

Raghunathpur College
DEPARTMENT OF ZOOLOGY

CBCS

**PROGRAMME OUTCOME, COURSE OUTCOME AND PROGRAM
SPECIFIC OUTCOME**

Aims of the Bachelors' Degree Program in Zoology

Zoology is the study of all animal life; from primitive, microscopic, malaria-causing protozoa to large advanced mammals, across all environments, from red deer in mountain forests to dolphins in deep oceans, and from underground burrowing voles to golden eagles in the sky. Some of these animals are useful to us and we keep them as pets or livestock; some are serious pests or disease-causing; and some are simply magnificent and awe-inspiring. Regardless of our relationship with animals, we need to understand their behavior, population dynamics, physiology, and the way they interact with other species and their environments.

1. To equip students with the knowledge and skills that would enable them to pursue postgraduate studies in zoology and related fields or in multidisciplinary fields.
2. Development of a range of general skills relevant to hired work, self-employment and entrepreneurship.
3. Improving the skills required to conduct research in laboratory and experimental research.
4. Training of specialists in immunology, ornithology, animal behavior or entomology areas and applications and their links with related disciplines/subjects knowledge in related areas area of sub-areas and current developments in the academic field of zoology and using their knowledge
5. Understanding and skills, to recognize the problems and issues related to zoology using the main concepts, constructs and techniques of the subject(s).
6. To demonstrate subject-related and transferable skills relevant to zoology-related careers and employment opportunities.
7. Develop good observation skills and a logical approach to problem solving.

Program Learning Outcomes

1. Ability to acquire comprehensive knowledge and understanding of the most important concepts, theoretical foundations and experimental knowledge in zoology and its various subfields (animal diversity, principles of ecology, comparative anatomy and developmental biology of vertebrates, physiology and biochemistry, genetics and evolutionary biology, animal biotechnology, applied zoology, aquatic biology, immunology, reproductive biology and insects, vectors and diseases) and other related fields of study, including broader interdisciplinary subfields such as chemistry, physics and mathematics.
2. Ability to use modern tools for advanced genomic and proteomic technology.

3. Ability to communicate complex technical knowledge related to zoology clearly and concisely in written and oral form.

4. Ability of critical thinking and efficient problem solving - Solution competence in the basic areas of zoology (animal diversity, basics of ecology, comparative anatomy and developmental biology of vertebrates, physiology and biochemistry, genetics and evolutionary biology, animal biotechnology, applied zoology, aquatic biology, immunology, reproductive biology, insect, vectors and diseases, etc.).

5. Ability to work effectively in diverse teams in both classroom, laboratory, industrial and field situations.
6. Ability to identify/mobilize appropriate resources required for a project and to lead a project to completion while making responsible and ethical scientific observations; and safety and chemical sanitation regulations and practices
7. Able to use bioinformatics and computational computers and appropriate software to analyze genomics and proteomics data, and to use modern bioinformatics search tools to locate, retrieve, and assess location and biological annotation genes of various species.
8. Able to carry out their work with honesty and precision and avoiding such unethical behavior as inventing, falsifying or misrepresenting data committing plagiarism and valuing environment and sustainability development and enhancing knowledge

Semester I

Course Outcomes

BSCHZOOC101 (HONOURS): Non-chordates I: Protista to Pseudocoelomates

Knowledge on the followings

1. Develop understanding on the diversity of life with regard to protists, Pseudocoelomate.
2. Group animals on the basis of their morphological characteristics / structures.
3. Develop critical understanding how animals changed from a primitive cell to a collection of simple cells to form a complex body plan.
4. Examine the diversity and evolutionary history of a taxon through the construction of a basic phylogenetic/cladistics tree.
5. Understand how morphological change due to change in environment helps drive evolution over a long period of time.
6. The project assignment will also give them a flavour of research to find the process involved in studying biodiversity and taxonomy besides improving their writing skills.
7. It will further enable the students to think and interpret individually due to different animal species chosen

BSCHZOOC102 (HONOURS): Perspectives in Ecology

Knowledge on the followings

1. Know the evolutionary and functional basis of animal ecology.
2. Understand what makes the scientific study of animal ecology a crucial and exciting endeavour.
3. Engage in field-based research activities to understand well the theoretical

- aspects taught besides learning techniques for gathering data in the field.
4. Analyse a biological problem, derive testable hypotheses and then design experiments and put the tests into practice.
 5. Solve the environmental problems involving interaction of humans and natural systems at local or global level.

BZOCCRC101 (PROGRAM): Non-chordates I: Protista to Pseudocoelomates

Knowledge on the followings

1. Develop understanding on the diversity of life with regard to protists, non chordates and pseudocoelomate.
2. Group animals on the basis of their morphological characteristics/ structures.
3. Develop critical understanding how animals changed from a primitive cell to a collection of simple cells to form a complex body plan.
4. Examine the diversity and evolutionary history of a taxon through the construction of a basic phylogenetic/cladistics tree.
5. Understand how morphological change due to change in environment helps drive evolution over a long period of time.
6. The project assignment will also give them a flavour of research to find the process involved in studying biodiversity and taxonomy besides improving their writing skills.
7. It will further enable the students to think and interpret individually due to different animal species chosen.

Semester II

Course Outcomes

BZOOCCHC 201 Non-Chordates II: Coelomates

1. Develop understanding on the diversity of life with regard to coelomate.
2. Group animals on the basis of their morphological characteristics/ structures.
3. Develop critical understanding how animals changed from a primitive cell to a collection of simple cells to form a complex body plan.
4. Examine the diversity and evolutionary history of a taxon through the construction of a basic phylogenetic/cladistics tree.
5. Understand how morphological change due to change in environment helps drive evolution over a long period of time.
6. The project assignment will also give them a flavour of research to find the process involved in studying biodiversity and taxonomy besides improving their writing skills.

BSCHZOLC401 (HONOURS): CELL BIOLOGY

Knowledge on the followings

1. Understand the functioning of nucleus and extra nuclear organelles and understand the intricate cellular mechanisms involved.
2. Acquire the detailed knowledge of different pathways related to cell signaling and apoptosis thus enabling them to understand the anomalies in cancer.
3. Develop an understanding how cells work in healthy and diseased states and to give a 'health forecast' by

analyzing the genetic database and cell information.

Get new avenues of joining research in areas such as genetic engineering of cells, cloning, vaccines development, human fertility programme, organ transplant, etc

BZOOCRC 201 (PROGRAM) Non-Chordates II: Coelomates

1. Develop understanding on the diversity of life with regard to coelomate.
2. Group animals on the basis of their morphological characteristics/ structures.
3. Develop critical understanding how animals changed from a primitive cell to a collection of simple cells to form a complex body plan.
4. Examine the diversity and evolutionary history of a taxon through the construction of a basic phylogenetic/cladistics tree.
5. Understand how morphological change due to change in environment helps drive evolution over a long period of time.

The project assignment will also give them a flavour of research to find the process involved in studying biodiversity and taxonomy besides improving their writing skills

Semester III

Course Outcomes

BZOOCCHC301 (HONOURS): DIVERSITY OF CHORDATES

Knowledge on the followings

1. Develop understanding on the diversity of life with regard to chordates.
2. Group animals on the basis of their morphological characteristics / structures.
3. Develop critical understanding how animals changed from a primitive cell to a collection of simple cells to form a complex body plan.
4. Examine the diversity and evolutionary history of a taxon through the construction of a basic phylogenetic/cladistics tree.
5. Understand how morphological change due to change in environment helps drive evolution over a long period of time.

BZOOCCHC302 (HONOURS): Animal Physiology: Controlling & Coordinating Systems

Knowledge on the followings

11. Understand the process of digestion and its control.
12. Develop understanding in muscle structure and contraction mechanism.
13. Learn the process of respiration and transport of gases.
14. Understand kidney structure and regulation of urine formation.
15. Understand heart structure and functioning.
16. Understand function of endocrine glands and formation of gametes

BZOOCCHC303 (HONOURS): FUNDAMENTALS OF BIOCHEMISTRY

Knowledge on the followings

1. Understand about the importance and scope of biochemistry.
2. Understand the structure and biological significance of carbohydrates, amino acids, proteins, lipids and nucleic acids.
3. Understand the structure and function of immunoglobulins.
4. Understand the concept of enzyme, its mechanism of action and regulation.
5. Understand the process of DNA replication, transcription and translation.
6. Learn the preparation of models of peptides and nucleotides.
7. Learn biochemical tests for amino acids, carbohydrates, proteins and nucleic acids.
8. Learn measurement of enzyme activity and its kinetics.

BZOOSEHT305 (HONOURS): AQUARIUM AND FISH KEEPING

Knowledge on the followings

1. To learn the scientific method of setting an aquarium
2. To learn the culture breeding and marketing techniques of common indigenous ornamental fishes

BZOCCRC301 (PROGRAM): DIVERSITY OF CHORDATES

Knowledge on the followings

1. Develop understanding on the diversity of life with regard to chordates.
2. Group animals on the basis of their morphological characteristics / structures.
3. Develop critical understanding how animals changed from a primitive cell to a collection of simple cells to form a complex body plan.
4. Examine the diversity and evolutionary history of a taxon through the construction of a basic phylogenetic/cladistics tree.
5. Understand how morphological change due to change in environment helps drive evolution over a long period of time.

BZOOGHEHC17 Animal Diversity

1. Introduce students to Animal groups and their overall morphological and anatomical structures.
2. Provide knowledge about complexity of animal groups and their evolutionary relationship.
3. Provide an overview of different animal groups and their systems.
4. Compare and contrast the life processes in different animal phyla and learn how the different systems evolved in their complexity
5. Familiarize the students with diverse aspects of animal biology and enable them to develop an understanding of the animal kingdom.

Semester IV

Course Outcomes

BZOOCCHC 401 (HONOURS): COMPARATIVE ANATOMY OF VERTEBRATES

Knowledge on the followings

1. Develop an understanding of the evolution of vertebrates thus integrating structure, function and development.
2. Have an overview of the evolutionary concepts including homology and homoplasy, and detailed discussions and comparison of anatomy of major organ systems from simpler to complex organisms

BZOOCCHC 402 Animal Physiology: Life Sustaining Systems

1. Impart a comprehensive overview of the principles and basic concepts of mammalian physiology, especially human physiology.
2. Provide an advanced understanding of skeleton-muscle physiology

and digestive system functioning.

3. Give an overview of renal physiology and electrolyte homeostasis and endocrine function.
4. Provide a comprehensive idea about circulatory and respiratory biology and functioning of the heart.
5. Provide a comprehensive idea about nervous coordination, nerve impulses and the central and peripheral nervous systems.
6. Familiarize students with laboratory techniques and equipment used in the acquisition of physiological data

BZOOCCHC 403(HONOURS): IMMUNOLOGY

Knowledge on the followings

1. Identify the major cellular and tissue components which comprise the innate and adaptive immune system.
2. Understand how are immune responses by CD4 and CD8 T cells, and B cells, initiated and regulated.
3. Understand how does the immune system distinguish self from non-self.
4. Gain experience at reading and evaluating the scientific literature in the area.
5. Through this paper the students will be introduced to the very complex but intriguing vertebrate immune system.
6. They will realise the significance of innate immunity and how it contributes to the activation of the adaptive branch.
7. The enormous diversity in recognition of foreign antigens resulting from the very unique 'gene segment rearrangement' phenomenon will be dealt with at molecular level.
8. The different immuno-techniques of wide-spread applications in different branches of biological research will be explained to the students.
9. The students will realise the details of intricate cell-cell, as well as intracellular signalling in the context of the immune system.
10. In the practical module, students would learn about immunological techniques like Western blot, ELISA and immunofluorescence.

BZOOSEHT405(HONOURS): SERICULTURE

1. Acquire competency in the discipline with sound knowledge about sericulture
2. Know the different components and chain link of sericulture industry.
3. Understand concepts of sericulture industry and demonstrate interdisciplinary skills acquired in mulberry plant cultivation, silkworm rearing, diagnosis of diseases and pest of mulberry and silkworm and their prevention and its relevance in Seri-farmers livelihood.
4. Demonstrating the Laboratory and field skills in mulberry cultivation and silkworm rearing with an emphasis on technological aspects.
5. Competent to transfer the knowledge and technical skills to the Seri-farmers.
6. Critically analyze the environmental issues and apply in management of mulberry

garden and silkworm rearing at field.

7. Demonstrate comprehensive innovations and skills in improvement of mulberry and silkworm varieties for betterment of sericulture industry and human welfare
8. Aptly demonstrate communication skills, scientific writing, data collection and interpretation abilities in all the fields of seribiotechnology.

BZOOGEHC17A (HONOURS): ENVIRONMENT AND PUBLIC HEALTH

Knowledge on the followings

1. Understand different causes of environmental pollution and their remedies
2. Learn about the depletion and contamination of natural resources.
3. To learn waste management technologies and its applications.
4. Develop awareness about the causative agents and control measures of many commonly occurring diseases

BZOOCCRC 401 (PROGRAM): COMPARATIVE ANATOMY OF VERTEBRATES

Knowledge on the followings

1. Develop an understanding of the evolution of vertebrates thus integrating structure, function and development.
2. Have an overview of the evolutionary concepts including homology and homoplasy, and detailed discussions and comparison of anatomy of major organsystems from simpler to complex organisms

BZOOSErT405(program): SERICULTURE

By the end of the program the students will be able to:

Acquire competency in the discipline with sound knowledge about sericulture

Know the different components and chain link of sericulture industry.

2. Understand concepts of sericulture industry and demonstrate interdisciplinary skills acquired in mulberry plant cultivation, silkworm rearing, diagnosis of diseases and pest of mulberry and silkworm and their prevention and its relevance in Seri-farmers livelihood.
3. Demonstrating the Laboratory and field skills in mulberry cultivation and silkworm rearing with an emphasis on technological aspects.
4. Competent to transfer the knowledge and technical skills to the Seri-farmers.
5. Critically analyze the environmental issues and apply in management of mulberry garden and silkworm rearing at field.
6. Demonstrate comprehensive innovations and skills in improvement of mulberry and silkworm varieties for betterment of sericulture industry and human welfare
7. Aptly demonstrate communication skills, scientific writing, data collection and interpretation abilities in all the fields of seribiotechnology

Semester V

Course Outcomes

BZOOCCHC501 (HONOURS): MOLECULAR BIOLOGY

Knowledge on the followings

1. Develop an understanding of concepts, mechanisms and evolutionary significance and relevance of molecular biology in the current scenario.
2. Get well versed in recombinant DNA technology which holds application in biomedical & genomic science, agriculture, environment management, etc. Therefore, a fundamental understanding of Molecular Biology will help in career building in all these fields.
3. Apply their knowledge in problem solving and future course of their career development in higher education and research.
4. Get new avenues of joining research in related areas such as therapeutic strategies or related opportunities in industry.
5. Students will be introduced to the major biological processes – replication, transcription and translation, in prokaryotic and eukaryotic systems.
6. Students will also be made familiar with DNA damage and repair mechanisms.
7. The course aims to impart knowledge about the mechanisms and regulation of prokaryotic transcription.
8. The course aims to impart knowledge about the mechanisms and regulation of eukaryotic transcription.
9. The course aims to impart knowledge about the mechanisms and regulation of prokaryotic and eukaryotic translation.
10. Students would be made familiar with DNA structure and replication.

