

COURSE OUTCOME

CCF (NEP)

EDUCATION

4 years B.A. Major course in Education (CCF, Based on NEP – 2020).

Semester 1

EDC/H/CC – 1/1 (For Major)

Introduction and Philosophical Foundation of Education

- After completing this course students will understand the meaning, nature, scope, and aims of education.
- Students can properly explain the factors of education and their interrelationship.
- Students can illustrate the concept of child-centrism and play-way in education.

EDC/H/IDC

Inclusive Education

- After completing this course students will be able to explain the meaning of Inclusion and exclusion.
- Students can analyse the types of exclusion and their causes.
- Students can illustrate how to bring about inclusion in different spheres.

EDC/H/SEC/1/1

Communication Skill

- After completing this course students can explain the basic elements of Communication.
- Students will be able to acquire Listening Skills.
- Students will be able to acquire Speaking Skills.

EDC/M/1/1 (For Minor)

Introduction and Philosophical Foundation of Education

- After completing this course students will understand the meaning, nature, scope and aims of education.
- Students can properly explain the factors of education and their interrelationship.
- Students can illustrate the concept of child-centrism and play-way in education.

EDC/H/CC/2/2 (For Major)

Psychological Foundation of Education

- completing this course students will understand the meaning of Psychology and be acquainted with its different aspects.
- Students can elaborately explain the patterns of different aspects of human development and relate this knowledge with education.
- Students can illustrate the cognitive approach of development and the process and the factors of cognition.

EDC/H/IDC

Inclusive Education

- After completing this course students will be able to explain the meaning of Inclusion and exclusion.
- Students can analyse the types of exclusion and their causes.
- Students can illustrate how to bring about inclusion in different spheres.

EDC/H/SEC/2/2

Aspect of Democratic Citizenship

- After completing this course students will be able to explain their duties as citizens.
- Students can illustrate their rights as citizens.
- Students can elaborately explain about child violence and child rights.
- Students can analyse domestic violence and domestic rights.

EDC/M/1/1 (For Minor)

Psychological Foundation of Education

- After completing this course students will understand the meaning of Psychology and be acquainted with its different aspects.
- Students can elaborately explain the patterns of different aspects of human development and relate this knowledge with education.
- Students can illustrate the cognitive approach of development and the process and the factors of cognition.

ENGLISH

4 years B.A. Major course in English (CCF, Based on NEP – 2020)

DSC 1 Introduction to English Literature (Poetry)

- Developing an understanding of the evolution of English poetry from the Elizabethan Age to the Modern Period
- Gaining insights into the thematic diversity and stylistic innovations of poets like Shakespeare, Donne, Keats, Yeats, and Hughes
- Enhancing analytical skills to interpret poetic forms, imagery, and symbols within their historical and cultural contexts
- Encouraging a comparative approach to studying poetry across periods, focusing on continuity and change in literary expressions.

DSC 2 Introduction to English Literature (Prose)

- Acquiring a comprehensive overview of the development of English prose through critical readings of texts from the Elizabethan Age to the Modern Period.
- Understanding the aesthetic and ideological underpinnings of prose works by Bacon, Lawrence, Joyce, Orwell, and Lahiri.
- Cultivating the ability to critically engage with different genres of prose, including essays and short stories, within their socio-political contexts.
- Developing skills to analyze narrative techniques, voice and the representation of reality in prose.

SEC Sem 1 Business Communication

This paper focuses on developing professional writing and communication skills essential in the corporate world. It equips students with the ability to craft clear, concise, and effective business documents and correspondence. This course would help students-

- To master the art of writing professional business letters, tailored for diverse business contexts and purposes;
- To develop competencies in crafting compelling CVs that effectively showcase skills, experiences, and qualifications.
- To acquire the skills to write clear, concise, and impactful business emails and understand the nuances of digital communication etiquette;

SEC Sem 2 Digital Empowerment

This course aims to develop students' skills and understanding of digital technologies, focusing on their effective and responsible use in various aspects of life. Students will learn essential digital literacy skills, online communication, digital security, ethical considerations and, also, some of the disruptive technologies of the digital world.

The course has the following learning-objectives:

- To understand the fundamentals of digital technologies and their impact on society.
- To enhance online communication and collaboration skills.
- To promote digital citizenship and responsible online behaviour.
- To gain awareness of digital security risks and implement best practices.
- To explore ethical considerations in the use of digital technologies.
- To use ICT and digital services in daily life.
- To develop skills to communicate and collaborate in cyberspace using social platforms.
- To become familiar with teaching/learning tools.
- To understand the significance of security and privacy in the digital world; ▪ To evaluate ethical issues in the cyber world.

GEOGRAPHY

4 years B.A. Major course in Geography (CCF, Based on NEP – 2020)

GEOG-H- CC01/MD- CC01-1 Physical Geography

Unit I: Cartography

- Students come to know about the role of scale and its importance in Geography.
- It helps them to learn about the different types of scales and how to construct them.
- Further students get acquainted with the different methods of projection which enables them to use the projection to portray the earth.

Unit II: Geotectonics

- Students get a comprehensive idea of how seismology as a method can help to understand the internal composition and chemistry of the Earth.

Unit III: Geomorphology

- This gives a clear view and understanding of the different physical forces and how they act upon different features on the Earth's surface.
- Students learn about rivers and their processes as a major force in reshaping the Earth's surface.

Unit IV: Climatology

- Students get a proper understanding of the Earth's atmosphere and its structure with composition.
- It gives a clear understanding of how the atmospheric system works throughout the globe to the students

Unit V: Soil Geography

- Students learn about the basic soil-forming factors that influence the origin of different soil types in different areas.
- Students get a clear understanding of what is a soil profile and how develops.

Unit VI: Biogeography

- Students learn about how plants and their different species grow and evolve based on water.

Unit VII: Geography of Hazards

- It gives a complete understanding of the different hazards and disasters in the Indian context and what are their effects.

GEOG-H- CC01/MD- CC01-1 Physical Geography Lab

- Students learn to calculate and construct four major types of scales used in the spatial representation of the geographical data.
- Students learn about the Toposheet along with its basics. Also, they get to know how to select drainage basins and different types of drainage stream ordering and bifurcation ratios.
- Identification of drainage and channel patterns helps the students to understand the key factors to be analysed for it from a Toposheet.
- Students via the construction of wind rose learn about how to graphically represent wind direction and velocity.

SEC Sem- I GEOG-H-SEC01/MD-SEC01-1 Methods in Geography

Unit I: Field Data Collection and Compilation

- Students get the idea about the creation of a primary survey based on several research issues and also learn the Significance of the pilot study.
- Proper knowledge about the sampling approaches and techniques depending on several research issues.
- Students get the knowledge and process of Creating the questions and scheduling the interviews.
- assembling information into a master table by which the students learn about the data entry and concept of data repositing.
- field data entry with computer assistance; data aggregation into frequency distribution tables by which the students learn about proper field data entry.
- Central tendency and dispersion measures in statistical data analysis, where the students learn how and when to use the methods.

Unit II: Methods in Physical Geography

Using small survey tools: leveling apps for smartphones, a distometer, and a Brunton compass, students learn about the different instruments and their utility in the field.

- Grain textural analysis utilizing sieves students gets hands-on idea about separating different particles.
- utilizing digital elevation models and satellite imagery to map and extract flooded regions, by which the students learn to link between remote sensing and actual field data.
- Using satellite imagery and/or Survey of India 1:50k maps, students learn about measuring the spatial and linear extents of riverbanks and coastlines.

Unit III: Methods in Human Geography

- prominent and unique roles of the different types of occupation in a spatial unit is learned by the students.
- By Ternary graphic illustrating patterns of occupation (after Ashok Mitra) students can identify different occupational patterns and percentages in an area.

- Creating an accessible map, by which the students can assess the nature of the transport network in an area.
- By creating flowcharts with transportation-related data students can measure and analyse the flow or movement of any kind.

