of graph theory.

- Definition, examples and basic properties of graphs, pseudo graphs, complete graphs, bipartite graphs isomorphism of graphs.
- Eulerian circuits, Eulerian graph, semi-Eulerian graph, theorems, Hamiltonian cycles, theorems
- Representation of a graph by matrix, the adjacency matrix, incidence matrix, weighted graph
- Travelling salesman's problem, shortest path, Tree and their properties, spanning tree, Dijkstra's algorithm, Warshall algorithm.

❖ Semester 5:

CoreCourse-11(Probability and Statistics)

LearningOutcomes:

In this course students will know about basic concepts on probability and statistics. Definition of probability, application of Bayes theorem, various probability functions and their applications, numerous measures to determine the nature of sampling data etc. have been discussed in this course.

Unit-1 & 2:

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Random experiments, Simple and compound events. Event space. Classical and frequency definition of probability and their drawbacks. Axioms of Probability. Statistical regularity. Multiplication rule of Probabilities. Bayes' thorem. Independent events. Independent random experiments. Independent trials. Bernoulli trials and binomial law. Poisson trials. Random variables. Probability distribution. Distribution function. Discrete and continuous distributions. uniform, binomial, Poisson, geometric, negative binomial, continuous distributions: uniform, normal, exponential. Mathematical expectation, mean, variance, moments, central moments, dispersion, skewness and kurtosis. Median, mode, quartiles, moment generating function, Characteristic function.

Unit-3,4 & 5:

Joint cumulative distribution function and its properties, joint probability density functions, marginal and conditional distributions, expectation of function of two random variables, conditional expectations, independent random variables, bivariate normal distribution, correlation coefficient, joint moment generating function and calculation of covariance, linear regression for two variables.

Chebyshev's inequality, statement and interpretation of (weak) law of large numbers and strong law of large numbers, Central Limit theorem for independent and identically distributed random variables with finite variance,

Concept of population and Sampling. Sampling distribution of Statistic. Estimates of Population characteristic or parameter. Unbiased and consistent estimates. Sample characteristic as estimates of the corresponding population characteristic. Sampling distributions of the sample mean and variance. Exact sampling distributions for the normal population.

CoreCourse-12 (Laplace Transform, Riemann Integration & Series of functions)

LearningOutcomes:

Theory and application of Laplace transformations, theory and concepts of Riemann integration and nature, convergence of series of functions and Fourier series will be discussed in this course.

Unit 1 (Laplace Transform:)

Laplace of some standard functions, Existence conditions for the Laplace Transform, Shifting theorems, Laplace transform of derivatives and integrals, Inverse Laplace transform and their properties, Convolution theorem, Initial and final value theorem, Laplace transform of periodic functions, error functions, Heaviside unit step function and Dirac delta function, Applications of Laplace transform to solve ODEs.

Unit 2:Riemann integration and Improper integral

inequalities of upper and lower sums, Darboux integration, Darboux theorem, Riemann conditions of integrability, Riemann sum and definition of Riemann integral through Riemann sums, equivalence of two definitions. Riemann integrability of monotone and continuous functions, properties of the Riemann integral; definition and integrability of piecewise continuous and monotone functions. Intermediate Value theorem for Integrals; Fundamental theorem of Integral Calculus.

Improper integrals. Convergence of Beta and Gamma functions.

Unit 3 & 4:Series of functions and Fourier series

Pointwise and uniform convergence of sequence of functions. Theorems on continuity, derivability and integrability of the limit function of a sequence of functions.

Series of functions. Theorems on the continuity, derivability and integrability of the sum function of a series of functions; Cauchy criterion for uniform convergence and Weierstrass M-Test.

Fourier series, Trigonometric Fourier series and its convergence. Fourier series of even and odd functions, Fourier half-range series.

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DSE -1(Linear Programming and Game Theory)

LearningOutcomes:

In this course, the students will be able to learn about various optimization techniques pertaining to linear programming and apply linear programming to problems arising from real life. Also, the students will learn the basic concepts of game theory through a problem solving approach.

Unit 1:

Introduction to linear programming problem. Theory of simplex method, graphical solution, convex sets, optimality and unboundedness, the simplex algorithm, simplex method in tableau format, introduction to artificial variables, two-phase method. Big-M method and their comparison.

Unit 2:

Duality, formulation of the dual problem, primal-dual relationships, economic interpretation of the dual.

Transportation problem and its mathematical formulation, northwest-corner method, least cost method and Vogel approximation method for determination of starting basic solution, algorithm for solving transportation problem, assignment problem and its mathematical formulation, Hungarian method for solving assignment problem.

Unit 3:

Game theory: formulation of two person's zero sum game, solving two person zero sum game, games with mixed strategies, graphical solution procedure, dominance property, linear programming solution of games.

DSE-2(Introduction to Integral equation and Dynamical system)

LearningOutcomes:

Preliminary idea about integral equation and dynamical system have been discussed here. The applications in real world problems have also been discussed in dynamical system.

Unit 1 & 2: Integral equations:

- Introduction and basic Examples. Classification, Conversion to Volterra Equation to ODE, Conversion of IVP and BVP to Integral equation, Decomposition, Direct Computation, Successive Approximation, Successive substitution method for Fredholm Integral equations.
- Series Solution. Successive approximation. Successive substitution method for Volterra integral equation. Volterra integral equation of first kind. Integral equation with separable kernel.

Unit 3 & 4: Dynamical System

- Formulation of physical system, Existence and uniqueness of solution of a dynamical system, linear system, solution of linear system, fundamental matrix, Fundamental matrices of non-autonomous system.
- Linear systems with periodic coefficients, stability of systems, stability of linear autonomous systems, stability of non-autonomous system using linearization, properties of orbit, phase portrait.

❖ Semester 6:

CoreCourse-13(Dynamics of a particle)

LearningOutcomes:

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In this course of study, students grab the basic knowledge of the behaviour of objects in motion. Motion in a straight line, Expressions of velocity and acceleration in different coordinate systems, central orbit, motion of a particle with varying mass and particle motion in a resisting medium are the key topics of this course.

Unit 1 &2:

- Motion in straight line under variable acceleration. Simple Harmonic Motion. Hooke's law. Problems on elastic string. Expressions for velocity and acceleration of a particle moving on a plane in Cartesian and Polar coordinates.
- Motion of a particle moving on a plane with reference to a set of rotating axes.
- Central forces and central orbit.
- Tangential and normal accelerations. Circular motion. Simple cases of constrained motion of a particle. Motion of a particle in a plane under different laws of resistance. Motion of a projectile in a resisting medium.
- Trajectories in a resisting medium where resistance varies as some integral power of velocity. Terminal velocity. Motion under the inverse square law in a plane. Kepler's law and planetary motion. Escape velocity, time of describing an arc of an orbit, motion of artificial satellites.

Unit 3:

Equation of motion of a particle of varying mass. Problems of motion of varying mass such as those of falling raindrops and projected rockets.

CoreCourse-14(Numerical Methods)

LearningOutcomes:

This course will help students to understand the concept of error, various methods to find a root of an equation, solution of a system of linear equations, interpolation, numerical differentiation and integration etc. The students will also have hand on experience of the topic through computers using any software.

Unit 1&2:

- Errors: Relative, Absolute, Round off, Truncation.
- Transcendental and Polynomial equations: Bisection method, Newton's method, Secant method. Rate of convergence of these methods.
- System of linear algebraic equations: Gaussian Elimination and Gauss Jordan methods. Gauss Jacobi method, Gauss Seidel method and their convergence analysis.
- Interpolation: Lagrange and Newton's methods. Error bounds. Finite difference operators. Gregory forward and backward difference interpolation.

Unit 3:

Numerical Integration: Trapezoidal rule, Simpson's 1/3rd rule. Composite Trapezoidal rule, Composite Simpson's 1/3rd rule. Ordinary Differential Equations: Euler's method. Runge-Kutta method of orders two and four.

Unit 4:

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1. Solution of transcendental and algebraic equations by
• Bisection method
• Newton Raphson method.
• Regula Falsi method.
2. Solution of system of linear equations
• Gaussian elimination method
• Gauss-Seidel method
3. Numerical Integration
• Trapezoidal Rule
• Simpson's one third rule

4. Solution of ordinary differential equations
• Euler method
• Runge- Kutta Method of orders two and four

DSE-3(Number Theory)

LearningOutcomes:

Students will learn about number theory and the topic like congruences, Chinese remainder theorem, Fermat's little theorem, integer modulo n, Fermat's last theorem etc are key features of this course.

Unit 1, 2 & 3:

- Linear diophantine equation, The fundamental theorem of arithmetic, statement of prime number theorem, Goldbach conjecture, linear congruences, reduced and complete set of residues. Chinese remainder theorem, Fermat's little theorem, Wilson's theorem.
- Number theoretic functions, sum and number of divisors, multiplicative and totally multiplicative functions, Mobius function, the Mobius inversion formula, the greatest integer function, Euler's phi-function, Euler's theorem, some properties of Euler's phi-function.
- Order of an integer modulo n, primitive roots for primes, composite numbers having primitive roots, Euler's criterion, the Legendre symbol and its properties, quadratic reciprocity, quadratic congruences with composite moduli. Pythagorean triple, primitive Pythagorean triple, Fermat's Last theorem.

DSE-4 (Boolean algebra and discrete mathematics)

LearningOutcomes:

Preliminary idea about Boolean algebra and its implementation to modern day computers have been discussed here. Also, foundations of discrete Mathematics have been introduced in this course.

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Unit 1 & 2: Boolean Algebra

- Boolean Algebra: Huntington postulates for Boolean algebra, Algebra of sets and switching algebra as examples of Boolean Algebra, duality principle, Boolean functions, Normal forms, minimal and maximal forms of Boolean polynomials .
- Karnaugh maps, Design of switching circuits, Logic gates.

Unit 3 & 4: Discrete Mathematics

- Discrete Mathematics: Principle of inclusion and exclusion, Pigeon-hole principle, Finite combinatorics, Generating functions, Partitions, Recurrence relations, Linear difference equations with constant coefficients.
- Partial and linear orderings, Chains and anti-chains, Lattices, Distributive lattices, Complementation, sub-lattices, products and homomorphisms.

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DEPARTMENT OF PHYSIOLOGY

For UG CBCS syllabus of Physiology in Cooch Behar Panchanan Barma University click the following link:

https://cbpbu.ac.in/userfiles/file/CBCS/UPDATED%20CBCS%20Syllabus_%20%20PHYSIOLOGY_30.05.2018123.pdf

PROGRAMME OUTCOMES

Sl. No.	PROGRAMME OUTCOMES
1	Scientific Reasoning
2	Laboratory Techniques and Instrumentation
3	Problem solving Skills
4	Community Health Awareness Aptitude
5	Analytical Thinking and Research Aptitude
6	Scopes and Career Avenues

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COURSE OUTCOMES

Programme Specific Outcome

Physiology is an all-in-one subject which not only provides knowledge about the structural and functional details of the human body but also emphasises on the different applied aspects of physiology. Besides studying the detailed structural and functional aspects of each and every organ systems of an organism, it also focuses on the intricate molecular details that forms the basis of these structural and functional attributes. The program also emphasises on the study of applied fields like haematological, biochemical, nutritional laboratory techniques, which provides a chance for future studies in these special areas. Sports Physiology and Ergonomics are two such fields of physiology which provide specialized knowledge helping students to venture into these arenas for further studies and even jobs in the Sports Authority of India (SAI) and ergonomics at industrial level.

1. Understanding about the structure-function relationship of organ, tissue and cell

2. Idea about the importance of biophysical and biochemical properties of human physiological system

3. Study about the mechanism of action of different physiological system and their functions to maintain the homeostasis

4. Idea about community health and public health issues

5. Practical knowledge about the normal range of different physiological parameters

6. Practical knowledge of biochemistry and biomedical instrumentation

B.Sc Honours

Course Code	Course Name	Course Outcome
UG/PHYH/101/C-1	Cellular Basis of Physiology	The structural and functional basis of the cells and their communication and interrelationship between each other is highlighted. Along with cells, the different tissues, their structure, function and localisation are elaborately discussed.
UG/PHYH/102/C-2	Biological Physics and Enzymes	The biophysical basis of various physiological functions of organ systems is highlighted along with the working of enzymes that bring about various physiological changes through major biochemical processes by catalysing reactions.

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UG/PHYH/201/C-3	Physiology of Nerve and Muscle Cells	The structural and functional interrelationship between neurons and muscles and their communication skills to bring about various body movements is highlighted.
UG/PHYH/202/C-4	Chemistry of Biomolecules	The chemistry of the cells, the chemical basis of their structure and function is studied along with the various processes involved in the maintenance of different cellular process at molecular level involving these biomolecules is highlighted.
UG/PHYH/301/C-5	Circulating Body Fluids	The fluid connective tissues of the body are studied in detail as per their composition, function, etc.
UG/PHYH/302/C-6	Circulation	The study of circulation of the body fluids involving the cardiovascular system, along with the structural and functional aspects of the heart are studied in detail.
UG/PHYH/303/C-7	Functions of the Nervous System	The parts of nervous system, their role in maintenance of the functions of all the organ systems, and communication with external and internal environments are highlighted.
UG/PHYH/305/SEC-1	Hematological Techniques	The laboratory experimental techniques to study the blood profiles are studied.
UG/PHYH/401/C-8	Energy Balance, Metabolism, and Nutrition	The cellular basis of generation of energy, and biomolecules for the maintenance of regular cellular functionality and survival, how the cells obtain nutrition from the consumed food substances is elaborately discussed.
UG/PHYH/402/C-9	Gastrointestinal Function	The ingestion, digestion, absorption, assimilation and egestion of consumed food though the digestive tract beginning with mouth and ending with anus is highlighted.
UG/PHYH/403/C-10	Respiration	The process of breathing, carriage and exchange of gases at the cellular level is explained.

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UG/PHYH/405/SEC-2	Pathological Microbiology and Bio-Medical Technology	The study of different microbes that causes diseases through laboratory techniques. The various medical related procedures like ECG, MRI, etc are also discussed.
UG/PHYH/501/C-11	Special Senses	The communication between body and external environment is via five special organs, the sense organs: Eye, Ear, Nose, Tongue and Skin. Their structural and functional specialities are elaborately discussed.
UG/PHYH/502/C-12	Endocrinology	The hormonal system regulate the physiology of the organ systems. A detailed study of the different glands that secrete hormones and their structural and functional relationship in maintaining the body homoeostasis is explained.
UG/PHYH/503/DSE-1	Microbiology and Immunology	A detailed description of the microbial world, their structures, pathology, etc are discussed. How the body develops immunity against diseases and forms the line of defence is elaborately explained.
UG/PHYH/504/DSE-2	Genetics and Molecular Biology	The knowledge about genes and how they affect individuals, heredity and its effects are highlighted. The structural and functional interrelationship of the cells of an organism at a molecular level is studied.
UG/PHYH/601/C-13	Reproduction	The structure and function of the organs that take part in production of next generation is discussed elaborately.
UG/PHYH/602/C-14	Formation and Excretion of Urine	The Renal system consisting of the Kidneys and its function to bring about removal of waste substances from the body.
UG/PHYH/603/DSE-3	Ergonomics and Occupational Physiology	The changes brought about on the general physiology due to a person's occupation, how they affect their lives and what changes can be brought about for improving their

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		physiology as well as efficiency is studied.
UG/PHYH/604/DSE-4	Sports and Exercise Physiology	The changes brought about in the physiology while exercising is discussed. The sportsmen who have different physiological parameters compared to sedentary people are elaborately highlighted.

GE Papers

Course Code	Course Name	Course Outcome
UG/PHYH/304/GE-3	Environmental Pollution and Human Health	The effects of different types of environmental pollution like noise pollution, air pollution, water pollution, etc. on human physiology are studied.
UG/PHYH/404/GE-4	Biotechnology	The study of different technological tools using biological science to understand, evaluate different physiological processes, decipher their pathological changes. These procedures are used in various treatment procedures in medical field increasing life expectancy to a great extent.

B.Sc Program

Course Code	Course Name	Course Outcome
UGP/PHYG/101/C-1A	PhysiologicalAspectOfCommunity Health	Humans are social organisms who live in groups forming communities. The changes in the health of people in a community affects the entire human race. This course elaborately discusses the health of people in a community and how that affects the community. An idea about Anganwadi, ICDS and other such programs are also provided.
UGP/PHYG/201/C-1B	Developmental Aspect of Embryo and Foetus	The process of fertilization of ovum by spermatozoa, formation of zygote, its subsequent implantation, followed by the process of development of the embryo into full form foetus, completion of gestation period to finally be born is discussed in this part.
UGP/PHYG/301/C-1C	Environmental Hazards and Human Physiology	The various danger that the environment poses to human health specially on account of the pollutions there is detrimental effect on human

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		physiology, giving rise to different pathological conditions.
UGP/PHYG/304/SEC-1	Food Pollutants Lab	In the present era, food is often found to be adulterated with similar looking but actually harmful substances. The identification and evaluation of such substances from common food substances are studied.
UGP/PHYG/401/C-1D	Bio-engineering	This course studies the application of all fields of life, physical, chemical and mathematical sciences to solve the problems faced in biology, medical sciences and healthcare.
UGP/PHYG/404/SEC-2	Methods in Hematology Lab	The laboratory experimental techniques to understand and evaluate the blood profiles are studied.
UGP/PHYG/501/DSE-1A	Clinical Microbiology and Immunology	The study of different microbes that causes diseases through laboratory techniques. Along with it how the body develops immunity against diseases and forms the line of defence is elaborately explained.
UGP/PHYG/504/SEC-3	Clinical Microbiology andLaboratory Medicine	The study of different microbes that causes diseases through laboratory techniques. The various medical used in laboratory are also discussed
UGP/PHYG/601/DSE-1B	Exercise and Sports Physiology	The changes brought about in the physiology while exercising is discussed. The sportsmen who have different physiological parameters compared to sedentary people are elaborately highlighted.
UGP/PHYG/604/SEC-4	Applied Biochemistry	The cellular basis of generation of energy, and biomolecules for the maintenance of regular cellular functionality and survival, how the cells obtain nutrition from the consumed food substances is elaborately discussed.

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DEPARTMENT OF SANSKRIT

For UG CBCS syllabus of Sanskrit in Cooch Behar Panchanan Barma University click the following link:

https://www.cbpbu.ac.in/userfiles/file/CBCS/UG%20CBCS%20Sanskrit%20Syllabus.pdf

PROGRAMME OUTCOMES

Sl. No.	PROGRAMME OUTCOMES
1	Reasoning
2	Liberal Mindset
3	Ethics
4	Social Development
5	Philosophical Thinking
6	Aesthetic Sense
7	Critical Thinking

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COURSE OUTCOMES

B.A. HONOURS IN SANSKRIT COURSE OUTCOMES (CO)

1st Semester	2nd Semester	3rd Semester	4th Semester	5th Semester	6th Semester
C1	C3	C5	C8	C-11	C-13
C2	C4	C6	C9	C-12	C-14
GE1[OTHER THAN SANSKRIT HONOURS STUDENTS]	GE2[OTHER THAN SANSKRIT HONOURS STUDENTS]	C7 SEC1	C10 SEC2	DSE-1 DSE-2	DSE-3 DSE-4

1ST SEMESTER COURSE OUTCOMES (CO)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
C1	**Sanskrit Grammar and Composition**	Students will earn knowledge of Paniniya'sVyakarana, knowledge of MaheshwaraSutras, Sandhi and Samjna based on Laghusiddhantakaumudi. Students will have capacity to understand fundamentals of Panini Grammar etc. They will earn knowledge of different types of voices (Active voice, Passive voice and Impersonal Voice). They will have translation ability of simple sentences from English to Sanskrit and Sanskrit to English.
C2	**Classical Sanskrit Literature (Prose & Ethics)**	Students will earn knowledge of Sanskrit Literature's 'Śukonasopadeśaḥ'(Prose mode) special in the context of MahakaviBanbhatta's Poetic style, Comprehensive understanding of the popular prose portion from Kadambari, appreciation of basic poetic and linguistic aspects of Sanskrit Literature etc. Through Nitishatakam they will earn knowledge of moral values and thoughts, inspiration to assimilation.
GE1	**Ethical and Moral Issues in Sanskrit Literature**	Students will understand that the truth always prevails, plant seeds of faith, unity in diversity in possible and necessary etc.Lord Rama is the epitome of kindness, compassion, and love. His wisdom and patience made it possible for him to follow his inner good without worrying about the loss of luxuries and kingship. The Mahabharata, an epic Indian poem detailing the struggle between two rival families for

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		control of the throne, stands as one of the great treasures of world literature. Throughout all of the adventures, an underlying theme runs through the tale.Through Nitishatakam they will earn knowledge of moral values and thoughts, inspiration to assimilation.

2ND SEMESTER COURSE OUTCOMES (CO)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
C3	Classical Sanskrit Literature (Drama) & Metre	This course aims to acquaint the students with most famous dramas of Sanskrit Literature, which not only reflect poetic excellence but also depict contemporary society and highlight human values and morality. It also intends to give an understanding of Sanskrit metres. The course also seeks to help the students negotiate the text independently with the help of Proficiency of Sanskrit.
C4	Classical Sanskrit Literature (Poetry) & Dramaturgy	This course aims to get the students acquaint with the text of classical Sanskrit Poetry. They also learn the ideas of Kavyasastric angle as well as Asthetics of Kavyas.
GE2	Nationalistic Thought in Sanskrit Literature	This Course aims to acquaint students with relevant and much debated issues of Ramayana and Mahabharata. They will also know our Nation from Vedic India to Modern India through Vedic Literature as well ae Classical Literature. They also know and realise the real picture of Nationalism in that period of time from this course.

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3RD SEMESTER COURSE OUTCOMES (CO)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
C5	History of Classical Sanskrit Literature	This course aims to introducing notable features of History of Classical Sanskrit Literature. It will enable students to understand and construct the structure of Classical Sanskrit. The Students can take the knowledge about the History of Rāmāyaṇam, Mahābhāratam, Purāṇam, Mahākāvyam, Gītikāvyam, Gadyakāvyam, Kathāsāhityam, Aitihāsikasāhityam, Nāṭyasāhityam & Campūkāvyam.
C7	Sanskrit Grammar	This course introduces the scientific study of Laghusiddhāntakaumudī - Subantaprakaraṇam and Laghusiddhāntakaumudī - Kṛt-Taddhita-pratyayāḥ . Students would be able to understand Grammar structure of Sanskrit language and status of it in the field of comparative studies.
GE3	OTHER THAN SANSKRIT [H] STUDENTS	----------NA----------
SEC1	Communicative Sanskrit	This course aims to introducing Communicative Sanskrit. Students would be able to writing of dialogue in sanskrit, usage of sanskrit words in day-to-day life (words related to educational institution, human body, occupation, fruits, vegetables, birds and animals), time calculation and knowledge of numbers (1-100) in sanskrit and writing of letter in sanskrit.

4TH SEMESTER COURSE OUTCOMES (CO)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
C8	History of Vedic, Scientific & Technical literature in Sanskrit	This course on Vedic literature aims to introduce various types of Vedic Text.The Students can take the knowledge about classifications of Veda, Brāhmaṇam, Āraṇyakam, Upanisad, Vedāngāni. Students must know how Indian education system Gurukul System was overtaken by convert school culture under a well drafted plan to produce Indians who thinks and behave like Englishman. It will also facilitate the students to know about philosophical, moral and scientific principles including the course of Indian Intellectual traditions of Vedic period.