BZOOCCHC502 Genetics)

The course aims to

1. impart a comprehensive understanding of the principles of genetics and the modes of inheritance including allelic and non-allelic interactions.
2. provide an overview of the basic structure and function of chromosomes.
3. provide a comprehensive idea about genetic linkage, crossing over and chromosomal mapping
5. introduce students to DNA damage and mutation.
6. thereafter introduce students to various DNA damage repair pathways and their detailed mechanisms.
7. enable students use their knowledge of genetics to analyze pedigrees and predict genotypes and phenotypes

BZOODSHC1 (HONOURS) Animal Biotechnology

1. Students will be introduced to the basics and applications of recombinant DNA technology.
2. They will learn various aspects about generating clones and gene expression using modern and relevant techniques.
3. Students will be provided with an overview of the application of molecular tools and Polymerase chain reaction (PCR).
4. Students will be provided with further knowledge about viral vectors (in continuation of the knowledge imparted in General Microbiology Module (Semester III)).
5. In practical module the students will be given hands on training of some of the techniques discussed in theory classes.
6. The module seeks to make students well versed with the technological aspects of the knowledge about recombinant DNA technology.
7. provide an overview of various technical methods and bio-analytical tools which have useful applications in biotechnology.
8. introduce students to microscopy, centrifugation and cell fractionation techniques.
9. introduce students to electrophoresis and its applications.
10. enable students understand the principles of chromatography.
11. introduce students to the principles of spectroscopy.
12. provide students with a hands-on-experience of several bio-analytical techniques in the practical module.
13. impart theoretical knowledge and information about computational tools of genomics.
14. impart theoretical knowledge and provide information about computational tools of proteomics.
15. introduce students to structural and functional genomics and DNA sequencing methods.
16. introduce students to proteomics and techniques for analysis of proteomes.
17. to provide knowledge about computational tools for high throughput handling of gene and protein sequences

Bzoodchc2 (honours): FISH AND FISHERIES

Knowledge on the followings

1. Develop an understanding of the classification of fishes and integrating structure, function and physiology
2. Gain an overview of the fishery and aquaculture industry
3. Express the importance of aquaculture
4. To understand the techniques involved in aquaculture practices

BSCHZOOOLDSE501(HONOURS): ANIMAL BEHAVIOR AND CHRONOBIOLOGY

Knowledge on the followings

1. Learn a wide range of theoretical and practical techniques used to study animal behaviour.
2. Develop skills, concepts and experience to understand all aspects of animal behaviour.
3. Objectively understand and evaluate information about animal behaviour and ecology encountered in our daily lives.
4. Understand and be able to objectively evaluate the role of behaviour in the protection and conservation of animals in the wild.
5. Consider and evaluate behaviour of all animals, including humans, in the complex ecological world, including the urban environment.

BSC(PROGRAM): WILDLIFE CONSERVATION AND MANAGEMENT

Knowledge on the followings

1. Develop an understanding of how animals interact with each other and their natural environment.
2. Develop the ability to use the fundamental principles of wildlife ecology to solve local, regional and national conservation and management issues.
3. Develop the ability to work collaboratively on team-based projects.
4. Demonstrate proficiency in the writing, speaking, and critical thinking skills needed to become a wildlife technician.
5. Gain an appreciation for the modern scope of scientific inquiry in the field of wildlife conservation management.
6. Develop an ability to analyse, present and interpret wildlife conservation management information.

Bzoosert504 (programme) Medical Diagnostic Techniques

- To apply fundamental practical skills for further studies and /or employment.
- To understand clinical significance of different tests.
- Evaluate quality control parameters.
- Distinguish between normal and abnormal laboratory results
- Gain knowledge about **Infectious Diseases, Clinical Microbiology and Clinical biochemistry.**
- **Gain about different types of tumors and its diagnosis technique.**

SEMESTER VI

Course Outcomes

BZOOCCHC601 (HONOURS): DEVELOPMENTAL BIOLOGY

Knowledge on the followings

1. Develop critical understanding how a single-celled fertilized egg becomes an embryo and then a fully formed adult by going through three important processes of cell division, cell differentiation and morphogenesis.
2. Understand how developmental processes and gene functions within a particular tissue or organism can provide insight into functions of other tissues and organisms.
3. Realize that very similar mechanisms are used in very diverse organisms; and development is controlled

BZOOCCHC602(HONOURS): EVOLUTIONARY BIOLOGY

Knowledge on the followings

1. Develop critical understanding how animals changed from a primitive cell to a collection of simple cells to form a complex body plan.
2. Examine the diversity and evolutionary history of a taxon through the construction of a basic phylogenetic/cladistics tree.
3. Understand how morphological change due to change in environment helps drive evolution over a long period of time.
4. Examine the evolutionary history of the taxa based on developmental affinities.

BSCHZOODSHC4 (HONOURS): PARASITOLOGY

Knowledge on the followings

- Describe the mechanisms for transmission, virulence and pathogenicity in pathogenic micro-organisms.
- Diagnose the causative agents, describe pathogenesis and treatment for important diseases.
- Describe the diagnosis and treatment of medically important parasitic diseases in India and West Bengal
- Describe and explain the appropriate measures for the prevention and control of parasitic diseases;
- Describe other medically important parasitic diseases in the world;
- Describe arthropod vectors that are capable of transmitting parasitic diseases and parasitic zoonoses

BZOODSHC6 Bio statistics and Bio informatics

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- **Have concept of data and distribution**
- Learn important statistical and bioinformatics concepts for analysing molecular data.

- Learn about correlation. Regression and t-test in detail
- Have knowledge of the specific statistical challenges associated with the analysis of high-throughput biological data.
- Know important biological databases and relevant statistics/ bioinformatics software tools.
- Be able to identify the data analysis problem and match the appropriate type of statistical method and corresponding software
- Able to calculate mean, median, mode, standard deviation and error.
- Explain which type of data is available from the most common public databases like (NCBI, EMBI, UniProt, GenBank, Protein Data Bank, CATH).
- Conceptualize the application of basic statistical concepts, diagrammatic and graphic representation data commonly used in biological research.
- Using basic analytical techniques to generate results and interpret results of commonly used statistical analyses which demonstrate statistical reasoning skills correctly and contextually.

Bzoodsr3 (program): PARASITOLOGY

Knowledge on the followings

- Describe the mechanisms for transmission, virulence and pathogenicity in pathogenic micro-organisms.
- Diagnose the causative agents, describe pathogenesis and treatment for important diseases.
- Describe the diagnosis and treatment of medically important parasitic diseases in India and West Bengal
- Describe and explain the appropriate measures for the prevention and control of parasitic diseases;
- Describe other medically important parasitic diseases in the world;
- Describe arthropod vectors that are capable of transmitting parasitic diseases and parasitic zoonoses

BZOOSERT 604 (PROGRAM): APICULTURE

Knowledge on the followings

1. Explain what are the prerequisite to get started in beekeeping.
2. Describe the laws around beekeeping.
3. Discuss the responsibilities of urban beekeepers.
4. Identify where to purchase equipment and demonstrate how to assemble It.
5. Name and identify major parts of the honeybee such as the stinger or mandibular parts.
6. Describe bee biology and anatomy from the perspective of managing bees.
7. Describe the importance of wax and identify what to look for in comb during hive inspections.

First Year

Semester I

UGZOOMJT101: Non-chordates and Cytogenetics

Theory=4 credits

Course objective: It is required to generalize about certain things and to dismiss others because the field of invertebrate biology is so extensive and runs across so many disciplinary lines that it is necessary to generalize about some topics. Classification, Structure and function were chosen as the primary focus for the curriculum that we devised for studying invertebrates so that we could establish common threads of interest. As a result, the most important objective that we have set for ourselves is to pique the students' interest in learning about the mystical world inhabited by animals that do not possess any notochords.

Genetics is one of the fastest-moving fields of science, with new discoveries being made every month. The study of genetics is timely, important, and fascinating because of the many

new discoveries and applications of genetics that have substantial economic and ethical implications.

Course outcomes:

At the end of the course the student should be able to:

1. Understand basics of classification of non-chordates.
2. Learn the diversity of habit and habitat of these species.
3. Study the functional biology of non-chordates through their body organization and its function.
4. Develop the skills to identify different classes and species of animals and their evolutionary relationships.
5. Enhance the basic laboratory skill like keen observation and drawing.
6. Understand the principles of inheritance, Mendel 's laws and the deviations
7. Comprehend the facts of sex determination in *Drosophila* sp.
8. Detect chromosomal aberrations in humans and study of pedigree analysis.

Semester II

UGZOOMJT201: Chordate and Physiology

Theory= 4 credits

Course objective: Chordate biology helps students gain an awareness and comprehension of scientific concepts that combine and reflect on how science works. As John A. Moore put it, science is the “way of knowing”. The comparative anatomy of vertebrates reveals distinct differences and similarities between the organisms. Using this section of the lesson, students will learn about the exciting journey of vertebrates and how evolution has shaped them to fit the demands of their surroundings.

The study of the structural and functional plans found in animals is known as animal physiology. Understanding how animals' function on all levels as a whole integrated organism, from cells to tissues to organs, can be aided by knowledge gained through the study of animal physiology. Clarifying the functions of all cells in all organs and all animals in relation to the neurological, respiratory, circulatory, muscular, cellular communication, and transport systems, as well as any other physiological systems, falls under the purview of the scientific discipline known as physiology.

Course outcomes:

At the end of the course the student should be able to:

1. Learn about the diversity, morphology, anatomy, and physiology of different chordate groups.
2. Comprehend the identification of species and their evolutionary relationships.
3. Understand the animal world and pursuing further studies and research that are directly linked to human welfare, such as disease control, animal husbandry, and functional studies.

4. Develop the skills to identify different classes and orders of Chordates.
5. Enhance of basic laboratory skill like keen observation and drawing.
6. Comprehend the regulatory mechanisms for maintenance of function in the body.
7. Develop the skills to identify different types of blood cells.
8. Enhance basic laboratory skill like keen observation, analysis and discussion.

Second Year

Semester III

UGZOOMJT301: Ecology and Evolution

Theory - 4 credits

Course objectives: Ecology deals with concept of ecosystem. The goal of this course to understand the basics of ecology. It includes population growth models, population genetics, community characteristics ecological succession etc. These disciplines of ecology help to develop an appreciation of the modern scope of scientific inquiry in the field of ecology and develop an understanding of the differences in the structure and function of different types of ecosystems.

In evolutionary study it aims to acquire knowledge about the evolutionary history of earth - living and non-living, to acquire basic understanding about evolutionary concepts and theories. It also includes the distribution of animals on earth, its pattern, evolution and causative factors which impart basic knowledge on animal behavioural patterns and their role.

Course Outcomes

On completion of this subject, students should be able to:

- Become familiar with the variety of ways that organisms interact with both the physical and the biological environment.
- Develop an understanding of the differences in the structure and function of different types of ecosystems.
- Learn techniques of data analysis as well as methods of presenting scientific information in figures and tables.
- Develop an appreciation of the natural world through direct experience with local ecosystems.
- Learn techniques for gathering data in the field.
- Develop an understanding on Life's beginnings – RNA world hypothesis along with natural selection which is one of several processes that can bring about evolution. Demonstrate knowledge of the concept of speciation, population genetics, Zoogeographical realms, Adaptation, Geological time scale, Phylogenetic trees etc. that will give a better understanding of how evolutionary science generates knowledge by way of hypothesis testing, systematic observations, and the comparative

Semester IV

UGZOOMJT401: Molecular Biology and Developmental Biology

Theory - 4 credits

Practical - 2 credits

Objective

Molecular biology deals with nucleic acids and proteins and how these molecules interact within the cell to promote proper growth, division, and development. It is a large and ever-changing discipline. This course (Group A) will emphasize the molecular mechanisms of DNA replication, repair, protein synthesis. In the part of developmental biology (Group B) student will gain a detailed understanding of the molecular, biochemical and cellular events that regulate the development of specialised cells, tissues and organs during embryonic development. In particular, cell signalling pathways that regulate embryonic induction, tissue interactions and pattern formation, and expression of regulatory genes. A particular focus is the experimental strategies and techniques that are used to identify molecular and cellular mechanisms of development.

Outcomes

On completion of this subject, students should be able to:

- Describe the core principles of molecular biology.
- Describe the genetic structure and types of chromatins.
- Elucidate the types, damage and repair of DNA, types of RNAs, genetic code, Understand the concept of mutations.
- Explicate the mechanism of gene regulation in prokaryotes.
- Understand the concept of gene expression in eukaryotes.
- Describe the morphological processes that transform a fertilised egg into a multicellular organism.
- Explain the molecular, biochemical and cellular events that regulate the development of specialised cells, tissues and organs during embryonic development.
- Identify model organisms used to investigate developmental biology and compare the developmental programmes of different organisms.
- Describe genetic, molecular and cellular techniques, including genome editing, used to investigate developmental and molecular biology processes in various organisms.
- Gain higher level thinking skills that is necessary for research.

UGZOOMJT402: Parasitology and Immunology

Theory - 4 credits

Course Objectives:

1. To provide students with knowledge regarding parasitological terms, types of parasites and host parasite relationship.
2. To provide students with knowledge concerning biological and epidemiological aspects of parasites causing diseases to humans.
3. To enable students to understand the pathogenesis, clinical presentations and complications of parasitic diseases.
4. To enable students to learn diagnosis and know the general outline of treatment, prevention and control of parasitic infections.
5. To provide students with knowledge regarding basic idea of zoonosis and zoonotic diseases. To provide an adequate knowledge about the basic concepts of health and diseases.
6. To provide students with knowledge regarding cells and organs of the immune system.
7. To enable students to understand the innate and adaptive immunity.
8. To provide students with knowledge about antigens and immunoglobulins.
9. To enable students to understand the antigen-antibody interactions and monoclonal antibody production.
10. To provide an adequate knowledge regarding vaccines and autoimmune diseases.