Semester 2 GEOG-H-CC02/MD-CC02-2 Human Geography

Unit I: Scope and Approaches

- Focuses on the study of patterns and processes that shape human societies, cultures, economies, and interactions with the environment.
- It examines the spatial distribution of human activities and how they are influenced by factors such as culture, politics, economics, technology, and the environment.
- These schools of thought provide different lenses through which the students as human geographers analyze and understand the complex relationships between humans and their environments.
- While they focus on different aspects, they are interconnected and contribute to a holistic understanding of human geography.

Unit II: Social Geography

- Each stage represents a milestone in human adaptation, innovation, and societal organization, by which the students can reflect on the evolving relationship between humans and their environments.
- These stages are not rigidly defined, and elements of each can be found in contemporary societies, illustrating the dynamic nature of human civilization.
- The Chenchu, Toda, and Gond communities exemplify human adaptation to diverse environmental contexts through sustainable livelihood practices, traditional knowledge systems, and cultural resilience.
- Students learn about how despite facing modern challenges and 28 pressures, these indigenous groups continue to maintain their unique identities and relationships with their environments.
- post-industrial urban societies represent a new phase of urban development characterized by economic diversification, knowledge-based industries, cultural dynamism, and technological innovation.
- Students learn that how they are hubs of creativity, diversity, and opportunity, shaping the future trajectory of global urbanization.

Unit III: Population Geography

- Demographic transition refers to the process of population change from high birth and death rates to low birth and death rates as a country develops from a pre-industrial to an industrialized economic system. This transition typically involves several stages: high birth and death rates in the initial stage, followed by a decline in death rates due to improved healthcare and sanitation, leading to a decline in birth rates in later stages due to various factors like urbanization, education, and

economic development, this gives the students idea about how societies develop from primitive to an urban society.

- Population distribution, density, and growth are influenced by a complex interplay of factors such as geographical features, economic opportunities, social and cultural norms, government policies, and historical trends.
- Understanding these demographic dynamics is crucial for the students as policymakers to formulate effective strategies for sustainable development, equitable distribution of resources, and improving the quality of life for all citizens.

Unit IV: Settlement Geography

- Urban and rural settlements possess distinct characteristics shaped by factors such as population density, economic activities, infrastructure, social dynamics, and governance structures.
- By Understanding these differences students can emerge as ideal policymakers and planners to address the unique needs and challenges of both types of settlements and promote sustainable development and improved quality of life for residents.
- Rural settlements vary in their site characteristics, situation factors, types, and spatial patterns.
- By Understanding these aspects students can develop thinking critically for planning and development initiatives tailored to the unique needs and contexts of rural communities.

Unit V: Urban Geography

- The size-class classification of urban settlements provides valuable insights into the urbanization trends, population distribution, and the hierarchy of urban centers across India.
- Students by understanding the dynamics of urban growth, infrastructure needs, and service delivery requirements in different urban areas can develop analytical and critical thinking.

GEOG-H CC02/MD CC02- Human Geography Lab

- Arithmetic growth rate is a simple method used to compare the population change between two decadal datasets. It's calculated by subtracting the initial population from the final population and then dividing the result by the number of years between the two datasets. Students via this learn to assess and compare the growth of the population in any spatial unit.
- The choropleth method is a cartographic technique used to represent spatial data, such as population density, by shading or coloring different geographic regions based on the magnitude of the data. Choropleth maps provide a visually intuitive way to understand population density variations across geographic regions. Students can use this to identify areas of high population concentration, assess demographic trends, and inform decision-making related to resource allocation, infrastructure development, and urban planning.
- By analyzing the topographical maps from the Survey of India, students can identify these different types of settlements based on their geographical features, land use patterns, and spatial arrangements. Understanding the types of settlements and their sites can provide valuable insights for urban planning, rural development, resource management, and environmental conservation efforts.

- Proportional squares provide a simple yet effective way to visualize quantitative data, such as the number of houses, and can be used in various contexts including urban planning, demographic analysis, and resource allocation. Students can give visual reference that allows others to grasp the relative magnitude of the data being represented at a glance.

HISTORY

4 years B.A. Major course in Geography (CCF, Based on NEP – 2020)

Semester 1

CC1 History of India from the Earliest Times to C.300 BCE

Unit 1

- The students get a deeper understanding of early Indian history
- Introducing the students to how diverse aspects of ancient Indian history have been recovered from a rich variety of sources, archaeological, literary, numismatic, and epigraphist.

Unit 2

- Familiarize the students with the prehistoric tools and cultures and their use for studying history today and for exploring the diverse regional variations in the Indian subcontinent and also study various facets of ancient India- social, cultural, political, and environmental concerns.

Unit 3

- Analysing the prehistoric Harappan Culture with an interdisciplinary approach helping the students trace the elements of continuity and changes in processes spanning over the period from 2nd Millennium BCE to 1800 BCE.
- Analysing the town planning and economics of the Harappan Culture and the post-Harappan Cultures.

Unit 4

- Emphasizing settlement patterns and socio political and economic relations including historiography allowing the students to understand how historians have approached ancient India between 1500 BCE to 300 BCE concentrating on North, South, and Central India separately.
- Deliberating on the Aryan Problem and understanding the debates surrounding them. 2

Semester 2

CC2; Social Formations and cultural patterns of the Ancient World other than India.

Unit 1

- Understanding the historical development of humans in regions other than India from the prehistoric period with special emphasis on the developments in world history that have shaped the complexity of human existence.

Unit 2

- Exploring the food production pattern of the ancient world other than India detailing the transition pattern from hunting-gathering, and subsistence pattern to the more advanced adaptation of a sedentary farming economy.

Unit 3

- Familiarize the students with the historical developments of Bronze Age civilizations like Egypt and China.

Unit 4

- Analysing the Iron Age Debate and exploring the emergence and distribution of Nomadic groups in Central and Western Asia

Unit 5

- Acquiring knowledge of the formation of slave society and its impact on the agrarian economy, urbanization, and trade of Ancient Greece and Rome.

Unit 6

- Understanding the development of Poleis concerning Athens and Sparta with special emphasis on polity, society, art, and architecture

SEC 1: MUSEUMS & ARCHIVES

Unit 1

- Introducing the students to institutions preserving the past; their definitions and history.

UNIT 2

- Familiarising the students with the different types of archives and museums; their ethics and procedures of collection preservation and conservation methods.

UNIT 3

- Looking at Museums and their presentation and exhibition. Different methods and procedures.

UNIT 4

- Field trip to Museums and Archives; Education and Communication outreach activities.

SEC 2; Understanding Cultural Heritage and Tourism

Unit 1

- Enabling the students to explore the various aspects of cultural heritage and cultural diversity from historical perspectives.
- Understanding the meaning, definitions, and historical background of cultural heritage.
- Analysing the Concepts, characteristics, and types of Indian cultural heritage, tangible and intangible.

UNIT 2

- Understanding the evolution of heritage legislation and its Institutional framework: Conventions and Acts

UNIT 3

- Analysing the significance, concept, and background of fair, festivals and rituals; and their importance in human life.
- Discussing the major festivals: regional, folk, and tribal.

Unit 4

- Going on tours to heritage sites and understanding the importance of cultural heritage in India.

PHILOSOPHY

4 years B.A. Major course in Geography (CCF, Based on NEP – 2020)

Semester 1

PHI-H DSCC-1

Fundamentals of Philosophy

This course helps the students to become aware of the fundamental questions of life and develop a critical attitude towards the long – established beliefs and convictions to enable them to lead a genuinely valuable life .

PHI-H Skill enhancement course

Man and Nature

This course enhances the ability to understand one's own self in relation with nature and eventually equips the students to develop love and respect towards the same

Semester II

PHI-H DSCC-II

Outlines of Indian Philosophy

This course helps to develop a comprehensive knowledge about the varied philosophical concepts used in Indian philosophy which may cater to develop an inner tendency to realize one's inner self keeping in harmony with the changing world.