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C9	Ancient Indian Polity & General Survey of Dharma, Artha and Nitisastra	In this course the students would know about the Texts of Dharmasastra, Arthasastra and Nitisastra. This course gives holistic and comprehensive understanding of the subject. It build a comprehensive outlook of ancient Indian polity.
C10	Vedic Hymns & Grammar	The students would know about the Vedic Mantras and Vedic Grammar also. The students would also know the differences between Classical and Vedic Grammar. The students can take the knowledge about socio-economic life in the age of Rigveda, different hymns of Rigveda and its philosophical importance.
GE4	**OTHER THAN SANSKRIT [H] STUDENTS**	----------**NA**----------
SEC 2	Self Management in Bhagabad Gita	The objective of this course is to study the philosophy of self-management in Bhagabad Gita. The course seeks to help students negotiate the text independently without referring to the traditional commentaries so as to enable them to experience the richness of the text. This course also develops self-control, moral values and initiates harmony in Society.

5TH SEMESTER COURSE OUTCOMES (CO)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
C11	Indian Philosophy	This course introduces the scientific study of Indian Philosophy. The students would know about the Tarkasaṃgrahaḥ and History of Indian Philosophy.
C12	Sanskrit Poetics & Literary Criticism	The objective of this course is to study the Sanskrit Poetics & Literary Criticism This course aims to introducing Kāvyadarśaḥ (Prathamaparicchedaḥ)and Sāhityadarpaṇaḥ 10th Paricchedaḥ – Yamakam, Anuprāsaḥ, Śleṣaḥ, Upamā, Rūpakam, Utprekṣā, Atiśayoktiḥ, Tulyayogitā, Prativastūpamā, Nidarśanā, Dīpakam, Dṛṣṭāntaḥ, Samāsoktiḥ, Aprastutapraśaṃsā, Arthāntaranyāsaḥ, Kāvyaliṅgam, Vibhāvanā, Viśeṣoktiḥ, Bhrāntimān, Apahnutiḥ, Vyatirekaḥ, Svabhāvoktiḥ.

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DSE1	Modern Sanskrit Literature	This course aims to introducing notable features of Modern Sanskrit Literature. It will enable students to understand and construct the structure of Modern Sanskrit Literature. The Students can take the knowledge about the Modern Sanskrit Literature in Bengal (Haridas Siddhanta Vagish, Chandrakanta Tarkalamkar, Panchanan Tarkaratna, Kalipada Tarkacharya, Srijib Nyayatirtha, Nityananda Smrititirtha, Jatindra Bimal Chowdhury, Roma Chowdhury, Birendra Kumar Bhattacharya, Sitanath Acharya) And Modern Sanskrit Literature in Outer Bengal (Rewa Prasad Dwivedi, Ramkaran Sharma, Kshma Rao, G. B. Palsule, S.B. Vernekar, Satyavrat Sastri, Radhavallabh Tripathy, Abhiraj Rajendra Mishra, Haridutta Sharma).
DSE2	Art of Balanced Living	The objective of this course is to study the philosophy of Art of Balanced Living in Bhagabad Gita.. This course also develops Self-presentation, Concentration and and Refinement of Behaviour (Methods of Improving Behaviour)

6TH SEMESTER COURSE OUTCOMES (CO)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
C-13	Paninian Grammer	This course aims to introducing two notable features of Sanskrit grammar. It will enable students to understand and construct the structure of Sanskrit language in an accurate manner through the system of traditional *Paninian* Grammar.
C-14	Linguistics	This course introduces the scientific study of human languages. Students would be able to understand linguistic structure of Sanskrit language and status of it in the field of comparative linguistics.
DSE3	Indian Epigraphy & Palaeography	This course will enable students to understand the different facets of ancient Indian history embedded in

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		various inscriptions written in Sanskrit. It will also help to know the importance of the study of inscriptions.
DSE4	Environmental Awareness in Sanskrit Literature	This course introduces the environmental awareness reflected in Vedic and Classical Sanskrit literature. It will be helpful to understand the significance of ancient Indian thoughts in the field of environmental studies.

B.A. PROGRAMME COURSE IN SANSKRIT COURSE OUTCOMES (CO)

1st Semester	2nd Semester	3rd Semester	4th Semester	5th Semester	6th Semester
DSC A1	**DSC A2**	**DSC A3** **SEC 1**	**DSC A4** **SEC 2**	**DSE A1** **GE – A1** **SEC 3**	**DSE A2** **SEC 4**

1ST SEMESTER COURSE OUTCOMES (CO)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
DSC A1	**Sanskrit Drama and Paniniyan Grammar**	Students will know MahakaviKalidasa's poetic style and geographical environmental surroundings. They will understand the role of Nature in AbhijnanShakuntalam by Kalidasa. They will make out what is Abhijnan in this play AbhijnanShakuntalam. Students will earn knowledge of Paniniya'sVyakarana, knowledge of Sandhi, Pratyahara, Samjna and Krit based on Laghusiddhantakaumudi. Students will have capacity to understand fundamentals of Panini Grammar etc.

2ND SEMESTER COURSE OUTCOMES (CO)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
DSC A2	**Sanskrit Poetry and Metre**	This course aims to acquaint the students with most famous poetry of Sanskrit Literature, which not only reflect poetic excellence but also depict contemporary society and highlight human values and morality. It also intends to give an understanding of Sanskrit metres.

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3RD SEMESTER COURSE OUTCOMES (CO)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
DSC – A3	History of Classical Sanskrit Literature & Translation	This course aims to introducing notable features of History of Classical Sanskrit Literature. It will enable students to understand and construct the structure of Classical Sanskrit. The Students can take the knowledge about the History of Rāmāyaṇam, Mahābhāratam, Purāṇam, Mahākāvyam, Gītikāvyam, Gadyakāvyam, Kathāsāhityam, Aitihāsikasāhityam, Nāṭyasāhityam & Campūkāvyam. They will have translation ability of simple sentences from English to Sanskrit and Sanskrit to English.
SEC 1	Basic Sanskrit Learning	This course aims to introducing of Declensions (Nara,Latā, Fala, Asmad, Nadī, Muni, Sādhu, Pitṛ,Ātman, Mātṛ, Madhu, Yuṣmad, Tad, Guṇin, Idam, Eka to Aṣtan), Conjugations, Indeclinables & Kāraka-vibhaktiḥ

4TH SEMESTER COURSE OUTCOMES (CO)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
DSC A4	Smṛtiśāstra & Upaniśad	In this course students will learn about the Indian Rituals, Religion and Culture in Sanskrit tradition. They will be able to know the Theology, their concept etc.
SEC 2	Communicative Sanskrit	This course enhance the ability of the students to express the thoughts and ideas effectively orally in Sanskrit. Students acquires the ability to communicate in Sanskrit with others through proper media and confidently share one's views in Sanskrit.

5TH SEMESTER COURSE OUTCOMES (CO)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
DSE A1	Sanskrit Prose & Indian Philosophy	This course introduces the scientific study of Indian Philosophy. Students will earn knowledge of Sanskrit Literature's 'Śukonasopadeśaḥ'(Prose mode) special in the context of MahakaviBanbhatta's Poetic style, Comprehensive understanding of the popular prose

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		portion from Kadambari, appreciation of basic poetic and linguistic aspects of Sanskrit Literature etc.
GE – A1	**Ethical and Moral Issues in Sanskrit Literature**	Students will understand that the truth always prevails, plant seeds of faith, unity in diversity in possible and necessary etc.Lord Rama is the epitome of kindness, compassion, and love. His wisdom and patience made it possible for him to follow his inner good without worrying about the loss of luxuries and kingship. The Mahabharata, an epic Indian poem detailing the struggle between two rival families for control of the throne, stands as one of the great treasures of world literature. Throughout all of the adventures, an underlying theme runs through the tale.Through Nitishatakam they will earn knowledge of moral values and thoughts, inspiration to assimilation.
SEC 3	**Indian Theatre**	This course introduces the scientific study of Indian Abhinayaḥ,Arthaprakṛtiḥ, Avasthā, Pañcasandhiḥ, Nāṭyasaṃlāpāḥ (Sāhityadarpaṇaḥ: 6th) & Mañcasajjā (Nāṭyaśāstram: 2nd)

6TH SEMESTER COURSE OUTCOMES (CO)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES
DSE A2	Fables Literature & Gita	Students would be able to learn the moral values and life skills from the stories from fable literature. They would also able to think about spiritual power of action as depicted in Gita.
SEC 4	Scientific & Technical Literature in Sanskrit	Students would be able to explore different streams of ancient Indian sciences and different methods of scientific thinking.

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https://cbpbu.ac.in/userfiles/file/CBCS/ENGLISH%20CBCS%20HONS%20-%20SEM%201,%203%20&%205.pdf

https://cbpbu.ac.in/userfiles/file/CBCS/ENGLISH%20CBCS%20HONS%20-%20SEM%202,%204%20&%206.pdf

https://cbpbu.ac.in/userfiles/file/CBCS/ENGLISH_CBCS_Prog%20Course-Sem%201,%203%20&%205.pdf

https://cbpbu.ac.in/userfiles/file/CBCS/ENGLISH%20CBCS%20Prog%20Course-Sem%202,%204%20and%206.pdf

https://www.cbpbu.ac.in/userfiles/file/CBCS/GE2_English.pdf

DEPARTMENT OF ENGLISH

PROGRAMME OUTCOMES

Sl. No.	PROGRAMME OUTCOMES
1	Values of life, literature and literary movements
2	Systematic knowledge of the field
3	Knowledge of literary texts, genres and stylistic variations
4	Critical aptitude and reflexive thinking
5	Creative and analytical application of subject knowledge to life
6	Career Options on completion of graduate program
7	Awareness of the linguistic and cultural richness of India
8	Use and application of Digital Knowledge Systems

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COURSE OUTCOMES

B.A. HONOURS IN ENGLISH: 2nd SEMESTER

SYLLABUS: ENGLISH (HONOURS) SEMESTER 2CEH 3: BRITISH LITERATURE: 18th CENTURY

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstraterun thus:

- explain and analyze the rise of the critical mind
- trace the development of Restoration Comedy and anti-sentimental drama
- examine and analyze the form and function of satire in the eighteenth century

Course Content

1. Alexander Pope: *The Rape of the Lock*
2. Jonathan Swift: *Gulliver's Travels* (Books III and IV)
3. Thomas Gray: 'Elegy Written in a Country Churchyard'
4. Laurence Sterne: *The Life and Opinions of Tristram Shandy, Gentleman*

Suggested Topics and Background Prose Readings for Class Presentations Topics

- The Enlightenment and Neoclassicism
- Restoration Comedy
- The Country and the City
- The Novel and the Periodical Press
- The Self-Conscious Art Form

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Readings

Jeremy Collier, A *Short View of the Immorality and Profaneness of the English Stage*

(London: Routledge, 1996).

Daniel Defoe, 'The Complete English Tradesman' (Letter XXII), 'The Great Law ofSubordination Considered' (Letter IV), and 'The Complete English Gentleman', in *Literature and Social Order in Eighteenth-Century England*, ed. Stephen Copley (London: Croom Helm, 1984).

Samuel Johnson, 'Essay 156', in *The Rambler*, in *Selected Writings: Samuel Johnson*, ed. Peter Martin (Cambridge, Mass.: Harvard University Press, 2009) pp. 194–7; *Rasselas* Chapter 10; 'Pope's Intellectual Character: Pope and Dryden Compared', from *The Life of Pope*, in *The Norton Anthology of English Literature*, vol. 1, ed. Stephen Greenblatt, 8th edn(New York: Norton, 2006) pp. 2693–4, 2774–7.

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CEH 4: BRITISH ROMANTIC LITERATURE

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstraterun thus:

- understand Romanticism as a concept in relation to ancillary concepts like Classicism
- understand the Romantic period in English literature in terms of its social, philosophical, intellectual, literary backgrounds including German and French influences
- analyze and understand the main characteristics of Romanticism
- appreciate the canonical and representative poems and prose of the writers of theRomantic period.
- develop skills of critical analysis and interpretation of selected poems in order tounderstand the theme, language, style, and elements of prosody.

Course Content

1. William Blake: 'The Lamb', 'The Tyger', 'The Chimney Sweeper' (from *The Songs of Innocence* and *TheSongs of Experience*)
2. William Wordsworth: 'Tintern Abbey', 'Ode: Intimations of Immortality'
3. Samuel Taylor Coleridge: 'Kubla Khan', 'Christabel, Part-1'
4. Lord Byron: 'Childe Harold': Canto III, verses 36–45 (lines 316–405); Canto IV, verses 178–186 (lines1594–1674)
5. P B Shelley: 'Ode to the West Wind', 'To a Skylark', 'Hymn to Intellectual Beauty'
6. John Keats: 'Ode to a Nightingale', 'To Autumn', 'La Belle Dame Sans Merci'
7. i) Mary Shelley: *Frankenstein*
   Or
   ii) Walter Scott: *The Heart of Midlothian*
   Or
   iii) Jane Austen: *Pride and Prejudice*

Suggested Topics for Presentation

- Reason and Imagination
- Conceptions of Nature
- Literature and Revolution

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- The Gothic
- The Romantic Lyric

Suggested Readings

William Wordsworth, 'Preface to Lyrical Ballads', in *Romantic Prose and* Poetry, ed. HaroldBloom and Lionel Trilling (New York: OUP, 1973) pp. 594–611.

John Keats, 'Letter to George and Thomas Keats, 21 December 1817', and 'Letter to RichardWoodhouse, 27 October, 1818', in *Romantic Prose and* Poetry, ed. Harold Bloom and LionelTrilling (New York: OUP, 1973) pp. 766–68, 777–8.

Jean-Jacques Rousseau, 'Preface' to *Emile or Education,* tr. Allan Bloom (Harmondsworth:Penguin, 1991).

Samuel Taylor Coleridge, *Biographia Literaria*, ed. George Watson (London: Everyman,1993) chap. XIII, pp. 161–66.

GEE 2: ACADEMIC WRITING AND COMPOSITION

[FOR HONOURS STUDENTS OTHER THAN ENGLISH HONOURS]

1. Basics of MLA Style sheet: How to frame citations and bibliography
2. How to write an Abstract of a long prose piece or an article
3. Critical Appreciation of a given prose passage
4. Paraphrase of an interdisciplinary passage

AECC 2: COMPULSORY ENGLISH

(FOR STUDENTS OTHER THAN BENGALI/HINDI AS MOTHER TONGUE)

- **This paper is skill-based, and practical contingencies of several types of workplaces are reflected inthe questions.**

1. Précis Writing: 5X1=5
2. Application writing for a job/bank loan/FIR: 10X1=10
3. Report Writing: 15X1=15
4. Comprehension from a given unseen passage (prose/verse/dialogue): 1X10=10

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B.A. HONOURS IN ENGLISH: 4th SEMESTER

SYLLABUS: ENGLISH (HONOURS) SEMESTER 4CEH 8: EUROPEAN CLASSICAL LITERATURE

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstraterun thus:

- historically situate classical European, i.e., Greek and Latin literary cultures and theirsocio-political-cultural contexts
- engage with classical literary traditions of Europe from the beginning till the 5th century AD
- grasp the evolution of the concept of classic and classical in the European literarythinking and its reception over a period of time

Course Content

1. Homer: *The Iliad*, Bk – 1 & 2, tr. E.V. Rieu (Harmondsworth: Penguin, 1985).
2. Sophocles: *Oedipus the King,* tr. Robert Fagles in Sophocles: The Three Theban Plays(Harmondsworth: Penguin, 1984).
3. Plautus: *Pot of Gold*, tr. E.F. Watling (Harmondsworth: Penguin, 1965).
4. i) Ovid: *Selections from Metamorphoses,* 'Bacchus', (Book III), 'Philomela' (Book VI), tr. Mary M. Innes(Harmondsworth: Penguin, 1975)
   Or
   ii) Horace: Satires I: 4, in *Horace: Satires and Epistles and Persius: Satires*, tr. Niall Rudd(Harmondsworth: Penguin, 2005).

Suggested Readings

Homer, *The Illiad*. Tr. E.V. Rieu. Harmondsworth: Penguin, 1985.

Sophocles, *Oedipus the King*. Tr. Robert Fagles in *Sophocles: The Three Theban Plays*. Harmondsworth: Penguin, 1984.

Richard Rutherford, *Classical Literature: A Concise History*. Oxford: Blackwell Publishing, 2005.

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CEH 9: MODERN EUROPEAN DRAMA

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstraterun thus:

- understand the role of theatre and drama in the introduction and shaping of modernity
- understand and engage with concepts like realism, naturalism, symbolism, expressionism, the Avant Garde, the epic theatre, the theatre of the absurd, etc.

Course Content

1. Henrik Ibsen: *An Enemy of the People*
2. Bertolt Brecht: *The Good Woman of Szechuan*
3. Samuel Beckett: *Waiting for Godot*
4. Eugene Ionesco: *Rhinoceros*

Suggested Topics for Presentation

- Politics, Social Change and the Stage
- Text and Performance
- European Drama: Realism and Beyond
- Tragedy and Heroism in Modern European Drama
- The Theatre of the Absurd
- The Role of the Director
- The Role of the free theatres

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Suggested Readings

Constantin Stanislavski, chap. 8, 'Faith and the Sense of Truth', In *An Actor Prepares*, tr. Elizabeth Reynolds Hapgood (Harmondsworth: Penguin, 1967) sections 1, 2, 7, 8, 9, pp.
121–5, 137–46.

Bertolt Brecht, 'The Street Scene', 'Theatre for Pleasure or Theatre for Instruction', and 'Dramatic Theatre vs Epic Theatre', in *Brecht on Theatre: The Development of an Aesthetic*,ed. and tr. John Willet (London: Methuen, 1992) pp. 68–76, 121–8.

George Steiner, 'On Modern Tragedy', in *The Death of Tragedy* (London: Faber, 1995) pp.303–24.

CEH 10: AMERICAN LITERATURE

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstraterun thus:

- understand the depth and diversity of American literature, keeping in mind the historyand culture of the United States of America from the colonial period to the present (17th century to 21st century)
- understand the historical, religious and philosophical contexts of the American spirit in literature; social-cultural-ecological-political contexts may, for example, include the idea of democracy, Millennial Narratives, the Myth of Success, the American Adam, the Myth of the Old South, the Wild West, Melting pot, Multiculturalism, etc.
- appreciate the complexity of the origin and reception of American literature, given its European and non-European historical trajectories, particularly in relation to writersof European (Anglo-Saxon, French, Dutch and Hispanic) descent, as well as writersfrom black and non-European (African, American Indian, Hispanic-American and Asian) writing traditions

- critically engage with the complex nature of American society, given its journey fromspecific religious obligations and their literary transformations (such as Puritanism, Unitarianism, Transcendentalism, etc.) to the growth of anti- or non-Christian sensibilities
- critically appreciate the diversity of American literature in the light of regional variations in climate, cultural traits, economic priorities
- explore and understand the nature of the relationships of human beings to other human beings and other life forms in relation to representative literary texts in variousgenres

Course Content

1. Tennessee Williams: *The Glass Menagerie*
2. i) Edgar Allan Poe: 'The Purloined Letter'
   ii) Scott Fitzgerald: 'The Crack-up'
   iii) William Faulkner: 'Dry September'
3. Anne Bradstreet: 'The Prologue'
4. Walt Whitman: Selections from *Leaves of Grass*: 'O Captain, My Captain', 'Passage to India' (lines 1–68)
5. Sherman Alexie: 'Crow Testament', 'Evolution'

Suggested Topics for Background Reading and Class Presentation

- The American Myths of Genesis/ The American Dream/ The American Adam
- American Romance and the American Novel
- Is *Huck Finn* the Prototypical American Novel?
- Multicultural Literature of the United States; Folklore and the American Novel
- Race and Gender in American Literature
- War and American Fiction
- Two Traditions of American Poetry; Emerson and Poe/ Typological andTropological Traditions
- Social Realism and the American Novel
- The Questions of Form in American Poetry

Suggested Readings

Hector St John Crevecouer, 'What is an American', (Letter III) in *Letters from an AmericanFarme*r (Harmondsworth: Penguin, 1982) pp. 66–105.

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Frederick Douglass, A *Narrative of the life of Frederick Douglass* (Harmondsworth: Penguin, 1982) chaps. 1–7, pp. 47–87.

Henry David Thoreau, 'Battle of the Ants' excerpt from 'Brute Neighbours', in *Walden* (Oxford: OUP, 1997) chap. 12.

Ralph Waldo Emerson, 'Self Reliance', in *The Selected Writings of Ralph Waldo Emerson*, ed. with a biographical introduction by Brooks Atkinson (New York: The Modern Library, 1964).

Toni Morrison, 'Romancing the Shadow', in *Playing in the Dark: Whiteness and Literary Imagination* (London: Picador, 1993) pp. 29–39.

SECEH 2: CREATIVE WRITING

Course Content

1. The Art and Craft of Writing
2. Modes of Creative Writing
3. Writing a Story with the hints provided: 15 marks
4. Writing a creative Travelogue: 10 marks

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B.A. HONOURS IN ENGLISH: 6th SEMESTER

CE 13: POPULAR LITERATURE

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstraterun thus:

- trace the early history of print culture in England and the emergence of genre fictionand best sellers
- engage with debates on high and low culture, canonical and non-canonical literature
- articulate the characteristics of various genres of non-literary fiction
- investigate the role of popular fiction in the literary polysystem of various linguisticcultures
- demonstrate how popular literature belongs to its time

Course Content

1. Lewis Carroll: *Through the Looking Glass*
2. Agatha Christie: *The Murder of Roger Ackroyd*
3. Shyam Selvadurai: *Funny Boy*
4. Satyajit Ray: *The Golden Fortress*, tr. Gopa Mazumder (Puffin Books, New Delhi)

Suggested Topics for Background Reading and Class Presentation

- Coming of Age
- The Canonical and the Popular
- Ethics and Education in Children's Literature
- Sense and Nonsense
- The Graphic Novel
- The Popular and the Market

Suggested Readings

Leslie Fiedler, 'Towards a Definition of Popular Literature', in *Super Culture: AmericanPopular Culture and Europe*, ed. C.W.E. Bigsby

Felicity Hughes, 'Children's Literature: Theory and Practice', *English Literary History*, vol.45, 1978,

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Christopher Pawling, 'Popular Fiction: Ideology or Utopia?' in *Popular Fiction and SocialChange*, ed. Christopher Pawling

Tzevetan Todorov, 'The Typology of Detective Fiction', in *The Poetics of Prose*

Darco Suvin, 'On Teaching SF Critically', in *Positions and Presuppositions in ScienceFiction*

Janice Radway. 'The Institutional Matrix, Publishing Romantic Fiction', in *Reading theRomance: Women, Patriarchy, and Popular Literature*

Edmund Wilson, 'Who Cares Who Killed Roger Ackroyd?', *The New Yorker*, 20 June 1945.Hilllary Chute,

"Comics as Literature? Reading Graphic Narrative', *PMLA* 123(2)

CE 14: WOMEN'S WRITING

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstraterun thus:

- recognise the importance of gender specificity in literature
- understand and appreciate the representation of female experience in literature
- explain the difference between the feminine and the feminist as opposed to the female
- examine and appreciate the role played by socio-cultural-economic contexts indefining woman
- link the status of woman to social discrimination and social change

Course Content

1. Emily Dickinson: 'Because I could not Stop for Death', 'I'm wife; I've finishedthat'Sylvia Plath: 'Daddy', 'Lady Lazarus'
   Eunice De Souza: 'Advice to Women', 'Bequest'
2. Alice Walker: *The Color Purple*
3. Charlotte Perkins Gilman: 'The Yellow Wallpaper'Katherine Mansfield: 'Bliss'
   Mahashweta Devi: 'Draupadi', tr. Gayatri Chakravorty Spivak (Calcutta: Seagull, 2002)
4. Mary Wollstonecraft: *A Vindication of the Rights of Woman* (New York: Norton, 1988) Chap. 1, pp.11–19; Chap. 2, pp. 19–38.

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Ramabai Ranade 'A Testimony of our Inexhaustible Treasures', in *Pandita Ramabai Through Her Own Words: Selected Works*, tr. Meera Kosambi (New Delhi: OUP, 2000) pp. 295–324.