Course Outcomes:

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

1. Identify the different types of parasites.
2. Classify parasites causing diseases to humans.
3. Assess the reasons of infections with parasites.
4. Explain the life cycles of various parasites.
5. Discuss the relationship between each parasite and its host.
6. Conduct procedures related to isolation of some parasites.
7. Define the principles of management for some common parasitic diseases.
8. Outline the methods of parasitic disease treatment, prevention and control.
9. Functioning in multi-disciplinary teams to advise the general public on scientific basis to prevent infections with parasite. Discuss the function of cells and organs involved in immunity.
10. Explain features and mechanisms of innate and adaptive immunity.
11. Describe the mechanisms involved in acute and chronic inflammation.
12. Explain about autoimmune diseases.
13. Clarify the antigen-antibody interactions and monoclonal antibody production.
14. Apply the acquired knowledge to explain defence mechanisms against infectious agents.
15. Advise the general public why vaccination is necessary.

Third Year

Semester V

UGZOOMJT501

Theory=4 credits

Course objective: Taxonomy is the science of classification in general, but more specifically the classification of living and extinct organisms—i.e., biological classification. The term comes from the Greek words taxis (arrangement) and nomos (law). Taxonomy is thus the methodology and principles of systematic Botany and Zoology that organizes plant and animal species into hierarchies of superior and subordinate groups. In 1813, the Swiss botanist Augustin Pyramus de Candolle proposed the term for plant classification. This course is designed to clear the basic fundamental idea regarding traditional and molecular taxonomy. In the portion of Biostatistics, the students will have an exposure on the basic statistical tools that are an essential part of modern biological research.

The second unit of this course provides some of the most important and fundamental analytical tools used in Biological Sciences that will engage the students with technical knowledge that could help them in better understanding of biological processes in broad range.

Course Outcomes

Taxonomy & Analytical tools in Biological science

Students will have learning about the basic taxonomy and systematics and classification of animal kingdom. In this course students will also learn about various data analyzing tools and techniques such as central tendency, t-test, chi-square, ANOVA, correlations and regression etc. They will handle common software used in statistical analysis and bio-informatics. They are expected to gather knowledge on implementation of various tools in biomedical research works.

UGZOOMJT502

Theory=4 credit

Course Objective: Mother Nature offers us a plethora of animal diversity, and if we are able to conserve them properly they could generate a source of income being exploited for the betterment of mankind. Thus, studying Aquaculture, Sericulture, Lac Culture, Apiculture and Poultry farming are the burning topics of the day especially in view of population explosion and need of more animal protein and other animal products. Additionally pest management is another big issue that will be addressed.

Course Outcomes

Economic Zoology,

Economic Zoology: In this section students will learn about the concepts and methods of aquaculture, sericulture apiculture, lac culture and poultry farming. They will also learn the methods of integrated pest management. After learning such concepts and tools they will be

able to employ these strategies in their practical life and will be able to establish or manage farms.

Semester: VI

UGZOOMJT601

Theory=4 credits

Course objective: Clinical Physiology is the study of life, especially how cells, tissues and organs function. It is a core and fundamental scientific discipline that underpins the health and well-being of living organisms. This paper provides a course of study in mammalian (principally human) systems and their physiology, based on the knowledge of basic physiological principles already studied in Semester II. The main objective of this paper is to expand some areas touched in Semester II and also introduce new and more complex physiological functions.

Course Outcomes

Clinical Physiology

Clinical Physiology: Students will learn about basics of histology. They will also understand the physiology of muscles, nerves, reproductive systems and bone. They will learn details of endocrinology with classification of hormones, their biosynthesis, receptors, mode of molecular actions, physiological function, feedback controls and related disorders. Students will know the physiology of digestion, respiration, circulation, excretion etc.

Reproductive Biology: In this section students will learn about the basic concept and mechanism of reproductive physiology as well as practical implications of the reproductive biology such as IVF, contraception, and how to medically manage menopause and andropause.

Course Outcomes:

Biochemistry: Students will understand the basic and fundamental biochemistry of carbohydrates, proteins, lipids and nucleic acids. They will also understand the nature, mechanism, and kinetics of enzyme action. The students are expected to learn to prepare various types of solutions. Some instrumentation such as Colorimetry/ Spectrophotometry, SDS-PAGE etc. will also be learnt.

UGZOOMJT603

Theory=4 credits

Course Objective: Animal Behavior has been associated with educational curricula for introductory courses in biological science for more than 40 years. When it comes to studying animal behaviour, a more integrated approach is needed to stay up to date with the

developments in this field. This course emphasizes research that links behaviour to the brain, genes and hormones as well as to environmental and social factors. It also aims to test out fresh theories on how animal behaviour has evolved. Finally, its fundamental objective is to provide students with a window into the multiple levels of analysis that researchers employ to explain why all living things behave, often in complex ways

Course Outcomes

Biochemistry: Students will understand the basic and fundamental biochemistry of carbohydrates, proteins, lipids and nucleic acids. They will also understand the nature, mechanism, and kinetics of enzyme action. The students are expected to learn to prepare various types of solutions. Some instrumentation such as Colorimetry/ Spectrophotometry, SDS-PAGE etc. will also be learnt.

Adaptation and Animal behavior: Students will know in details about patterns of behaviors, survival strategies, social and cooperative behaviors, design of signals and chronobiology.

UGZOOMJOI604

Outreach/ Internship 2 Credits

Fourth Year

Semester VII

UGZOOMJT701

Course Objective: The field of invertebrate biology is so vast and runs across so many disciplinary lines so, it is necessary to make certain generalisation and to avoid others. Structure and function are the two primary focuses for the curriculum which is necessary to build up common threads of interest among students. The first topic, structure gives the general idea about the fundamentals of functional body architecture. The second group of themes emphasises on the degree to which the structure has been adapted over time to fulfil a specific function for the organism that bears it. After the completion of this course the student's interest will be widen in knowing about the complex diversity of our living world inhabited by the animals which does not have notochord in any stage of their life cycle.

Course Outcome: This curriculum will provide a wide and vast understanding about the evolutionary changes of the invertebrate systems which depends upon their survival and reproduction within thenatural habitat.

UGZOOMJT702

Theory=4 credits

Title: Chordate structure & function

Course Objective: The biology of chordates provides awareness and understanding about the fundamental scientific concepts that reflects upon the concepts of how science of the

natural world works. As John A. Moore put it, science is the “way of knowing”. The comparative anatomy of vertebrates provides comparison between the organisms of the living world. The skeleton system of animals relies upon the basic anatomy while evolution of vertebrates deals with the progression and development of a complicated interrelated system of organs and their functions. The anatomy of vertebrates gives a strong example of how the evolution of an integrated organism works. From this section of the lesson, students will learn about the exciting journey of vertebrates and how evolution has shaped them to fit the demands of their surroundings.

Course Outcome: After completion of the course students will gain knowledge about the diversity, morphology, basic anatomy, and physiology of the different groups of chordates which will help them to understand the animal world and the further studies that are directly linked to human welfare, such as disease control, animal husbandry, and functional studies.

UGZOOMJT703

Theory=4 credits

Ecosystem Structure and Function

Course Objective: The term "Ecology" refers to the study of inter-relationships between organisms and their physical environment. There are various ways in which these relationships can regulate the natural ecosystem such as distribution and abundance of living organisms, the variety of species living together, and the energy flow in natural ecosystem. Since environmental change is occurring at a rapid rate in the early twenty-first century it is vital that we better comprehend the ecology of the planet. While most people associate ecologists with fieldwork, ecologists who develop theoretical models or do laboratory research have made some of the most significant contributions to ecological theory. We can clearly see that our simplistic description of ecology does not adequately convey its vastness or the diversity of its practitioners. Let's talk at this course to have a better grasp of what ecology is all about.

Course Outcome: After completion of this course the student will know about the basic information about ecosystem and figure out how to use it. The following is part of this information: population growth and the factors influencing this growth, Resource - consumer interactions, models of natural resources and sustainable development, ecological footprint analysis, ecosystem health etc

Semester VIII

UGZOOMJT801:

Theory=4 credits

Course Objective: To understand the complicated cellular chemistry, a comprehensive study of sub-cellular component is prerequisite. Recently developed mathematical/computational approaches explained cellular behaviour through the generation of quantitative information, some of which have yet to be invented. Emerging approaches in the evaluation of quantitative information has now become the primary focus for cell biologists.

Course Outcome: The students will know more about the key concepts that underlies the cellular biochemistry. The importance of well-synchronised activity of the cell is necessary for the continued existence of a living organism.

UGZOOMJT802

Theory=4 credits

Clinical Immunology and Infection Biology

Course Objective: This topic gives emphasis on the advanced immunological aspects including treatments related to immunity. The students will be able to understand the theoretical framework about the complex molecular mechanisms involved in the immunity and the related immunological methods. Along with these the students will be able to understand about tolerance, immunodeficiency and vaccination, immunology of transplantation, the immunology of tumors, immunomodulation, and immunopharmacology.

Course Outcome: After completion of this elective, student will understand the fundamentals of molecular mechanism behind immunity. They will have a wide knowledge of many immunological techniques that include immunohistochemistry, ELISA, FACS etc. They will simply gain the basics of tolerance, autoimmunity, immunological disease, and cancer immunology. They will also understand the basic idea of immunomodulation and immunopharmacology.

UGZOOMJT803:

Theory=2 credits

Course Objective:Due to significant loss of biodiversity and deterioration of natural ecosystems, there is little room for argument that all life on earth is currently in jeopardy. As a result, this course is available to all graduate students, regardless of their academic expertise, in order to make them aware of and sensitize them to this survival dilemma. Students who complete this course will have gained a solid foundation in the importance of biodiversity and ecosystem services in supporting life on Earth, as well as an understanding of the dangers posed by the careless behavior of man.

Course Outcome:Biodiversity and wildlife: Student will be learning the various issues related to biodiversity loss and conservation as well as status, conditions and conservation of forests and wildlife. They will also be able to use various tools used in field biology.

UGZOOMJT804:

Theory=2 credits

Course Objectives : Reproductive Biology covers principles and techniques in reproduction. It also enlightens the areas including Physiology of human reproductive system and its hormonal regulation, Applications of Reproductive Biology like Artificial Reproductive Techniques (ARTs) etc. that will help to develop further practical skills or research ability of the students.

Course outcome:Reproductive Biology: In this section students will learn about the basic concept and mechanism of reproductive physiology as well as practical implications of the reproductive biology such as IVF, contraception, and how to medically manage menopause and andropause.

UGZOOMJT805:

Theory=2 credits

Title: Biotechnology

Course Objective: Biotechnology has transformed the planet. Advances in biotechnology now can track many inherited disorders. People may now live in considerably higher population densities due to biotechnology's ability to produce more food per acre. As a result of advance biotechnology, we now know more about genomes of a wide range of creatures, from viruses to trees to people. Science has been shifted from a descriptive to a variety of fields that generate new items such as pharmaceuticals, vaccines, and meals thanks to the application of this knowledge. This course is designed to flash the spotlight of Biotechnology on student to make them equipped with the modern science

Course Outcome: The key objective of this class is to provide fundamental knowledge about the structural and functional features of biological macromolecules such as DNA, RNA, and proteins. After completion of this course the students will be able to use this knowledge in their scientific discipline and in future higher studies.

UGZOOMJR806

For Honours with Research

Research Project/ Dissertation 12 Credits

Minor

First Year

Semester I

UGZOOMIT101

Theory=2 credits

Course objective:It is required to generalize about certain things and to dismiss others because the field of non-chordate and chordate biology is so extensive and runs across so many disciplinary lines that it is necessary to generalize about some topics. Classification, Structure and function were chosen as the primary focuses for the curriculum that we devised for studying diversity of animals so that we could establish common threads of interest.

Genetics is one of the fastest-moving fields of science, with new discoveries being made every month. The study of genetics is timely, important, and fascinating because of the many new discoveries and applications of genetics that have substantial economic and ethical implications.

Course outcomes:

At the end of the course the student should be able to:

1. Understand basics of classification of non-chordates and chordates.
2. Learn the diversity of habit and habitat of these species.
3. Study the functional biology of animals through their body organization and its function.
4. Develop the skills to identify different classes and species of animals and their evolutionary relationships.
5. Enhance the basic laboratory skill like keen observation and drawing.
6. Understand the structure and function of the cell organelles
7. Understand the principles of inheritance, Mendel 's laws and the deviations
8. Comprehend the facts of sex determination in *Drosophila* sp.
9. Detect chromosomal aberrations in humans and study of pedigree analysis.

Minor

Second Year

Semester III/IV

UGZOOMIT201:

Ecology and Evolution

Theory - 2 credits

Course objective: Basic concept of how animals interact with their surroundings and what are the factors that regulates the extremely complex multi species dynamics in which each species and individual plays a specific role is absolute necessity to understand impact of human activities, fragility of a system and its outcome, possible ways of restoration and management. Ecological awareness and knowledge how complex interconnected biotic and abiotic components of nature ultimately regulates global outcomes is thus a necessary part of any biological course.

Elementary and fundamental idea regarding how forces of nature and ecological, biological interactions continuously push individual, species and groups to change characteristics to prevent extinction and evolve in to organisms that are different from ancestor is necessary to understand any biological process and even systems that has the capacity to evolve like Artificial intelligence. Last but not the least it provides us with a glimpse of our past selves and our probable future selves.

Understanding of Molecular biology and Developmental biology is now a must have skill as most of the biological processes are studied at molecular level and knowledge of developmental biology prepares a student for further studies that require how different functional organs function, what are probable causes of any dysfunction and how development diseases can be prevented or cured.