PHI-H Skill enhancement

Recent issues in Philosophy – Political and ethical

A.Human Rights

B.Feminist Ethics

The course tries to build an all- embracing view on the theoretical ideals of justice, equality and the general principles that govern how one should act amidst the changing political and ethical scenario This academic orientation will successfully enable the students to make moral judgements about several political and social actions.

IDC

Philosophy of Peace and Conflict Resolution

This course wants to educate the students about the multidimensional forms and causes of violence in order to make them aware about the values and skills for living in a peaceful society by remaining aware about the techniques of keeping peace by conflict resolution.

Semester III

PHI-H DSCC

Indian Philosophy - 1

The course offers a thorough knowledge of the multiple schools of Indian thought and their diverse ways of reasoning. Such an intellectual exposure virtually helps to develop critical thinking which has a significant impact on different areas of contemporary life.

DSCC-4

Western logic – 1

The course helps to develop logical and critical thinking and plays a spectacular role in improving reasoning skills by providing techniques for analyzing arguments and drawing sound conclusions.

Semester IV

PHI-H DSCC-5

History of western philosophy

The course offers a thorough knowledge of the Western thought and philosophy which helps to explore the general problems, facts and situations connected with human existence.

DSCC-6

Indian Philosophy II

The course acquaints the students with the concepts formulated in the traditional Indian Philosophical systems which may help them to generate knowledge about diverse problems connected with life,

DSCC-7

Western logic II

The course aims to increase rational thinking by using value – neutral presuppositions and develop an analytical framework for thinking and evaluation.

DSCC-8

Social and Political Philosophy

The course ensures a reflective attitude among students on multiple emerging social and political phenomena to become responsible citizens

POLITICAL SCIENCE

4 years B.A. Major course in Political Science (CCF, Based on NEP – 2020)

Semester 1

CC/Minor Political theory Foundational Concepts

- This course introduces the basic concepts of politics intended to prepare the students for understanding theoretical dimension.
- It helps to understand a) the entry points through which the political is interpreted, b) the core concepts that guide the theorization of politics and how they relates to politics.

Governance Acquainting with the dynamics of administration.

Constitutional Principles Gaining knowledge on structure &working of Political apparatus of state .

Methodological Rigor Equipping methodological rigor for precision, reliability & validity in methodologies .

SEC1 Democratic Awareness through Legal Literacy

- To acquaint undergraduate students with different tiers of legal structures of India, improve working knowledge of affirming one's rights and be aware of duties to explore opportunities and challenges for different sections of people in India.

IDC Understanding Governance

- This course deals with concepts and different dimensions of governance highlighting the major issues in contemporary times.
- It aims to facilitate understanding of the importance of the concept and practice Governance which is essential for students across discipline.
- It simultaneously focuses on environment, administration and development.

CVAC Constitutional Values & Fundamental Duties

- This course aims to enrich students with knowledge and relevance of the Indian Constitution.
- to develop awareness about values of basic tenets and duties and to inculcate a sense of Constitutionalism.

BA 3- YEAR Multidisciplinary Course

CC/Minor Political theory Foundational Concepts

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- It helps the students to understand
- a) the entry points through which the political is interpreted.
- b) the core concepts that guide the theorization of politics and how they relate to politics.

SEC1 Democratic Awareness through Legal Literacy

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CVAC Constitutional Values & Fundamental Duties

- This course aims to enrich students with knowledge and relevance of the Indian Constitution.
- to develop awareness about the values of basic tenets and duties and to inculcate a sense of Constitutionalism.

Semester- II

CC/Minor Constitutional Govt. in India

- It enables students to know the constitutional design of govt. and political institutions in India.
- It encourages students to see how institutional practices and constitutional design are impacted by the political contexts within which they unfold.
- It develops the ability to comprehend the relationship between constitutionalism, laws & governance.

SEC2 Understanding the legal System

- Course design is intended to create a systematic perspective on an overarching framework for approaching law as a skill based subject
 - Critical thinking Developing skills of critical thinking under contextual Specificities

- Analytical skills Equipping with the empirical insights with a reasonable knowledge .
- Governance Acquainting with the dynamics and best practices of administration
- Constitutional Principles Gaining knowledge on Constitutional architecture and working of Constitutional Democracy Method of Assessment
- Methodological Rigor Equipping methodological rigor for precision, reliability & validity in methodologies Method of Assessment
- Policy analysis Analyzing policies for effective Implementation

Semester 2

CC/Minor Constitutional Govt in India

- It enables students to know the Constitutional design of govt & institutions in India.
- It encourages students to see how Institutional Practices and Constitutional design are impacted by the political contexts within which they unfold.
- It develops the ability to comprehend the relationship between constitutionalism, laws and governance. I

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- It aims to facilitate understanding of the importance of the concept and practice Governance which is essential for students across discipline.
- It simultaneously focuses on environment, administration and development.

BENGALI

4 years B.A. Major course in Bengali (CCF, Based on NEP – 2020)

Semester 1

CC-1- History of Bengali Literature(up to 1800 AD)

The course introduces an idea of social and cultural history of mediaeval Bengal. The course develops knowledge about ancient Bengali literature and obscure religious cult)

BNG-H- IDC- Bengali Fiction and Drama

This course introduces fictions and dramas of different writers.

BNG-H- SEC--1- Print and Publication

Students will acquire primary knowledge about printing and publication.

Semester II

CC-2- Linguistics

- Basic idea and knowledge on linguistics, specially on morphology, phonetics and semantics, Bengali dialect

SEC--2- Byaboharik Bangla-

Bengali Students will develop their writing skill (diary , content writing, book review and translation

Semester III

CC-3- History of Bengali Literature (Modern)

The course introduces to different genres of Bengali literature from 19 th century.

CC-4- Bengali Literature:

Primary Concept Introduces literary texts – From ancient to contemporary Bengali poetry.

Early novels and short story Drama and Prose writing.

SEC--3- Byaboharik Bangla-

This course will provide the fundamentals required by students who may choose career in the performing arts; such as theatre, television and other medias.

BNG-AEC- Essays and Terminology

This course is offered to students of all discipline. The course is to acquaint the students with essays and Terminology.

Semester IV**CC-5- Pre-Modern Literature**

This course introduces obscure religious poetry of mediaeval Bengal.

CC-6- Bengali Detective literature, SF and supernatural stories

This course reintroduces the students to the already familiar genres of Detective stories, SF and Supernatural ghost stories within a more theoretical model.

CC-7- Bengali Fiction

This course focuses on detailed study of some important Novel and short stories.

BNG-AEC-2- Short stories and Poetry

This course is offered to students of all discipline. The course is to acquaint the students with poems and short stories.

SANSKRIT

4 years B.A. Major course in Sanskrit (CCF, Based on NEP – 2020)

Semester 1

CC1-1

Unit1

Students will learn about basic Sanskrit grammar and their uses.

Unit 2

Students will learn selected metres.

SEC1-1-

Student will learn to read, write and speak Basic Sanskrit.

SAN-MN-1-1

Unit1-Students will learn about basic Sanskrit grammar and their uses.

Unit 2-Students will learn selected metres.

Semester2

CC2-2

Unit1

Students will get a brief introduction about Epic literature, Drsyakavya, Sravyakavya and Narrative literature.

Unit2

An outline of Vedic literature will be learnt.

SEC2-2- Students will learn basic Computational Sanskrit and will be aware on use of computer in day-to-day life.

SAN-H-CC3-3

Unit1-

Students will be acquainted to Kālidāsa and his works. Students will learn to critically discuss the importance of Kālidāsa's works in Indian and World literature.

Unit2- Acquaintance with Classical Sanskrit Poetry and overall understanding of literature.

Unit 3& 4-Students will understand the versatility of Sanskrit prose literature.