Suggested Topics for Background Reading and Class Presentation

- The Confessional Mode in Women's Writing
- Sexual/Textual Politics
- Body, Beauty and Discrimination
- Race, Caste and Gender
- Social Reform and Women's Rights
- Women under Colonialism
- Women in and out of Slavery
- Is there a Woman's Language?

Suggested Readings

Virginia Woolf, *A Room of One's Own* (New York: Harcourt, 1957) chaps. 1 and 6.

Simone de Beauvoir, 'Introduction', in *The Second Sex*, tr. Constance Borde and Shiela Malovany-Chevallier (London: Vintage, 2010) pp. 3–18.

Kumkum Sangari and Sudesh Vaid, eds., 'Introduction', in *Recasting Women: Essays in Colonial History* (New Delhi: Kali for Women, 1989) pp. 1–25.

Chandra Talapade Mohanty, 'Under Western Eyes: Feminist Scholarship and Colonial Discourses', in *Contemporary Postcolonial Theory: A Reader*, ed. Padmini Mongia (New York: Arnold, 1996) pp. 172–97.

DSEEH 3: ANY ONE OF THE FOLLOWING: A) SCIENCE FICTION AND DETECTIVE LITERATURE / B) LITERATUREAND CINEMA

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A) SCIENCE FICTION AND DETECTIVE LITERATURE

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstraterun thus:

- write critically about the two genres: Science Fiction, and Detective Literature
- engage with the philosophical and psychological and social issues that are an intrinsicpart to the two genres
- think through the concept of progress, and the role of technology in our life and the interaction between technology and human behaviour

Course Content

1. Wilkie Collins: *The Woman in White*
2. Arthur Conan Doyle: *The Hound of the Baskervilles*
3. Ursula K. Le Guin: *The Left Hand of Darkness*
4. Ray Bradbury: *Fahrenheit 451*

Suggested Readings

Suvin, Darko. "On the Poetics of the Science Fiction Genre." College English 34, no. 3 (December 1972): 372–82.

Charles J. Rzepka, 'Introduction: What is Crime Fiction?', in *Companion to Crime Fiction: Blackwell Companions to Literature and Culture*, eds Charles J Rzepka and Lee Horsley (Oxford: Wiley and Blackwell, 2010) pp.1-9

Robert A. Heinlein, 'On the Writing of Speculative Fiction',

online at

https://mab333.weebly.com/uploads/3/2/3/1/32314601/writing

_sf_-

_01_on_the_writing_of_speculative_ficiton.pdf

Joy Palmer, 'Tracing Bodies: Gender, Genre, and Forensic Detective Fiction',

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South Central Review; Vol.18, No.3/4; *Whose Body: Recognizing Feminist Mystery and Detective Fiction* (Autumn-Winter,2001), pp.54-71.

OR

B) LITERATURE AND CINEMA

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstraterun thus:

- demonstrate a systematic and historically-grounded knowledge of literature andcinema as expressive arts
- identify and illustrate the distinction between literary and cinematic arts ofstorytelling
- identify and describe the difference between cinematic and literary images
- examine different theories of adaptation and link then to contexts of expression andreception
- organize different sets of activities to identify and make use of skills that distinguishthe medium of cinema from that of literature

Course Content

1. James Monaco: 'The language of film: signs and syntax', in *How To Read a Film: The World of Movies,Media & Multimedia* (New York: OUP, 2009) chap. 3, pp. 170– 249.
2. William Shakespeare: *Romeo and Juliet*, and its adaptations: *Romeo & Juliet* (1968; dir. Franco Zeffirelli, Paramount); and *Romeo + Juliet* (1996; dir. Baz Luhrmann, 20th Century Fox).
3. Bapsi Sidhwa: *Ice Candy Man* and its adaptation *Earth* (1998; dir. Deepa Mehta, Cracking the EarthFilms Incorp.)
4. David Lean [dir.]: *A Passage to India*, 1984.

Suggested Topics and Background Prose Readings for Class Presentations

- Theories of Adaptation
- Transformation and Transposition
- Hollywood to 'Bollywood'

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- The 'Two Ways of Seeing'
- Lost or Gained in Adaptation?
- Adaptation as Interpretation
- Classics in Fiction and Film
- Location and Adaptation in Indian Cinema
- Indian Cinema based on Western Texts
- Indian Movies based on Western Movies

Suggested Readings

Linda Hutcheon, 'On the Art of Adaptation', *Daedalus*, vol. 133, (2004).

Thomas Leitch, 'Adaptation Studies at Crossroads', *Adaptation*, 2008, vol. 1, no. 1, pp. 63–77.

Poonam Trivedi, 'Filmi Shakespeare', *Litfilm Quarterly*, vol. 35, issue 2, 2007.

Tony Bennett and Janet Woollacott, 'Figures of Bond', in *Popular Fiction: Technology, Ideology, Production, Reading*, ed. Tony Bennet (London and New York: Routledge, 1990).

DSEEH 4: ANY ONE OF THE FOLLOWING: A) LITERATURE OF DIASPORA / B) PARTITION LITERATURE

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstraterun thus:

- understand the concept of 'diaspora' in its historical and cultural contexts
- identify different aspects of Indian diasporic consciousness and the literary features ofdiasporic texts
- develop a clear understanding of the formation of Indian diasporic movements withinIndia and outside
- develop a critical understanding of the writings of the Indian diaspora within the discourse of postcoloniality, postmodernity, hybridity, globalization and transnationalism.
- develop the analytical ability to read diasporic texts and analyze key diasporic issuessuch as displacement, nostalgia, alienation, belonging, identity, gender, racism and assimilation

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Course Content

1. M. G. Vassanji: *The Book of Secrets* (Penguin, India)
2. Rohinton Mistry: *A Fine Balance* (Alfred A Knopf)
3. a) Meera Syal: *Anita and Me* (Harper Collins)
   Or
   b) Jhumpa Lahiri: *The Namesake* (Houghton Mifflin Harcourt)

Suggested Topics

- The Diaspora
- Nostalgia
- New Medium
- Alienation
- Globalization
- Transnationalism

Suggested Readings

"Introduction: The diasporic imaginary" in Mishra, V. (2008). *Literature of the Indiandiaspora.* London: Routledge

"Cultural Configurations of Diaspora," in Kalra, V. Kaur, R. and Hutynuk, J. (2005). *Diaspora & hybridity*. London: Sage Publications.

"The New Empire within Britain," in Rushdie, S. (1991). *Imaginary Homelands*. London:Granta Books.

OR

B) PARTITION LITERATURE

Course Learning Outcomes

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Some of the learning outcomes that learners of this course are required to demonstrate are mentioned below:

- explain historical and socio-cultural factors responsible for the Partition of Indian Sub-continent.
- demonstrate critical understanding of manifestations of the experience of the partition in various art forms.
- link and analyze the eco-socio-historical-cultural contexts and dimensions related to the Partition of India e.g. nation, nationalism, communication, violence, exile, homelessness, refugee, rehabilitation, resettlement, border and border lands (colonialism and post colonialism), literary responses to the partition in different parts of Indian continent and interpret them.

Course Content

1. Intizar Husain, *Basti*, tr. Frances W. Pritchett (New Delhi: Rupa, 1995)
2. Amitav Ghosh: *The Shadow Lines*
3. a) (i) Dibyendu Palit: 'Alam's Own House', tr. Sarika Chaudhuri, *Bengal Partition Stories: An Unclosed Chapter*, ed. Bashabi Fraser (London: Anthem Press, 2008) pp. 453– 72.
   OR
   (ii)) Manik Bandhopadhya: 'The Final Solution', tr. Rani Ray, *Mapmaking: Partition Stories from Two Bengals*, ed. Debjani Sengupta (New Delhi: Srishti, 2003) pp. 23–39.

   b). Sa'adat Hasan Manto, 'Toba Tek Singh', in *Black Margins: Manto*, tr. M. Asaduddin (New Delhi:Katha, 2003) pp. 212–20.
   b) (i) Jibananda Das, 'I Shall Return to This Bengal', tr. Sukanta Chaudhuri, in *Modern Indian Literature*
   (New Delhi: OUP, 2004) pp. 8–
   13.OR
   (ii) Gulzar, 'Toba Tek Singh', tr. Anisur Rahman, in *Translating Partition*, ed. Tarun Saint et. al.
   (NewDelhi: Katha, 2001)

Suggested Topics and Reading for Class PresentationTopics

- Nationalism, Colonialism, British Rule in India
- Post Colonialism in India
- Communalism and Violence
- Homelessness and Exile

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- Women and Children in Partition Literature

Background Reading and Screenings

1. Ritu Menon and Kamla Bhasin, 'Introduction' in *Borders and Boundaries*.New Delhi, Kali for Women. 1998
2. Sukrita P Kumar, *Narrating Partition*. Delhi, Indialog 2004
3. Urvashi Butalia, *The Other Side of Silence: Voices from the Partition of India*. New Delhi, Kali for Women 2000
4. Sigmund Freud, 'Mourning and Melancholia' in *The Complete Psychological Works of Sigmund Freud,* Tr James Strachey. London: Hogarth Press 1953 (pp 3041 – 53)

Films

a. *Garam Hawa* (Dir. M S Sathyu, 1974))
b. *Khamosh Paani*: *Silent Waters* (Dir. Sabiha Sumar, 2003)
c. *Subarnarekha* (Dir Ritwik Ghatak, 1965)

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B.A. HONOURS IN ENGLISH: 1st SEMESTER

SYLLABUS: ENGLISH (HONOURS) SEMESTER 1

CEH 1: BRITISH POETRY AND DRAMA: FROM CHAUCER TO THE END OF 16TH CENTURY

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstraterun thus:

- understand the tradition of English literature from 14th to 16th centuries.
- develop a clear understanding of Renaissance Humanism
- engage with the major genres and forms of English literature and develop fundamental skills required for critical thinking of the texts and concepts
- appreciate and analyze the poems and plays in the larger socio-political and religious contexts of the time.

Course Content

1. Geoffrey Chaucer: *The Wife of Bath's Prologue*
2. Edmund Spenser: Sonnet LXXV ('One Day I Wrote Her Name...')
3. William Shakespeare: Sonnet 18, 73,137 and 138
4. Christopher Marlowe: *Edward II*
5. William Shakespeare: *Macbeth* / *Twelfth Night*

Suggested Topics

- Renaissance Humanism
- The Stage, Court and City
- Religious and Political Thought

Suggested Readings

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- Pico Della Mirandola, excerpts from the *Oration on the Dignity of Man,* in *The Portable Renaissance Reader*, ed. James Bruce Ross and Mary Martin McLaughlin (New York: Penguin Books, 1953) pp. 476–9.

- John Calvin, 'Predestination and Free Will', in *The Portable Renaissance Reader,* ed. JamesBruce Ross and Mary Martin McLaughlin (New York: Penguin Books,1953) pp. 704–11.

CEH 2: BRITISH POETRY AND DRAMA: 17TH CENTURY

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstraterun thus:

- understand the tradition of English literature of 17th centuries.
- develop a clear understanding of Renaissance Humanism
- develop fundamental skills required for close reading and critical thinking of the texts and concepts

Course Content

1. John Donne: 'The Sunne Rising', 'Batter My Heart', 'A Valediction: Forbidding Mourning'
2. Henry Vaughan: 'The Retreate', 'Regeneration'
3. John Milton: *Paradise Lost: Book 1*
4. a) John Webster: *The Duchess of Malfi*
   Or
   b) William Congreve: *The Way of the World*
   Or
   c) John Dryden: *All for Love*

Suggested Topics

- Renaissance Humanism
- The Stage, Court and City
- Religious and Political Thought
- Ideas of Love and Marriage
- The Writer in Society

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Suggested Readings

Baldassare Castiglione, 'Longing for Beauty' and 'Invocation of Love', in Book 4 of *The Courtier*, 'Love and Beauty', tr. George Bull (Harmondsworth: Penguin, rpt. 1983) pp. 324–8, 330–5.

Philip Sidney, *An Apology for Poetry*, ed. Forrest G. Robinson (Indianapolis: Bobbs-Merrill,1970) pp.13

GEE 1: LANGUAGE, LITERATURE, CULTURE

1. Language: Regional, cultural, class-based, situation-based variations
2. The Classical influence on English Language and culture
3. The Scandinavian impact on English Language and culture
4. The French influences on English Language and culture
5. Media, technology and internet: How these affect the English language and culture

B.A. HONOURS IN ENGLISH: 3rd SEMESTER

SYLLABUS: ENGLISH (HONOURS) SEMESTER 3 CEH 5: BRITISH LITERATURE: LATE 19TH CENTURY

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstraterun thus:

- identify and analyze the socio-economic-political contexts
- comment on the historical and political awareness of literary texts as reflected in the transition from nature to culture across various genres
- understand the conflict between self and society in different literary genres of theperiod
- link the rise of the novel to the expansion of Colonialism and Capitalism
- understand the transition from Romantic to Victorian in literature and culture

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Course Content

1. a) Charlotte Bronte: *Jane Eyre*
   Or
   b) Charles Dickens: *Hard Times*
2. Alfred Tennyson: 'The Lady of Shalott', 'Ulysses', 'The Defence of Lucknow
3. Robert Browning: 'My Last Duchess', 'The Last Ride Together', 'Fra Lippo Lippi'
4. Christina Rossetti: 'The Goblin Market'
5. a) Oscar Wilde: *The Importance of Being Earnest*
   Or
   b) G.B. Shaw: *Arms and the Man*

Suggested Topics for Background Reading and Class Presentation

- Utilitarianism
- Colonialism and nineteenth century literature
- The Death of the Village
- The 19th Century Novel
- Marriage and Sexuality
- The Writer and Society
- Faith and Doubt
- The Dramatic Monologue

Readings:

Karl Marx and Friedrich Engels, 'Mode of Production: The Basis of Social Life', 'The Social

Nature of Consciousness', and 'Classes and Ideology', in *A Reader in Marxist Philosophy*, ed. Howard Selsam and Harry Martel (New York: International Publishers,1963) pp. 186–8,190–1, 199–201.

Charles Darwin, 'Natural Selection and Sexual Selection', in *The Descent of Man* in *The Norton Anthology of English Literature*, 8th edn, vol. 2, ed. Stephen Greenblatt (New York:Norton, 2006) pp. 1545–9.

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John Stuart Mill, *The Subjection of Women* in *Norton Anthology of English* Literature, 8th edn, vol. 2, ed. Stephen Greenblatt (New York: Norton, 2006) chap. 1, pp. 1061–9.

CEH 6: BRITISH POETRY AND DRAMA: 20TH CENTURY

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstraterun thus:

- trace the history of modernism in the socio-cultural and intellectual contexts of late nineteenth century and early twentieth century Europe
- link and distinguish between modernity and modernism
- explain the links between developments in science and experiments in literature
- explain the history of early twentieth-century modernism in the light of stream of consciousness, Jungian and Freudian ideas, Psychoanalysis, Imagism, Cubism, Vorticism
- identify and analyze the use and modernist technique in different genres in early twentieth century British literature
- trace the history of the self and subjectivity in literature in the light of colonial consciousness

- Course Content

1. W.B. Yeats: 'Leda and the Swan', 'The Second Coming', 'No Second Troy', 'Sailing to Byzantium'
2. T.S. Eliot: 'The Love Song of J. Alfred Prufrock', 'Sweeney among the Nightingales', 'The Hollow Men'
3. John Osborne: *Look Back in Anger*
4. J.M. Synge: *The Playboy of the Western World*

Suggested Topics for Background Reading and PresentationTopics

- Modernism, Post-modernism and non-European Cultures
- The Women's Movement in the Early 20th Century
- Psychoanalysis and the Stream of Consciousness
- Literature and the Fear of Disintegration

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- The Uses of Myth
- Nation and Narration in Early Twentieth Century Novel
- The Avant Garde

Suggested Readings

Sigmund Freud, 'Theory of Dreams', 'Oedipus Complex', and 'The Structure of the Unconscious', in *The Modern Tradition*, ed. Richard Ellman et. al. (Oxford: OUP, 1965) pp.571, 578–80, 559–63.

T.S. Eliot, 'Tradition and the Individual Talent', in *Norton Anthology of English Literature,* 8th edn, vol. 2, ed. Stephen Greenblatt (New York: Norton, 2006) pp. 2319–25.

Raymond Williams, 'Introduction', in *The English Novel from Dickens to Lawrence* (London: Hogarth Press, 1984) pp. 9–27.

CEH 7: BRITISH PROSE: 20TH CENTURY

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstrate run thus:

- trace the history of modernism in the socio-cultural and intellectual contexts of late nineteenth century and early twentieth century Europe
- link and distinguish between modernity and modernism
- explain the links between developments in science and experiments in literature
- explain the history of early twentieth-century modernism in the light of stream of consciousness, Jungian and Freudian ideas, Psychoanalysis, Imagism,
- identify and analyze the use and modernist technique in different genres in early twentieth century British literature
- trace the history of the self and subjectivity in literature in the light of colonial consciousness

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Course Content

1. Joseph Conrad: *Lord Jim*
2. E.M. Forster: *A Passage to India*
3. D.H. Lawrence: *Sons and Lovers*
4. Virginia Woolf: *Mrs Dalloway*

Suggested Topics for Background Reading and PresentationTopics

- Modernism, Post-modernism and non-European Cultures
- The Women's Movement in the Early 20th Century
- Psychoanalysis and the Stream of Consciousness
- Literature and the Fear of Disintegration
- The Uses of Myth
- Nation and Narration in Early Twentieth Century Novel

T.S. Eliot, 'Tradition and the Individual Talent', in *Norton Anthology of English Literature,* 8th edn, vol. 2, ed. Stephen Greenblatt (New York: Norton, 2006) pp. 2319–25.

Raymond Williams, 'Introduction', in *The English Novel from Dickens to Lawrence* (London: Hogarth Press, 1984) pp. 9–27.

SECEH 1: ANY ONE OF THE FOLLOWING: A) FILM STUDIES / B) BUSINESS COMMUNICATION

A) FILM STUDIES

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstrate run thus:

- demonstrate a systematic and historically-grounded knowledge of literature andcinema as

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expressive arts

- identify and illustrate the distinction between literary and cinematic arts ofstorytelling
- identify and describe the difference between cinematic and literary images
- examine different theories of adaptation and link then to contexts of expression andreception
- organize different sets of activities to identify and make use of skills that distinguishthe medium of cinema from that of literature
- present a coherent view of the relationship between written and cinematic texts
- communicate the role of location in adaptation

1. **Basic Cinematic Techniques:**
   - i. Montage
   - ii. Jump cut
   - iii. Mise en scène
   - iv. Flashback
   - v. Long shot
   - vi. Close-up
   - vii. Pan
   - viii. Voice over
   - ix. Backlighting
   - x. Freezing
   - xi. Slow motion

2. Critical Appreciation of any 1 (one) film from below:
   - *i. La Dolce Vita*
   - *ii. Bicycle Thief*
   - *iii. Piyasa*
   - *iv. Meghe Dhaka Tara*
   - *v. Gupi Gayen Bagha Bayen*
   - *vi. Titanic*
   - *vii. Sholay*

3. Short note on any 1 (one) film personality: [Any 4 (four) will be set]
   - i. Mrinal Sen
   - ii. Gulzar
   - iii. Utpal Dutt
   - iv. Amitabh Bachchan
   - v. Aparna Sen

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Course Content

1. James Monaco, 'The language of film: signs and syntax', in *How To Read a Film: The World of Movies, Media & Multimedia* (New York: OUP, 2009) chap. 3, pp. 170–249.

2. William Shakespeare, *Romeo and Juliet*, and its adaptations: *Romeo & Juliet* (1968; dir. Franco Zeffirelli, Paramount); and *Romeo + Juliet* (1996; dir. Baz Luhrmann, 20th Century Fox).

3. Bapsi Sidhwa, *Ice Candy Man* and its adaptation *Earth* (1998; dir. Deepa Mehta, Cracking the Earth Films Incorp.); and Amrita Pritam, *Pinjar: The Skeleton and Other Stories*, tr. Khushwant Singh (New Delhi: Tara Press, 2009) and its adaptation: *Pinjar* (2003; dir. C.P. Dwivedi, Lucky Star Entertainment).

4. Ian Fleming, *From Russia with Love*, and its adaptation: *From Russia with Love* (1963; dir. Terence Young, Eon Productions).

Suggested Topics and Background Prose Readings for Class Presentations

- Theories of Adaptation
- Transformation and Transposition
- Hollywood to 'Bollywood'
- The 'Two Ways of Seeing'
- Lost or Gained in Adaptation?
- Adaptation as Interpretation
- Classics in Fiction and Film
- Location and Adaptation in Indian Cinema
- Indian Cinema based on Western Texts
- Indian Movies based on Western Movies

Suggested Readings

Linda Hutcheon, 'On the Art of Adaptation', *Daedalus*, vol. 133, (2004).

Thomas Leitch, 'Adaptation Studies at Crossroads', *Adaptation*, 2008, vol. 1, no. 1, pp. 63–77.

Poonam Trivedi, 'Filmi Shakespeare', *Litfilm Quarterly*, vol. 35, issue 2, 2007.

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Tony Bennett and Janet Woollacott, 'Figures of Bond', in *Popular Fiction: Technology, Ideology, Production, Reading*, ed. Tony Bennet (London and New York: Routledge, 1990).

OR

B) BUSINESS COMMUNICATION

1. Any 1 (one) of the following have to be answered:
   i. Writing (i) Notice Inviting Quotation/Tender (ii) Letter for submission of Quotation/Tender
   ii. Writing Appointment/Joining Letter
   iii. Drafting a Brochure

2. Any 1 (one) of the following have to be answered:
   i. Docketing
   ii. File Tracking
   iii. Legalities of Draft
   iv. Drafting circulars
   v. Minutes/Agenda keeping

3. Any 1 (one) of the following have to be answered:
   i. Types of Office Communication: (i) Lateral (ii) Down line
   ii. Advertisement Writing (of a product)

4. Any 10 (ten) of the following have to be answered:

   i. Use of Internet and email in business communication

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B.A. HONOURS IN ENGLISH: 5th SEMESTER

SYLLABUS: ENGLISH (HONOURS) SEMESTER 5CEH 11: POSTCOLONIAL LITERATURES

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstraterun thus:

- understand the social-historical-political-economic contexts of colonialism and postcolonialism in India and other countries affected by colonial rule
- understand the scope of postcolonial literatures in India and elsewhere
- see through a corpus of representative postcolonial texts from different colonial locations: the effects of colonial rule on the language, culture, economy and habitat ofspecific groups of people affected by it
- appreciate and analyze the growing spectres of inequality arising out of colonial occupation and the role played by postcolonial literatures to resist it in India and similar locations
- critically engage with issues of racism and imperialism during and after colonial occupation
- appreciate the changing role and status of English in postcolonial literatures
- link colonialism to modernity

Course Content

1. Chinua Achebe: *Things Fall Apart*
2. Gabriel Garcia Marquez: *One Hundred Years of Solitude*
3. Bessie Head: 'The Collector of Treasures' Ama Ata Aidoo 'The Girl who can' Grace Ogot: 'The Green Leaves'
4. Pablo Neruda: 'Tonight I can Write', 'The Way Spain Was' Derek Walcott:

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'A Far Cry from Africa', 'Names'
David Malouf: 'Revolving Days', 'Wild Lemons'
Mamang Dai: 'Small Towns and the River' 'The Voice of the Mountain'

Suggested Topic for Background Reading and Class Presentation

- Nationalism and Nationality
- De-colonization, Globalization and Literature
- Race, Region, Religion
- Women and Postcolonialism/Gender and Identity
- English and Bhasha: The Languages of Postcolonialism
- Postcolonial Literatures and Questions of Ethics
- Postcolonialism and Resistance
- Literature and Identity Politics
- Writing for the New World Audience

Suggested Readings

Franz Fanon, 'The Negro and Language', in *Black Skin, White Masks*, tr. Charles LamMarkmann (London: Pluto Press, 2008) pp. 8–27.