Course outcomes:

- Become familiar with the variety of ways that organisms interact with both the physical and the biological environment.
- Develop an understanding of the differences in the structure and function of different types of ecosystems.
- Develop an appreciation of the natural world through direct experience with local ecosystems.
- Learn techniques for gathering data in the field.
- Develop an understanding on Life's beginnings with natural selection which is one of several processes that can bring about evolution.
- Demonstrate knowledge of the concept of speciation, Adaptation,
- A better understanding of how evolutionary science generates knowledge by providing information regarding how systems and function change over time.
- On completion of this subject, students should be able to:
 - Describe the core principles of molecular biology.
 - Describe the genetic structure and types of chromatins.
 - Elucidate the types, damage and repair of DNA, types of RNAs, genetic code, Understand the concept of mutations.
- Describe the morphological processes that transform a fertilised egg into a multicellular organism.
- Explain the molecular, biochemical and cellular events that regulate the development of specialised cells, tissues and organs during embryonic development.
- Identify model organisms used to investigate developmental biology and compare the developmental programmes of different organisms.
- Describe genetic, molecular and cellular techniques, including genome editing, used to investigate developmental and molecular biology processes in various organisms.
- Gain higher level thinking skills that is necessary for research.

Minor

Third Year

Sem V

UGZOOMIT301

Course objective: Biochemistry is the wing of biology that deals with the basic bio-molecules and their structure and function. Here an emphasis has been made so that the students can obtain a basic understanding of chemical solutions, metabolic processes of bio-molecules, enzymes and Bioenergetics. Furthermore, this paper deals with Physiology which is the study of the structural and functional plans found in animals. Understanding how animals' function on all levels as a whole integrated organism, from cells to tissues to organs, can be aided by knowledge gained through the study of animal physiology. Clarifying the functions of all cells in all organs and all animals in relation to the neurological, respiratory, circulatory, muscular systems etc. falls under the purview of the scientific discipline known as physiology.

The other half of this paper deals with Biodiversity and Conservation. Due to significant loss of biodiversity and deterioration of natural ecosystems, there is little room for argument that all life on Earth is currently in jeopardy. As a result, this course is available to all graduate students, regardless of their academic expertise, in order to make them aware of and sensitize them to this survival dilemma.

Course Outcomes:

Course outcome: Students who complete this course will have gained a solid foundation in the basic Biochemistry and physiological processes and are also expected to be having profound knowledge on the importance of biodiversity and ecosystem services in supporting life on Earth, as well as an understanding of the dangers posed by the careless behavior of man and possible conservation strategies.

MINOR

Fourth Year

Theory=2 credits

Sem VII

UGZOOMIT401

Course Objectives:

This course is aimed to provide students with knowledge regarding parasitological terms, types of parasites and host parasite relationship. To provide students with knowledge concerning biological and epidemiological aspects of parasites causing diseases to humans. To

enable students to understand the pathogenesis, clinical presentations and complications of parasitic diseases. To enable students to learn diagnosis and know the general outline of treatment, prevention and control of parasitic infections. To provide students with knowledge regarding basic idea of zoonosis and zoonotic diseases. To provide an adequate knowledge about the basic concepts of health and diseases. To provide students with knowledge regarding cells and organs of the immune system. To enable students to understand the innate and adaptive immunity. To provide students with knowledge about antigens and immunoglobulins. To enable students to understand the antigen-antibody interactions and monoclonal antibody production. To provide an adequate knowledge regarding vaccines and autoimmune diseases.

Advances in biotechnology now can track many inherited disorders. People may now live in considerably higher population densities due to biotechnology's ability to produce more food per acre. As a result of advance biotechnology, we now know more about genomes of a wide range of creatures. It is the most promising field that generates pharmaceuticals, vaccines, and treatments . This course is designed to flash the spotlight of Biotechnology on student to make them equipped with the modern science

Statistics is fundamental to experimental science, to prove or disprove or to establish meaningful interpretation of data. This course is designed to clear the basic fundamental idea regarding traditional and molecular taxonomy. In the portion of Biostatistics, the students will have an exposure on the basic statistical tools that are an essential part of modern biological research.

Course Outcomes:

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

1. Identify the different types of parasites.
2. Classify parasites causing diseases to humans.
3. Assess the reasons of infections with parasites.
4. Define the principles of management for some common parasitic diseases.
5. Outline the methods of parasitic disease treatment, prevention and control.
6. Functioning in multi-disciplinary teams to advise the general public on scientific basis to prevent infections with parasite.
7. Discuss the function of cells and organs involved in immunity.
8. Explain features and mechanisms of innate and adaptive immunity.
9. Explain about autoimmune diseases.
10. antigen-antibody interactions and antibody production.
11. Apply the acquired knowledge to explain defence mechanisms against infectious agents.
12. Advise the general public, why vaccination is necessary.
13. Students will also learn about various data analysing tools and techniques such as, t-test, chi-square, , correlations and regression etc.

14.. They are expected to gather knowledge on implementation of various tools in biomedical research works.

15. Fundamental knowledge about the structural and functional features of biological macromolecules such as DNA, RNA, and proteins.

16. After completion of this course the students will be able to use this knowledge in their scientific discipline and in future higher studies.

BSc with Physics Hons

2022-23

Programme Outcome: After completing the BSc programme with Physics Hons, the students will develop a strong analytical skill and will be able to study critically a physics problem, solve the problem using different tools and present the result/conclusion. They have developed their skills in computer programming, presenting their ideas and developing an environment friendly technology for a pollution free nature.

They will develop a good communication skill such that they can explain complicated physics technical terminologies in simple manner. They will be aware of the information available nowadays and will be able to retrieve information from e-libraries and other e-sources available using internet. They will be aware of their ethical and moral values and not practice fabrication and plagiarism. They will know of their responsibility of preserving our environment and the world. Finally, they will be ready to work individually as well as in a team. They also develop ability to work in group, capacity of critical reasoning, judgment and communication skills and abilities for logical thinking.

Course outcome:

In each course students will acquire theoretical as well as practical knowledge about different subject areas of basic science.

Course name	Course Title	SEM	Course Outcome
BPHSCCHC101	Mathematical Physics I	I	This course will acquaint the students with basic mathematical tools like vectors, matrices and calculus which are extremely essential to study theoretical and experimental physics. The students will learn basics of programming in Python, a universally accepted open source programming language
BPHSCCHC102	Mechanics		This course in Classical Mechanics serves as the foundation for further progress towards study of physics at graduate or post-graduate level. Newtonian mechanics forms the basis of this course. The study of nature through different conservation principles are introduced with detailed treatment. The Physics of rotational motion of a rigid body and fluid motion are also introduced. In this course the students will be familiar with some

			<p>basic apparatus used in physics laboratory. They will learn how to make systematic experimental observation, data collection, recording of data and other basic laboratory practices in this course.</p>
BPHSCCHC201	Electricity and Magnetism	II	<p>The students will learn fundamental properties of charged particles and electric fields in this course. This course will also give students an understanding of the phenomena of electricity, magnetism, electromagnetic induction and electrical circuits which are extremely essential for higher studies in physics and also important for various engineering applications. The students will strengthen their skill of experimental work in this course. They will be familiar with various electrical components, power supply, multimeter and various other measuring instruments.</p>
BPHSCCHC202	Waves and Optics		<p>The students will gain basic knowledge about vibration, wave motion and wave theory of light. Study of classical harmonic oscillator and wave propagation in vacuum and material media, and phenomena of interference and diffraction of light are important for further progress to more advanced topics of Physics. In this laboratory course the students will be acquainted with spectrometer, a very important optical instrument and some other optical instruments like Fresnel's biprism and Newton's ring experiment.</p>
BPHSCCHC301	Mathematical Physics-II	III	<p>In this course the students will learn more advanced topics of mathematical physics like Fourier series, some special functions, special integrals, integral transforms, partial differential equations and probability. In this course the students will learn more advanced computational techniques using different packages of Python like numpy, scipy, matplotlib etc.</p>
BPHSCCHC302	Thermal Physics		<p>The students learn the basic distribution laws which are obeyed by the molecules in the Thermal Physics part and the application to explain the basic laws of ideal gas. The limitation to explain different observed phenomena with ideal gas prescription leads the study of real gas and also conduction of heat in this course. This part covers other very important aspects related to academic</p>

			importance and also to industrial applications. In this course the student will perform different experiments on heat and thermodynamics. This laboratory course will further enrich their experimental skill learned so far.
BPHSCCHC303	Analog Systems and Applications		This course forms the basis of electronics which is undoubtedly at the heart of most of the technological advances of the present era. The students will understand the basic concepts of semiconductor physics and its application. They will learn about the operation, characteristics and various applications of different type of diodes, transistors, field effect transistors, OPAMP and oscillators. They will also have an idea about working of amplifier and regulated power supply. This laboratory course will provide the student with adequate exposure to some essential laboratory equipments like CRO, function generator, regulated power supply etc. The students will design, fabricate and perform experiments with zener diode.
BPHSSEHT305	Renewable Energy and Energy harvesting		Students will know about different types of renewable energy and different technology to produce green energy.
BPHSCCHC401	Mathematical Physics III	IV	The students will learn the mathematical tools required for study of some advanced topics of theoretical physics. They will learn complex analysis, variational calculus and its application which results in the famous Lagrangian and Hamiltonian formulation of classical mechanics.
BPHSCCHC402	Elements of Modern Physics		Quantum Mechanics will be introduced here. Students will find application in this course and hence this is the appropriate course to introduce Atomic Physics so that the students get continuity in their progress.
BPHSCCHC403	Digital Systems and Applications		This course lays the foundation for understanding the digital logic circuits and their use in combinational and sequential logic circuit design. It also imparts information about the basic architecture, memory and input/output organization in a microprocessor system.
BPHSSEHT405	Computational Physics Skills		Learn the Basic Programming Concept, : Improve the logical as well as Computational ability
BPHSCCHC501	Quantum	V	Introduction to Quantum Mechanics,

	Mechanics & Applications		Historical background, Matter Waves, Wave particle duality, Phase and Group Velocity, Heisenberg's Uncertainty Principle There are many atomic models to explain atomic structure. But none of the model explained atomic structure fully. A new model could explain all parameters of atomic structure called vector atom model. Studying these model students can draw vector diagrams easily.
BPHSCCHC502	Solid State Physics		Students will able to study difference between crystalline and amorphous material, crystal structures, miller indices, interplaner distances, interatomic forces and bonds. From this study students get to learn the basics of solid state physics.
BPHSDSHC	Advanced Mathematical Physics		Students will know about advanced mathematical technique like tensors, metric and variational principles.
BPHSDSHT	Classical Dynamics		Students will learn Lagrangian and Hamiltonian formulations. Canonical transformation, Poisson's Bracket concept. Using the technique of Lagrangian and Hamiltonian formulation students will explain motions of different bodies in simple form such as kinetic and potential energy.
BPHSCCHC601	Electromagnetic Theory	VI	The students will go through a very important training in Electromagnetic Theory which is one of the fundamental components of classical physics. The important set of relations of Electrostatics, Magnetostatics, Electro-magnetic Induction, taught in earlier Semesters find application in this topic. The electromagnetic wave is generated naturally from the Maxwell's relations and the students will get the explanation of polarization and related optical and other aspects from this theory.
BPHSCCHC602	Statistical Mechanics		The students will use Python programming to study aspects of statistics like Random numbers and Time scale, application of Random numbers including Monte Carlo integration. The approach is extended also to the study of different distributions in statistical mechanics.
BPHSDSHT	Nuclear and Particle Physics		The students of UG level will get the first lesson of Nuclear Physics in this topic. The contents are very important from the

			viewpoints of both theory and applications. Since it is very difficult to set up Nuclear Physics Laboratory at the UG level, the students are taught very carefully so that they may get the necessary inputs to carry on the study in Masters and in the Research level in reputed national and International Laboratories.
BPHSDSHC	Communication Electronics		The students will learn about different types of electronic communication like digital, continuous. They will know about modern days communication technique like satellite communication and mobile communications.

Syllabus Outcome

Subject: Chemistry

Inorganic Chemistry – I

COURSE OUTCOMES: 1.1 Gather an in-depth knowledge about atomic structure.
1.2 Understand the periodic properties of the elements.
1.3 Understand the concepts of a redox reaction.
1.4 Explain various phenomenon of redox

Organic Chemistry – I

COURSE OUTCOMES: 2.1 Understand the valence bond theory.
2.2 Understand the basics of electronic displacements.
2.3 Understand the concepts of a Molecular Orbital theory.
2.4 Understand the physical properties of the organic

Physical Chemistry – I

COURSE OUTCOMES: 3.1: Introduce the basic definitions of Thermodynamics and the concepts of heat, energy, work,
and their interrelationship.
3.2: To understand the details of two major Thermodynamic Laws along with their applicability

Inorganic Chemistry – II

COURSE OUTCOMES: 4.1 Thorough understanding of Chemical Bonding with special Emphasis on Ionic, Covalent
bonding and Concepts of weak bonds like Hydrogen Bond, van der Waals bond.
4.2 Understanding the concepts of Molecular Orbit

Organic Chemistry – II

COURSE OUTCOMES: 5.1 Understand the aliphatic substitution reactions.
5.2 Understand the basics of elimination reaction.
5.3 Understand the concepts of a Molecular Orbital theory.

Physical Chemistry – II

COURSE OUTCOMES: 6.1: Kinetic Theory of Gases, Behaviour of Real Gases, and Related Theories
6.2: Thermodynamic rationale of the behaviour of solutions and mixtures, the thermodynamics
of different phases of matter, and phase transition

Organic Chemistry – III

COURSE OUTCOMES: 7.1 Thorough understanding of addition reactions involving alkenes and alkynes.

- 7.2 Detailed study of various aromatic electrophilic and nucleophilic reactions .
7.3 Detailed study of reactions involving carbonyl compounds

Inorganic Chemistry – III

COURSE OUTCOMES: 8.1 Thorough understanding of Co-ordination chemistry in the light of VBT, CFT, LFT.
8.2 Understanding of the colour and spectra of co-ordination Compounds and their magnetic properties.

Physical Chemistry – III

COURSE OUTCOMES: 9.1: This module will be helpful in understanding the Fundamentals of Quantum Mechanics,
which include the Postulates of Quantum Mechanics, the Concept of Wave Function, the Probabilistic Nature of Quantum Particles

Organic Chemistry – IV

COURSE OUTCOMES: 10.1 Thorough understanding of reactions involving nitrogen compounds.
10.2 Detailed study of rearrangement reactions , which includes several organic name reactions.

Organic Chemistry – V

COURSE OUTCOMES: 11.1 Thorough understanding of carbocycle and heterocycle systems and corresponding reactions. CO- 11.2 Detailed study of stereochemistry of alicyclic compound s and corresponding reactions viz, elimination, substitution reactions

Inorganic Chemistry – IV

COURSE OUTCOMES: 12.1 Developing the idea and concepts of Bio-inorganic chemistry.
12.2 Understanding of Organometallic chemistry from Inorganic point of view.
12.3 Study of catalysis by organometallic compounds.