CC4- Unit1&2-

Learners will acquire poetic theory with special technical terms of Dramaturgy of Sanskrit.

Unit3- Learners will be familiar with general and some eminent Alamkarikas of Sanskrit Poetics and their theories.

Unit4- Students will learn selected Alamkars and their uses.

SEC 3-

Students will develop their skill while writing Sanskrit and it will help them to know this language in a better way.

SAN-MN-3-3

Students will be acquainted to Kālidāsa and his works. Students will learn to critically discuss the importance of Kālidāsa's works in Indian and World literature.

Acquaintance with Classical Sanskrit Poetry and overall understanding of literature. Students will understand the versatility of Sanskrit prose literature.

IDC SAN-MD-IDC1-1/2-2/3-3

Students will learn the ancient Indian Medical Science, Mathematics, Painting, Astronomy, Music, Dance and Architecture.

PHYSICS

4 years B.A. Major course in Physics (CCF, Based on NEP – 2020)

Semester -1

Basic Physics I (Minor I is offered to students of other programmes)

After completion of this course (Theory and Practical) students will

A. Mathematical Physics

- Get acquainted with the basic mathematical concepts required to understand Physics.
- Learn to solve differential equations often appeared in Physics.
- Learn vector algebra and the coordinate systems.

B. Classical Mechanics

- Get acquainted with classical Newtonian mechanics and are able to solve related physical problems.
- Learn dynamics of system of particles; collision problems.
- Learn theories of central force and related problems.
- Learn theories of fluid dynamics. In Laboratory class the students will
 - Able to use basic measuring instruments: Vernier Caliper, Screw Gauge, Travelling Microscope etc.
 - Able to measure height using sextant
 - Able to measure moment of inertia
 - Able to measure elastic modulus
 - Able to measure coefficient of viscosity of liquid

SEC I

Introduction to Computer Programming and Graph Plotting

This is a laboratory course where students will learn to use computer and software to solve Physics problems and their graphical presentation.

- Learn graph plotting using GNUPLOT.
- Learn Python programming to solve basics mathematical problems.

IDC (Interdisciplinary)

Frontiers in Physics (This course is offered to students of other programmes)

After completion of this course students will

- Get basic idea of scientific and logical methods and are able to differentiate science from pseudoscience.
- Get idea about the Universe: Its origin and evolution
- Learn Energy and Matter and interactions.

- Learn basics of kinetic theory and thermodynamics.
- Learn the historical development of laws of physics from classical to quantum.

Semester II

DSC 2/Minor 2 -Basic Physics II (Minor 2 is offered to students of other programmes)

After completion of this course (Theory and Practical) students will

A. Basic Electricity and Magnetism

- Able to comprehend Electrostatics and can solve electric field and potential problems
- Able to comprehend Magnetostatics and can solve related field and potential problems
- Get basic idea of magnetism
- Build the concepts of kinetic theory of gasses
- Get acquainted with thermodynamic parameters; able to understand thermodynamic laws and heat flow
- Able to solve thermodynamic and heat flow problems
- Build the basic concept of entropy
- Get acquainted with electrical measuring devices: Ammeter, voltmeter, their connections and applications in electrical circuit and the method of inter conversion
 - Learn to use meter bridge, Carey Foster bridge, potentiometer and the method to measure small resistance
- Learn the method to measure thermal expansion coefficient of solid

SEC II

Scientific Writing Skills (Latex)

This is a laboratory course where students will develop scientific writing skills using Latex.

- Learn the fundamentals and rules of Latex and the syntax and its use in writing scientific articles.
- Learn Python programming to solve basics mathematical problems.

IDC –

Frontiers in Physics

(This course is offered to students of other programmes) After completion of this course students will

- Get basic idea of scientific and logical methods and are able to differentiate science from pseudoscience.
- Get idea about the Universe: Its origin and evolution

- Learn Energy and Matter and interactions.
- Learn basics of kinetic theory and thermodynamics.
- Learn the historical development of laws of physics from classical to quantum.

Semester III:

DSC 3-

Waves and Optics

After completion of this course (Theory and Practical) students will

- Learn theory of oscillations: Simple harmonic, damped and forced vibration and the idea of superposition of harmonic oscillations
- Get the idea of waves: Different kinds of waves and their nature
 - Build the concept of superposition of waves, formation of standing waves and the application in plucked and struck string
- Get basic idea of geometrical optics
- Learn the theory of wave optics: Interference, Diffraction and Polarization In Laboratory class the students will
- Learn to use spectrometer and its applications in measuring wavelength of light by different techniques
- Learn to measure wave length of light by interference technique using Fresnel's bi-prism and Newton's ring.
 - Learn to measure wave length of light by diffraction technique using spectrometer and grating
- Learn to use polarimeter to measure specific rotation of optically active material

DSC 4:

Mathematical Physics

After completion of this course (Theory and Practical) students will

- Learn power series and its application to solve problems in different branches of Physics
- Learn Fourier series analysis and Fourier Transform
- Get acquainted with partial differential equations and its applications
- Learn the concept of probability and its applications in Physics
- Learn Dirac delta function and some special functions used in Physics
- Learn the techniques of numerical analysis In Laboratory class the students will
- Learn to use numpy and its applications to solve matrix operation, numerical solutions like Lagrange's interpolation, trapezoid and Simpson's 1/3 rule
- Learn to solve ordinary differential equations using Runge-Kutta method
- Learn to use pyplot to draw graphs 9.

SEC –

Introduction to data analysis

After completion of this course (Theory and Practical) students will

- Learn the method of data analytics: Sampling, Scaling, Grouping and the method of statistical analysis
- Learn Pandas and its applications in data analysis
- Learn to use numpy and its applications in numerical computing
- Learn matplotlib and seaborn for graph plotting and visualization of data

Semester IV

DSC 5:

Modern Physics

After completion of this course (Theory and Practical) students will

- Learn basic theory of Black body radiation and its nature
- Learn basics of quantum mechanics and uncertainty principle
- Learn Schrodinger equation and its application in potential box problem, quantum tunneling,
- Learn quantum theory of Simple harmonic oscillator In Laboratory class the students will
- Learn to measure Planck's constant using LED
- Learn to determine e/m using bar magnet
- Study photoelectric effect
- Study I-V characteristics of tunnel
- Study laser diffraction using grating

DSC 6 –

Electromagnetism

After completion of this course (Theory and Practical) students will

- Learn the theory of alternating current, its measurement and applications
- Learn the theory of electrostatics and the problem solving methodologies: potential and field problems, method of images, boundary value problems
- Learn the theory of magnetostatics and the problem solving methodologies
- Learn dielectric properties and magnetic properties of matter
- Learn the theory of electromagnetism
- Learn Maxwell's equations and its applications in electromagnetic wave propagation in unbounded and bounded media. In Laboratory class the students will
- Study electrical resonance in LCR circuit
- Study mutual inductance

- Study earth's magnetic field using magnetometer
- Study Malus's law using pair of polaroids
- Study to verify Fresnel's equation using prism and polaroids

DSC 7:

Mathematical Physics II

After completion of this course (Theory and Practical) students will

- Learn to solve second order differential equations and power series solution
- Study linear vector space and related problems
- Learn vector and tensor analysis
- Learn matrix algebra and its applications in Physics problems
- Learn methods of numerical analysis to solve partial differential equations In Laboratory class the students will
- Learn scipy for solving first and second order differential equations
- Learn to solve improper integrals, Gaussian integrals by numerical methods using scipy
- Learn to determine Fourier coefficients using scipy
- Learn to solve partial differential equations, wave equations, heat flow equations, Laplace equations using scipy

DSC 8 –

Classical Mechanics and Special theory of relativity

After completion of this course (Theory and Practical) students will

- Study non-inertial system and rotational system, rigid body problem
- Learn variational calculus to study mechanics and fluctuation
- Learn Special theory of relativity and concept of space-time In Laboratory class the students will
- Determine moment of inertia of a fly wheel
- Determine Young's modulus by the method of Flexure
- Determine elastic modulus by Searle's method
- Determine acceleration due to gravity using bar pendulum
- Study to simple pendulum and its modeling using Tracker's software

CHEMISTRY

4 years B.A. Major course in Chemistry (CCF, Based on NEP – 2020)

Semester I

CC1

Fundamentals of Chemistry-

CO-1: Provide students with a comprehensive understanding of the extranuclear structure of atoms and their influence on chemical behavior and also explore the periodic table, periodic trends, and their correlation with atomic structure.