Ngugi wa Thiong'o, 'The Language of African Literature', in *Decolonising the Mind*

(London: James Curry, 1986) chap. 1, sections 4–6.

Gabriel Garcia Marquez, the Nobel Prize Acceptance Speech, in *Gabriel Garcia Marquez: New Readings*, ed. Bernard McGuirk and Richard Cardwell (Cambridge: Cambridge University Press, 1987).

CEH 12: INDIAN WRITING IN ENGLISH

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstraterun thus:

- appreciate the historical trajectory of various genres of IWE from colonial times tillthe present
- critically engage with Indian literary texts written in English in terms of colonialism/postcolonialism, regionalism, and nationalism
- critically appreciate the creative use of the English language in IWE
- approach IWE from multiple positions based on historical and social locations

Course Content

1. R.K. Narayan: *The Guide*
2. Anita Desai: *Clear Light of Day*
3. H.L.V. Derozio: 'Freedom to the Slave', 'The Orphan Girl'Kamala Das: 'Introduction', 'My Grandmother's House' Nissim Ezekiel: 'Enterprise', 'The Night of the Scorpion'
   A.K. Ramanujan: 'The Strider', 'Anxiety'
4. Mulk Raj Anand: 'Two Lady Rams' Salman Rushdie: 'The Free Radio'
   Rohinton Mistry: 'Swimming Lesson'Ruskin Bond: 'The Eyes Have It'

Suggested Topics for Presentation

- Indian English
- Indian English Literature and its Readership
- Themes and Contexts of the Indian English Novel

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- The Aesthetics of Indian English Poetry
- Modernism in Indian English Literature
- The Nation and Indian English Literature

Suggested Readings

Raja Rao, Foreword to *Kanthapura* (New Delhi: OUP, 1989) pp. v–vi.

Salman Rushdie, 'Commonwealth Literature does not exist', in *Imaginary Homelands* (London: Granta Books, 1991) pp. 61–70.

Meenakshi Mukherjee, 'Divided by a Common Language', in *The Perishable Empire* (New Delhi: OUP, 2000) pp.187–203.

Bruce King, 'Introduction', in *Modern Indian Poetry in English* (New Delhi: OUP, 2nd edn, 2005) pp. 1–10.

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DSEEH 1: LITERARY CRITICISM

EXPOSURE TO AND LITERARY INSTANTIATION OF THE FOLLOWING NOTIONS, CONCEPTS AND THEORIES:

A) PRACTICAL SKILLS FOR CRITICAL ANALYSIS: RHETORIC AND PROSODY (The student will be given a verse passage not exceeding eight lines. He or she is expected to find out the figures of speech in the lines and exercise scansion of the same passage)

B)

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstraterun thus:

- understand the historical and philosophical contexts that led to the development of literary criticism and its practice in different traditions and periods
- learners will be able to understand fundamental literary and critical concepts
- learners will be able to grasp a wide range of literary philosophers and critics whoseworks had informed and shaped the discourse of literary theory
- learners will have knowledge about major, critical movements and critics in various critical traditions – Indian(schools of *Rasa, Alamkar, Riti, Dhwani, Vakroti, Auchitya*)and Western (Greek, Roman, English, German, Russian and French)
- learners will be able to identify theoretical and critical concepts with critics/texts/movements with which they are associated and understand them in theircontexts
- learners will be able to apply various theoretical frameworks and concepts to literaryand cultural texts
- learners will be able to strengthen and deepen their interpretative skills

1. Plato's ideas of Mimesis
2. Aristotle's ideas of Mimesis, Catharsis
3. Longinus' idea of the Sublime
4. Pope's and Dryden's basic observations as literary theorists
5. Blake's Contraries
6. Coleridge's concept of Fancy and Imagination
7. Keats's idea of Negative Capability

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8. Eliot's idea of Tradition and Individual Talent

Suggested Readings

A.H. Gilbert, *Literary Criticism: Plato to Dryden*. Detroit: Wayne University Press, 1962.

David Lodge and Nigel Wood, *Modern Criticism and Theory: A Reader*: London & NewYork: Routledge, 2000.

Peter Barry Beginning, *Theory: An Introduction to Literary and Cultural Theory*.Manchester: Manchester University Press, 1984.

Raman Selden, et al. *A Reader's Guide to Contemporary Literary Theory*. Kentucy:University Press of Kentucky, 1993.

S.K. Dey, *History of Poetics*. New Delhi: MLBS, 1960.

Terry Eagleton, *Literary Theory: An Introduction*. NJ: Wiley Blackwell, 2009.

DSEEH 2: ANY ONE OF THE FOLLOWING: A) WORLD LITERATURE / B) INDIAN LITERATURE INENGLISH TRANSLATION

A) WORLD LITERATURE

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstraterun thus:

- explain the concept of World Literature and its evolution in relation to other related concepts e.g. national literature, general literature, comparative literature and *Vishwa Sahitya*.
- appreciate the connectedness and diversity of human experiences and literary responses to them in different parts of the world.
- analyze and appreciate literary texts from different parts of the world and receivethem in the light of one's own literary traditions.

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Course Content

1. V.S. Naipaul: *Bend in the River* (London: Picador, 1979)
2. Paulo Coelho: *The Zaheer*
   Or
   Antoine De Saint-Exupery: *The Little Prince* (New Delhi: PigeonBooks, 2008)
3. Judith Wright: 'Bora Ring', in *Collected Poems* (Sydney: Angus & Robertson, 2002) p. 8.
   Gabriel Okara: 'The Mystic Drum', in *An Anthology of Commonwealth Poetry*, ed. C.D. Narasimhaiah(Delhi: Macmillan, 1990) pp. 132–3.

   Kishwar Naheed: 'The Grass is Really like me', in *We the Sinful Women* (New Delhi: Rupa, 1994) p. 41.
   Shu Ting: 'Assembly Line', in *A Splintered Mirror: Chinese Poetry From the Democracy Movement*, tr.Donald Finkel, additional translations by Carolyn Kizer (New York: North Point Press, 1991)

   Jean Arasanayagam: 'Two Dead Soldiers', in *Fussilade* (New Delhi: Indialog, 2003) pp. 89–90.

Background Reading:

Rabindranath Tagore, *Vishwa Sahitya*, Sarkar & Sons, 1993.

David Damrosch, *How to Read World Literature*, Wiley Blackwell, 2002.

Lillian Herlands Hornhtin, *The Reader's Companion to World Literature*, Penguin,2002.

Frank Magil, *Masterpieces of World Literature*, Collins Reference, 1991.

OR

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B) INDIAN LITERATURE IN ENGLISH TRANSLATION

Course Level Learning Outcomes

Some of the course learning outcomes that students of this course are required to demonstraterun thus:

- appreciate the diversity of modern Indian literatures and the similarities betweenthem
- understand and creatively engage with the notion of nation and nationalism
- appreciate the impact of literary movements on various Indian literatures
- critically engage with significant social issues like caste and gender

understand the historical trajectories of Indian literatures

1. Premchand: 'The Shroud', in *Penguin Book of Classic Urdu Stories*, ed. M. Assaduddin (New Delhi:Penguin/Viking, 2006)
   Or
   Fakir Mohan Senapati: 'Rebati', in *Oriya Stories*, ed. Vidya Das, tr. Kishori Charan Das (Delhi: SrishtiPublishers, 2000)
2. Ismat Chugtai: 'The Quilt', in *Lifting the Veil: Selected Writings of Ismat Chugtai*, tr. M. Assaduddin(New Delhi: Penguin Books, 2009)
   Or
   Gurdial Singh: 'A Season of No Return', in *Earthy Tones*, tr. Rana Nayar (Delhi: Fiction House, 2002)
3. Rabindra Nath Tagore: 'Light, Oh Where is the Light?' and 'When My Play was with thee', in *Gitanjali:A New Translation* with an Introduction by William Radice (New Delhi: Penguin India, 2011)
4. Dharamveer Bharati: *Andha Yug*, tr. Alok Bhalla (New Delhi: OUP, 2009)Or
   G. Kalyan Rao: *Untouchable Spring*, tr. Alladi Uma and M. Sridhar (Delhi: Orient Black Swan, 2010)

Suggested Topics

- The Aesthetics and Politics of Translation

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- Linguistic Regions and Languages
- Modernity in Indian Literature
- Caste, Gender and Resistance
- Questions of Form in 20th Century Indian Literature

Suggested Readings

Rabindranath Tagore, 'Nationalism in India,' in *Nationalism* (Delhi: Penguin Books, 2009) pp. 63-83.

Namwar Singh, 'Decolonising the Indian Mind', tr. Harish Trivedi, *Indian Literature*, No. 151 (Sept./Oct. 1992).

B.R. Ambedkar, 'Annihilation of Caste' in *Dr. Babasaheb Ambedkar: Writings and Speeches, vol. 1* (Maharashtra: Education Department, Government of Maharashtra, 1979) chaps. 4, 6, and 14.

Sujit Mukherjee, 'A Link Literature for India', in *Translation as Discovery* (Hyderabad: Orient Longman, 1994) pp. 34–45.

G.N. Devy, 'Introduction', from *After Amnesia* in *The G.N. Devy Reader* (New Delhi: OrientBlackSwan, 2009) pp. 1–5.

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For UG CBCS syllabus of Political Science in Cooch Behar Panchanan Barma University click the following link:

https://cbpbu.ac.in/userfiles/file/CBCS/SYLLABUS,%2020.02.2019%20(1).pdf

DEPARTMENT OF POLITICAL SCIENCE

PROGRAMME OUTCOMES

Sl .No.	PROGRAMME OUTCOMES
1	PO1 -Develop the skill of critical thinking and argument
2	PO2 -Develop knowledge of the history of political thought, major associated theories and concepts of political science and its subfields
3	PO3 -Understanding administration, its role in formulation of public policy, implementation, problems, available, public policy choices and the inter- relationship between policy decisions and its reffection on society
4	PO4 Development of the understanding of the scenario of International Relations, the international organizations such as the UNO and its functiong and role in the contemporary scenaio, concepts of terrorism, regionalism, globalization, military cap
5	PO5 -Development of the understanding of central realities,issues and developments pertaining to Foreign policy of India at the bilateral, regional, and global levels, along with the Role that India plays in global political regimes.
6	To make students knowledgable about the effective citizen qualities and spread awareness of rights,duties, environmental problems and societal problems including understanding of law and prevalent legal system
7	PO7 Develop knowledge of Indian constitution, process and institutions along with the political process of India
8	To develop an understanding about the political system in comparison to systems as it exits in other countries of the First, second amnd third world. This helps in developin a comparative analytical thougt process
9	To develop and maintain a connectivity between major concepts of politics with that of the perspective of the society, thereby strengthenig the bond between politics and sociology
10	To develop the skill of understanding the complex nature of development opolitics in West Bengal since the year 1949 and make the students of the state more acqiuanted about the Bengal politcal scenrio.
11	To make a thorough understanding about three dimensional Western, marxian and Indian Political thought, the pioneers of political thinking and their contributions , basic to the understanding of the varied parameters of political thought in various
12	This paper outlining the emergence and dynamics of some of the social movements in the context of societal transitions in contemporary india makes students capable of knowing about their country better and the numerous efforts and challenges

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Sl .No.	PROGRAMME OUTCOMES
13	Develops an unique way of understanding South Asia where people from all races and religions have coexisted over a long period of time.
14	developing an understanding about the role of women in politics and the allied concepts such as gender mainstreaming, gender equality etc.

COURSE OUTCOMES

COURSE OUTCOME: POLITICAL SCIENCE

B.A. POLITICAL SCIENCE SYLLABUS FOR SEMESTER COURSE IN POLITICAL SCIENCE (HONOURS) -MAJOR

Semester I

□ ***Paper-I/Core-1: Understanding Political Theory***

Syllabus:

1. **Nature of Politics, What is Political Science, its nature and scope: Political Science as Social science; Politics as a process.**
2. **Nature and significance of Political theory: What is Political theory; its features and relevance. Debate on decline of political theory;**
3. **Political ideology: ideology as a science of Ideas; End of ideology debate; Liberalism, Neo-liberalism, Marxism, Socialism.**
4. **Approaches to the study of politics: Traditional and modern approach- Normative and Empirical; Behavioral; Post-Behavioral Revolution.**

The basic aim of Political theory is to provide the concepts, ideas and premises in political theory. This course seeks to explain the evolution and usage of the concepts, ideas and theories with reference to individual thinkers both historically and analytically. The different ideological standpoints with regard to various concepts and theories are to be critically explained with the purpose of highlighting the differences in their perspectives and in order to understand their trend of continuity and change.

- ✓ This paper aims to provide students a sound understanding of Political Science, including various approaches, ideological perspectives and relationship with other Social Sciences. Acknowledging the importance of 'State' in the contemporary political discourses, the students will be able to comprehend the function of the state in society and how it rules and regulates the power structure by learning various theories of origin and functioning of the state.

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- ✓ Learners would be able to describe and comprehend various key concepts related to the discipline and develop their own understanding of politics. They will understand what power is and how it functions in society and politics. They will be able to explain various theories of Justice.
- ✓ They will learn to comprehend and explain various theories and contemporary debates in democracy. Also, they will come to know how liberal and Marxist traditions look at and understand politics today.

Topic –wise Outcomes:

Thus the paper begins with a basic understanding of political enquiry-Political Science, the discipline. The topics are discussed with the following endeavors.

- o To understand and comprehend the nature of politics, meaning of the discipline, scope and significance of political Science, to relate this discipline with other branches of social science and explore the relevance of political science as a social science and to evaluate its role as a trivial process.
- o To give a thorough understanding of the meaning, nature and significance of Political Theory and consequently assess whether there has been a momentous decline of the theory and its importance.
- o To appreciate by realizing the procedure of different theoretical ideas in political theory such as political ideology, ideology as science of ideas. Thereafter a glimpse of the debate around the end of ideology arouse social interest and augments the interest further when detailed explanations are given on ideological conceptions such as Liberalism, neo-liberalism, Marxism, socialism and its facets.
- o To review and figure out the various traditional and modern approaches to the study of Politics such as Normative, Empirical, Behavioural, Post-Behavioural. etc..

Recommended readings:

1.Bhargava,R and Acharya,A(eds.),2008,Political Theory: An Introduction .New Delhi :Person ,Longman
2. Mckinnon,C(ed.),2008,Issues in Political theory, New York: Oxford University Press

Semester I

Paper-II/Core-2: Constitutional Government and democracy in India

Syllabus:

1. **Constituent Assembly, composition and its working**
2. **Preamble and its significance**
3. **Indian Federalism: Centre-State relations: Legislative, administrative and financial.**
4. **Fundamental rights and duties and Directive Principles of State Policy.**

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5. **Union executive: President; position, functions, Vice-President, Prime Minister**
6. **Union Legislature: Rajya Sabha and Lok Sabha: composition,functions,relationship between the two houses; Speaker**
7. **The Judiciary: Supreme court and High court: composition and functions, judicial activism**
8. **Government in the states: Governor, Chief Minister: Position, functions, Role and relationship.**

The vast majority of contemporary constitutions describe the basic principles of the state, the structures and processes of government and the fundamental rights of citizens in a higher law that cannot be unilaterally changed by an ordinary legislative act. This higher law is usually referred to as a constitution.

- ✓ This course acquaints students with the constitutional design of state structures and institutions, and their actual working over time.
- ✓ The Indian Constitution accommodates conflicting impulses (of liberty and justice, territorial decentralization and a strong union, for instance) within itself. The course traces the embodiment of some of these conflicts in constitutional provisions, and shows how these have played out in political practice.
- ✓ It further encourages a study of state institutions in their mutual interaction, and in interaction with the larger extra-constitutional environment.

Topic-wise outcomes:

The paper highlights on the following points from the under mentioned philosophical base:

- o To understand the philosophy of Indian Constitution and explore its formation by the constituent assembly and know about its role in the making of the Constitution.
- o Introducing the Indian Constitution with a focus on the evolution of it and examining the essence of the Preamble.
- o Assessing the nature of Indian Federalism and figuring out the Centre-state relations in the three areas of legislature, administrative and financial
- o Examining the Fundamental Rights and Duties of Indian citizens with a study of the significance and status of Directive Principles.
- o Critically analyzing the important institutions of the Indian Union: the Executive: assessing the powers, position and role of President; Vice-President, Prime Minister, Council of Ministers; Governor, Chief Minister and the relationship between them at the state level.
- o Analyzing the role of the legislature: Rajya Sabha, Lok Sabha, and realizing the relation between these two houses of the union legislature. Functions and role of Speaker.
- o Understanding the role of the Judiciary: Supreme Court and the High Court: composition and functions- analyzing the meaning of the concept of Judicial Activism.

Recommended readings:

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1. Bhargava ,R(ed.)Politics and ethics of the Indian Constitution, New Delhi: Oxford University, Constitution of India(Latest edition) (Govt.of India Publications)
2. Chatterjee P.,State and politics in India(Oxford University Press Delhi)
3. Johari,J.C.,Indian Government and politics(2 volumes),Vishal Publications,Delhi.
4. Basu,D.D.,an introduction to the Constitution of India,PrenticeHall,New Delhi.

COURSE DESIGN FOR SECOND SEMESTER:

Course type-Core-3-Course Title- Political Theory-Concept and Debates, Credit-06-Full Marks-50(Continuous evaluation* / Internal assessment – {10} +40=50)

Course type-Core-4-Course TitleComparative Constitutional System -Credit-06-Marks-50(Continuous evaluation* / Internal assessment – {10} +40=50)

*All Continuous Evaluation Records should be maintained by the individual departments and submitted to the Controller of Examinations on completion of semester-end exams or whenever asked for. The Continuous Evaluation/Internal Assessment process should be completed one month before semester-end exams.

Semester II

□ ***Paper-III/Core-3: Political Theory-Concepts and Debates***

Syllabus:

1. Concept of the State: Meaning and definition of state; theories of the state-Idealist, Marxist, Gandhian
2. Liberty-Its meaning, J.S Mill's views on Liberty; Classification and scope of liberty
3. Equality: Meaning and dimensions of equality; Liberty and equality
4. Justice: Meaning and nature of Justice; Theories of Justice-John Rawl's view; Barker's view
5. Rights: Idea of rights-Theories of Rights (Laski and Barker)
6. Sovereignty: Meaning and characteristics-Monistic and pluralistic theories of sovereignty
7. Socialism: Guild Socialism; Syndicalism and Democratic socialism
8. Democracy: Meaning and theories of democracy-protective, Participatory, Developmental

Topic –wise Outcomes:

- Since this paper deals with the major theoretical concepts associated with the study of political theory and its voracious understanding, the paper introduces students with the most well defined pivotal concept around which the entire gamut of political perceptive revolves round-the State. Thus the first topic vividly determines the meaning and definition of state and relates its origin and purposes to three major dimensions of original understanding-that from an Idealist, Marxist and more recent Gandhian viewpoints.
- In the second topic, the concept of liberty, a most talked about concept is examined, its meaning gets unfolded being supported by definitions provided by different political thinkers

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at different points of time. Then one of the chief exponent of this concept , John Stuart Mill's analytical explanations on liberty is elaborately dealt with. Thereafter types of liberty as a form of classification are explained.

- Another significant concept of Political theory lies in Equality. Thus the third topic deals with this concept, its meaning and the various dimensions. Lastly the major highlight remains that of understanding the relationship between two relative and complementary concepts- Liberty and Equality.
- One of the most important concept of Political theory is Justice, therefore the fourth topic of this paper justifies the concept of Justice by giving an understanding about its meaning and nature. With regard to theories of Justice, John Rawl's concept is the most regarded one, as well as Barker gives an elaborate understanding of his approach of Justice.
- The idea of Rights is the next significant idea which has been dealt with in the fifth topic, whereby this concept is dealt from two approaches as forwarded by John Laski and Earnest Barker respectively.
- Sovereignty is one of the most pivotal concepts of state without which a state is no state. Thus the meaning of Sovereignty, its characteristics are to explained clearly. Two major dimensions of examining the concept of sovereignty are Monism and Pluralism which are also taught here.
- In this topic three major dimensions of Socialism-Guild socialism, Syndicalism and Democratic socialism are vividly elaborated.
- Democracy, the most thought out concept of modern times is dealt with in the last topic of the paper whereby the meaning and theories of Democracy as propounded by David Held are viewed and reviewed. Three major theories such as Protective, Participatory and Developmental are elaborately explained.

Recommended readings:

1. Gauba,O.P.-An introduction to Political Theory,Macmillan Publishers,2003

2. Heywood Andrew.-Key concepts in Politics, Macmillan Press

3. Dworkin. Ronald,-Taking Rights Seriously,London,Duckworth

4. Held David-Political Theory and Modern State,Cambridge ,1989

5.Leftwich, A. (Ed.). (1984). What is Politics: The Activity and its Study. Oxford: Basil• Blackwell

Semester II

□ ***Paper-IV/Core-4: Comparative Constitutional System***

Syllabus:

1. Comparative Politic: Definition, Nature and Scope; Colonialism and process of decolonization; Going beyond Euro centrism
2) Types of state and government
a)Unitary and Federal
b) Liberal and Socialist
c) Presidential and Parliamentary
3) Themes for political analysis: Comparative study across Britain, USA and China of

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a)Cabinet
b)Speaker
c) Committee system
d)Party system

Comparative politics is a field of Political Science characterized by an empirical approach based on the comparative method. The study of comparative politics depends on conscious comparisons in the field of political experience, behaviour and processes.

Upon successful completion of this course, students will be able to:

- ✓ Define and apply key concepts in comparative politics, including but not limited to nation-states, political regimes, political identity, gender and politics, and political violence.
- ✓ Explain and evaluate the importance of specific historical events in the context of the political and economic development of the countries studied.
- ✓ Compare and contrast the political systems of the countries explored in the course, paying particular attention to historical, political, economic, geographical, and moral aspects of governance in a variety of countries.
- ✓ Use the comparative method to analyze contemporary political issues.
- ✓ Demonstrate an ability to communicate in writing, the knowledge and beliefs about the institutions and forces shaping the political systems of several countries. Particular emphasis will be placed on how each country resolves the conflicts associated with.

Topic –wise Outcomes:

- In the very first topic the inner implications related to the study of Comparative Politics is dealt with as students are introduced with the conceptual understanding, nature and subject matter of this dimension of political study.

Colonisation and its consequence, decolonization and the revival of colonialism in the form of neocolonialism or more specifically Eurocentrism is elaborately discussed in this topic.*Eurocentrism* refers to a discursive tendency to interpret the histories and cultures of non-European societies from a European (or Western) perspective. This is a rather a contentious subject matter that has captured the physique and mental psyche of the world population. The present topic under consideration goes beyond the normal tendencies of this typical western tendency and discusses about its newer parameters.

- In the next topic, three categorizations of governmental types along with their functional specialities along with the merits and demerits are elaborately to be discussed ,whereby one comes across three pairs of governmental types,viz.Unitary and Federal, Liberal and Socialist, Presidential and Parliamentary.
- In the last topic of this paperthemes for political analysisfrom the perspectives of Cabinet system,

Speaker and his responsibilities, Committee system and Party system in the three powerful nations, Great Britain, USA and China are comparatively analyzed.

Recommended Readings:

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1. Kopstein and Lichbach L.(eds.),2005, Comparative politics; Interests, Identities and Institutions in a changing and global order, Cambridge University Press.
2. Meek, R.(1957),The definition of Socialism: A comment, The Economic Journal.
3. Kapoor, A.C., Select Constitutions.