BACHELOR OF ARTS (BA) AND BACHELOR OF SCIENCE (BSC) HONOURS IN ECONOMICS

Program Outcome: The B.A. (Hons) Economics program under CBCS provides a firm basis for much of the advanced thinking in the Economics discipline. Its outcomes provide students with a logical paradigm for modeling and interpreting the behavior and interactions of households, firms, and government institutions. Consistent with global standards in the Economics discipline, this program shall deliver a platform for training. The curriculum outcome allows students to choose elective courses from a set of courses with contemporary relevance, thereby offering students the flexibility to prepare for multidisciplinary careers across various fields.

Semester	Course Title	Code &	Course Outcome
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Sem - I	BECOCCHT101: CC1, Introductory Microeconomics	This paper serves as an introduction to microeconomics, giving students a strong basis on which to build their economic analysis skills. The first section of the paper provides an overview of supply and demand as well as the fundamental factors that affect equilibrium in a market economy. The objective of this course is to introduce students to the fundamental ideas of microeconomic theory. The course will demonstrate how to apply microeconomic ideas to examine real-life situations, with a focus on thinking like an economist.
Sem - I	BECOCCHT102: CC2, Mathematical methods in Economics-I	The goal of the course is to provide students with the foundational mathematics needed to study economic theory at the undergraduate level. This includes courses on statistics, econometrics, macroeconomic theory, and microeconomic theory. Students in this course are introduced to specific economic models that serve as tools, not the ends, in demonstrating how mathematical concepts are applied to economic theory in general.
Sem - II	BECOCCHT201: CC3, Introductory Macroeconomics	The course's goal is to introduce the students to the fundamental ideas of macroeconomics. The results introduce the students to the basic ideas involved in calculating and measuring aggregate macroeconomic variables, such as GDP, money, savings, investments, inflation, and the balance of payments.
Sem - II	BECOCCHT202: CC4, Mathematical methods in Economics-II	This paper is a progression from the Mathematical Methods for Economics-I paper and aims to develop understanding and skill in the application of mathematical theorems and techniques to economic theory and applications. Topics include linear algebra, functions of several real variables, multi-variable optimization, and differential equations. Learning outcomes include capability to formulate static and dynamic theoretical models and solving applications in economics, as in production and consumption theory, macroeconomic modelling, and financial economics amongst others.
Sem - III	BECOCCHT301: CC5 Intermediate Microeconomics-I	This course aims to give students a solid foundation in microeconomic theory so they may formally study the actions of individual economic agents. Students will be able to utilize mathematical tools to comprehend fundamental ideas after finishing this course.
Sem - III	BECOCCHT302: CC6, Intermediate Macroeconomics-I	The course outcome will be to introduce the students to formal modeling of a macro-economy in terms of analytical tools. It discusses various alternative theories of output and employment determination in a closed economy in the short run as well as medium run, and the role of policy in this context. It also introduces the students to various theoretical issues related to an open economy.
Sem - III	BECOCCHT303: CC7, Statistical Methods for Economics	This paper is an introductory, though challenging course in basic statistical methods. It prepares students in utilizing statistical techniques for quantitative, data-based problems, analysis and inference. It also develops the ability to understand econometrics courses at the Honours and Masters levels. Topics include elementary probability theory, random variables and probability

		distributions, random sampling and jointly distributed random variables, sampling, point and interval estimation. Learning outcomes include developing proficiency for statistical research in academics, research institutions and industry.
Sem - IV	BECOCCHT401: CC8, Intermediate Microeconomics-II	This course is a sequel to Intermediate Microeconomics I. The outcome is based on giving conceptual clarity to the student coupled with the use of mathematical tools and reasoning. It delivers ideas on general equilibrium and welfare, imperfect markets and topics under information economics to pupils.
Sem - IV	BECOCCHT402: CC9, Intermediate Macroeconomics-II	This paper aims to provide students with a solid understanding of macroeconomics at the intermediate level, and to ensure that they can apply macroeconomic analysis to the study of economic problems such as inflation, unemployment, budget deficit and many more. In this paper, the modern theories of the determination of consumption, investment, demand for money, steady state levels and growth rate of capital and income are developed and the implications of each model/theory on alternate fiscal and monetary policy seeking to facilitate full employment, economic growth and price stability are discussed.
Sem - IV	BECOCCHT403: CC10, Introductory Econometrics	This course outcome involves providing a comprehensive introduction to basic econometric concepts and techniques to students. It covers statistical concepts of hypothesis testing, estimation and diagnostic testing of simple and multiple regression models. The course outcome covers the consequences of and tests for misspecification of regression models.
Sem - V	BECOCCHT501: CC11, International Economics	The paper on International Economics is well prepared for students of third year undergraduate honors programme. It includes classical and new theories of international trade. It familiarizes students on trade policies on the one hand and on the other hand introduces open economy macroeconomics dealing with exchange rate determination in presence of 'expectation' and different policies to maintain stability in the external front. This is an optional paper but given the content it is observed that most of the students of fifth semester opt for this paper. The students take interest in studying the paper as it gives them an opportunity to understand and analyse the real-world trade related issues. They score well both in internal assessment as well as in end semester examination. In post graduate programme in Economics students find it easier to understand the advanced course in International economics having their strong foundation attained through this course.
Sem - V	BECOCCHT502: CC12, Public Economics	Public Finance as a subject for undergraduate students is very important in the highly competitive world. Given the limited resources and unlimited demand and desires, the subject helps students understand how government should use the funds of the public. The paper includes topics such as

		public goods, budget and some of the latest tax reforms. All this helps the student to understand the working of the economy in context of above mentioned topic and thus makes them capable of evaluating the pros and cons of public policies.
Sem - V	BECODSHT1 , DSE1. Issues in Indian Economy	This paper examines sector-specific policies and their impact in shaping trends in key economic indicators in India to the third-year students in their sixth semester. It highlights major policy debates and evaluates the Indian empirical evidence after liberalisation. Given the rapid changes taking place in the country, the course gives an insight into macroeconomic policies and their impact, policies pursued and the performance of the agricultural sector and the industrial sector over a period of time. It also throws light on the trends and performance in the services sector in terms of its growth, productivity, diversification, competition policy, and foreign investment among other things. The purpose of the paper is to provide a more comprehensive view of the students, making them more aware about the economic activities taking place around them.
Sem - V	BECODSHT2, DSE-2, Economics of Health & Education	On successful completion of this course students will be able to understand the importance of education and health in improving well-being (as per the Millennium Development Goals, other goals), they have idea on status of primary education, child mortality, maternal health and combating diseases. They acquired idea on microeconomic framework to analyze, among other things, individual choice in the demand for health and education. They know the idea on government intervention and aspects of inequity and discrimination in both sectors.
Sem - V	BECODSHT3, DSE3, Applied Econometrics	This paper is an extension to the Introductory Econometrics compulsory paper of Semester IV. The course is specifically designed for students who are keen to pursue empirical research after graduation. Broadly, the course includes matrix approach to linear regression model, review of functional forms and qualitative explanatory variable regression models, regression diagnostics: detection of, and remedial measures for multicollinearity, autocorrelation, heteroscedasticity, model selection, dynamic econometric models, instrumental variable estimation, simultaneous equations model, panel data models and estimation techniques. Thus, qualifying this paper considerably adds to the profile of the student applying for jobs in the corporate and government organisations, research institutions, and in teaching
Sem - VI	BECOCCHT601: CC13, Indian Economy	Using appropriate analytical frameworks, the course outcome involves delivering to students the major trends in economic indicators and policy debates in India in the post-Independence period, with particular emphasis on paradigm shifts and turning points.
Sem - VI	BECOCCHT602: CC14, Development Economics	The course outcome focusses on alternative conceptions of development and their justification. It provides the understanding of 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.
Sem - VI	BECODSHT4, DSE4, Environmental Economics	This course outcome focuses on making students understand about the 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.
Sem - VI	BECODSHT5, DSE5, Money and Financial Markets	This is a paper on the economics of money, banking and financial markets. It provides coverage of economic principles that underlie the operation of banks and other financial institutions. The paper aims to provide the student with an introduction to the role of money, financial markets, financial institutions and the monetary policy in the economy, thus providing a solid foundation for further study or employment in the financial services industry. The paper establishes how monetary policy and the financial markets work in theory and practice. The main components of the course are cover the role of financial markets in the economy with a particular emphasis on bond markets and interest rate determination, the main aspects of banks and other financial institutions and the role of money, central banking and monetary policy.
Sem - VI	BECODSHT6, DSE6, Political Economy-II	On successful completion of this course students will be able to understand key models and concepts of the history of economic thought, understand scholarly articles concerned the history of economic thought. The idea of socialism and capitalism is develop .

Department of Computer Application

Course Outcomes according to the CBCS:

Core Course1: Fundamentals of Computer

[SEM-I Credit:6(4+2+0)]

Course Outcomes:

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

- Demonstrate a comprehensive understanding of fundamental concepts and principles underlying computer systems.
- Analyze and explain computer structure, operation, and hardware-software interactions.
- Identify and utilize input and output devices commonly used in computer systems.
- Comprehend computer memory and storage devices, including types, capacities, and functionalities.
- Demonstrate proficiency in programming languages and software tools for algorithm implementation and computer system manipulation.

Core Course2: Introduction to C Programming

[SEM-I Credit:6(4+2+0)]

Course Outcomes:

- Demonstrate a comprehensive understanding of the basic syntax, data types, and operators in the C programming language.
- Apply problem-solving strategies to develop algorithms and implement them as C programs.
- Analyze and debug C programs to identify and rectify errors, ensuring program correctness and efficiency.
- Develop proficiency in utilizing fundamental programming constructs, such as loops, conditionals, and functions, to solve real-world problems.

Core Course3: Digital Logic

[SEM-II Credit:6(4+2+0)]

Course Outcomes:

On completion of the course, student will be able to:

- Use the basic logic gates and various reduction techniques of digital logic circuit in detail.
- Design combinational and sequential circuits.
- Design and implement hardware circuit to test performance and application.

Core Course4: Data Structure using C

[SEM-II Credit:6(4+2+0)]

Course Outcomes:

- Demonstrate thorough understanding of different data structures and their characteristics, including arrays, linked lists, stacks, queues, trees, and graphs.
- Apply appropriate data structures and algorithms to solve real-world problems efficiently.
- Implement and manipulate various data structures using programming language.
- Analyze the time and space complexity of algorithms and evaluate their efficiency in different scenarios, allowing for optimal solution selection and performance optimization.

Core Course5: Computer Networks

[SEM-III Credit:6(5+0+1)]

Course Outcomes:

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

- Identify and describe communication network elements and interactions.
- Illustrate data communication and networking standards and their applications.
- Design and implement LAN and WAN based on specific criteria.
- Identify emerging trends and technologies in data communication and networking.
- Evaluate the social impact of networking technology, focusing on security and privacy.

Core Course6: Principles of Operating System

[SEM-III Credit:6(4+2+0)]

Course Outcomes:

- To understand the functions of an operating system and study the concepts underlying its design and implementation.
- To gain knowledge about Processes, Inter-process communication, process scheduling and process synchronization.
- To understand the principles of main memory and secondary memory management.
- To gain knowledge about file system, access algorithms, Interrupts.

Core Course7: Introduction to Algorithm

[SEM-III Credit:6(4+2+0)]

Course Outcomes:

On successful completion of the course, the student will:

- Understand the concept of pseudocode for writing an algorithm and acquire ability to

- o analyze the asymptotic performance of various algorithms.
- Explore the concept of trees and graphs and get familiarity of analysis of various graph, tree traversal algorithms.
- Understand algorithm designing techniques such as Greedy approach Dynamic programming and explore to various related application problems.
- Synthesize efficient algorithm design paradigms backtracking, Branch & Bound in solving common analytical problems.
- Understand the variations among tractable and intractable problems and able to classify P and NP classes.

Skill Enhancement Course1: Programming in Python **[SEM-III Credit: 2(2+0+0)]**

Course Outcomes:

On successful completion of the course, the student will:

- Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.
- Express proficiency in the handling of strings and functions.
- Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.
- Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python.

Core Course8: Database Management System **[SEM-IV Credit: 6(4+2+0)]**

Course Outcomes:

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

- Analyze data organization requirements and establish inter-relationships.
- Apply appropriate data models for efficient data storage and retrieval.
- Design and execute queries to maintain and retrieve useful information.
- Evaluate physical database design for performance and optimize query processing.
- Apply best practices for indexing, transaction control, and concurrency maintenance.

Core Course9: Microprocessor - 8085 **[SEM-IV Credit: 6(4+2+0)]**

Course Outcomes:

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

- To gain knowledge about the hardware architectures and the functional blocks of a microprocessor (8085)
- Understand the functionality of common peripheral controllers and its interfaces with various peripheral devices.
- Understand assembly language programming.

Core Course10: Object Oriented Programming Using java **[SEM-IV Credit: 6(4+2+0)]**

Course Outcomes:

- Use object-oriented programming concepts to solve real world problems.
- Explain the concept of class and objects with access control to represent real world identities.
- Demonstrate the behavior of programs involving the basic programming constructs like control structures, constructors, string handling and garbage collection.
- Use overloading methodology on methods and constructors to develop application programs.
- Demonstrate the implementation of inheritance (multi level, hierarchical and multiple) by using, extend and implement keywords.
- Describe the concept of interface and abstract classes to define generic classes.
- Use dynamic and static polymorphism to process objects depending on their class.
- Illustrate different techniques on creating and accessing packages (fully qualified name and import statements).
- Understand the impact of exception handling to avoid abnormal termination of program using checked and unchecked exceptions.
- Demonstrate the user defined exceptions by exception handling keywords (try, catch, throw, throws and finally).
- Use multi threading concepts to develop inter process communication.
- Understand and implement concepts on file streams and operations in java programming for given application programs.
- Possess the knowledge and skills for employability and to succeed in national and international level competitive exams.

Skill Enhancement Course2: Computer Organization **[SEM-IV Credit: 2(2+0+0)]**

Course Outcomes:

- Understand the fundamental concepts and principles of computer organization and architecture.
- Familiar with different instruction set architectures, such as CISC and RISC.
- Gain knowledge about the internal components and organization of a processor.
- Understand the principles of caching, memory management, and virtual memory.
- Gain knowledge of input/output (I/O) systems, including I/O interfaces, devices, a

ndprotocols.