CO-2: fundamental concepts of organic chemistry, focusing on the nature of chemical bonding and the relationship between molecular structure and physical properties

CO-3: Provide a foundational understanding of thermodynamics and chemical kinetics.

SEC1

Quantitative Analysis and Basic Laboratory Practices

CO-1: Introduce students to the fundamental principles and techniques of quantitative analysis and its broad applications across various scientific fields

CO-2: Introduce the principles and methods of titrimetric analysis, focusing on different types of titrations and their applications; learn about key concepts such as normality, molarity, molality, mole fraction, ppm, and ppb, along with the preparation and dilution of standard solutions

CO-3: Learn about impurities in water and the standards for water quality for potable, domestic, industrial, and agricultural purposes; provide students with a solid foundation in water quality analysis and treatment, essential for ensuring safe and sustainable water use.

Semester II

CC2

Fundamentals of Chemistry - II

CO-1: Understand the fundamental principles of the kinetic theory of gases, including molecular motion, gas laws, and the behavior of ideal and real gases.

CO-2: Learn about different types of chemical bonds, including ionic, covalent, and metallic bonds; understanding bond formation, bond energy, hybridization, molecular geometry, and the impact of bonding on molecular properties.

CO-3: Develop a deeper understanding of stereochemistry; Gain foundational knowledge of reaction mechanisms, including types of reactions (substitution), reaction intermediates, and the role of energy profiles in determining reaction pathways.

SEC 2

AI for Everyone

CO-1: Understand Artificial Intelligence (AI) and its difference from human intelligence; explore core AI subfields e.g. machine learning, deep learning and neural networks

CO-2: Introductory understanding of AI's role in healthcare , finance, transportation, customer service, and education; Gain knowledge on critical ethical concerns including bias and fairness in AI systems, privacy and data protection, the impact of AI on employment, and its role in amplifying social inequality.

CO-3: Gain knowledge on ethical guidelines and responsible AI practices; explore how AI drives innovation across industries and examine emerging trends and future directions in AI technology

Semester III

CC3

Physical Chemistry - I

CO-1: Develop thorough understanding of the second law of thermodynamics, its principles, and applications; learn about thermodynamics of pure and mixed systems

CO-2: Gain insight on thermodynamic conditions for equilibrium and explore the relationship between standard Gibbs free energy change and reaction conditions

CO-3: Gain a detailed understanding of electrochemical principles, focusing on conductance and ionic equilibrium; Develop a solid foundation in electrochemical processes and their applications in various fields.

CC4

Organic Chemistry – I

CO-1: In-depth exploration of aromatic substitution reactions, focusing on both electrophilic and nucleophilic mechanisms; Introduces fundamental concepts of organic acids, bases, and tautomerism, with a focus on pKa, the effects of substituents and solvents on acidity

CO-2: Build solid foundation in the principles of stereochemistry, conformational analysis, and reaction mechanisms, enabling them to apply this knowledge to understand and predict the outcomes of organic reactions

CO-3: Develop a strong grasp of the chemistry of alkenes and alkynes, including their structural features, reactivity patterns, and various addition reactions; build understanding and predicting the behavior of these compounds in organic synthesis and other applications.

SEC3

Introduction to Numerical Methods for Chemists

CO-1: Equip students with a deep understanding of the fundamental principles and techniques used in numerical analysis. Students will learn about various numerical methods, their applications, and their limitations

CO-2: Gain ability to use these methods to solve equations, approximate functions, and analyze data efficiently and accurately that focuses on practical application of numerical methods in different fields

CO-3: Enhance students' ability to identify and solve problems using numerical techniques and learn to analyze problems, choose appropriate methods, and interpret the results

Semester IV

CC5

Inorganic Chemistry – I

CO-1: Understanding of the principles of molecular orbital theory and its application to different types of chemical bonding; Gain ability to analyze the structure and properties of molecules based on their electronic structure and intermolecular interactions.

CO-2: Build solid understanding of acid-base chemistry, including the different definitions, concepts, and their applications in aqueous solutions; develop ability to analyze acid-base equilibria, calculate pH, and select appropriate indicators for acid-base titrations.

CO-3: Acquire basic knowledge of radioactivity, nuclear stability, and various nuclear reactions; build understanding on the principles and applications of radiocarbon dating

CC6

Organic Chemistry – II

CO-1: Comprehensive understanding of conformational analysis and chiral molecules, including pro-stereoisomerism and chirality arising from stereoaxes; gain ability to analyze the stereochemistry of various molecules and predict the potential for stereoisomerism

CO-2: Develop comprehensive understanding of the chemistry of carbonyl compounds, including their structure, reactivity, and various transformations. They will be able to apply this knowledge to design and analyze organic synthesis routes involving carbonyl compounds

CO-3: Build solid understanding of organometallic compounds, their preparation, reactions, and applications acquire ability to utilize these reagents effectively in organic synthesis to form new carbon-carbon bonds and introduce functional groups.

CC7

Physical Chemistry – II

CO-1: Build strong foundation in transport processes and the properties of liquids; gain understanding on diffusion, viscosity, and surface tension, as well as their underlying principles and applications.

CO-2: Develop solid understanding of the structure and properties of solids; acquire the ability to analyze crystal structures, determine unit cell dimensions, and apply Bragg's law to diffraction experiments

CO-3: Build a strong understanding of colligative properties, phase equilibria, and electrochemistry; Gain ability to apply these concepts to various systems, calculate molar

masses, analyze phase diagrams, and understand the principles of electrochemical cells and their applications.

CC8

Inorganic Chemistry – II

CO-1: Acquire solid understanding of coordination chemistry, including fundamental concepts, theories, and applications; Gain ability to analyze the structure, bonding, spectra, and magnetic properties of coordination compounds

CO-2: Develop a strong understanding of the principles and applications of supramolecular chemistry; Gain ability to analyze the role of non-covalent interactions in the formation and stability of supramolecular

CO-3: Build a solid understanding of redox reactions, including their principles, balancing, and applications; gain ability to analyze redox processes, predict the feasibility of redox reactions, and perform redox titrations.

COMMERCE

4 years B.A. Major course in Accountancy (CCF, Based on NEP – 2020)

SEMESTER 1

Major Paper 1

Financial Accounting - I

- Introducing basics of Financial Accounting, Accounting Standards, Accounting Theory.
- Understanding Final Accounts of Trading Concern, Financial statements from Incomplete records and of NPO, Consignment, Sale on Approval, Sectional and Self Balancing Ledger and Insurance Claim elaborately.

Minor Paper 1

Principles and Practice of Management

- Understanding basics of management and its Different Schools of Thoughts.
- Explaining various functions of management, namely, Planning, Organising, Directing and Staffing, Motivation, Co-ordination and Control in detail.

IDC Paper 1

Microeconomics

- Understanding Demand, Consumer behaviour, Production, Cost and Perfect Competition Market in detail.
- Explaining fundamentals of Statistics and discussing Measures of Central Tendency and Dispersion, Moments, Skewness and Kurtosis and Interpolation in detail.