COURSE DESIGN FOR THIRD SEMESTER:

Course type-Core-5—Paper-5, Course Title- Public Administration, Credit-06-Full Marks-50(Continuous evaluation* / Internal assessment – {10} +40=50)

Course type-Core-6-Paper-6, Course Title-International Relations -Credit-06-Marks-50(Continuous evaluation* / Internal assessment – {10} +40=50)

Course type-Core-7-Paper-7, Course Title-Political Sociology -Credit-06-Marks-50(Continuous evaluation* / Internal assessment – {10} +40=50)

SEC-1-Democratic awareness with Legal literacy
Credit-06-Marks-50(Continuous evaluation* / Internal assessment – {10} +30+10[Project]=50)

GE (to be studied by the students from other than Political Science)-United Nations and Global Conflicts(Marks-50(Continuous evaluation* / Internal assessment – {10} +40=50)

*All Continuous Evaluation Records should be maintained by the individual departments and submitted to the Controller of Examinations on completion of semester-end exams or whenever asked for. The Continuous Evaluation/Internal Assessment process should be completed one month before semester-end exams.

Semester III

Paper-V/Core-5: Public Administration

Syllabus:

1. **Public Administration: Meaning, Nature and Scope; Evolution of Public administration; Private and Public Administration**
2. **Theories in Public Administration: Classical theories**
   a) Scientific Management(F.W. Taylor)
   b) Administrative Management- UrtherGullick, Urwick and Fayol
   c) Ideal-Type of Beurucracy (Max Weber)
   Neo- Classical theories
   a) Human Relations theory(Elton Mayo)
   b) Rational Decision Making(Herbert Simon)
   Contemporary theory
   a) Ecological approach(Fred Riggs)
3. **Major Approaches in Public administration**
4. **New Public Administration**

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5. New Public Management
6. Good Governance

Public Administration is concerned with the implementation of governmental policy that serves wide population, carrying political activity and decision into actions and developing public programmes for the wellbeing of society and the citizens. Graduates in Public Administration will be able to:

- Demonstrate critical thinking, research and communication skills as applied to the public and private sectors.
- Explain the cross-cultural context of public and private institutions operating in a global environment.
- Manage diversity issues within an organizational framework.
- Identify major issues in today's public and private institutions.

Topic –wise Outcomes:

Dealing topic-wise it is found that
The first topic of this paper deals with the meaning, nature and scope of Public Administration as well as elaborates on how the discipline has evolved over the years so that students can know about the stage wise development of such a significant parameter of Political Study.
The second topic likewise discusses the various theories related to Public Administration which have been broadly categorized into three sections, viz.Classical theories, Neo-Classical theories and Contemporary or Modern theory.
The third topic discusses on the major approaches of Public Administration such as Historical approach, Philosophical approach, Legal approach, Systems Approach.

New Public administration is an anti-positivist, anti-technical and anti-hierarchical reaction against traditional public administration .A practiced theory in response to the ever changing needs of the public and how institutions go bout to solve these issues. Being a product of three significant conferences held at Minowbrook way back in 1968, 1988 and 2008 respectively (at a gap of every 20 years) marked the beginning of New Public Administration and New public Management. The fourth and fifth topic of this paper extensively focuses on the development of New Public Administration and New Public Management.
Last but not the least when terms such as governance and good governance are increasingly used as a part of development literature nowadays, requirement to study the characteristics of governance and good governance becomes highly essential within the academic purview of Public Administration. With this objective in front, the students are acquainted with matters of governance and more specifically good governance in the final topic of this paper.

Recommended readings:
1.Bhattacharya M.(2008) , New horizons of Public administration ,5th Revised edition, New Delhi
2.Maheswari, S.(2009), Administrative thinkers,New Delhi, Macmillan
3. Shome Subhas, Janaprasahashan

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Semester III

Paper-VI/Core-6: International Relations

Syllabus:

1. **International Relations: meaning, nature and scope; IR as an autonomous discipline**
2. **Evolution of the International State system and crisis of nation-state system**
3. **Theoretical perspectives**
   i)Classical Realism:E.H.Carr, Morgenthau
   ii) Liberalism and Neo-liberalism
   iii) Marxist approaches

4. IR since World War II

i) World War II- Causes and consequences

ii) Cold War: Different phases, Detante-Features of Post Cold War and emergence of other centres of power

iii) The Third World; features, problems and relevance

- The study of the relations of states with each other and with the international organizations and certain sub-national entities is broadly known as International Relations.
- Graduates in World Politics and International Relations who have successfully participated in all the core courses are able to:

- - *analyse and explain contemporary international phenomena*, including identifying and assessing the positions and interests of key international subjects, drawing on theoretical insights from more than one discipline;
- - *identify important historical continuities and changes* in international relations and in the machinery of diplomacy;

- Formulate and communicate rigorous arguments /statements, whether explanatory (social, scientific) or prescriptive (ethical or legal) applied to a global or international context.

Topic –wise Outcomes:

- Thus in the very first topic the meaning, nature and scope of this array of the discipline is discussed in detail. Further whether the discipline has acquired an autonomous status is also vividly discussed in the first topic.
- The early modern state was creative coercive machinery designed to make war and to extract resources from the society. Yet at the end of the 18th century, this machinery came to be radically transformed or the 'state' was combined with a 'nation' forming a compound concept of nation-state which was organized with particular goals in the forefront. The second topic extensively focuses on the evolution of International state system and also the crises as faced by it.
- The theoretical perspectives are taken up in the third topic whereby International Relations is analysed from different dimensions,viz. Classical realism, Liberalism and Nero-Liberalism and Marxist viewpoints.
- A new phase of International setting began in the post Second World War Era. To understand that, the study of The Second World war along with its consequences becomes a vital part of the fourth topic.

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- Cold War was a phenomenal development at the post second world war period when the entire world got virtually divided into two camps-that of the Capitalist and the Socialist. thus the different phases of Cold war, Detante(a temporary halt to Cold war) and features of Post Cold War world becomes a significant matter to be studied in the Second last topic of this paper.
- In the last topic, emergence of Third World, its features, challenges faced and relevance forms an important subject matter to be discussed.

Recommended Readings:

1.Bsasu Rumki,(Ed.)2012, International Politics, Concepts, Theories and Issues, New Delhi, Sage Publications.
2.Frankel Joseph, International Relations
3. ChakrobortyRadharaman, AntorjatikSomporko.

Semester III

□ ***Paper-VII/Core-7: Political Sociology***

Syllabus:

1. **Social basis of Politics, interrelations of society, state and politics.**
2. **Social stratification and Politics: Class and Caste; Social mobility**
3. **Political Socialization: Agencies with special reference to education and media**
4. **Political Participation; Concept and types; Non-participation**
5. **Political Culture**
6. **Political development**
7. **Political parties-definition, function and types**
8. **Interest groups/Pressure groups**

- ✓ As sensible and rational animals, human beings make conscious efforts to establish and strengthen their social existence. Through various means of communication like language, expressions, gestures and symbols, they have come in contact with their fellow beings since the beginning. Such interactions were used for sharing and accumulating experiences, a fund of social heritage thus accrued.
- ✓ Politics deals with the power-relations aspect in multidimensional ways and the state is the reservoir of supreme power in a society. The large terrain of politics is thus characterized by the relationship among state, society and individuals. The social base of politics has to be understood in this background.
- ✓ Political Sociology is one of the core areas of Political studies. It is a thriving subfield of Political Science with important theoretical and practical consequences. The endeavor in this course is to render it compact, contemporaneous and make it contextual for students, while familiarizing them with enduring conceptual and theoretical concerns.The course equips students to grasp the essential historicity of political processes, political institutions and political change to facilitate an understanding of the dynamic nature of political phenomena.
- ✓ Through this course, students develop an ability to comprehend the embeddedness of political and the social in each other and are able to understand the relationship

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between state and society in shaping politics in India both historically and analytically.

Topic –wise Outcomes:

The first topic thus deals with this in an in-depth manner.

- Every society is stratified by factors such as caste, class; etc.which creates an impact on the society either positively or otherwise. Social mobility is the process by which individuals can move from one stage of living to the other which has an obvious impact on societal stratification thereby becoming a determining factor of assessment of relationship between man-society-state. The second topic focuses on such a dimension whereby differences between caste and class have been highlighted as also the different types of stratification along with their causes are dealt with.
- The third topic deals with Political socialization, a way by which inherited ideas, attitudes and orientations about politics are transferred from one generation to the next. Several agencies are responsible for this transference. All these mediums with special emphasis on media and education are elaborately dealt with in the third topic.
- The fourth topic deals with participation, an inevitable phenomenon of political underpinnings. Participation has manifold manifestations in the form of expressed or latent forms. These are further highlighted by political sociologists from their points of view.
- Political Culture, a somewhat related topic to Political socialization, deals exclusively with the growth and development of attitudes and orientations about a particular political system. The fifth topic deals with the concept of Political Culture.
- Political development enhances the state's capacity to mobilize and allocate resources, to process policy inputs into implementable outputs. This assists with problem-solving and adaptation to environmental changes and goal realization. The contemporary notion of good governance also dwells on efficient, effective, and non-corrupt public administration.Thus the notion of Political development is largely dealt with in this topic.
- Political Parties, an obvious functional factor which provides life to a political system is an issue to be dealt with in political studies. Thus the definition, functions and types of political parties are discussed in detail in this topic.
- Another appendage to political parties are interest or pressure groups .These accentuates the entire force of functioning of a political system. The last topic deals with the characteristics of these pressure or interest groups and their mode of functioning.

Recommended Readings:

1.Parsons. Talcott, The Social System
2.Poluntzas.N,Political Power and social class,London
3.Kar., ParimalBhusan, Samajtatya
4. Bottomore, T, Political Sociology

Semester III

□ ***Paper*-SEC-1-Democratic awareness with Legal literacy**

Syllabus:

1. **Rights and their enforcement; right to remedy(Article 32, 226)- Public Interest litigation**
2. **Courts and their jurisdiction in India- Criminal and Civil Courts, Alternate dispute mechanisms(Lok Adalats)**
3. **Laws relating to;**
   a)Environment
   b)Dowry Prohibition
   and c) Domestic Violence [Provisions and their evaluations]
4. **Project report (Written and internal marks) on any one topic eg.**
   a) arrest) sexual harassment) Domestic violence) child abuse;e)Filing of Public Interest Litigation)Consumer grievance

Knowledge of law is power and helps self-realization. India, the largest democracy in the world, has an emergent need for generating awareness of rights as knowledge so that people live in consonance with the true dictates of democracy and rule of law.

- ✓ Legal literacy is commonly understood as knowing the primary level in law. When citizens, particularly marginalized or underprivileged groups, know what the law has to offer them, they can recognize and challenge injustices much more forcefully. The first step towards that knowledge of law, which can transform people's lives, is legal literacy and this comes through democratic consciousness.

Topic-wise Outcomes:

- All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood. Human Rights are essentially a product of Democracy. Man's struggle against tyranny and all forms of oppressions has been long and never-ending. Thus the rights have been enshrined in the Constitution as away to ensure rights and freedom for individuals. But simple enshrinements of rights are not enough unless they are enforceable. Thus this paper deals with the awareness issue within a democratic structure which demands this consciousness from the public for general public welfare, coupled with the knowledge about law .Right to Remedy along with Public Interest Litigation are thus dealt as inevitable portions of this topic.
- The second topic deals with the jurisdiction pattern of India whereby not only the composition and jurisdiction of the Supreme and High Courts but also alternate modes of justice such as Lok Adalats are discussed in this chapter.
- Then in the third topic, laws relating to environment, prohibition of social evils like dowry, domestic violence are dealt with.
- The fourth topic asks students to undertake a project work whereby they can encounter several other social lacunae prevailing in the society such as child abuse, sexual harassment etc.

Recommended Readings:

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1.Sankaran Kamala and Singh Ujjwal, 9eds., Creating Legal awareness,(Delhi:OUP,2007)
2. Kothari, J, Criminal Law on Domestic Violence' EPW, Vol.40(46),2005
3. Mathew and Bakshi, Indian Legal System, New Delhi, Indian Social Institute

Semester III

□ ***Paper*-GE-United Nations and Global conflicts**

Syllabus:

1. **United nations: Genesis and the Charter**
2. **Objectives and Principles of the United Nations**
3. **United Nations: its structure and functions**
   General Assembly, Security Council, Economic and Social Council; the specialized agencies-International Labour Organization, United Nations Educational, Scientific and Cultural Organization, World Health Organization
4. **Peace Making and peace keeping role of the United Nations**
5. **Major global conflicts**
   Vietnam War, Afganisthan War

Topic-wise outcomes:

- The United Nations is an international organization founded in 1945 after the Second World War by 51 countries committed to maintaining international peace and security, developing friendly relations among nations and promoting social progress, better living standards and human rights.

Due to its unique international character, and the powers vested in its founding Charter, the Organization can take action on a wide range of issues, and provide a forum for its Member States to express their views, through the General Assembly, the Security Council, the Economic and Social Council and other bodies and committees.

The work of the United Nations reaches every corner of the globe. Although best known for peacekeeping, peace building, conflict prevention and humanitarian assistance, there are many other ways the United Nations and its System (specialized agencies, funds and programmes) affect our lives and make the world a better place.

Topic-wise Outcomes:

Thus the genesis and the causes behind are exclusively dealt with in the first topic.

- Likewise such a wide ranged international organization definitely functions on the basis of certain objectives and has certain purposes to fulfill on the basis of prescribed principles. These are discussed in the second topic.

- The United Nations has a fixed composition as it has 6 major organs through which it carries on its multiplicity of functions. Besides these six major organs there are a number of subsidiary organs too. All these organs are dealt with in the third topic.

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- Best known for peacekeeping, peace building, conflict resolution and prevention, humanitarian assistance, there are many other ways the United Nations and its System (specialized agencies, funds and programmes) affect our lives and make the world a better place to live in . Such role is evaluated in the fourth topic.

- Last but not the least, two major global conflicts, the Vietnam War and the Afghanistan war are also discussed in this paper.

Recommended readings:

1. Baylis J., Smith .s. (eds.), The globalization of World Politics, An introduction to International Relations, 4t Edition, Oxford University Press.

2. Basu, Rumki. United Nations.

COURSE DESIGN FOR FOURTH SEMESTER:

Course type-Core-8,Paper-8 -Course Title- Credit-06-Government and Politics in West Bengal since 1949,Full Marks-50(Continuous evaluation* / Internal assessment – {10} +40=50)

Course type-Core-9,Paper-9 -Course Title-Indian Political Thought -Credit-06-Marks-50(Continuous evaluation* / Internal assessment – {10} +40=50)

Course type-Core-10,Paper-10 -Course Title-Marxian Political Thought -Credit-06-Marks-50(Continuous evaluation* / Internal assessment – {10} +40=50)

SEC-2- Legislative Practices and Procedures, (Credit-06-Marks-50(Continuous evaluation* / Internal assessment – {10} +30+10[Project]=50)

*All Continuous Evaluation Records should be maintained by the individual departments and submitted to the Controller of Examinations on completion of semester-end exams or whenever asked for. The Continuous Evaluation/Internal Assessment process should be completed one month before semester-end exams.

Semester IV

□ ***Paper*-Core-8- Government and Politics in West Bengal since 1949.**

Syllabus:

1. **Politics in West Bengal: Partition(1947)and its impact on society and politics**
2. **Parties and politics- The Indian National Congress; Emergence of Coalition Politics, The Left in West Bengal , Left in Power and the Left in Opposition; Rule of Trinamool Congress**
3. **Naxalite movements; Origin, nature and decline**
4. **Local self government: Urban and Rural –evolution, composition, functions and role.**

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Topic-wise Outcomes:

- Politics in West Bengal experienced a transition after Partition and this created an impact on society and politics, this has been dealt with in the first topic.
- Three major political parties ,The Indian National Congress, The Left in Power and Left in Opposition, and the rise of Trinamool Congress as a major political power in West Bengal is discussed in elaboration in the second topic.
- Naxalite movement, a major outbreak during 1967-70's saw some of the most devastating consequences. Its origin nature and causes of decline have been dealt with in the third topic.
- Remedy to grievances of local people found an expression through the governments at local levels-The Panchayat at the Local level and Municipalities at an Urban level ,these are dealt in detail at the last topic.

Recommended readings:
1. Sarathi. Partha,Left Politics in West Bengal: Examining the Marxists and the Maoists ,Purbalok Publications, 2016
2. Webster. Neil, Panchayati raj and Decentralization of Development Planning in West Bengal, Calcutta.

Semester IV

***Paper*-Core-9- Indian Political Thought-I.**

Syllabus:

1. **VedVyas(Shanti Parva): Rajdharma**
2. **Kautilya:Dandaniti, Theory of State**
3. **Zia-Uddin- Barani:Kingship and State**
4. **Bengal Renaissance:Nature and Features**
5. **Raja Rammohan:Freedom of Press;Liberalism**
6. **J.Phule:Anti caste movement**
7. **Vivekananda:Socialism**
8. **R.N.Tagore:Nationalism and Internationalism**

- ✓ Indian political thought is the branch of philosophical thought in India and one of the basic place of political enquiry that addresses questions related to polity, statecraft, justice, law and the legitimacy of forms of governance. It also deals with the scope of religion in state-organization and addresses the legitimacy of sociopolitical institutions in a polity.
- ✓ This course introduces the specific elements of Indian Political Thought spanning over two millennia. The course as a whole is meant to provide a sense of the broad streams of Indian thought while encouraging a specific knowledge of individual thinkers and texts. Selected extracts from some original texts are also given to discuss in class. The list of additional readings is meant for teachers as well as the more interested students. The major objective of this course is to Study

in detail the political philosophy of ancient and medieval India. The course helps students to understand major idea of Manu, Kautilya and Shukra. It studies the political ideas of Shanti Parva and Ramayana. This course is designed to understand major tenets of Buddhism and Jainism, islam and Sikhism. This course elaborately deals with the ancient and medieval political ideologue of India.

After successful completion of the course students will get to know and be able to • Understand the Social and political philosophy of ancient and medieval India. • Understand and assess the political ideologies of famous ancient Indian scriptures. • At the end of the course student will be able to understand and analyze tenets of various religion.

Topic-wise outcomes:

The first topic of this paper deals with Ved Vyas' creation of the Shanti Parva and installation of ideas of Rajdharma or good governance. Thus in this topic an attempt to trace the elements of good governance in Rajadharmanushasana Parva of Shanti Parva as is one of the most important parva of Mahabharata has been made.

- A close study of ancient Indian texts like Kautilya'sArthashastra exploring the seven limbs of statecraft as King, Amatya and so on along with the theory of state as propounded by Kautilya has been made in the second topic.
- The theory of kingship and state finds an expression through Barani's opinion of state and kingship in the third topic.
- In the fourth topic, The Bengal Renaissance also known as the Bengali Renaissancewhich was a cultural, social, intellectual, and artistic movement that took place in the Bengal region of the British Raj, from the late 18th century to the early 20th century have been discussed. Historians have traced the beginnings of the movement to the victory of the British East India Company at the 1757 Battle of Plassey, as well as the works of reformer Raja Rammohan Roy, considered the "Father of the Bengal Renaissance," born in 1772.
- Fifth topic is almost a continuation of the fourth one as the contributions of Raja Rammohan Roy, his movement towards Freedom of Press and liberalism is dealt with in detail.
- Phule, who was born on 11 April 1827, challenged the very premise of the racial theory of caste using his choicest weapon — reason. The sixth topic thus deals with the anti-caste movement of J. Phule.
- Swami Vivekananda was one of the first religious leadersof India who encouraged the Indians to formulate adefinite philosophy of service.Vivekananda talked to India about socialism and equality much before the ideas of Karl Marx was known toIndia.He was prepared to call all those traitors who deprived the labour class of their rights. Vivekanandaupheld the noble idea of 'vedanta ' which holds that noindividual can be completely free unless everyone is freefrom oppression. This socialistic philosophy of Vivekananda has been dealt in the seventh topic.
- The last topic deals with the nationalistic and international fervor as expressed by Rabindranath Tagore.

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Recommednded readings:

1. Kingle, R. P. –Arthasashtra of kautilya.
2. Mehta. V.Foundation of Indian Political thpught
3. Sarkar.Kalyan, BharatiyaRashtrachinta
4. Habib, Ziya Barani's Vision of the state.

Semester IV

***Paper*-Core-10- Marxian Political Thought.**

Syllabus:

1. **Marxist Approach: Dialectical and Historical Materialism**
2. **Marx's Conceptualization of Capitalist society and socialist society**
3. **Theory of class and Class Struggle**
4. **Marx and the concepts of Freedom and Democracy**
5. **Marxian theory of Revolution**
6. **Lenin-Dictatorship of the Proletariat**
7. **Mao-Ze-Dong – Mao on New Democracy.**

- Karl Marx (b. 1818–d. 1883) is undoubtedly one of the most important and influential thinkers of the modern period. Nevertheless, although much of what he wrote has been sedimented into contemporary culture, many of his ideas, especially his political ideas, are widely circulated and brings about a tumult in thought process.

Topic-wise Outcomes:

The Marxist approaches in two dimensional forms of the Dialectical and Historical Materialism are dealt about in the first topic.

- Marx begins his theories basically leaning on his interpretations of capitalism. The second topic thus deals with the Marxist conceptualization of the Capitalist class and the society and takes a natural curve towards socialist society in the second topic.
- Theory of class and class struggle is an important part of Marx's flow of thought based on the oppression of classes and the division of the society into haves and have nots.This is elaborately discussed in the third topic.
- Marx's conceptualization of class struggle eventually flows into his notions of freedom and democracy in the fourth topic and then the concept of revolution in the fifth topic.
- Lenin, the predecessor to Karl Marx finds a special mention in this regard as his theory of Dictatorship of the Proletariat found its initial expression in the opinion of Marx. This theory is dealt with in the sixth topic.
- When China emerged from a half century of revolution as the world's most populous country and launched itself on a path of economic development and social change, Mao Zedong occupied a critical place in the story of the country's resurgence. In the last topic, Mao- Ze-Dong with his overtone of Maoism and New democracy finds a mention.

Recommended readings:

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1.Sabine, History of Political Thought
2.Miliband,R. Marxism and Politics, Oxford, Pantheon Books,1977
3.Dattagupta Shovanlal, MarxioSamajtatya

SEC-2- Legislative Practices and Procedures:

Syllabus:

1. **Election of and Powers and functions of People's Representatives –Members of Parliament and State Legislature**
2. **Legislative process: types of Bills and Bill passing Process**
3. **Legislative committees : Types of Committees, Role of Committees in reviewing Government finances, Policy, programmes and legislation**
4. **Budget-An overview of budgetary process.**

- The Parliament of India is the supreme legislative body of the Republic of India. It is a bicameral legislature composed of the President of India and the two houses: the Rajya Sabha (House of States) and the Lok Sabha (House of the People). Those elected or nominated (by the President) to either house of Parliament are referred to as Members of Parliament (MP). The Members of Parliament, Lok Sabha are directly elected by the Indian public voting in Single-member districts while the Members of Parliament from Rajya Sabha are elected by the members of all State LegislativeAssembly by proportional representation.In the same way in states , the State Legislative Assembly exists to look after the legislative matters.

  Topic-wise Outcomes:

  Thus the first topic deals with the mode of election of the members of the Parliament at Union level and State legislatures at the State level. Their powers and functions are also discussed in the first topic.

- The making of laws is the primary responsibility of the Legislature. Thus in the second topic, the process of making of laws is discussed starting from the Bill passing process to its conversion into law.
- The legislature is overburdened with multiplicity of functions. Thus at times, to ease and release the Legislature of its burden, there are Committees or rather a composed Committee system. In the third topic,the role of the Committees in reviewing Government finances, Policy, programmes and legislation is discussed in elaboration.

- Union Budget is the annual financial statement or the statement of the estimated receipts and expenditure of the Central Government before the beginning of each financial year, presented to the Lok Sabha on such day as the President might direct. Thus the last topic deals with the budgetary process in detail.

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Recommended readings:

1. Bhargava, R. (ed.) Politics and Ethics of the Constitution of India , Govt. Of India Publishers.
2. Chatterjee, Partha, The Government and Politics in India, Universal , New Delhi.
3. Basu,D.D., The Constitution of India.