Core Course11:Theory of Computation

[SEM-V Credit: 6(5+0+1)]

Course Outcomes:

- Developingconceptsofautomaton.
- UnderstandingthevariouscategoriesoflanguagesandgrammarsintheChomskyhierar chy.
- Understandingdeterministicandnondeterministicfinitestateautomata,andvaria ntsofTuringmachines.
- DevelopingprogrammingskillinPython.
- Developingknowledgeinworkingwithlists,dictionaries.
- Understatinguseofvariousscientificlibrariesinhighlevelprogrammingenvironment.

Core Course12:Internet & E-Commerce

[SEM-V Credit: 6(4+2+0)]

Course Outcomes:

- Understand the concept of Internet.
- Understand and analyze the concept of different protocols of internet.
- Analyze the impact of E-commerce on business models and strategy.
- Describe the major types of E-commerce.
- Explain the process that should be followed in building an E-commerce presence.
- Identify the key security threats in the E-commerce environment.

Discipline Specific Electives1:Computer Graphics

[SEM-V Credit: 6(4+2+0)]

Course Outcomes:

Afterthe completionofthiscourse, studentswillbeableto:

- Demonstratetheunderstandingofdifferenthardwarecomponentsusedforgraphic alrequirements.
- Applyvisualcomputationstocreate andmanipulategeometricaldrawings effectively.
- Implement clippingtechniquestocontrolthedisplayofgraphicalobjects.
- Displaythree-dimensionalobjectsontwo-dimensionaldisplaydevicesusingappropriateprojectiontechniques.

Discipline Specific Electives2:Software Engineering

[SEM-V Credit: 6(5+0+1)]

Course Outcomes:

- Understand and apply fundamental software engineering concepts, methodologies, and principles.
- Design, develop, and test software systems using different techniques and tools.
- Apply project management techniques and collaborate effectively in software development teams.
- Demonstrate ethical and professional behaviour, stay updated with emerging technologies, and understand the broader impact of software engineering.

Discipline Specific Electives 3: Numerical Methods

[SEM-V Credit: 6(4+2+0)]

Course Outcomes:

- Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions to otherwise intractable mathematical problems.
- Apply numerical methods to obtain approximate solutions to mathematical problems.
- Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations.
- Analyze and evaluate the accuracy of common numerical methods.
- Implement numerical methods in C program.

Core Course 13: Web Technology

[SEM-VI Credit: 6(4+2+0)]

Course Outcomes:

The student will be able to:

- Analyze a webpage and identify its elements and attributes.
- Create webpages using XHTML and Cascading Style Sheets.
- Build dynamic webpages using JavaScript (Client-side programming).
- Create XML documents and Schemas.
- Installation and usage of Server software's.

Core Course 14: Project Work

[SEM-VI Credit: 6(0+6+0)]

Course Outcomes:

While doing a project:

- It makes the student confident in designing an Online Project with advanced technologies on their choice.
- Students are trained to meet the requirements of the Industry.

Discipline Specific Electives4:Artificial Intelligence **[SEM-V Credit: 6(5+0+1)]**

Course Outcomes:

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

- Apply search techniques effectively, evaluate and compare solutions.
- Analyze and evaluate knowledge representation techniques in AI systems.
- Demonstrate an understanding of probabilistic reasoning and apply it to practical scenarios.
- Implement machine learning solutions for classification, regression, and clustering problems.
- Design and implement machine learning algorithms in real-world applications, understanding their capabilities and limitations.

Discipline Specific Electives5:Advance Operating System **[SEM-VI Credit: 6(5+0+1)]**

Course Outcomes:

- Knowledge and understanding –
 - Outline the potential benefits of distributed systems.
 - Summarize the major security issues associated with distributed systems along with the range of techniques available for increasing system security.
- Cognitive skills (thinking and analysis).
 - Apply standard design principles in the construction of these systems.
 - Select appropriate approaches for building a range of distributed systems, including some that employ middleware.
- Communication skills (personal and academic).
- Practical and subject specific skills (Transferable Skills).

Discipline Specific Electives6:Advance DBMS **[SEM-VI Credit: 6(5+0+1)]**

Course Outcomes:

Students will be able to

- Explain and evaluate the fundamental theories for advanced database architectures and query operators.
- Design and implement parallel database systems with evaluating different methods of storing, managing of parallel database.
- Assess and apply database functions of distributed database.
- Evaluate different database designs and architecture.

- Administer and analyze database with query optimization techniques and develop Web interface with database.
- Understand advanced querying and decision support system.

Program Outcomes:

- An ability to enhance the application of knowledge of theory subjects in diverse fields.
- Develop language proficiency to handle corporate communication demands.
- Preparing students in various disciplines of technologies such as computer applications, computer networking, software engineering, JAVA, database concepts and programming.
- In order to enhance programming skills of the young IT professionals, the concept of project development in using the technologies learnt during the semester has been introduced.
- To enhance knowledge in robotics, provide experimental hardware equipment for teaching the basics of robotics, robot dynamics and control, and robot system design and application.
- To enhance logical ability and programming concepts by implementing programming lab.
- Preparing students for future aspects by building and improving their creativity, social awareness, and general knowledge.
- Encouraging students to convert their start-up idea to reality by implementing.
- Ability to understand the changes or future trends in the field of computer application.
- Ability to identify, formulate, analyse and solve problems of programming using different languages.

Course Outcomes according to the new education policy:

Major1:ProgramminginC

[SEM-I Credit:6(4+2)]

CourseOutcomes:

- Demonstrateacomprehensiveunderstandingofthebasicsyntax,datatypes,andoperatorsintheC programminglanguage.
- Applyproblem-solvingstrategiestodevelopalgorithmsandimplementthemasC programs.
- AnalyzeanddebugCprogramstoidentifyandrectifyerrors,ensuringprogramcorrectnessandefficiency.
- Developproficiencyinutilizingfundamentalprogrammingconstructs,suchasloops,conditionals,and functions, to solvereal-world problems.

Major2:ComputerArchitectureandComputerOrganization

[SEM-II Credit: 6(4+2)]

Course Outcomes:

- Understand the fundamental concepts and principles of computer organization and architecture.
- Familiar with different instruction set architectures, such as CISC and RISC.
- Gain knowledge about the internal components and organization of a processor.
- Understand the principles of caching, memory management, and virtual memory.
- Gain knowledge of input/output (I/O) systems, including I/O interfaces, devices, and protocols.

Major3: Data Structure

[SEM-III Credit: 6(4+2)]

Course Outcomes:

- Demonstrate a thorough understanding of different data structures and their characteristics, including arrays, linked lists, stacks, queues, trees, and graphs.
- Apply appropriate data structures and algorithms to solve real-world problems efficiently.
- Implement and manipulate various data structures using programming language.
- Analyze the time and space complexity of algorithms and evaluate their efficiency in different scenarios, allowing for optimal solution selection and performance optimization.

Major4: Database Management Systems

[SEM-IV Credit: 6(4+2)]

Course Outcomes:

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

- Analyze data organization requirements and establish inter-relationships.
- Apply appropriate data models for efficient data storage and retrieval.
- Design and execute queries to maintain and retrieve useful information.
- Evaluate physical database design for performance and optimize query processing.
- Apply best practices for indexing, transaction control, and concurrency maintenance.

Major5: Web Technology

[SEM-IV Credit: 6(4+2)]

Course Outcomes:

The student will be able to:

- Analyze a webpage and identify its elements and attributes.
- Create web pages using XHTML and Cascading Style Sheets.
- Build dynamic web pages using JavaScript (Client-side programming).
- Create XML documents and Schemas.
- Installation and usage of Server software's.

Major6: Operating System

[SEM-V Credit:6(4+2)]

Course Outcomes:

- To understand the functions of an operating system and study the concepts underlying its design and implementation.
- To gain knowledge about Processes, Inter-process communication, process scheduling and process synchronization.
- To understand the principles main memory and secondary memory management.
- To gain knowledge about file system, access algorithms, Interrupts.

Major7: Design and Analysis of Algorithm

[SEM-V Credit:6(4+2)]

Course Outcomes:

On successful completion of the course, the student will:

- Understand the concept of pseudocode for writing an algorithm and acquire ability to analyze the asymptotic performance of various algorithms.
- Explore the concept of trees and graphs and get familiarity of analysis of various graph, tree traversal algorithms.
- Understand algorithm designing techniques such as Greedy approach Dynamic programming and explore to various related application problems.
- Synthesize efficient algorithm design paradigms backtracking, Branch & Bound in solving common analytical problems.
- Understand the variations among tractable and intractable problems and able to classify P and NP classes.

Major8: Data Communication and Computer Networks

[SEM-VI Credit:6(4+2)]

Course Outcomes:

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

- Identify and describe communication network elements and interactions.
- Illustrate data communication and networking standards and their applications.
- Design and implement LAN and WAN based on specific criteria.
- Identify emerging trends and technologies in data communication and networking.
- Evaluate the social impact of networking technology, focusing on security and privacy.

Major9: Object Oriented Programming using JAVA

[SEM-VI Credit:6(4+2)]

Course Outcomes:

- Use object-oriented programming concepts to solve real world problems.
- Explain the concept of class and objects with access control to represent real world identities.
- Demonstrate the behavior of programs involving the basic programming constructs like control structures, constructors, string handling and garbage collection.
- Use overloading methodology on methods and constructors to develop application programs.
- Demonstrate the implementation of inheritance (multi level, hierarchical and multiple) by using, extend and implement keywords.
- Describe the concept of interface and abstract classes to define generic classes.
- Use dynamic and static polymorphism to process objects depending on their class.
- Illustrate different techniques on creating and accessing packages (fully qualified name and import statements).
- Understand the impact of exception handling to avoid abnormal termination of program using checked and unchecked exceptions.
- Demonstrate the user defined exceptions by exception handling keywords (try, catch, throw, throws and finally).
- Use multi threading concepts to develop inter process communication.
- Understand and implement concepts on file streams and operations in java programming for given application programs.
- Possess the knowledge and skills for employability and to succeed in national and international level competitive exams.

Major10: Software Engineering

[SEM-VI Credit:6(4+2)]

Course Outcomes:

- Understand and apply fundamental software engineering concepts, methodology

- es, and principles.
- Design, develop, and test software systems using different techniques and tools.
- Apply project management techniques and collaborate effectively in software development teams.
- Demonstrate ethical and professional behaviour, stay updated with emerging technologies, and understand the broader impact of software engineering.

Major 11: Cyber Security

[SEM-VII Credit:6(4+2)]

Course Outcomes:

- On successful completion of the course, students will be able to:
 - Analyze and evaluate the cybersecurity needs of an organization.
 - Conduct a cybersecurity risk assessment.
 - Measure the performance and troubleshoot cybersecurity systems.
 - Implement cybersecurity solutions.
- Use cybersecurity, information assurance, and cyber/computer forensics software/tools.
- Identify the key cybersecurity vendors in the marketplace.
- Design and develop a security architecture for an organization.
- Design operational and strategic cybersecurity strategies and policies.

Major 12: Microprocessor

[SEM-VII Credit:6(4+2)]

Course Outcomes:

- To gain knowledge about the hardware architectures and the functional blocks of a microprocessor (8085)
- Understand the functionality of common peripheral controllers and its interfaces with various peripheral devices.
- Understand assembly language programming.

Major13:ArtificialIntelligenceandMachineLearning

[SEM-VII Credit:6(4+2)]

Course Outcomes:

Afterthe completionofthiscourse, studentswillbeableto:

- Applysearchtechniqueseffectively,evaluateandcomparesolutions.
- AnalyzeandevaluateknowledgerepresentationtechniquesinAI systems.
- Demonstrateanunderstandingofprobabilisticreasoningandapplyittopracticalscenarios.
- Implement machine learning solutions for classification, regression, and clusteringproblems.
- Design and implement machine learning algorithms in real-world applications,understandingtheir capabilities and limitations.

Major14:DataAnalytics

[SEM-VIII Credit:4(3+1)]

Course Outcomes:

Onsuccessful completionofthecourse,studentswill beableto:

- Understandbasicsofpythonforperformingdataanalysis
- Understandthe data, performingpreprocessing, processing anddata visualization to getinsightsfrom data.
- Usedifferentpythonpackagesformathematical,scientificapplicationsandforwebdataanalysis.
- Developthemodelfordataanalysisandevaluatethemodelperformance.

Major15:OperationsResearch

[SEM-VIII Credit:4]

Course Outcomes:

OperationalResearch(OR)hasseveralpositiveoutcomesandimpactsonorganizationsanddecision-makingprocesses. Herearesomekey outcomes ofOR:

- Improveddecision-making:**ORprovidesanalyticaltoolsandtechniquethatsupportevidence-baseddecision-

making. It enables organizations to make informed choices by considering various factors, evaluating alternatives, and optimizing resources. This leads to more effective and efficient decision-making processes.

- **Enhanced operational efficiency:** OR helps organizations identify and eliminate inefficiencies in their operational processes. By analysing and optimizing workflows, resource allocation, and scheduling, OR improves productivity, reduces costs, and enhances overall efficiency. This can result in increased profitability and competitive advantage.
- **Optimal resource allocation:** OR enables organizations to allocate their resources, such as labor, capital, and materials, optimally. By considering constraints and objectives, OR techniques help in determining the most efficient and effective allocation strategies. This leads to better resource utilization, improved performance, and cost savings.
- **Cost reduction:** OR plays a crucial role in cost reduction by identifying areas of waste, inefficiency, and unnecessary expenses. Through optimization techniques and process improvement, OR helps organizations streamline operations, eliminate redundancies, and minimize costs. This can lead to significant cost savings and improved financial performance.
- **Enhanced forecasting and planning:** OR helps organizations make accurate forecasts, predict future trends, and plan their operations accordingly. By analyzing historical data, market trends, and other relevant factors, OR techniques assist in demand forecasting, production planning, inventory management, and capacity planning. This leads to better resource utilization, reduced stock outs, and improved customer satisfaction.
- **Risk management:** OR aids in assessing and managing risks associated with various business activities. By using techniques like risk analysis, simulation, and decision-making under uncertainty, OR helps organizations evaluate risks, develop mitigation strategies, and make risk-informed decisions. This improves resilience and reduces the likelihood and impact of potential risks.

Overall, OR delivers a wider range of outcomes and benefits, including process optimization, improved customer satisfaction, strategic planning, competitiveness, innovation, sustainability, effective project management, collaboration, continuous improvement, data-driven decision-making, and organizational learning. These outcomes contribute to organizational success, growth, and improved performance in a dynamic and competitive business environment.