Skill Enhancement Course (SEC) Paper 1

Entrepreneurship Development

- Demonstrate a clear understanding of key concepts related to entrepreneurship, including the role of entrepreneurs, types of entrepreneurship, and the characteristics of successful entrepreneurs.
- Identify and evaluate business opportunities by generating innovative business ideas and assessing market potential, feasibility, and competitive landscape.
- Develop a comprehensive business plan that includes market analysis, business model, operational plan, financial projections, and strategies for growth and risk management.

SEMESTER 2

Major Paper 2

Cost and Management Accounting - I

- Introducing Cost and Management Accounting.
- Explaining Material Costs, Employee Cost and Incentive Systems, Overhead and Cost
- Statement and Cost Book – keeping. Learning various Costing methods.

Minor Paper 2

Marketing Management and Human Resource Management

- Understanding basics of marketing. Learning Consumer Behaviour and Market segmentation, Product, Pricing, Distribution Channels, Physical Distribution and Promotion.
- Highlighting recent developments in marketing. Understanding nature and scope of Human Resource Management.
- Explaining Human Resource Planning, Recruitment and Selection, Training and Development, Job Evaluation and Performance Appraisal in detail.

GE 2.1

E-Commerce & Business Communication

- Introducing basics of E-Commerce. Explaining E-CRM, SCM, Digital Payment and ERP. Highlighting new trends in E-Commerce.
- Understanding basics of Business Communication, types and tools of Communication. Learning drafting of business letters, notices, circulars, resolutions, minutes etc.

IDC Paper 2

Macroeconomics

- Demonstrate a thorough understanding of key macroeconomic concepts including Gross Domestic Product (GDP), inflation, unemployment, and national income accounting.
- Evaluate and interpret various economic indicators such as GDP growth rates, inflation rates, and unemployment rates to assess the overall health of an economy.
- Explain the concepts of aggregate demand and aggregate supply, and analyze their effects on the economy's equilibrium, including short-run and long-run perspectives.
- Assess the role of monetary and fiscal policies in managing economic stability and growth.
- Analyze how central bank actions, government spending, and taxation impact economic activity.

Skill Enhancement Course (SEC) Paper 2

Information Technology and its Application in Business

- Outlining the basics of Information Technology, Data Organization and Data Base Management System, Internet, Security and Encryption and IT Act. 2000 and Cyber Crimes.
- Acquiring practical knowledge on Word Processing, Presentations preparing,
- Spreadsheet preparing.
- Learning Database Management System and Web Designing.

SEMESTER 3

Major (Core) Paper 3

Cost Accounting-II

- Ability to implement and manage cost book-keeping systems effectively.
- Proficiency in applying Activity-Based Costing (ABC) methods to allocate overhead costs more precisely based on activities.
- Mastering various costing methods and processes, including job costing, process costing, and batch costing. Understanding the principles of accounting for joint products and by products and applying appropriate methods for cost allocation and valuation.

Major (Core) Paper 4

Direct Tax I

- Understanding Basic Concepts and Definitions under IT Act, Residential Status and Incidence of Tax.
- Learning various Heads of Income and computations in relation to those.

Minor Paper 3 (Elective)

Fundamentals of Information System (e-B 1)

- Ability to define and describe the components and types of information systems, including their role in organizations.
- Gaining insights into enterprise systems, including Enterprise Resource Planning (ERP) systems, and their role in integrating business processes across various departments.
- Understanding and applying different number systems, such as binary, octal, decimal, and hexadecimal.
- Familiarizing with the principles and practices of Knowledge Management Systems.
- Grasping the fundamental concepts of data communication, including data transmission methods, encoding, and protocols.

- Students will understand the fundamentals of computer network systems, including network topologies, protocols, and architectures.

IDC / MDC Paper 3

Indian Economic Environment

- Gaining insights into the evolution of economic planning and policy making in India.
- They will analyze key economic plans, policies, and reforms, including Five-Year Plans, Liberalization, Privatization, and Globalization (LPG) reforms, and their impact on economic development.
- Understanding the factors influencing India's economic growth and development.

SEC PAPER 3

Computerised Accounting and Introduction to Data Science (Practical)

- Applying computerized accounting systems to perform key accounting processes, including ledger management, trial balance preparation, and financial reporting.
- Understanding how to set up and maintain accounting records and ensure accuracy in financial data entry.
- Grasping fundamental concepts of data science, including data collection, data cleaning, exploratory data analysis, and visualization.
- They will understand the role of data science in deriving insights from data.

SEMESTER 4

GE 4

Microeconomics II & Indian Economy

- Discussing various market types, namely, Monopoly, Imperfect Competition.
- Understanding Factor Price Determination.
- Introducing Basic Issues in Economic Development and Basic Features of Indian Economy.
- Analysing Sectoral Trends and Social Issues in Indian Economy.

CC 4

Entrepreneurship Development and Business

- Introducing the concept of Entrepreneurship Development in detail.
- Understanding Principles of Business Ethics, Ethics in Management, Corporate Culture and Ethics & Corporate Governance. Ethics

CC 4

Taxation I

- Understanding Basic Concepts and Definitions under IT Act, Residential Status and Incidence of Tax.
- Learning various Heads of Income and computations in relation to those.

CC 4.2

Cost and Management Accounting -II

- Learning Joint Product & By product, Activity Based Costing, Budget and Budgetary Control, Standard Costing, CVP Analysis, Marginal Costing in detail.

SEMESTER 5

CC 5.1

- Auditing & Assurance Introducing basic concepts of Audit.
- Understanding Audit Procedures and Techniques, Audit Risk and Internal Control System, Vouching, Verification and Valuation, Company Audit, Audit Report And Certificate And Other Thrust Areas like, Cost Audit, Management Audit, Tax Audit and Social Audit.

CC 5.2

Taxation II

- Learning computation of Total Income and Tax Payable.
- Understanding the concept of Tax Management.
- Discussing Indirect Taxes in detail.

DSE 5.1

Economics II and Advanced Business Mathematics

- Determining Commodity market and Money market equilibrium.
- Understanding macroeconomics topics like, National Income Accounting, Money, Inflation and Unemployment.
- Understanding the concept Functions, Limit and Continuity, Differentiation and Integration, Determinants and Matrix. Learning to solve problems related to mentioned topics.

DSE 5.2 A

Corporate Accounting

- Studying Accounting for Shares & debentures,
- Buy back and Redemption of preference shares, Company Final Accounts, Redemption of debenture, Company Merger and Reconstruction along with Valuation of Goodwill and Shares.

SEMESTER 6

AECC 6.1

Environmental Studies

- Learning concepts like, Ecology and Ecosystems, Biodiversity and Conservation. Understanding various Environmental Policies and Practices. Analysing the relationship between Human Communities and the Environment.
- Creating awareness about Environment.

SEC 6.1

Computerised Accounting and e-Filing of Tax Returns

- Exploring practical knowledge on DBMS and designing Computerized Accounting System on the basis of that.
- Learning E-filing of Tax return.

CC 6.1

Project Work Preparing a genuine Project report.

DSE 6.1

A Financial Reporting and Financial Statement Analysis

- Understanding Holding Company, Accounting Standards, Fund Flow Statement and Cash Flow Statement in detail.
- Analysing Financial Statements with the help of Comparative Statement, Common -size Statement, Trend Analysis and Accounting Ratios.

DSE 6.2 A

Financial Management

- Understanding the Basic Concepts of Financial Management and its functions elaborately.

BOTANY

4 years B.A. Major course in Botany (CCF, Based on NEP – 2020)

Semester I

BOT-H-CC-1/ Minor

Plant Diversity

1. Will be conscious about the scientific debates and reaching goals by experimental evidences and will develop scientific attitude.
2. Know the importance of plants in day to day life from food to fuel.
3. Know the classification, morphology, reproduction and economic and ecological importance of cryptogams.
4. Handling and observation of Algae, Fungi, Bryophytes and Pteridophytes.

SEC 1

Mushroom cultivation technology

1. Know the basics to identify edible mushrooms.
2. Know the infrastructure needed for mushroom cultivation.
3. Know the strategies for mushroom cultivation.
4. Development of skills for entrepreneurship.