GE- Constitution of India
Syllabus:

1. **Constituent Assembly: Composition and objectives**
2. **Preamble: Contents and Significance**
3. **Fundamental Rights, Fundamental Duties, Directive Principles of State Policy**
4. **Nature of Federalism**
5. **Union and State Legislature- Composition , powers and functions**
6. **Union and State Executive- President, Prime Minister, Governor, Chief minister**
7. **Union and State Judiciary- Supreme Court, High Court- Composition, Power and functions**
8. **Election Commission, Electoral reforms.**

- The Constitution of India is the supreme law of the land. The document lays down the framework that demarcates fundamental political code, structure, procedures, powers, and duties of government institutions and sets out fundamental rights, Directive Principles, and the duties of citizens. It is the longest written national constitution in the world.

Topic-wise Outcomes:

- Thus the first topic deals with the birth of the Constitution of India, highlighting on the composition of the Constituent Assembly focusing on its objectives.

The second topic deals with the prelude of the Constitution in the form of the Preamble, focuses on the contents and significance of the Preamble.

- The detail on types of Fundamental Rights, Fundamental duties, Directive Principles of State Policy all finds a place in the third topic.
- The fourth topic deals with the nature of Federal Structure along with its significance.
- The three pivotal organs of a Government in the form of Union Legislature, Union Executive and Union Judiciary as well as all these functional parts at State levels finds the fullest expression focusing on the composition and the functions, in the fifth, sixth and seventh topics respectively.
- The last topic deals with the most vital part of democratic politics that is Election, the procedure, the Election Commission an independent body in charge of conducting elections, and types of electoral reforms introduced so far.

Recommended readings:

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1. Parliamentary Procedures(Abstract series)published by Lok Sabha , available at http://164.100.47.132/Lss New /abstract/index.aspx,website:www.loksabha.nic.in, Committees of Lok Sabha, Available at http://164.100.47.134/committee/committee_list.aspx
2. Basu, D.D. , Constitution of India

COURSE DESIGN FOR FIFTH SEMESTER:

Course type-Core-11-Course Title- Western Political thought-I-Credit-06-Full Marks-50(Continuous evaluation* / Internal assessment – {10} +40=50)

Course type-Core-12-Course Title-Constitutional Indian Political Thought-II -Credit-06-Marks-50(Continuous evaluation* / Internal assessment – {10} +40=50)

Course type –DSE-1-Course Title- Social movements in Contemporary India-Credit-06-Marks-50(Continuous evaluation* / Internal assessment – {10} +40=50)

Course type –DSE-2-Course Title- Indian foreign Policy-Credit-06-Marks-50(Continuous evaluation* / Internal assessment – {10} +40=50)

*All Continuous Evaluation Records should be maintained by the individual departments and submitted to the Controller of Examinations on completion of semester-end exams or whenever asked for. The Continuous Evaluation/Internal Assessment process should be completed one month before semester-end exams.

Core-11-Western Political Thought-I

Syllabus:

1. **Greek Political thought: Basic Features**
2. **Plato: Ideal State, Justice, Education, Communism**
3. **Aristotle: Aristotle's Method, Notion of state, Justice, slavery and Revolution**
4. **Cicero: Natural law, State**
5. **Medieval Political thought: Theory of two swords.**
6. **Thomas Aquinas: Theory of Law**
7. **Marsiglio of Padua: Conception of State, Conciliar Movement**

✓ Western political thought, since its beginning from ancient Greece has dealt with diverse varieties of issues, and each philosopher has handled them from his own angle. The major issues relating to politics have been the concerns of political philosophers. These issues are the power relations between government and subject, the nature of political authority, the problems created by social conflicts, purposes and objectives of political activity, and the character and utility of political knowledge. By attempting to find solutions to these political issues, the political theorists have given the western political thought not only a

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direction, but also a unity of thought processes. The significance of western political thought lies in the attempt of the political philosophers to identify political issues, and provide solutions, thus giving political thought a meaning and a vision.

- ✓ The course gives an introduction to Political Thought processes and Theory making in the West. From the Greek Political thinkers to down the ages including Utilitarians, this course introduces the student to the richness and variations in the political perceptions of Western Thinkers. It provides a foundation to students of Political Science in familiarizing themselves to the Thought & Theory of Western Philosophy.

The classics in political thought include the works of Plato to that of Marx. These philosophers have opened a dialogue between different perspectives and interpretations of reality as a work.

Topic-wise outcomes:

- Thus the first topic opens up with the major features of political thought as it existed in Greece at that point of time since Greece has been considered as the place pioneering the development of political thinking.
- The second topic deals with Plato's theories of Ideal State, educations, justice and communism.
- Likewise Aristotle being influenced by Plato being his teacher improvised and developed theories from his own standpoint as his theories of justice, slavery, revolution, notion of state and classification of Constitution occupies a significant place in the history of political thought. These are dealt with in the third topic.
- The fourth topic jumps over to the Roman period where Cicero's contribution in the development of theory of law is treated with respect as it was a novel venture.
- From the standpoint of political thought, the medieval period has certain special features about political thought which need specific consideration. It is said that this period was un-political. Neither political theory nor any ideology developed in the middle Ages. Of course, various institutions and organizations were set up. But all these revolved around religious dogmas and beliefs.

The church was the most dominating institution. All other institutions remained under its control. As a result, independent thinking in the political arena could not flourish at all. The conflict between the church and the state; the relation of church to common people, learned persons, feudal landlords and students of educational institutions provided sufficient live materials for political thought.

Moreover, in the middle Ages, feudalism became one of the dominant forces and this was treated as part of political thought. So it cannot be said that the medieval period was barren or dead. All these features are in detail dealt with in this topic.The claims to universality advanced by the

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medieval Church brought it into close relationship with an ancient human institution: the state. Especially after the fourth century, when it was first recognized and then given status as the only legal religious body, it was necessary for the Church to formulate a set of political principles, comparable to those for economic activity, which could then be applied to the many and continuing relations between church and state. This eventually gave rise to the two swords theory.

- Two magnanimous figures of the medieval period amongst many were Thomas Aquinas and Marsiglio of Padua. Their theories concerning to law, state are discussed in detail in the sixth and seventh topic respectively.

Recommended readings:

1. Sabine.George. H, A history of Political thought.
2. Mukherjee .S. and Ramaswamy, S.,A history of Political thought.
3. Das. Prangobindo, RashtrachintarItibritto.

Core-12-Indian Political Thought-II

Syllabus:
1. Aurobindo: Nationalism
2. M.N. Roy: New Humanism
3. M.K. Gandhi: Sarvodaya
4.S. C. Bose: Doctrine of Samya
5. J.Nehru: Seculrism
6. J.P.Narayan: Partyless Democracy
7. Azad:Nationalism
8. Ambedkar: Democracy and Constitutionalism.

Indian Political thought involves three related issues of nation, nationalism and national identity. In other words, the ideas are constructed, nutured and developed within a social, political and economic milier that can never be wished away in conceptualising social and political thoughts. What is most determining in the entire process is the organic link with a particular reality that always leaves an imprint on the construction of ideas. Indian social and political thought is not **configurable.** Hence, a unilinear explanation of its evolution can never be tenable. Ideas metamorphose in response to the milier contributing to their germination. Under colonialism, the role of the alien power seems to be a significant determinant in the articulation of the ideas which can be either be oppositional or supportive of the regime it creates.
India has an ancient civilization comparable with any other great civilizations on Earth. The rich political traditions, ideal practices and humanistic principles that guided the society, state and community in pre-modern India have become benchmarks and reference points in providing a direction to the modern political thought that essentially began with the renaissance and reform

movement of 19th century India. Hence, to better understand the political thought that emerged in the modern times in India, the study with a quick reference to the political traditions and ideas that emerged in the Ancient and Medieval India have been dealt with in the previous semester.

- Thus all the topics of this paper chronologically deal with Aurobindo's nationalistic ideas, to M. N. Roy's Humanism, to Gandhi's concept of Sarvodaya to Subhas Bose's Doctrine of Samya. The next four topics likewise focus on Nehru's Secular ideas to Jay Prakash Narayan's ideas of Partyless Democracy to Azad's Nationalism and last but not the least with B.R. Ambedkar's notions of Democracy and Constitutionalism.
  All the topics with nationalistic flavor enhance the spirit of love towards our motherland and instills a sense of duty and uprightness.Political thought as it has lived and/or exists in India, for instance, seeks to set up ethical/moral values in politics, spiritualism, cooperative livelihood, and the like.

Recommended readings:

1.Ghose, Sankar, Modern Indian Political Thought, New Delhi,, Allied Publishers. 1984.
2. Gore, M.S., The Social Context of an Ideology: Ambedkar's Political and Social thought, New Delhi, Sage Publications, 1993.
3. Graham, B.D., Hindu Nationalism and Indian Politics, Cambridge, Cambridge University Press, 1993.
4.Parekh, Bhiku, Gandhi's Political Philosophy: A Critical Examination, Hampshire, Macmillan Press, 1989.

DSE-I- Social Movements in Contemporary India

Syllabus:

1. **Social movement: Meaning, types and causes**
2. **Environment Movement:Chipko& Narmada Bachao**
3. **Anti-Corruption movement-India against corruption**
4. **Women Movement: Self Employed Women's Association (SEWA)**
5. **Dalit Movements- Basic features**

Topic –wise outcomes:

Indian society has long been a breeding ground for a range of tribal, caste, peasant, worker's, women's, ethnic, regional, environmental, human rights, gay rights, and animal rights movements, and many other social movements under the auspices of varied ideologies and organizations. This paper outlines the emergence and dynamics of some of these movements in the context of societal transitions in contemporary India. Students get to know their country better and the numerous efforts and challenges encountered by common people while playing a decisive role in the major movements that occurred in India.

Topic-wise Outcomes:

- In the first topic, therefore the meaning, types and general causes behind the rise of these social movements have been discussed.
- The second topic typically highlights the two major environmental movements that occurred in India, the Chipko and the Narmada BachaoAndolan, both in which women had a preceding role to play.
- Several anti-corruption movements spelt a spur in Indian politics; these have been directed against corruption paralyzing a country's transparency.
- Women have played a pivotal role in the organization of many movements to protect their freedom and rights. The genesis of the new women's liberation movement lay in the radicalization of Indian politics in the late sixties. The rebellious mood of the youth, poor peasants, marginal farmers, educated dalit and tribal men and women, industrial working classes found its expression in the formation of innumerable special interest groups addressing themselves to the needs and demands of the local masses as well as issues which were standing on the way of their rights. The fourth topic highlights on these issues, discussing the role of SEWA(Self Employed Women's Association) in this regard.
- In the last topic, the features of Dalit movements have also been elaborately discussed.

Recommended readings:

1. Ghadiali, Rehana (1988). (Ed).Women and Society in India, Sage Publications, 1988.
2. Ray, Civil Rights Movement and social Struggle in India, Economic and Political Weekly,XXI(28),1996

DSE-2-Indian foreign Policy

1. Indian foreign policy: Evolution, Basic principles and determinants
2. India's policy of non-alignment
3. India Pakistan relation-challenges and prospects
4. India-China relations: recent dynamics
5. Indo-US relations

India's foreign affairs/policies are closely integrated with the issue of country's fundamental security and developmental priorities. This section highlights India's foreign policy, its relation with the other countries etc.

Upon successful completion of the paper, students will

➢ Have a sound grasp of the key elements of Indian traditions of thought
➢ develop an understanding of the fundamentals of foreign policy-making in India;
➢ Acquire an understanding of the foreign policy challenges facing India;
➢ Develop capacity to present strong arguments in their written and oral work and to deploy relevant key facts, concepts and theories (as developed through written assessments, in-class discussions and tutorial-based activities).

Topic-wise Outcomes:

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- Thus the first topic deals with the stage –wise evolution of foreign policy, basic principles on which Indian foreign policy is based and the basic determinants on which it leans on.
- Non-alignment is the most important feature of India's foreign policy. Its core element is to maintain independence in foreign affairs by not joining any military alliance formed by the USA and Soviet Union, which emerged as an important aspect of cold war politics after the Second World War. Non-alignment should not be confused with neutrality or non-involvement in international affairs or isolationism. It was a positive and dynamic concept. It postulates taking an independent stand on international issues according to the merits of each case but at the same time not committing to coming under the influence of any military bloc. This policy is dealt with in the second topic.
- Indo-Pak, Indo- China and Indo-US relations in the context of changing scenario are discussed in detail in the next three topics respectively.

Recommended readings:

1. Bandopadhyaya. J. , The Making of India's foreign policy, New Delhi, Allied Publishers
2. Ghosh .Peu, International Relations

COURSE DESIGN FOR SIXTH SEMESTER:

Course type-Core-13-Course Title- Western Political thought-II-Credit-06-Full Marks-50(Continuous evaluation* / Internal assessment – {10} +40=50)

Course type-Core-14-Course Title–United Nations-An overview -Credit-06-Marks-50(Continuous evaluation* / Internal assessment – {10} +40=50)

Course type –DSE-3-Course Title- Understanding South Asia-Credit-06-Marks-50(Continuous evaluation* / Internal assessment – {10} +40=50)

Course type –DSE-4-Course Title- Women in Modern India-Power and Politics-Credit-06-Marks-50(Continuous evaluation* / Internal assessment – {10} +40=50)

*All Continuous Evaluation Records should be maintained by the individual departments and submitted to the Controller of Examinations on completion of semester-end exams or whenever asked for. The Continuous Evaluation/Internal Assessment process should be completed one month before semester-end exams.

Core-13-Western Political Thought-II

Syllabus:

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1. Machaivelli:Ethics and Politics, ' Child Of Renaissance'
2. Hobbes:theory of social Contract
3. Locke: Natural Law and Rights, Social Contract
4. Rosseau: General Will
5. Bentham: Utilitarianism, Liberty
6. J.S.Mill: Liberty, Representative Government
7.Hegel: Dialectic, State

:

Political thought attempts to identify values and norms and creates them an inseparable part of a scrupulous political trend. Western political thought, if we wish to identify its magic themes, evolves and revolves approximately around the values such as liberty and libertarian, democracy and democratic custom, equality and egalitarian values. Political thought and political philosophy have been used interchangeably. When we talk of the history of political thought, we refer to the classical custom that began with Plato and ended with Marx though both Germino and MacIntyre consider Hegel's political philosophy as the ending of the classical custom, for, both see Marx as re-interpreting Hegel. The works of the great philosophers depict not only the troubles faced in their respective times, but also reflect their examination, enquiry, and experience.

Topic-wise Outcomes:

- ✓ The modern age in political thinking more or less saw its beginning with Machaivelli's 'Prince' wherein the duties of king/prince have been thoroughly depicted. Machiavelli being considered as the Child of Renaissance was known for his opinion on the separation of the two considerable concepts-ethics and politics. The first topic of the paper deals with this .
- ✓ Political thinkers have attempted to explain the origin of the state in various ways. When, where and how the state came into existence have not been recorded anywhere in history. Therefore, the political thinkers were compelled to adopt various hypotheses, many of which are now discredited in the light of modern knowledge. The Social Contract theory as propounded by Hobbes ,Locke and Rousseau after examining different perspectives, have been regarded as the most reasonable theory behind the origin of state.The social contract theory is not only the most ancient but also the most famous of the theories regarding the origin of the state. The substance of this theory is that state is the result of an agreement entered into by men who originally had no governmental organization. I Thus the second, third and fourth topics discusses on the theory of Social Contract as expounded by Hobbes, along with concepts Natural law and rights that of Locke and that of General will as popularized by Rousseau.
    - ✓ The struggle between Liberty and Authority is the most conspicuous feature in the portions of history with which we are earliest familiar, particularly in that of Greece, Rome, and England. But in old times this contest was between subjects, or some classes of subjects, and the Government. Such contradictions brought along with them more concepts such as that of Utilitarianism, Liberty, Representative government, etc.These thematic issues were dealt in by different philosophers at times, most prominently, James Mill, Jeremy Bentham, John

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Stuart Mill.Thus Bentham and j.S.Mill's concepts have been elaborately dealt with in the fifth and sixth topics.

- ✓ Hegel's "organicist" theory of the state is usually, and surely rightly, regarded as the expression of a specific political outlook on his part. Thus the last topic of this paper discusses in elaboration about Hegel's opinion about state and his notion of Dialectics on which Marx later leaned on.

Recommended readings:

1.Sabine.George. H, A History of Political thought.
2. Mukherjee .S. and Ramaswamy, S.,A history of Political thought.
3.Das. Prangobindo, RashtrachintarItibritto.
4.Sharmas.U, ,Western Political Thought

Core-14-United Nations: An overview

Syllabus:

1. **United Nations(UNO) : Genesis and the Charter**
2. **Objectives and Principles of the United Nations**
3. **United Nations: structure , functions and role of General Assembly, Security Council, Economic and Social Council; the specialized agencies-International Labour Organization, United Nations Educational, Scientific and Cultural Organization, World Health Organization, International Court Of Justice**
4. **United Nations: Evaluation of Role in Conflict Management and Arms Control**

The United Nations is an international organization founded in 1945 after the Second World War by 51 countries committed to maintaining international peace and security, developing friendly relations among nations and promoting social progress, better living standards and human rights.

Due to its unique international character, and the powers vested in its founding Charter, the Organization can take action on a wide range of issues, and provide a forum for its Member States to express their views, through the General Assembly, the Security Council, the Economic and Social Council and other bodies and committees.

The work of the United Nations reaches every corner of the globe. Although best known for peacekeeping, peace building, conflict prevention and humanitarian assistance, there are many other ways the United Nations and its System (specialized agencies, funds and programmes) affect our lives and make the world a better place.

Topic-wise Outcomes:

Thus the genesis and the causes behind are exclusively dealt with in the first topic.

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5. Likewise such a wide ranged international organization definitely functions on the basis of certain objectives and has certain purposes to fulfill on the basis of prescribed principles. These are discussed in the second topic.

   The United Nations has a fixed composition as it has 6 major organs through which it carries on its multiplicity of functions.Besides these six major organs there are a number of subsidiary organs too. All these organs are dealt with in the third topic.Herein special emphasis as per syllabus is to be given on General Assembly, Security Council, Economic and Social Council; the specialized agencies-International Labour Organization, United Nations Educational, Scientific and Cultural Organization, World Health Organization, International Court Of Justice.

6. Best known for peacekeeping, peace building, conflict resolution and prevention, humanitarian assistance, there are many other ways the United Nations and its System (specialized agencies, funds and programmes) affect our lives and make the world a better place to live in . Disarmament or arms control is a potential weapon in the hands of the United Nations to stop arms race between powerful nations.Such role is evaluated in the fourth topic.

Recommended readings:

1. Baylis J., Smith .s. (eds.), The globalization of World Politics, An introduction to International Relations, 4t Edition, Oxford University Press.

2. Basu, Rumki. United Nations.

Core-DSE-3-Understanding South Asia

Syllabus:

1. **Understanding South Asian states: Constitutional features of Pakistan, Sri Lanka,Bangladesh, Bhutan and Maldives**
2. **Regional Organization-ASEAN and SAARC**
3. **Terrorism in South Asia**
4. **Security challenges and Nuclear Policy: An Appraisal**

South Asia is a realm of one of the oldest civilizations in the world where people from all races and religions have coexisted over a long period of time. This layering of different cultures has given it a unique identity that is unparalleled anywhere else in the world. The appellations South Asia and the Indian subcontinent are synonymous. The area was usually referred to as Britain's Indian Empire or Raj prior to 1947. Most geographers, such as Sir Dudley Stamp, called it the Indian subcontinent because of its separation from the rest of the Asian landmass by a continuous barrier of mountains in the north. This enabled the development of a civilization in relative isolation through the ages. The seven independent countries of the region are India, Bangladesh, Pakistan, Nepal, Sri Lanka, Bhutan and Maldives. India has been the central core of

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this region both physically and culturally. The other countries form the peripheral region that has been influenced historically and politically by the core for many centuries.

Topic-wise outcomes:

1. Taking these points under consideration, the uniqueness and Constitutional features of these **(Pakistan, Sri Lanka,Bangladesh, Bhutan and Maldives)** countries are dealt with in the first topic of the paper.

2. A set of countries in close geographical proximity with each other can be categorised as a 'region' when, first and foremost, they share a certain commonality of (national) interests. These interests could incorporate a whole gamut of social, economic, political, cultural, historical, and other factors. Secondly, this set of countries should be sufficiently enlightened so as to understand the significance of placing cooperation above conflict in the conduct of interstate relations. This should also be bolstered by a collective desire to come together on a common plank to create some lasting mechanism for regional cooperation. These initiatives have found expression through two regional organizations-THE ASEAN and SAARC.These are discussed in the second topic.

3. Horrific acts of terrorism, such as the November 2008 attacks in Mumbai, underscore the regional nature of the terrorist threat in South Asia, and they highlight the need for greater cooperation within the region to address it. The pertinent problem of terrorism in South Asia is discussed with, in the third topic.

4. Lastly keeping the previous topics in view, security concerns and nuclear policy finds a special mention in the last topic.

Recommended readings:

1. Appadorai. A, Domestic roots of Foreign policy, new Delhi,OUP,1981

2.Muni, S.D., South Asian Survey,Vol-10,Nos.2,July-Dec,2003

Core-DSE-4-Women in Modern India-power and Politics

Syllabus:

1. Women's participation in Indian freedom movement

2. Women in post-independence (Indian) politics (Parliament and Assembly)

3. Empowerment of Indian women: Concept and trends, 73rd and 74th Constitutional Amendment Act

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4. Legal provisions for protection of Women: sexual harassment of women at Workplace Act (2013); National Commission for Women-composition and role.

- Fair representation of women in political life has a positive impact on gender mainstreaming in various policies.Women's political participation regarded as an essential element in all forms of development; however, gender equality policies of India remain under scrutiny. Women have taken a front footing during the period of Indian struggle for freedom. After independence in 1947, there have been many initiatives to increase the political representation of women by decentralization of power in various local self-government institutions of India. The Act of Panchayati Raj Institutions has increased the engagement of marginalized segments of society, including women, into the decision-making role in political institutions.

Topic-wise outcomes:

- Hence, the study of this paper is trying to explore the political participation/leadership of women from pre-independence era to post-independence period and is trying to assess the level of empowerment of this section of population. All these have been elaborately discussed in the first three topics of the paper.
- However the fourth topic deals with the issue of protection of womenfolk at different walks of life as it discusses about the legal provisions related to Sexual harassment of women at workplace. Last but not the least the National Commission for Women-its composition and role is discussed herewith.