Major 16: Formal Language and Automata Theory

[SEM-VIII Credit:4]

Course Outcomes:

- Developing concepts of automata.
- Understanding the various categories of languages and grammars in the Chomsky hierarchy.

- Understanding deterministic and nondeterministic finite state automata, and variants of Turing machines.
- Developing programming skill in Python.
- Developing knowledge in working with lists, dictionaries.
- Understanding use of various scientific libraries in high level programming environment.

SC1: Computer Graphics

[SEM-VIII Credit:6(4+2)]

Course Outcomes:

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

- Demonstrate an understanding of different hardware components used for graphic requirements.
- Apply visual computation to create and manipulate geometrical drawings effectively.
- Implement clipping techniques to control the display of graphical objects.
- Display three-dimensional objects on two-dimensional display devices using appropriate projection techniques.

SC2: Internet-of-Things(IoT)

[SEM-VIII Credit:6(4+2)]

Course Outcomes:

- Students will be able to understand the application areas of Internet of Things (IoT).
- Students will be able to grow the theoretical background of implementation of IoT.
- Students will be able to understand various architectures of developing IoT solutions.
- Students will get accustomed with working with sensors, actuators related to IoT.
- Students will be able to learn other associated technologies like cloud computing.
- Students will be able to implement IoT based solutions using Arduino/Raspberry Pi computing.

Minor1: Computer Fundamentals

[SEM-I Credit:4(2+2)]

Course Outcomes:

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

- Demonstrate a comprehensive understanding of fundamental concepts and principles underlying computer systems.
- Analyze and explain computer structure, operation, and hardware-software interactions.
- Identify and utilize input and output devices commonly used in computer systems.

- Comprehend computer memory and storage devices, including types, capacities, and functionalities.
- Demonstrate proficiency in programming languages and software tools for algorithm implementation and computer system manipulation.

Minor2: Basic Algebra, Calculus and Ordinary Differential Equations

[SEM-II Credit:4]

Course Outcomes:

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

- Solve tangent and area problems using concepts of limit, derivatives and integrals.
- Calculate higher order derivatives and find limit of functions which are of indeterminate form using L'Hospital's rule.
- Find the rate in which a curve curves, further to find Asymptotes of curves, envelopes etc.
- Learn concepts of complex numbers, De'Moivre's theorem and its application.
- Find number of real (positive & negative) and complex roots of algebraic equations using Descartes' rule and learn the methods to solve cubic and bi-quadratic equations.
- Acquire knowledge of inequalities.
- Solve first order differential equations utilizing the standard techniques for exact, linear, homogeneous, or Bernoulli cases.
- Solve first order nonlinear differential equations using the standard techniques and get an idea of singular solution.
- Find the complete solution of a non-homogeneous differential equation as a linear combination of the complementary function and a particular solution.

Minor3: Introduction to Accounting & Costing

[SEM-III Credit:4]

Course Outcomes:

The outcomes of an introduction to accounting and costing are designed to equip learners with specific knowledge, skills, and abilities that are valuable in the business world and various professional settings. Here are some common outcomes of studying these subjects:

- Financial literacy Students gain an understanding of financial terminology, principles, and concepts, enabling them to interpret and analyse financial information.

- **Bookkeeping Skills:** Learners develop basic bookkeeping skills, including recording financial transactions, maintaining journals, and posting entries to ledgers.
- **Preparation of Financial Statements:** Students learn how to prepare financial statements such as Income Statements, Balance Sheets, and Cash Flow Statements, which are essential for assessing the financial health of a business.
- **Interpretation of Financial Statements:** The ability to analyse financial statements helps learners identify trends, financial ratios, and areas of concern or improvement within a business.
- **Budgeting and Planning:** Understanding accounting and costing concepts allows individuals to create budgets and financial plans to guide business activities effectively.

Minor4:Probability and Statistics

[SEM-IV Credit:4]

Course Outcomes:

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

- Calculate the expectation and moments of one- and two-dimensional random variables.
- Use of some important one dimensional discrete and continuous distributions and their basic properties.
- Learn the concept correlation and regression.
- Explain the concept of convergence and check for the convergence of a given sequences of random variables.
- Find the expressions for the characteristic function of a random variable and verify its properties.
- Apply the various laws of large numbers to sequences of random variables.
- Understand the basic components of sampling and have the knowledge on exact sampling distributions which are essential for estimating and testing hypothetical statements.
- Find a best estimator with reference the different criteria in case of real-life applications. Understand critically the problems that are faced in testing of a hypothesis.
- Apply the different testing tools like t-test, chi-square test etc. to analyze the real-life problems.

Minor5:Introduction to R Programming

[SEM-V Credit:4(2+2)]

Course Outcomes:

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

- Implement Statistical functions using R Programming Language.
- Analysis data using R.
- Manipulate and summarize data sets using R.
- Create visualization with R.

Minor6:Business Intelligence

[SEM-VI Credit:4(3+1)]

Course Outcomes:

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

- Become familiar with the role of mathematical models, Business intelligence architectures, representation of the decision-making process, evolution of information systems
- Define development of a model, representation of input data, data mining process, analysis methodologies, data validation, data transformation, data reduction
- evaluate classification models, Bayesian methods, Clustering methods, Partition methods, Hierarchical methods
- study relational marketing, sales force management, optimization models for logistics planning, efficiency measures, efficient frontier, The CCR model
- Be well-versed with Organizational Learning and Transformation, Knowledge Management Activities.

Minor7:Deep Learning

[SEM-VII Credit:4(3+1)]

Course Outcomes:

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

- Understand the mathematics behind functioning of artificial neural networks
- Analyze the given dataset for designing a neural network-based solution
- Carry out design and implementation of deep learning models for signal/image processing applications
- Design and deploy simple TensorFlow-based deep learning solutions to classification problems

Minor8:Digital Marketing

[SEM-VII

Credit:4(3+1)]

Course Outcomes:

On successful completion of the course students will be able to:

- Analyse the confluence of marketing, operations, and human resources in real-time delivery.
- Demonstrate cognitive knowledge of the skills required in conducting online research and research on online markets, as well as in identifying, assessing and selecting digital market opportunities.
- Explain emerging trends in digital marketing and critically assess the use of digital marketing tools by applying relevant marketing theories and frameworks.
- Investigate and evaluate issues in adapting to globalised markets that are constantly changing and increasingly networked.
- Interpret the traditional marketing mix within the context of a changing and extended range of digital strategies and tactics.
- Comprehend the importance of conversion and working with digital relationship marketing; and
- Analyse cross-cultural and ethical issues in globalised digital markets.

Department Of Political Science

Title: Understanding Political Theory

Course Objective: This course is divided into two sections. Section A introduces the students to the idea of political theory, its history and approaches, and an assessment of its critical and contemporary trends. Section B is designed to reconcile political theory and practice through reflections on the ideas and practices related to democracy.

Title: Constitutional Government and Politics in India.

Course objective: 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.

Second Sem : core courses -

Title: Governance and Democratic Politics in India.

Course Objective: This paper deals with concepts and different dimensions of governance highlighting the major debates in the contemporary times. There is a need to understand the importance of the concept of governance in the context of a globalising world, environment, administration, development. The essence of governance is explored through the various good governance initiatives introduced in India.

Title: Political Process in India

Course objective: Actual politics in India diverges quite significantly from constitutional legal rules. An understanding of the political process thus calls for a different mode of analysis - that offered by political sociology. This course maps the working of 'modern' institutions, premised on the existence of an individuated society, in a context marked by communitarian solidarities, and their mutual transformation thereby. It also familiarizes students with the working of the Indian state, paying attention to the contradictory dynamics of modern state power.

Title: Comparative Government and Politics .

Course objective: This is a foundational course in comparative politics. The purpose is to familiarize students with the basic concepts and approaches to the study of comparative politics. More specifically the course will focus on examining politics in a historical framework while engaging with various themes of comparative analysis in developed and developing countries.

Title: Public Administration.

Course objective: The course provides an introduction to the discipline of public administration. This paper encompasses public administration in its historical context with an emphasis on the various classical and contemporary administrative theories. The course also explores some of the recent trends, including feminism and ecological conservation and how the call for greater democratization is restructuring public administration. The course will

also attempt to provide the students a comprehensive understanding on contemporary administrative developments.

Title: Indian Administration

Objective: The paper seeks to provide an introduction to the interface between public policy and administration in India. The essence of public policy lies in its effectiveness in translating the governing philosophy into programs and policies and making it a part of the community living. It deals with issues of decentralization, bureaucratic structure, history of civil services and administration and social welfare from a non-western perspective.

Title: Legislative Process in India [SEC]

Objective: This seeks to inform students about India's cabinet ,union legislature , knowledge and classification of bills , budget ect . As a whole , the paper will educate all students about basic parliamentary processes regarding finance and other related matters.

Title: International Relations: Basic Theories and Approaches.

Course Objective: This paper seeks to equip students with the basic intellectual tools for understanding International Relations. It introduces students to some of the most important theoretical approaches for studying international relations. The course begins by historically contextualizing the evolution of the international state system before discussing the agencystructure problem through the levels-of-analysis approach. After having set the parameters of the debate, students are introduced to different theories in International Relations. It provides a fairly comprehensive overview of the major political developments and events starting from the twentieth century. Students are expected to learn about the key milestones in world history and equip them with the tools to understand and analyze the same from different perspectives. A key objective of the course is to make students aware of the implicit Euro - centricism of International Relations by highlighting certain specific perspectives from the Global South.

Title: World Politics: Issues and Challenges .

Course objective: This course introduces students to the key debates on the meaning and nature of globalization by addressing its political, economic, social, cultural and

technological dimensions. In keeping with the most important debates within the globalization discourse, it imparts an understanding of the working of the world economy, its anchors and resistances offered by global social movements while analyzing the changing nature of relationship between the state and trans-national actors and networks. The course also offers insights into key contemporary global issues such as the proliferation of nuclear weapons, ecological issues, international terrorism, and human security before concluding with a debate on the phenomenon of global governance.

Title: Parliamentary Procedures in India [SEC]

Objective:

This seeks to inform students about India's parliamentary procedure ,such as question answer processes .It is also a distingt try to educate students about various checks and balances used by parliament to restrict government. It also states about the privileges of the members both inside and out side the house. As a whole , the paper will educate all students about basic parliamentary processes and other related matters.

Title: Gandhi and Contemporary World I [GE].

Course objective:

Locating Gandhi in a global frame, the course seeks to elaborate Gandhian thought and examine its practical implications. It will introduce students to key instances of Gandhi's continuing influence right up to the contemporary period and enable them to critically evaluate his legacy

Title: United Nations and Global Conflicts I [GE].

Course Objective:

This course provides a comprehensive introduction to the most important multilateral political organization in international relations. It provides a detailed account of the organizational structure and the political processes of the UN, and how it has evolved since 1945, especially in terms of dealing with the major global conflicts. The course imparts a critical understanding of the UN's performance until now and the imperatives as well as processes of reforming the organization in the context of the contemporary global system.

Title: Indian Political Thought

Course objective:

This course introduces the specific elements of Indian Political Thought spanning over two millennia. The basic focus of study is on individual thinkers whose ideas are however framed by specific themes. 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. Based on the study of individual thinkers, the course introduces a wide span of thinkers and themes that defines the modernity of Indian political thought. The objective is to study general themes that have been produced by thinkers from varied social and temporal contexts. Selected extracts from original texts are also given to discuss in the class. The list of additional readings is meant for teachers as well as the more interested students.

Title: Modern Political Philosophy .

Course objective:

Philosophy and politics are closely intertwined. We explore this convergence by identifying four main tendencies here. Students will be exposed to the manner in which the questions of politics have been posed in terms that have implications for larger questions of thought and existence.

Title: Indian Foreign Policy II [DSE-4].

Course objective:

This course's objective is to teach students the domestic sources and the structural constraints on the genesis, evolution and practice of India's foreign policy. The endeavour is to highlight integral linkages between the 'domestic' and the 'international' aspects of India's foreign policy by stressing on the shifts in its domestic identity and the corresponding changes at the international level. Students will be instructed on India's shifting identity as a postcolonial state to the contemporary dynamics of India attempting to carve its identity as an 'aspiring power'. India's evolving relations with the superpowers during the Cold War and after, bargaining strategy and positioning in international climate change negotiations, international

economic governance, international terrorism and the United Nations facilitate an understanding of the changing positions and development of India's role as a global player since independence.

Title: Human Rights [DSE-5].

Course objective:

This course attempts to build an understanding of human rights among students through a study of specific issues in a comparative perspective. It is important for students to see how debates on human rights have taken distinct forms historically and in the contemporary world. The course seeks to anchor all issues in the Indian context, and pulls out another country to form a broader comparative frame. Students will be expected to use a range of resources, including films, biographies, and official documents to study each theme. Thematic discussion of sub-topics in the second and third sections should include state response to issues and structural violence questions.

Department of English

Course Type: MAJ-2 Semester: 2 Course Code: BENGMAJ2

Course Title: British Poetry and Drama: 14th to 17th Centuries (L-P-Tu): 502 Credit: 6
Practical/Theory

Theory Course Objective: To encourage students to make a detailed study of a few sample masterpieces of English Drama and Poetry from 14th to 17th century in order to develop an interest among the students to appreciate and analyze drama and poetry independently

Learning Outcome: Students will develop an understanding of poetry and drama of this specific period
1. Geoffrey Chaucer: The Wife of Bath's Prologue from The Canterbury Tales (Nevill Coghill)
Philip Sydney: from Astrophel and Stella: Sonnet no 1 Edmund Spenser: from Amoretti: Sonnet LXXV 'One day I wrote her name...' Shakespeare: Sonnet no. 64 & 130
2. William Shakespeare: Macbeth
3. William Shakespeare: As You Like It
4. Francis Bacon: "Of Studies", "Of Friendship"

Raghunathpur College, Purulia
(Under SKBU)
Department of Bengali
Bachelor Of Arts
Learning Outcome Based Curriculum Framework

Bengali Honours

Semester - 1(CBCS) Honours

- Paper Code BBNGCCHT 101 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Prak-Adhunik Bangla Sahitya (প্রাক্ আধুনিক বাংলা সাহিত্য)
 - Class hours- 65
 - Program Outcome– This course aims in
 - familiarizing students with pre-modern Bengali literature through a selective study of literary texts– *Charyapada, Srikrishnakirtan, Srikrishnabijoy & Shibayana.*
 - Course Outcome- By the end of the term the students will be –
 - intimately acquainted with the pre-modern Bengali literature.