IDC

Plant around us

1. Know the characteristics of different plant groups.
2. Know the contribution of different plant scientists.
3. Know the external and internal morphology of plants.
4. Know the role of plants in maintaining ecosystems.
5. Know the role of plants in providing food, furniture and beverages for human society.
6. Know the utilization of plants in controlling diseases.

Semester II

CC-2/ Minor

Plant Systematics

1. Know the rules for naming of a plant.
2. Know the sources of collecting data for classification.
3. Know the techniques for identifying plants.
4. Know the methods of collecting and preserving plants from different localities of varied geographical regions.

SEC 2

Biofertilizer and Biopesticides

1. Know the needs for less use of chemical fertilizers and more use of Biofertilizer and Biopesticides for sustainable agricultural practices.
2. Know the identification and culturing of N₂ fixing, P, K and Zn solubilising bacteria.
3. Know the techniques to isolate arbuscular mycorrhiza.
4. Know the techniques to culture and use of a biopesticide.

IDC

Plant around us

1. Know the characteristics of different plant groups.
2. Know the contribution of different plant scientists.
3. Know the external and internal morphology of plants.
4. Know the role of plants in maintaining ecosystems.
5. Know the role of plants in providing food, furniture and beverages for human society.
6. Know the utilization of plants in controlling diseases.

Semester III

CC-3-3

Economic Botany

1. Know the concept and evolution of new crops.
2. Know the cultivation, processing and uses of different cereals, pulses and rubber.
3. Know the processing and uses of products and by-products of different sugar, starch, spices and beverage yielding plants.
4. Know the processing, uses and health hazards of poppy, cannabis and tobacco.
5. Know about different vegetables and fruits and the morphological nature of their edible parts.
6. Will identify the aforesaid plants in field as well as in laboratory.

CC-4-3

Plant anatomy and Embryology

1. Know about different plant cells and tissues.
2. Know about different growth patterns viz. primary, secondary and anomalous.
3. Know about different adaptive anatomical features.
4. Know about different applications of plant anatomy in systematics, forensic and pharmacognosy.
5. Know about different pre and post fertilisation changes in male and female gametophytes
6. Know about embryo development and apomixes.
7. Will perform slide preparation with different plant parts of academic and economic interest.

SEC-3

Plant tissue culture and horticulture practices

1. Know about history, importance and future prospects of Plant tissue culture.
2. Know the requisites of plant tissue culture and plant regeneration.
3. Know the techniques plant tissue culture and plant regeneration.
4. Know the techniques of production of useful metabolites.
5. Know the scope importance and employment generation by horticulture practices.
6. Know the techniques of manuring, weed control and propagation and processing of different ornamentals, fruits and vegetables.

Minor

Plant Diversity

1. Will be conscious about the scientific debates and reaching goals by experimental evidences and will develop scientific attitude.
2. Know the importance of plants in day to day life from food to fuel.
3. Know the classification, morphology, reproduction and economic and ecological importance of cryptogams.
4. Handling and observation of Algae, Fungi, Bryophytes and Pteridophytes.

Semester IV

CC-5-4

Phycology

1. Know about the general account of different algal species.
2. Know about the classification and characteristics of different algal groups.
3. Know about the role of phytoplanktons in aquatic ecosystems.
4. Know about the techniques of algal culture and uses of algae as food, fuel and biofertilizer.
5. Will collect algae from different aquatic habitat and identify them.

CC-6-4

Archaeogniates

1. Know about the unifying features, classification, origin and evolution of Bryophytes.
2. Know about the role of Bryophytes as pollution indicators.
3. Know about the unifying features, origin and evolution of Pteridophytes.
4. Know about the economic importance of Pteridophyte.
5. Know about the origin of seed habit.
6. Know about the life history of some Bryophytes, Pteridophytes and Gymnosperms.
7. Know about the phylogeny and evolutionary significance of Gymnosperm. Palaeobotany and

CC-7

Palynology

1. Know about the geological time table and origin and evolution of flora.
2. Know about the plant fossils.
3. Know about the fossil Pteridophytes and Gymnosperms.
4. Know about the Indian Gondwana system.
5. Know about the pollen morphology.
6. Know about the applied palynology e.g forensic analysis, melissopalynology.

CC-8

Pharmacognosy and Ethnobotany

1. Know the scope and importance of medicinal plants.
2. Know about the plant drugs.
3. Know the secondary metabolites.
4. Know the pharmacologically active constituents.
5. Know about the folk medicine.
6. Know about the nutraceuticals.

Minor

Plant Systematics

1. Know the rules for naming of a plant.
2. Know the sources of collecting data for classification.
3. Know the techniques for identifying plants.
4. Know the methods of collecting and preserving plants from different localities of varied geographical regions.

ZOOLOGY

4 years B.A. Major course in Zoology (CCF, Based on NEP – 2020)

Semester I

CC-1

Cell Biology

Upon completion of this course, students will be able to:

1. Describe the structure and function of the plasma membrane, including its role in cell signaling, transport, and cell-cell interactions.
2. Identify and explain the functions of cytoplasmic organelles, including mitochondria, endoplasmic reticulum, Golgi apparatus, lysosomes, and peroxisomes, and their roles in cellular processes such as metabolism, protein synthesis, and degradation.
3. Explain the composition and functions of the cytoskeleton, including microtubules, microfilaments, and intermediate filaments, and their roles in cell shape, movement, and division.
4. Describe the structure and function of the nucleus, including the nuclear envelope, chromatin, and nucleolus, and its role in gene expression and cell regulation.
5. Explain the principles of cell signaling, including signal transduction pathways, second messengers, and gene regulation, and how cells respond to internal and external stimuli.
6. Demonstrate an understanding of tools and techniques in cell biology, including microscopy, cell culture, and molecular biology techniques, and their applications in research and medicine.

CC-2

Biochemistry

Upon completion of this course, students will be able to:

1. Describe the structure and function of various kinds of monosaccharides like aldose and ketose carbohydrates, disaccharides, polysaccharides; they will be acquainted with isomerism of monosaccharides (D and L, optical isomers, furanose and pyranose, α and β anomers, epimers) as well as reducing and non-reducing sugars. They will also know physiological importance of monosaccharide, disaccharides and polysaccharides.
2. Identify structure, classification, general and electrochemical properties of α -amino acids; essential and non-essential amino acids; structures of protein: primary, secondary, tertiary and quaternary) of protein, classification of proteins.
3. Explain the saturated and unsaturated fatty acids, essential and non-essential fatty acids, structure and formation of triglyceride.
4. Describe the cofactors and coenzymes, effect of temperature, pH, substrate concentration, enzyme concentration on enzyme action, isozymes and proenzyme, mechanism of enzyme action (Lock and key model, Induced fit model), enzyme kinetics, also learn the process of derivation of Michaelis-Menten equation with its significance, Lineweaver-Burk plot and its significance. enzyme inhibition – competitive, non-competitive, allosteric / feedback and its effect on V_{max} and K_m .

5. Describe and explain glycolysis, citric acid cycle, pentose phosphate pathway, gluconeogenesis from lactate and glycerate, glycogenesis and glycogenolysis along with the name of the enzymes and their significance.

6. Explain protein metabolism like transamination, deamination and their types as well as pathways with name of enzymes and significance. They also learn the fate of C-skeleton of glucogenic and ketogenic amino acids.

7. Describe lipid metabolism such as β -oxidation of fatty acids like palmitic acid (saturated), linoleic acid (unsaturated) including fatty acid biosynthesis pathway.

8. Explain nucleic acid metabolism such as degradation of purine; purine salvage pathway and significance. 9. Gather fundamental knowledge on free radicals and antioxidants and can also describe concepts of free radicals and antioxidants along with examples.