Recommended readings:

1. Kosambi.M. , Crossing the threshold, New Delhi, Permanent Black,2007
2. Bhargava. R, Acharya. A, (eds.) Political Theory: An introduction, Delhi, Perason
3. Swaminathan, P.Introduction in Women and Work, Hyderabad: Orient Blackswan,2012

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For UG CBCS syllabus of Zoology in Cooch Behar Panchanan Barma University click the following link:

https://cbpbu.ac.in/userfiles/file/CBCS/CBPBU_UG-Zoology-2017Syllabus.pdf

DEPARTMENT OF ZOOLOGY

PROGRAMME OUTCOMES

Sl. No.	PROGRAMME OUTCOMES
1	Career opportunities
2	Leadership and Team Work
3	Research Aptitude
4	Self-reliance
5	Problem Solving Skills
6	Social welfare
7	Analytical Skills
8	Professional Skills
9	Laboratory Skills & Instrumentation
10	Environmental and Sustainibility

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UG Programmes in the Department of ZOOLOGY

Sl. No.	Name of the Program	Name of the Course	Course Outcome
1.1	B.Sc. - Zoology (Honours / Core) – First Semester	Ability Enhancement compulsory Course(AECC)- English communic ation Value aided Add onCourse- GE-1-Chemistry	• These courses are designed to develop the communication andvocabulary skills in the students • Upon completion ofthe course, the students have sufficient knowledge for professional communication to excel in the chosen profession • Students will develop environmentalvalue and philosophical value of education and will adopt somewhat Professional ethics also.
1.1		Non Chordates I: Protista inPseudo coelomates	• This course imparts the knowledge ofbasicknowledge ofanimal kingdom from the beginning of unicellular organism to Pseudo coelomate helminthes along with their economic importance and functional anatomy. • Students are taught to handle various animal acquainted withmuseum specimens. • By the end of the course, the studentsare able to appreciate theimportance of study animal research and prepares them for a career in research also.
1.2		Principles of Ecology	• The main objective of this paper isto create an awareness among thestudents about the environment • By the end ofthe course,thestudents will have a better appreciation for the environment and become responsible citizens.
2.1	B.Sc. - Zoology (Honours / Core) – Second Semester	AECC – Environmental science Value aided Add on Course- GE-2-Chemistry	• These courses are designed to develop the communication andvocabulary skills in the students • Upon completion ofthe course, thestudents have sufficient knowledge for professional communication to excel in thechosen profession • The students will learn constitutional safeguard of Environment, different components along with their interaction, different environmental disasters and their mitigation strategies, Environmental law and some

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			noteworthy contributors in theIndian context.
2.1	**B.Sc. - Zoology (Honours / Core) – Second Semester**	Non Chordates II: Coelomates	• This course imparts the knowledge of basic knowledgeof animal kingdom from the beginning of Coelomates to allnon-chordates along with theireconomic importance and functional anatomy. • Students are taught to handle various animal acquainted withmuseum specimens. • By the end of the course, the students are able to appreciatethe importance of study animal research and prepare them fora career in research also.
2.2		Cell Biology	• This course introduces the students to the basics of cell and its components. • This gives them a strong foundation on the basic unit of life. • At the end of the course, the student has a strong foundation on the functions of the cell.
3.1	B.Sc. - - Zoology (Honours / Core) – Third Semester	Skill Enhancement Course 1-Aquarium &fish Keeping Value aided Add on Course- GE-3-Botany	• These courses are designed to develop hands on experience on aquarium and fish keeping specially in ornamental fishes found in North Bengal and North Eastern Indian states. • Upon completion ofthe course,the students have sufficient knowledge for professional communication to excel in thechosen profession
3.1		Diversity of Chordates	• This allied paper introduces the students to concepts of various animals under chordates. • The student will be able to applybasic principles of biology like aerodynamics, migration and mathematical or biophysical concepts to address complex biological problems

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3.2		Physiology: Controlling and Coordinating Systems	• This is a skill based paper that introduces the students to thebasics of physiological processes mandatory for maintaining coordinating nervous system. • The student is imparted with knowledge on both theoretical and practical.
3.3		Fundamentals of Biochemistry	• Through this course the students are exposed to importance of biologicalmacromolecules • They acquire knowledge in the quantitative and qualitative estimation of biomolecules • They study the influence and role of structure in reactivity of biomolec ules • At the end of the course, thestudents have a thoroughunderstanding on the roleof biomolec ules and their functions
4.1	B.Sc. (Zoology (Honours / Core) – Fourth Semester	Skill Enhancement Course 2-Sericulture Value aided Add on Course- GE-4-Botany	• These courses are designed to develop hands on experience on Sericulture both by theoretical approach and Institutional visit where such practices are done in regular practice. • Upon completion of the course, thestudents have sufficient knowledge for professional communication to excel in thechosen profession • This course introduces the studentsto explore entrepreneurial avenues in this field

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4.1		Comparative Anatomy of Vertebrates	• Students will be taught different types of systems and their comparative analysis. Moreover through the practical classes they areexposed to different histological slides of organsand systems.
4.2		Physiology: Life sustaining Systems	• Students will be taught physiology of different systemslike respiration, Digestion, Circulation, Excretion and theirinteraction. • They learn about Blood physiological experimentsusually done in routine Laboratory. • The student will gain a basic understanding on human Gastro intestinal tract (GI) through sectional slides.
4.3		Biochemistry of Metabolic Processes	• The student through this course will be able to explain the principle of energy yieldingand consuming reactions, various anabolic and catabolicpathways, transport systems and the mechanisms of energyconservation in mic robial metabolism • Metabolism of different biomolec ules along with stoichiometry is also the partof this syllabus. • Different types of enzyme assays are taught in practicalclasses.
5.1	B.Sc. (Zoology (Honours / Core) – Fifth Semester	Discipline specific Elective (DSE-1)-**Animal Biotechnology** Discipline specific Elective2(DSE-2)-**Immunology**	For DSE- 1(**Animal Biotechnology)** • This course teaches organization and expression ofanimal genome and animal tissue culture. • Students learn about transgenic animal, their application in pharmac euticalindustry, cloning and its importance. • This course prepares the students in appreciating the itsbenefits and applications in biotechnological, Pharmac eutical, medic al andagricultural field.

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			• Upon completion of the course,the students have sufficient knowledge for professional communication to excel in theChosen profession. **For DSE-2(Immunology):-** • This course gives an overviewon the immune system including organs, cells and receptors • The students learns aboutmolec ular basis of antigen recognition, hypersensitivityreaction, antigen-antibody reactions • The course develops in the student an appreciation for principles of immunology and itsapplications in treating human diseases
5.1		Molecular Biology	• This course teaches RDNA technology techniques and their application in the field ofgenetic engineering • They learn about plasmids, vectors and gain knowledge on the construction of c DNAlibraries • Student of this course have knowledge on gene manipulation, gene expression, etc which prepares them for further studies in the area ofgenetic engineering. • This course aims to provide the knowledge and practical skills of functional genomic s and proteomics • The course also teaches the techniques used in functional genomic s such as microarrays,NGST, mRNA expression and miRNA expression. • By the end of the course, students will have the necessarylearning to radically advance ourunderstanding of life and transform medicine.
5.2		Principles of Genetics	• The course teaches the studentsabout genes at molecular level • They learn about DNA, RNA andtheir replication, mutations, DNA repair mec hanism. • The course outcome is to train the students in understanding genetics and relate modern DNA technology for disease diagnostics and therapy

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6.1	B.Sc. (Zoology (Honours / Core) – Sixth Semester	Discipline specific Elective (DSE-3)-**Parasitology** Discipline specific Elective (DSE-4)-**Wildlife Conservation &Management**	**For Discipline specific Elective(DSE-3)-Parasitology:-** • This interdisciplinary course teaches the students interactionsbetween human and parasites, theircausingdiseases. • They learn about culture, collection, handling and transport of clinical samples They also learn about diagnosis of various parasites. • At the end of the course studentswill be able to identify diseases and understand the treatment plan **For Discipline specific Elective (DSE-4)-Wildlife Conservation & Management** • This interdisciplinary course teaches details about Wildlife starting from their habitat management to census, management of disease to planning of wild life protectedareas. • Different wildlife fauna widely available at North Bengal and adjoining areas, hands on training of different wildlife census technics are part of thepractical courses.
6.1		Developmental Biology	• This course gives an overview onthe pre, post embryonic development along with late embryonic part also. • The students learn about molecular basis of teratogen. • The course develops in the student an appreciation for principles of in vitro fertilization and its applications in treating Infertility and little bit of prenatal diagnosis.

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6.2		Evolutionary Biology	• Introspect of Evolutionary concepts and product of evolution along with phylogenetic analysis. • This is a skill based paper that introduces the students to the basics of computer operations. • The student is imparted with knowledge on both hardware and software. • The student has a better understanding on the use of computers for various • applications • This allied paper introduces the students to concepts in bioinformatics. • The student will be able to apply basic principles of biology, computer science and mathematics to address complex biological problems.

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PG COURSES

DEPARTMENT OF BENGALI

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https://www.cbpbu.ac.in/userfiles/file/PG_CBCS/PG%20CBCS%20%20BENGALI_SYLLABUS.pdf

PROGRAMME OUTCOMES

Sl. No.	PROGRAMME OUTCOMES
1	Literary Sense
2	Language Skills
3	Historical Understanding
4	Philosophical Understanding
5	Analytical and Theoretical Understanding
6	Interdisciplinary Prospect
7	Understanding of Society and Culture
8	Ethics and Human Values
9	Research Orientation
10	Art and Creativity

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COURSE OUTCOMES

Introduction:

The purpose of the learning outcomes-based curricular framework for a Master's degree in Bengali Language and Literature is to offer a wide framework within which different related programmes that address student requirements and the subject's dynamic character could be constructed. With a broad framework of agreed-upon expected graduate attributes, qualification descriptors, programme learning outcomes, and course-level learning outcomes, the framework is expected to support the maintenance of the standard of Bengali degrees/programs across the nation and periodic programme review. The framework, however, does not aim to standardise the teaching-learning process or methods for evaluating student learning or the syllabi for a Bengali M.A. programme of study. Instead, the framework is meant to support creativity and flexibility in the syllabi and design of programmes along with assessment of students' learning levels.

Nature and Extent of the M.A. in Bengali degree Programme:

Postgraduate study of Bengali Language and Literature is a vibrant course that opens up many doors for further researches and career opportunities. On the language part, it not only involves a systematic study of development of Bengali language throughout the ages along with a careful focus on the different 'dialects' and local variations, it also involves discussions on different linguistic and stylistics discussions that touches relevant disciplines like linguistics. On the literature part, it ranges from the middle ages to the most contemporary times, discussing the development of Bengali literature in various sociocultural, political and religious contexts. It also involves comparative studies with other literatures such as English, Hindi and Sanskrit. Students also continue higher researches on relevant disciplines such as Comparative Literature and Culture Studies.

Aims of the Master's Degree programme in Bengali Language and Literature

4. To give students learning opportunities that foster a passion for learning and getting involved into the world of literature with a focus on Bengali, along with broadening and balance their knowledge and understanding of important literary principles, concepts of analysing and understanding literature as a

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social response to historical situations, along with providing them knowledge of tools, frameworks and theories that would help them understand the literary phenomenon critically.

5. The broader aim of any humanities discipline is to make the students ware of the human condition, which will kindle compassion, introspective intelligence and critical observation power in them, which is needed more than ever at this world of machine and systems. Master's in Bengali wholly fulfils this commitment.
6. To provide students the knowledge and foundation they need to pursue further studies in multidisciplinary fields of humanities and social sciences. The course also aid in the development of a variety of generic skills that are important for wage employment, self-employment, and entrepreneurship.

Characteristic attributes of a postgraduate in Bengali:

Some of the characteristic attributes of a post-graduate in Bengali may include the following:

8. In pursuit of the highest taught degree in Bengali language and literature, the students acquire a deep knowledge of the literature discipline along with a specific knowledge of selected papers(s) to proceed with their research interests. They learn about different technological tools that could be used in their further academic enedeavours.
9. Students demonstrate skills in writing analytical essays and are equipped with tools to conduct critical investigations into the matters of Language, literature and society.
10. Students are able to use critical thinking and effective problem-solving techniques in different areas of the discipline such as History of Literature; Critical Analysis of Literary texts; Linguistics and studies in grammatical development of the language; contemporary critical theories and theoretical frameworks.
11. Students possess the ability to organise, carry out, and report the results of an experiment or investigation. They demonstrate capacity to ask pertinent/appropriate questions on difficulties and challenges in the study of Literature and Language.
12. Students are capable of working well in a variety of teams in a classroom, , an industry, or an academic job setting.

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13. Students are able to locate/point out the essential resources needed for a project and oversee its execution while adhering to proper methodology, apt analytical skills, necessary ingenuity in thought and perception. They also are aware of research ethics and responsibilities.
14. Students are capable of locating, retrieving, and evaluating subject-related material utilising contemporary library search techniques, online resources and digital repositories other technologies.
15. Students refrain from using unethical actions, such as fabricating, falsifying, or misrepresenting facts, or plagiarising, and appreciating environmental and sustainability issues.
16. Students possess ability to learn independently and at their own pace with the goal of boosting knowledge acquisition, skill development, and reskilling.

Qualification Descriptors for a Postgraduate (Master's) Degree Programme in Bengali

The qualification descriptors for a Postgraduate Degree programme in Bengali may include the following:

6. (i) A fundamental/systematic or coherent understanding of the academic field of Bengali language and literature, its various learning areas and applications, and its connections with related disciplinary areas/subjects; (ii) Procedural knowledge that creates various types of professionals related to the area of study, including research and development, teaching, and government and public service; and (iii) Skills in areas related to specialisation area and sub fields associated to Bengali Language, Literature and Culture.
7. Utilise the knowledge, understanding, and skills necessary to recognise subject-related problems and issues, collect pertinent materials, resources and data from a variety of sources, and apply, analyse, and evaluate that data using methodologies that are appropriate to the discipline in order to create solutions and arguments that are supported by evidence as well as rational arguments.
8. Use the key ideas, constructs, and methods of the subject(s) to accurately communicate the findings of studies conducted in a variety of situations.
9. Satisfy one's individual learning goals by utilising a variety of recent research, development, and professional resources.
10. Employ one's specialised knowledge and transferrable abilities to novel or unfamiliar situations in order to recognise problems, examine them, and come up with well-defined solutions.

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11. Showcase knowledge of the subject and transferable abilities that are pertinent to careers in academic as well as media and administrative job and employment prospects related to Bengali language and literature.

Programme learning outcomes relating to Postgraduate (Master's) Degree programme in Bengali Language and Literature:

Certain expected learning outcomes (subject-specific skills, generic/global skills and attributes) that a postgraduate student of Masters in Bengali should be able to demonstrate for the award of the qualification may include the following:

8. The students will be able to demonstrate a coherent understanding of the academic and creative field of Bengali Language and Literature, its various learning areas and applications, and its connections with related disciplinary areas/subjects (such as other literary studies, linguistics, philosophy, political and cultural studies, critical social thought and so on). They will possess procedural knowledge that creates various types of professionals related to the disciplinary/subject area of Bengali, including professionals engaged in research and development, teaching, and government/public service; and (iii) skills in areas related to one's specialisation.
9. They will possess the capacity to apply the knowledge of Bengali to a variety of language, literature and culture related problems by articulating and addressing them, as well as by recognising and using the proper concepts and procedures.
10. The students showcase pertinent generic skills and global competences, such as (i) problem-solving abilities needed to address various literature-related problems with clear solutions and handle open-ended challenges that may cross disciplinary boundaries; (ii) investigative skills, including the capacity to independently research Bengali language, literature and culture-related problems and issues; (iii) communication skills, including the capacity to pay close attention, read texts and research papers critically, and succinctly convey complex information to various groups/audiences; (iv) ability to build logical arguments using appropriate literature-related technical language, analytical skills that need close attention to detail; ICT proficiency (v); personal competency (vi), such as the capacity to work both independently and collaboratively.

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11. The students will have a deep understanding of the methods and frameworks that literary studies as well as linguistics use to conduct researches and further disciplinary peripheries.
12. The students will have an in-depth understanding of the history of Bengali language and literature, also in reference to that of English and other languages, which will help them contextualise the materials they encounter in their further studies.
13. Although the Masters course has been designed for students intending to pursue higher research degrees such as M.Phil or PhD, it eventually prepares students for academic jobs such as professorship and teaching in schools. Moreover, the students get a training of preparing for NET and similar national/state level eligibility tests which immensely help them pursue a fruitful career.
14. The students show professionalism by acting in ways such as: (i) remaining impartial, truthful, and objective in all aspects of work; (ii) being able to spot ethical dilemmas in work-related situations; (iii) having an understanding of issues relating to intellectual property, the environment, and sustainability; and (iv) promoting a safe learning and working environment.

Course Learning Outcomes relating to Postgraduate (Masters) Degree Programme in Bengali Language and Literature:

Some examples of course-level learning outcomes relating to courses within M.A. degree programme in chemistry are indicated in the following sections:

Semester 1: 20 credits/ 4 Core Courses

1. **[Core] PGBNG-CC-1-1: History of Bengali Literature (10th -18th Century)**

This course attempts to provide a thorough knowledge of medieval Bengal as the background of the development of Bengali language and literature. This will help students to historically contextualise the literary artefacts and other materials, which might also be used as the source materials for socio-historical and cultural reading of Middle Bengal. Students learn to understand the nuances of analysing historiography as well. This is a foundational course designed for serious engagement in Bengali literature.

2. **[Core] PGBNG-CC-1-2: History of Bengali Literature (19th Century to the middle of 20th Century)**

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This course introduces students to the modern Bengali literature and society. This course provides a fundamental understanding of the shifting sociocultural scenario of colonial Bengal at the wake of modernism, which continues to independence and the development of post-independence contemporary Bengali literature. Students garner knowledge about relevant methods and modalities to theoretically understand literature born in unstable sociocultural conditions.

3. **[Core] PGBNG-CC-1-3: Discussions on Bengali Language and Linguistics**

This course provides the students with working knowledge on the origin and development of Bengali language, touching tenets of Historical Linguistics, General linguistics, semantics, and studies in local variations of Bengali language. This course will also provide introductory knowledge of socio linguistics, psycho-linguistics, anthropological linguistics and stylistics. In this course students will learn the nuances of critical investigation through a literary text.

4. **[Core] PGBNG-CC-1-4: Literature of Ancient and Middle Bengal**

In this course, students will engage in thorough reading of some of the choicest texts belonging to ancient and middle Bengali language. This will provide them hand-on knowledge of the literature the history and cultural contexts of which they have studied in CC1 and CC2. Students will learn to interpret ancient texts which have deep rooted religious connections and rhetorical mellifluence which tethers to ancient and middle Bengali poetics.

Semester 2: 20 credits/ 4 Core Courses

1. **[Core] PGBNG-CC-2-5: Maṅgalˈkābya, Ākhyānˈkābya and the court literature of Cooch Behar Royal Court**

This course focuses on genre based Bengali literary texts of the Middle Ages, with a special focus on the Cooch Behar royal court. Students will learn to understand different literary genres that defined the middle Bengali literature. They will also learn to identify indigenous characteristics and specific local references. The historical conditions which made a textual production happen in the middle ages is an important thing to learn from this course. Since the University predominantly caters to the students of Cooch Behar district, this course gives them an idea about the literary heritage of their homeland.

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2. **[Core] PGBNG-CC-2-6: Modern Bengali Prose**

This course involves close reading of signature literary proses, namely articles of prominent historical importance, penned by the trailblazers of modern Bengali prose writing such as Bankimchandra Chattopadhyay, Pramatha Chowdhury and Rabindranath Tagore. The texts deal with multiple issues regarding society, literature, culture and criticism. Students will learn to understand critical writing along with gaining initiatory knowledge on effective prose writing.

3. **[Core] PGBNG-CC-2-7: Modern Bengali Poetry**

This course involves close reading of select pieces of modern Bengali poetry, ranged from Michael Madhusudan Dutta to Jibananda Das and Subhash Mukhopadhyay. The students would understand how Bengali poetry developed throughout the nineteenth and twentieth century, how modernism influenced Bengali poetry, how the modern Bengali poets have negotiated with western literary influence and have eventually constructed their own literary canon.

4. **[Core] PGBNG-CC-2-8: Modern Bengali Drama**

This course involves close reading of Modern Bengali plays from nineteenth and mid twentieth century. The students will learn about the practical implication of dramaturgy along with understanding the textual nuances of the select texts, which have immensely influenced Bengali society during their time.

Semester 3: 20 credits/ 2 Core Courses, 1 Discipline Centric Elective Course (DCE) 1 General Elective Course (GE)

1. **[Core] PGBNG-CC-3-9: Literary theory and literary criticism**

This course attempts to provide the students in-depth knowledge about literary theories and modes of literary criticism, both in Western and Eastern premises. Students learn about ancient Sanskrit 'Kāvyatattva' or poetics along with ancient Greek poetics. Along with critical understanding of classical poetics and literary criticism, they also read some trailblazing essays on literature and its critical understanding penned by the poet-laureate Rabindranath Tagore. Students gain knowledge about modern critical thoughts and theoretical frameworks ranging from post-colonalism, postmodernism, Marxism, feminism and gender theories and subaltern literary criticism. Students learn to analyse particular texts with the help of theoretical framework and critical perspectives.

2. **[Core] PGBNG-CC-3-10: Literature of Rabindranath Tagore**

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The privilege of hailing to Bengali Language is to have a taste of the

literary genius and thinker Rabindranath Tagore. This course is dedicated to his poems, novels, short stories, dramas and articles. Students learn to read Tagore's writing both as finest literary texts written in any modern language, and as a literature that has vividly captures the culture, society, politics and lifeworld of colonial India. It would not be an overstatement to say that one may choose learning Bengali language only to read Tagore. Students are encouraged to critically analyse his works and engage in debates which still renders the Nobel-laureate's works relevant.

3. **[Disciple Centric Elective] DCE: Students pick one of their choice**

PGBNG-DCE (A)-3-1: Literature of Rabindranath Tagore (1)

This is the first part of the serious scrutiny of the literature of Rabindranath Tagore that students may undertake in the final year of their Masters studies. This course deals with Tagore's earlier writings that include poems, short-stories, novel, drama and his letters. Students will be able to understand how the philosophical ideas, which Tagore has negotiated with throughout his life, had developed in his earlier days and how contemporary history of Bengal and India has influenced his understandings. This course is a research-oriented course.

PGBNG-DCE (B)-3-1: Modern Bengali Novel and Short Story

Delving deeper into the study of the most influential literary genre of modern world, this course offers in-depth study of four novels curated from the vast repertoire of Bengali Novels of twentieth century. Students also learn the theories of Novel along with the history of development of Bengali Novel from the nineteenth century. Students learn to compartmentalise and analyse long literary texts and articulate their findings in solid argumentative essays.

PGBNG-DCE(C)-3-1: Context and pretexts of medieval Bengali literature, basics of manuscriptology

This course is the prefect critical initiation of a researcher interested in medieval Bengali literature, culture, society and religion. Students learn how to contextualise medieval literature, how to understand nuances of sociocultural and religious elements in texts, how to construct cultural history through analytical and text-critical method using old manuscripts and oral literature. Students also gain a basic knowledge on manuscripts and how to use them.

PGBNG-DCE (D)-3-1: Dramaturgy and Bengali Theatre (1)

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This course focuses on Bengal's vibrant culture of theatre and dramaturgy, although more specific focus here is on the theories of dramaturgy. Ranging from Sanskrit Naṭyatattva, this course discusses western theories on play and production, which Bengal with Aristotle in ancient Greece. Students learn the history of Bengali theatre and closely read two select plays.

PGBNG-DCE (E)-3-1: Folklore

This is a research oriented elective course which critically introduces folklore as a discipline. Along with teaching different method of folklore research, this course offers a detailed discussion on the various forms and tenets of folklore, literature and culture. This becomes particularly relevant because Bengali discipline has a vibrant history of engaging with folklore studies in Bengal. This course also engages students in field training and practical experiences.

4. **General Elective [GE]: Students pick one of their choice**

PGBNG-GE-3-1(A): Contemporary Bengali Novel

This general elective course has been designed to provide the students a deeper understanding of contemporary Bengali Novel. They learn to understand how the modernist turn has shifted into newer post-modern forms and gradually different experiments with forms and techniques becomes a signifying character of Bengali Novel ranging from late twentieth to early twenty-first century. Students not only get acquainted with in-vogue theories and critical understanding of novel, they get a chance to close read some novels which represent the literary tendencies of their time. Although this course involves close reading of select texts, the approach is theory based, which makes the whole Masters experience more relevant and useful for further research.

PGBNG-GE-3-1(B): Literature and Cinema 1

This is the first half of the two semester long elective course on Literature and Cinema. This course introduces the art of cinema, with a special focus on Bengali cinema. The main focus of this course, however, is to put cinema into the context of twentieth century Bengal. This historically poignant and critical discussion is substantiated by analysis of the relationship between cinema and literature in the changing modern times. Along with learning to develop fresh perspective of cinema, students are encouraged to watch different types of cinema.