SEC-1

Applied Entomology

Upon completion of this course, students will be able to:

1. The unit 1 comprising of Basic entomology has been incorporated to encourage students to gain interest in knowing the structural adaptability of insects to cope up their interacting environment. After completing this unit, they will be able to identify and characterize insects having agricultural, medical, sericultural and apicultural importance.

2. The unit 2, entitled 'Medical entomology' comprises of description of insect and related arthropod creatures having medical importance. The students will acquaint with the biology and ecology of various insect vectors in relation to certain vector borne diseases like malaria, filaria, dengue etc. and also will be able to know about how these diseases can be prevented/controlled. They will further enhance their knowledge about how forensic science could utilize insects and related arthropods in the estimation of time of death of human/animal cadavers needed by legal authorities to solve unnatural death.

3. In the Unit 3 (Agricultural Entomology), students will gain knowledge about the insect pests of crops with special reference to pest dynamics, nature of damage and their management process so that crop yield can be increased to meet human demand.

4. The Unit 4 or Sericulture deals with insects directly involved in the production of Silk, the queen of threads. The students will get vivid knowledge about the biology of silk producing moths, their commercial rearing, cocoon harvesting, silk reeling and the marketing of silk. They will explore the huge potentiality of the sericulture used to uplift Indian rural economy. Students will also be able to identify the SWOC of this cottage industry.

5. In the Unit 5 (Apiculture) students will gain knowledge about the biology of Honey bees, scientific rearing of such beautiful insect creatures, their enemies & management of such enemies, scientific production and uses of honey.

6. After completing the practical unit, students will be able to handle insects and will get hands on training through their visit to places of having applied entomological interest.

SEC-2

Aquaculture

Upon completion of this course, students will be able to:

1. The course on basic fish biology in aquaculture typically aims to provide students with an understanding of fish anatomy, physiology, and behaviour, as well as how these aspects influence aquaculture practices.
2. Students will gain knowledge of the principles and practices of sustainability in aquaculture, including resource management, waste reduction, and the use of renewable resources. Students will also explore emerging technologies and innovative practices in sustainable aquaculture, and assess their potential impact on the future of the industry.
3. Students will gain insight into the latest technological innovations in aquaculture, such as advanced breeding techniques, genetic modification, and automation. They will learn how to apply recent advancements in aquaculture practices, including novel feeding strategies, disease management techniques, and water quality monitoring systems. They will explore emerging trends and future directions in aquaculture research and technology, and assess their potential to shape the industry.
4. Students will gain knowledge of common and emerging diseases affecting finfish in aquaculture, including their aetiology, epidemiology, and impact on fish health and production.
5. Students will develop hands-on skills in operating and managing various aquaculture systems, including pond, tank, and recirculating systems. Students will gain hands-on experience and knowledge in advanced breeding techniques for shrimp and prawns, including selective breeding, hatchery management, and larval rearing. Students will perform economic evaluations of breeding and pearl culture operations, including cost management, profitability analysis, and market trends.

IDC-1:

Animal Biology

Upon completion of this course, students will be able to:

Unit 1: Animal Diversity

1. Unit 1(Animal Diversity) comprises of diversity of animals.
2. Students will understand the fundamental theories of living world and capability of developing ideas based on them.
3. Students will be motivated for research studies in Zoology and related fields.
4. Provide knowledge of a wide range of scientific techniques and application of methods/tools in related fields
5. Understanding animal diversity is fundamental to appreciating the myriad forms and functions that life has taken on our planet
6. Knowledge gained on the concept of maintenance systems in non-chordates and chordate groups.

7. Collaboration of structure and function, functional basis of body structures and Organ systems, relationships of the Chordates with such other animal groups/Phyla

Unit 2: Genetics

1. Knowledge gained on the fundamental genetic principles, from inheritance patterns to molecular mechanisms, Gene concept, genome organization

Unit 3: Biodiversity and Wildlife

1. Knowledge gained on wildlife, the ecological roles of animals, conservation challenges, and the impact of human activities on animal populations, the threats responsible for decimation of Biodiversity and Wildlife.
2. How to tackle issues of sustainable development and conservation of Biodiversity and Wildlife.
3. Conservation of Wildlife.

Unit 4: Insect Vectors

1. Knowledge gained on insect vectors, explored in detail for their roles in disease transmission and ecological balance.
2. Understanding their biology and behaviors that is crucial for effective pest management and disease control
3. The vital role of insect vectors in animal biology and behavior of vectors, their interactions with pathogens, and the implications for disease transmission, providing critical insights into the dynamics of infectious diseases.

Unit 5: Laboratory techniques and Instrumentation

1. Knowledge gained on laboratory techniques and instrumentation form the backbone of modern biological research.
2. This section covers essential methodologies, from microscopy to molecular biology tools,

MATHEMATICS

4 years B.A. Major course in Mathematics (CCF, Based on NEP – 2020)

Semester I

CC1-1- MATH-H MC 1-

Calculus, Geometry & Vector analysis

Upon successful completion of this course, students will be able to:

CO 1. Compute limits, derivatives, and integrals.

CO 2. Analyse functions using limits, derivatives, and integrals.

CO 3. Recognize the appropriate tools of calculus to solve applied problems.

CO 4. Describe the various forms of equation of a plane, straight line, Sphere, Cone and Cylinder.

CO 5. Find the angle between planes, Bisector planes, Perpendicular distance from a point to a plane, Image of a line on a plane, Intersection of two lines.

CO 6. Define coplanar lines and illustrate.

CO 7. Compute the angle between a line and a plane, length of perpendicular from a point to a line.

CO 8. Define skew lines, calculate the shortest distance between two skew lines.

CO 9. Find and interpret the gradient curl, divergence for a function at a given point.

CO 10. Interpret line, surface and volume integrals, evaluate integrals by using Green's Theorem, Stokes theorem & Gauss's Theorem.

SEC1-1

C Language with Mathematical Application

CO 1. This course is very effective to the students because it includes from algorithms, flowcharts, basic programming in C.

CO 2. Understand C programming language and can solve problems using C-programming software.

CO 3. Understand the necessity of using numerical methods apply these to solve various types of problems.

CO 4. Find roots of transcendental and polynomial equations using numerical technique.

CO 5. Solve mathematical models using appropriate numerical methods and pursue research in the field of mathematics, engineering, computer science.

CO 6. Constructs polynomials employing different methods and understand numerical differentiation and integration which enables them to undertake further studies in Mathematics, or its allied areas.

CO 7. Compare the rate of convergence of different numerical formula Students will be able to

Semester 2

CC2-2-Th & MATH-H MC 2-2-

Basic Algebra

CO 1. Employ De Moivre's theorem in a number of applications to solve numerical problems.

CO 2. Apply Cardons method (solve cubic equation) and Ferrari's method (solve Bi-quadratic equation).

CO 3. Apply the inequality to the problems of maxima and minimum.

CO 4. Complex functions are really helpful for understand the complex analysis.

CO 5. Complex numbers are used in real life applications such as electricity, and also to signal processing, which is use full in cellular technology and wireless technologies, as well as radar and even biology (brain waves).

CO 6. Anyone can judge about dependency between two rows and two columns of a matrix with the help of rank.

CO 7. In our real life we use system of linear equations in the regards of age problem, speed related problems, wages and hourly rate problems.

SEM-I, II & III

IDC-1-

Mathematics in Daily Life

CO 1. Know Division Algorithm, Fundamental theorem of Arithmetic, Algorithm for Primality test.

CO 2. Understand logical connectives: NOT, OR, AND and their truth tables, Tautology, logical consequence etc.

CO 3. Formulate daily life problems as an LPP

CO 4. Solve an LPP by graphical method

CO 5. Know definition of Game, Examples from daily life Two person zero sum game.

CO 6 Learn Simple interest and Compound interest, Idea of repayment of loans.

CO 7. Know dividend calculation and calculation of income tax on taxable income (old and new regime)