PGBNG-GE-3-1(C): Drama 1

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This course deals with the critical question how different socio-cultural movements in the nineteenth and twentieth centuries have influenced Bengali theatre. This course also addresses the question of rural-metropolis, i.e., urban elite-subaltern class dichotomy in question of Drama. Students learn to address the class question in the discussion of modern Bengali theatre and learn how folk forms of drama have influenced so-called urban or 'mainstream' theatre activism.

PGBNG-GE-3-1(D): Regional language and culture

Although this course deals with theoretical discussions on area studies, the focus is on the northern Bengal, and particularly to Cooch Behar and some parts of Alipurduar district. To that end, this course offers a general introduction to Rajbanshi Language and the community, the social and cultural anthropology of them along with providing a serious discussion on Rajbanshi culture and Society, which eventually germinate many a research interest among students. This also makes them aware of their immediate heritage.

Semester 4: 20 credits/ 2 Core Courses, 1 Discipline Centric Elective Course (DCE) 1 General Elective Course (GE)

1. **[Core] PGBNG-CC-4-11: Bengali Novel**
   This is the core course on Bengali novel, ranging from

Bankimchandra Chattopadhyay, the founder of modern Bengali novel to later novelists like Saradindu Bandopadhyay. This course mainly deals with the novels that loosely befall on the modernist era. The students learn to closely read, analyse and comment upon novel as a literary form and a source material of socio-cultural history.

2. **[Core] PGBNG-CC-4-12: Post-Independence Bengali Literature**
   This course focuses on poems, novels and short stories written after

The Independence of India. The select literature are chiefly political in nature. The students grasp the idea of political literature and the postcolonial perspectives of analysing them. They learn how problems of society and politics are reflected in literature. Through these readings, they gain knowledge about the tumultuous times that the country had passed through after independence.

3. **DCE: Students need to select one**
   PGBNG- DCE(A)-4-2: Literature of Rabindranath Tagore (2)

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This DCE course is designed for students with research interest on Rabindranath Tagore. This is a continuation of the previous discipline specific course. In the final semester, students delve deeper into the fascinating world of Tagore's literature. They learn to read Tagore with detailed references to his life and his associations with contemporary Bengali society and politics. They learn to critically analyse the writings of Tagore and filter out his ideology and beliefs behind his writings.

PGBNG- DCE(B)-4-2: Contemporary Bengali prose literature-2

This is the second part of the previous DCE on the same topic. Students engage in deeper readings of post-independence Bengali short stories, they learn to negotiate with the plot and sociocultural references along with acquiring theoretical knowledge to critically analyse short stories. This course will also provide the students a critical discussion on the theories and historical background of the oeuvre of Bengali short story.

PGBNG- DCE(C)-4-2: Middle Bengali Translation Literature, Ballads, Vaishnava Literature and Hagiography

This DCE course engages in critical discussion on certain genre-based medieval texts to provide the students an in-depth knowledge on the Medieval Bengali literature. These texts not only have religious connotations, they could be also used to unfold the complex socio-political history of Middle Bengal. Students with research interest on Middle Bengali literature and religion find this course tremendously helpful.

PGBNG- DCE (D)-4-2: Dramaturgy, Stage and Drama

This course has been designed for theatre enthusiasts and researchers who strive to explore the vibrant theatre culture of Bengal. Along with learning the history of theatre in Bengal, and reading some remarkable pieces, they learn to understand and apprehend theatre as a tool of artistic expression and political dissent. They understand the nuances of theatre writing, production and use of theatre as a means to instigate historical changes in society.

PGBNG- DCE(E)-4-2: Folklore of Bengal

This course on Bengal's Folklore is a serious avenue to further research and it has been proven immensely helpful for students who plan to pursue careers in social work and administrative

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services. This course not only provides them with in-depth knowledge of different genres of Bengali folk lore, they also learn different methods to conduct research on folklore.

4. **GE: Students need to select one**

PGBNG-GE-4-2 (A): Contemporary Bengali Short Story

This course discusses the contemporary trends on short story and similar shorter fiction genres. With a variety of texts to engage with, students also learn how to theorize short stories. Most importantly, they learn about multiple literary movements in the oeuvre of Bengali short stories, which are closely tethered to the political reality of post-independent Bengal.

PGBNG-GE-4-2 (B): Film and Literature 2

As a continuation of the previous General Elective Course, this course intends to provide the students a clear idea about the interrelation between films and literature, in order to equip them with working knowledge and vibrating enthusiasm to pursue a creative career or continue with their research interests in cinema and beyond.

PGBNG-GE-4-2 (C): Drama 2

This course could be considered a focused continuation of the previous course on Bengali theatre. Intertwined with the colonial history of Bengal, the development of Bengali drama is a matter of intellectual investigation not only for literature students, but also for the students of history and sociology. This course, evidently, is more fixated towards the goal of research, hence it particularly focuses on the interrelationship between Bengali and Western drama.

PGBNG-GE-4-2 (D): Rajbanshi Literature

Cooch Behar is the land of Cooch Kings and certain indigenous tribes who associates themselves with the kings, yet who actually represent the demographic majority of the tribal population in Cooch Behar district. The cornerstone of the cultural identity of Rajbanshi people is their language,

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which has a bittersweet relationship with Bengali and Assamese. This course is designed for students who are interested in rajbanshi literature, culture and language. Courses such as these makes the Masters experience at A.B.N.Seal truly multidisciplinary and connecting all the local sociocultural contours with broader academic possibilities.

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DEPARTMENT OF HISTORY

For PG CBCS syllabus of History in Cooch Behar Panchanan Barma University click the following link:

https://www.cbpbu.ac.in/userfiles/file/PG_CBCS/PG%20CBCS%20HISTORY_SYLLABUS.pdf

PROGRAMME OUTCOMES

Sl. No.	PROGRAMME OUTCOME
1	Historical Methodology
2	Understanding of Physical/Cultural Landscape
3	Philosophical thinking and ethical values
4	Understanding of social, political and economic development
5	Notion about nation state and nationalism
6	Ability to conduct independent research
7	Critical Analysis
8	Understanding Regional contexts
9	Interdisciplinary approach
10	Liberal Mindset

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COURSE OUTCOMES

Sl. No.	Semester	Course Name	Course Outcome
1	1st Semester	Cc-1 principles of history	after completing this course, students will be able to define and explain key historical concepts such as causation, continuity and change, periodization, and historical significance. they also able to equip themselves with a comprehensive understanding of the principles of history, fostering critical thinking, research skills, and an appreciation for the complexities of historical interpretation.
2	1st Semester	Cc-2 ancient civilizations	on completion of this course, the student will be able to acquire a comprehensive understanding of major ancient civilizations, including their social structures, political systems, economic activities, religious beliefs, and cultural achievements. it also develop a chronological framework for major ancient civilizations, enabling students to place events, developments, and cultural achievements in their proper historical context. it also introduce students to the methods and techniques used by historians to study ancient civilizations, including the interpretation of archaeological evidence, historical documents, and oral traditions.
3	1st Semester	Cc-3 contemporary world up to 1939	On completion of this course, the students will be able to understand of global events, major political, economic, social, and cultural developments, and trends leading up to the outbreak of world war ii.
4	1st Semester	cc-4 contemporary world since world war –ii	After completion of the course students will get a well-rounded understanding of the complexities and dynamics that have shaped the contemporary world since world war ii. the course should encourage critical thinking, global awareness, and effective communication skills.
5	2nd Semester	cc-5 skills in history writings	After completing this course students will be able to demonstrate the ability to conduct effective and thorough research using primary and secondary sources. it also develop critical thinking skills to analyze historical events, trends, and perspectives and formulate well-reasoned arguments based on historical evidence. students will also able to develop and refine writing skills specific to historical writing, including proper citation methods and formatting. produce well-structured and organized historical essays or papers.

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Sl. No.	Semester	Course Name	Course Outcome
6	2nd Semester	Cc-6 history of kamata and cooch behar (12th century to anglo-koch treaty)	After the study of the course students gain a comprehensive understanding of the historical, social, political, and cultural developments in the region during this timeframe. students will also able to construct a chronological timeline of key events in the history of kamta and cooch behar, demonstrating an understanding of the sequence of historical developments.
7	2nd Semester	Cc-7 history of kamata and cooch behar (tributary state to merger with the union of india)	Students will acquire knowledge regarding demonstrate an understanding of the historical context surrounding kamta and cooch behar as tributary states, including their geopolitical significance. it also help the students to understand investigate the events and circumstances leading to the merger of kamta and cooch behar with the union of india, including political, social, and economic factors.
8	2nd Semester	cc-8 history of anti-colonial movements in india (1857-1947)	The purpose of this course is to equipped students to focus upon the core ideas of national movement in its conceptuality. indiaâ€ ™s quest for independence and nation building are interwoven script of history, debated most widely at global level with various angles. indeed, indias national movement has vast and divergent ideological base with inner contradictions.
9	3rd Semester	dce-1 socio-religious movement in india	Students will be able to learn the historical context in which various socio-religious movements emerged in india. they also able to identify and explain the key socio-religious movements in different periods of indian history, such as the bhakti and sufi movements, the arya samaj, the brahmo samaj, the sikh movement, and others.
10	3rd Semester	Dce-2 contemporary india (1947-2000)	Students will be able to demonstrate a comprehensive understanding of the key events and developments in india from 1947 to 2000. students also gain an insight into the political evolution of india, including the formation of the republic, major political movements, and changes in governance structures .
11	3rd Semester	dce-3 b. political history of medieval india(c 1200 - 1750ad)	Students will be able to identify the major political developments in the history of india during the sultanate to mughal period . they will be able to outline the changes and continuities in the field of polity, economy and culture. they will acquire the knowledge about how the turks and mughals built an empire through their military campaigns and conquest

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Sl. No.	Semester	Course Name	Course Outcome
			and how they had given the people of india a good administrative and revenue system.
12	3rd Semester	ge-1 b. history of north bengal (colonial period (1757-1947)	The students will gather the knowledge about the emergence of northern part of bengal as north bengal and about the princely state of cooch behar. they will also know about the land system of northern part of bengal and different protest movements of north bengal.
13	4th Semester	Dce-4 political thought	Students will gain a comprehensive understanding of key political ideas and concepts that have shaped political thought throughout history. this may include concepts such as justice, power, authority, equality, liberty, and democracy. students will become familiar with the works of major political thinkers from different historical periods and cultural contexts. this may include thinkers such as plato, aristotle, machiavelli, hobbes, locke, rousseau, marx, and others.
14	4th Semester	Dce-6 b. socio-cultural and economic history of medieval india(c 1200-1750 ad)	On completion of this course, students will be able to acquire a detailed knowledge of the major socio-cultural and economic developments in medieval india between 1200 and 1750 ad. this includes understanding the political structures, religious changes, and economic activities during this period.
15	4th Semester	Ge 2 b. history of northe bengal (post-colonial period ,since1947)	This course will develop the understanding of north bengal in post colonial period. the students will gather the knowledge about the re organization of northern part of bengal, demographic changes and different ethno-political movement of north bengal. the objective of this course is also to highlight the regional history of north bengal and make the students aware about the facts and figures of different places such as hill, tarai and plain land of north bengal.

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DEPARTMENT OF SANSKRIT

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https://www.cbpbu.ac.in/userfiles/file/PG_CBCS/PG%20CBCS%20SANSKRIT_SYLLABUS.pdf

PROGRAMME OUTCOMES

Sl. No.	PROGRAMME OUTCOMES
1	Reasoning
2	Liberal Mindset
3	Ethics
4	Social Development
5	Philosophical Thinking
6	Aesthetic Sense
7	Critical Thinking

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COURSE OUTCOMES

Sl. No.	Semester	Course Name	Course Outcome
1	1st Semester	Cc – 1: general grammar from pāniṇīyam	Students would get a clear conception about the appropriate pronunciation of word, contractive knowledge of word and verb, idea of karaka and bibhakti, construction of sentence .
2	1st Semester	Cc – 2 : vedic language and literature	This course demonstrates the conception of vedic language. pronunciation of verse, construction of word, verb and sentence, also differences from classical sanskrit language. beside, nature of literature, culture and heritage of vedic age.
3	1st Semester	Cc – 3 : poetry & drama	Students would acquire proficiency in understanding the literary wealth of classical sanskrit poetic literature and dramatic literature.
4	1st Semester	Cc-4 indian philosophy	Students would get a clear conception about the indian philosophy and knowledge system of ancient india. ethics and values of the life is also subject matter of thinking. students would also get conception about universe, idea of god, nature of atman, character of mind etc.
5	2nd Semester	Cc – 5: linguistics and grammar	This course reveals the idea of linguistics and phonetics since early age of india. nature of linguistics, source of linguistics, comparative language, composition of word, construction of verb, various laws of phonetics are also the subject matter of knowledge. on the other hand

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Sl. No.	Semester	Course Name	Course Outcome
			students would get a clear conception about various grammatical traditions.
6	2nd Semester	Cc – 6: indian philosophy	Students would get a clear conception about the indian philosophy and knowledge system of ancient india. ethics and values of the life is also subject matter of thinking. students would also get conception about universe, idea of god , nature of atman, character of mind etc.
7	2nd Semester	Cc – 7: history of sanskrit grammatical tradition & vaiyākaraṇasiddhāntakaumudī	This course reveals the grammatical tradition in indian knowledge system, nature of various branches of grammar and co-relation of grammatical branches. on the other hand, the course demonstrates the special contribution of panini and his followers in knowledge system.
8	2nd Semester	Cc-8 : drama & poetics	Students would acquire proficiency in understanding the literary wealth of classical sanskrit dramatic literature and poetic literature.
9	3rd Semester	Dce – 1(a) : poetry	Students would acquire proficiency in understanding the literary wealth of classical sanskrit poetic literature.
10	3rd Semester	Dce – 2(a) : prose	Students would acquire proficiency in understanding the literary wealth of classical sanskrit literature of prose.
11	3rd Semester	Dce – 3(a) : drama	Students would acquire proficiency in understanding the literary wealth of classical sanskrit dramatic literature.

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Sl. No.	Semester	Course Name	Course Outcome
12	3rd Semester	Ge – 1(a) : dramaturgy	This course demonstrates nature of sanskrit drama since earlier age. definition and implementation of drama is also aim of the course.
13	4th Semester	Dce – 4(a) : literary criticism	This course demonstrates the special contribution of some literary critics in the field of sanskrit literary criticism. students would be able to assess sanskrit literature through the mirror of the works of these critics.
14	4th Semester	Dce – 5(a) : poetry	Students would acquire proficiency in understanding the literary wealth of classical sanskrit poetic literature.
15	4th Semester	Dce – 6(a) : modern sanskrit literature & literary criticism	This course exhibits the continual development of sanskrit literature through the ages. students would be able to acquire the knowledge of modern sanskrit literature and literary criticism.
16	4th Semester	Ge – 2(a) : poetics	Students would get a clear conception about the different schools of indian poetics and they would be able to assess literature with the help of poetics.

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DEPARTMENT OF ZOOLOGY

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https://www.cbpbu.ac.in/userfiles/file/PG_CBCS/Update/PG%20CBCS%20ZOOLOGY_SYLLABUS.pdf

PROGRAMME OUTCOMES

Sl. No.	PROGRAMME OUTCOMES
1	Laboratory Skills & Instrumentation
2	Career opportunities
3	Self-reliance
4	Problem Solving Skills
5	Research Aptitude
6	Leadership and Team Work
7	Environmental and Sustainability
8	Analytical Skills
9	Social welfare
10	Professional Skills
11	Computer and software based skills

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COURSE OUTCOMES

PG Programme in the Department of ZOOLOGY

Sl. No.	Name of the Program	Name of the Course	Course Outcome
1.1	M, Sc Zoology First Semester	Core-1- Functional Biology of Non chordates and Chordates	• This paper deals with animal architecture, functional anatomy, different physiological systems like excretion, respiration etc. along with their evolutionaryaspects. • It further provides a platformto understand biological design, jaw suspension mec hanism, Brain development and sense organ development in Vertebrates.
1.2		Core-2-Biochemistry and Environmental Physiology	• Through this course the students are exposed to importanc e of biologicalmacromolecules • They acquire knowledge in the quantitative and qualitative estimation of biomolecules • They study the influence and role of structure in reactivity ofBiomolecules • The paper also covers the working of internal organ and system. • The students will be exposed to anatomy of different organs • Paper helps the students to understand the physiologicalfunctions of the biological systems

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1.3		Core3- Ecology and Animal Behavior	• This introductory course introduces the students to thebasic concepts in ecosystem dynamics. • The students learn aboutecology, biogeochemical cycles, evolution and biomes. • At the end of the course, thestudents have a clear understanding on the Importance of ecosystem. • This students will be able tounderstand the relationship between science and societyand will be able to give justification for Environmental manipulation forhuman use.
1.4		Core 4-Devlopmental Biology and Endocrinology	• The students are taught the developmental aspects of the human body at molecular level. • At the end of this course the students will be able toappreciate the anatomic al and physiological aspects of the human body development. • The details of the functionaries of the endocrine organs, their abnormalities related withthe disease and treatmentstrategies are also taught in this course.

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2.1	M. Sc Zoology Second Semester	Core 5-Genetics and Biotechnology	• The paper helps in highlighting the scope andsignificance of genetics by imbibing the principles of hereditary genetic transmission and interactions of gene with environment. • It also helps students to learn the molecular aspects ofgenetics disorders and mutations. • It helps the students to appreciate the concepts of
	M. Sc Zoology Second Semester		gene and relationship between genotype and Phenotype. • The students are introduced tothe biological revolutions in these fields. • They are taught the role of biotechnology in the worldwide market • They learn about biosensors, vaccine production, monoc lonal antibodies, nanotechnology and itsapplications. • The students will be able to demonstrate the use of biotechnology in solving various medic al problems.

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2.2		Core 6- Cell Biology and Neurobiology	• The students here introduces in the field of Cell Biology. Biomembrane structure, Biomolecule trafficking, Cell cycle regulation and resultant cancer development in case ofabnormalities etc. are discussed here. • The course also helps the students to understand theprinciples of cognitive neuroscience. • It enables them to learn the development of perception, spatial recognition, memory,speech, decision making andreasoning. • The student builds up potentialsfor practical knowledge on applications of cognitive psychology in improvingmemory processes. • The students will learn to appreciate the importance ofnormal neuronal physiology while understanding theabnormal physiology.
2.4	M. Sc Zoology Third Semester	Core 8- Parasitology and Insect Biology	• The course introduces theanalytical methods used inseparation science • They learn about various analytical techniques that are routinely used for separation of biomolec ules and theircomponents • The course teaches students the advantages of separation science as applied to biotechnology
3.1		Core 9- Biodiversity & Wildlife + Agriculture and Fisheries Resources of India	• The aim of this course is to impart the knowledge of biodiversity and conservation of environmental resources • The students study the taxonomic nomenclature,global biodiversity, endangered species and approaches in their

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			conservation. • At the end of the course, thestudents have a thorough understanding on the components in biodiversity and • the methodology in conservations. • The objective of this course isalso to introduce the students to the role of aquaculture and Fisheries Resources of India. • The students learn about induced breeding, Ornamentalfishes, Different kinds of fisheries, Fish disease and their combating mechanismpracticed worldwide. • At the end of the course will be able to understand the treatment processes of waste water to transform in fishery.
3.2	M. Sc Zoology Third Semester	DCE-1-Molecular cytology &Genetics Or Entomology (Theory)	**For Molecular Cytology & Genetics:-** • The students in this course learn different types of pureculture techniques, preservation of pure culture and culture collection centers. • This course also introduces thestudents to the different types of media and teaches aboutisolation of strain and improvement. • By the end of the course, the students will be able to isolate cultures in pure form and preserve cultures for further use in research studies **For Entomology:-** • The students of this course arebasically exploited in insect Physiology and Industrial Entomology. • Details aspects of Sericulture specially biotechnological part,social insects, Insect flight mechanism are teaches in this DCE.
3.3		DCE-2- Molecular cytology &	**For Molecular Cytology & Genetics:-**

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		GeneticsOr Entomology (Practical)	• Preparation of mitotic and meiotic chromosomes, karyotype preparation from Human tissues and setting test cross of Drosophila mutant along with their handling and food preparation are done here. • Handling of Microscope, centrifuge like analytical instruments are done here. **For Entomology:-** • Taxonomic key preparation, Protein estimation from insectseggs, their protein profiling through Gel electrophoresis are done along with classical mouthparts investigation and other internal morphology visualization.
3.4		Generic Elective-1 Biophysics and Biostatistics	This skill based course will teach the students the various instrumentations that are used in the analytical laboratories. This course covers both fundamental and applications of the instruments that are routinely used for the characterization of biomolecules At the end of the course, the student has the basic knowledge on the theory, operation and function of It also provides an introduction to selected important topics in bio statistical concepts and reasoning. This course represents an introduction to the field of data and data types. The students learn specific topics including tools for describing central tendency and variability in data; methods for performing inference on population means and proportions via sample data; statistical hypothesis testing and its application to group comparisons; issues of power and sample size in study designs; and random sample and other study types. By the end of the course, the students are able to appreciate the importance of statistics in research and prepares them for a career in research
4.1	M. Sc Zoology Fourth Semester	Core 10- Evolutionary Biology and Population Genetics	• These courses are designed to develop the fundamentals and applied aspects of Evolutionary Biology and Population Genetics in the students. • Upon completion of the course, the students

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			have sufficient knowledge for professional communic ation to excel in the chosen profession
4.2	M. Sc Zoology Fourth Semester	DCE 3- Molecular Cytology and Genetics Or Entomology(Theory)	For Molecular Cytology and Genetics • Students will be taught cell division, genetic materials, their structure and types, mec hanism of replication of DNA. • Students gain knowledge in gene concepts and genetic code, gene expression, gene regulation and also learn about mutation. • By the end of study in this course, the student will be able to identify and distinguish genetic regulatory mec hanism at different levels • This paper also introduces to the basic biology of proteins and the new advanced science called as proteomic s which aims to look into entire set of proteins in the milieu. • The paper will cover details of the two major aspects of proteomic s i.e., Gel-based proteomic s and Mass spectrometry-based proteomic s. • The techniques involved at large in major contribution in transition from protein chemistry to proteomic s are learnt. • Upon completion of the course, the students have sufficient expertise for molec ular biological techniques in the chosen profession. • The paper enables the students to learn the basic concepts, models, and measures to characterize the properties of analyzing metabolic networks in terms of genetic Disease.
			• It helps the students to understand the integrating aspects of multi-omic s datasets and thereby understanding
			the biological systems.
			For Entomology:- • Here students are exposed in

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			the field of Medical and Forensic Entomology, Economic entomology, Biological Controls measures.
4.3		DCE 4- Molecular Cytology and Genetics Or Entomology(Prac tical)	For Molecular Cytology and Genetics • DNA based practical are taught here. It starts with DNA isolation from different types of tissues, their quantification, manipulation by Restriction endonuclease and mapping, PCR are done here.
			• More over through research Institute visit students are exposed in the field of research and interdisciplinary relevance of research.
			• This course is an introduction to the students on the ethical aspects of conducting research and safety aspects to be adhered in a research setting.
			• This course also introduces the students to effective management of available resources and footprint of research activities.
			• At the end of the course, the student would have gained sufficient knowledge to act as a responsible scientist and environmentally conscious.
			For Entomology:- • Quantitative estimation of pest damage, Measurement of insect population density,
			measurement of Toxicity in pest species etc. are done here besides Institutional visit and training.
4.4	M. Sc Zoology Fourth Semester	Generic Elective- 2 Taxonomy & Biosystematic s and Bioinformatic s	• This fundamental paper discusses the importanc e of nomenc lature in Zoology. • The course throws light on types of molec ular tools used to solve the disputes in Taxonomy. • This allied paper introduces the students to concepts in bioinformatic s • The student will be able to apply basic principles of biology, computer science and mathematic s to address complex biological problems • At the end of the course, the student has understanding on the concept of handling molec ular algorithms and estimating the evolutionary lineages in subject taxonomy.

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