- Paper Code BBNGCCHT 102 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Adhunik Bangla Sahitya (আধুনিক বাংলা সাহিত্য)
 - Class hours- 70
 - Program Outcome– This course aims in
 - understanding about the forms and features of contemporary Bengali poetries, novel, drama and short stories of the 19th and 20th century.
 - Course Outcome- By the end of the term the students will be –
 - able to analyse 19th and 20th century modern bengali literature with it multitudes of nuances.

- Paper Code BBNGGEHT5 103 (6 Credits- 5 Theory + 1 Tutorial)[for other than Bengali Honours]
 - Paper Title : Prak-Adhunik Bangla Sahityer Nirbachita Path (প্রাক্-আধুনিক বাংলা সাহিত্যের নির্বাচিত পাঠ)
 - Class hours- 74
 - Program Outcome This course aims in
 - familiarizing students with pre-modern Bengali literature through a selective study of literary texts– *Krittibasi Ramayana, Baishnab Padabali, Sakta Padabali & Chandimangal.*
 - Course Outcome– By the end of the term the students will be –
 - intimately acquainted with the pre-modern Bengali literature.

Semester - 2 (CBCS) Honours

- Paper Code BBNGCCHT 201 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Chhanda O Alankar (ছন্দ ও অলংকার)
 - Class hours- 68
 - Program Outcome– This course aims in
 - introducing Bengali rhetoric and prosody.
 - Course Outcome–By the end of the term the students will be –
 - proficient in basic dictums of Bengali rhetoric and prosody to the extent of identification and analysis of a given specimen.

- Paper Code BBNGCCHT 202 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Bhasatattwa (ভাষাতত্ত্ব)
 - Class hours – 60
 - Program Outcome – This course aims in
 - providing basic concepts concerning Bengali language including its origin, development, organs of speech, phonology , morphology and transcription in IPA.
 - Course Outcome – By the end of the term the students will be –
 - proficient with various aspects of origin and development stages of Bengali language with associated minutiae.

- Paper Code BBNGGEHT5A 203 (6 Credits- 5 Theory + 1 Tutorial)[for other than Bengali Honours]
 - Paper Title : Adhunik Bangla Sahityer Nirbachita Path (আধুনিক বাংলা সাহিত্যের নির্বাচিত পাঠ)
 - Class hours- 74
 - Program Outcome- This course aims in
 - understanding about the forms and features of contemporary Bengali poetries, novel and drama of the 19th and 20th century.
 - Course Outcome - By the end of the term the students will be
 - able to analyse 19th and 20th century modern bengali literature with it multitudes of nuances.

- Paper Code BAECCLBHT 204 (2 Credits- 2 Theory + 0 Tutorial) [for who opted AECC Bengali]
 - Paper Title : Bangla Bhasar Bhasik Sangjog (বাংলা ভাষার ভাষার ভাষিক সংযোগ)
 - Class hours- 20 hours
 - Program Outcome -This course aims in
 - acquiring ability to writing Bengali properly.
 - Course Outcome- By the end of the term the students will be
 - able to build proficiency required for getting employed in different streams in publishing or advertising areas.

Semester - 3 (CBCS) Honours

- Paper Code BBNGCCHT 301 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Madhyayuger Kabita O Kabya (মধ্যযুগের কবিতা ও কাব্য)
 - Class hours- 70
 - Program Outcome – This course aims in –
 - providing a brief outline of Bengali literature in middle ages through the selective study of *Vaishnav Padavali*, *Chaitanyabagbat*, *Shakta Padabali*, *Chandimangal*.
 - Course Outcome – By the end of the term the students will be
 - proficient in analyzing the socio-cultural influences of middle age Bengali literature.
- Paper Code BBNGCCHT 302 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Adhunik Kabya-Kabita (আধুনিক কাব্য- কবিতা)
 - Class hours-70
 - Program Outcome- This course aims in
 - A detailed knowledge of the modern poetries of 19th and 20th century , trends and intentions from pre-Rabindranath, Rabindranath and the later modern poets.
 - Course Outcome - By the end of the term the students will be
 - get a comprehensive understanding about the poetry composed by the poets of such genres with a detailed knowledge of the 19th and 20th century poetry and its trends.
- Paper Code BBNGCCHT 303 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Engreji Sahityer Itihas (ইংরেজি সাহিত্যের ইতিহাস)
 - Class hours- 65
 - Program Outcome-This course aims in
 - acquainting with the history of English literature from Chaucer to W.B. Yeats.
 - Course Outcome - By the end of the term the students will be -
 - intimately familiar with the aspects of history of English Literature and its influences upon the history of Bengali Literature.
- Paper Code BBNGSEHT 305 (2 Credits- 2 Theory + 0 Tutorial)
 - Paper Title :Anubad O Proof Sangsodhan(অনুবাদ ও প্রুফ সংশোধন)
 - Class hours- 20 hours
 - Program Outcome-This course aims in
 - Aquanting students with aspects of proceeding and translation.
 - Course Outcome- By the end of the term the students will be -
 - Proficient in translating from Bengali to English and vice versa. They will also be able to proofread Bengali manuscripts.

Semester – 4 (CBCS) Honours

- Paper Code BBNGCCHT 401 (6 Credits – 5 Theory + 1 Tutorial)
 - Paper Title : Sanskrita Sahityer Itihas (সংস্কৃত সাহিত্যের ইতিহাস)
 - Class hours- 70
 - Program Outcome- This course aims in

- acquainting with the History of Sanskrit Literature.
 - Course Outcome- By the end of the term the students will be -
 - able to know the journey of Sanskrit literature from classical Sanskrit Literature (*Ramayana & Mahbharata*) to modern Sanskrit Literature(*Gitagobindam by Kavi Joydev*) . Besides the information of history, this course also seeks to help the students select the Sanskrit texts for independent literary study.
- Paper Code BBNGCCHT 402 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Kabyatatwa O Sahityer Rupriti (কাব্যতত্ত্ব ও সাহিত্যের রূপ রীতি)
 - Class hours- 70
 - Program Outcome - This course aims in
 - Achieving a knowledge of how to interpret poems concept of rhetoric and prosody. It discusses verses and early songs, the history of the evolution of lyric poetry, ballads and experiments with different genres of literature and the history of construction of literary theories in Poetics.
 - Course Outcome - By the end of the term the students will be
 - Achieving a comprehensive expertise over Aesthetics and Poetics.
- Paper Code BBNGCCHT 403 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Bangla Upanyas O Chhotogalpo (বাংলা উপন্যাস ও ছোটগল্প)
 - Class hours- 70
 - Program Outcome - This course aims in
 - understanding about the forms and features of contemporary novels and short stories of the 19th and 20th century.
 - aiming at introducing the student to the analysis of a novel as a relatively long work of narrative fiction in prose.
 - Course Outcome-By the end of the term the students will be
 - Understand the importance about the challenging issues of the contemporary such as conflicts of interest between the society and the individual , women's position in the Bengali household , environment issues and people's struggle for socio-economic and political existence through modern novel and short stories.
- Paper Code BBNGSEHT 405 (2 Credits 2 Theory + 0 Tutorial)
 - Paper Title : Amantran Patra, Pratisthanik Chithi, Pratibedan O Prabandha Rachana (আমন্ত্রণপত্র , প্রতিষ্ঠানিক চিঠি, প্রতিবেদন ও প্রবন্ধ রচনা)
 - Class hours – 20 hours
 - Program Outcome - this course aims in
 - Developing skills for working in a publishing media and other institution.
 - Course Outcome - By the end of the term students will be
 - Acquainted with various types of official letter writing, report and essay writing to publish in newspapers. Employment ability skill will also develop by this course.

Semester - 5 (CBCS) Honours

- Paper Code BBNGCCHT 501 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Bangla Natak (বাংলা নাটক)

- Class hours-70
 - Program Outcome- This course aims in
 - providing and outline of Bengali drama through the textual study of diverse yet limited number of specimens from 19th and 20th century.
 - Course Outcome- by the end of the term students will be
 - able to study drama as a genre and how to analyse plot, character , thought, dialogues etc. studing of different types of drama they will achieve the ability of criticism.
- Paper Code BBNGCCHT 502 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Prabandha O Sahitya-Sanskriti Bishak prabandha Rachana (প্রবন্ধ ও সাহিত্য-সংস্কৃতি বিষয়ক প্রবন্ধ রচনা)
 - Class hours- 60
 - Program Outcome- this course aims in
 - reading and writing various types of essays
 - Course Outcome- by the end of the term the students will be
 - able to enhance their ability of thinking and to develop art of writing new essays.
- Paper Code BBNGDSHT 503 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Bangla Sahityer Itihaas- Astadash Satabdi Porjonta (বাংলা সাহিত্যের ইতিহাস- অষ্টাদশ শতাব্দী পর্যন্ত)
 - Class hours- 70
 - Program Outcome – This course aims in
 - providing a concise overview of the history of Bengali literature of the old and medieval period from 10th to 18th century.
 - Course Outcome-by the end of the term the students will be
 - acquainted with the characteristics and features of Bengali literature, such as Tantrik Sahojia Bouddha cult, origin and evolution of Radha Krishna myths in Padavali Sahitya, Mangal kabya, Translated literature and the impact of the battle of Plassey.
- Paper Code BBNGDSHT 504 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Bangla Sahityer Itihaase Samaj-Dharma-Sanskriti (বাংলা সাহিত্যের ইতিহাসে সমাজ-ধর্ম-সংস্কৃতি)
 - Class hours- 70
 - Program Outcome- this course aims in
 - Achieving the history of Bengali literature , reflection of contemporary society , religion and culture.
 - Course Outcome- by the end of the term the students will be
 - Receiving knowledge about socio- cultural background of Bengal of 19th century and first half of the 20th century going through different essays.

Semester – 6 (CBCS) Honours

- Paper Code BBNGCCHT 601 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Rabindra Sahitya (রবীন্দ্র সাহিত্য)
 - Class hours- 70
 - Program Outcome – This course aims in
 - providing an overview of the poetical credo of Rabindranath Tagore.
 - introducing the epistle as an integral part of Bengali Literature and Tagore’s contribution in its developments.
 - familiarizing Tagore’s critical outlook on classics of Sanskrit literature.
 - acquainting with Tagore’s vision for creative writing through his essays on literature.
 - Course Outcome – By the end of the term the students will be –
 - able to grasp connotative and denotative implications of Tagore’s poems.
 - able to apprehend Tagore’s place in the matrices of epistolary literature and bengali literature as whole.
 - able to fathom Tagore’s convictions about creative writing.
- Paper Code BBNGCCHT 602 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Simanta Banglar Loksahitya (সীমান্ত বাংলার লোকসাহিত্য)
 - Class hours- 60
 - Program Outcome – This course aims in
 - providing a broad overview of the folkloric tradition of south-western border area of West Bengal specifically that of the district of Purulia.
 - Course Outcome – By the end of the term the students will be –
 - intimately acquainted with *Bhadu, Tusu, Chhou & Jhumur* – its origin, regional variations, socio-economic factors that influence its mutation etc.
- Paper Code BBNGDSHT 603 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Bangla Sahityer Itihaas- Unish Satak O Bish Sataker Prathomardha (বাংলা সাহিত্যের ইতিহাস - উনিশ শতক ও বিশ শতকের প্রথমার্ধ)
 - Class hours- 70
 - Program Outcome – This course aims in
 - providing an overview of the history of 19th and 20th century Bengali literature.
 - Course Outcome- By the end of the term the students will be –
 - acquainted with a concise overview of 19th and 20th century Bengali literature and the socio-political factors that shaped it.
- Paper Code BBNGDSHT 604 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Byabaharik Bangla Byakaran (ব্যবহারিক বাংলা ব্যাকরণ)
 - Class hours- 70
 - Program Outcome – This course aims in
 - Improving the students’ writing skill.

- Course Outcome – By the end of the term the students will be –
 - able to comprehend the nuances of bengali syntax i.e Pad-prakarana, Shabda-prakarana, Bakya-prakarana etc.

Raghunathpur College, Purulia

Bengali Program

Semester - 1(CBCS) Program

- Paper Code BBNGCCRT 101 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Prak-Adhunik Bangla Sahitya (প্রাক-আধুনিক বাংলা সাহিত্য)
 - Class hours- 65
 - Program Outcome- This course aims in
 - familiarizing students with pre-modern Bengali literature through a selective study of literary texts– *Charyapada, Srikrishnakirtan, Srikrishnabijoy & Shibayana*.
 - Course Outcome- By the end of the term the students will be -
 - intimately acquainted with the pre-modern Bengali literature.
- Paper Code BBNGCCLT 103 (2 Credits- 2 Theory + 0 Tutorial)
 - Paper Title : Kabita (কবিতা)
 - Class hours- 20 hours
 - Program Outcome- This course aims in
 - The emergence of poets and poetries from pre-modern age to modern age in Bengali Literature .
 - Course Outcome - By the end of the term the students will be -
 - getting a comprehensive understanding about the poetries composed by the poets of such detailed knowledge of the 16th ,17th , 18th , 19th and 20th century of Bengal.
- Paper Code BAECCLBT 104 (2 Credits- 2 Theory + 0 Tutorial)
 - Paper Title : Bangla Bhasar Bhasik Sangjog (বাংলা ভাষার ভাষার ভাষিক সংযোগ)
 - Class hours- 20 hours
 - Program Outcome- This course aims in
 - Acquiring ability to writing Bengali properly.
 - Course Outcome - By the end of the term the students will be
 - able to build proficiency required for getting employed in different streams in publishing or advertising areas.

Semester - 2 (CBCS) Program

- Paper Code BBNGCCRT 201 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Adhunik Bangla Sahitya (আধুনিক বাংলা সাহিত্য)
 - Class hours- 70
 - Program Outcome- This course aims in
 - understanding about the forms and features of contemporary Bengali poetries, novel, drama and short stories of the 19th and 20th century.

- Course Outcome - By the end of the term the students will be -
 - able to analyse 19th and 20th century modern bengali literature with it multitudes of nuances.

Semester - 3 (CBCS) Program

- Paper Code BBNGCCRT 301 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Chhanda O Alankar (ছন্দ ও অলংকার)
 - Class hours- 68
 - Program Outcome- This course aims in
 - introducing Bengali rhetoric and prosody.
 - Course Outcome - By the end of the term the students will be -
 - proficient in basic dictums of Bengali rhetoric and prosody to the extent of identification and analysis of a given specimen.
- Paper Code BBNGCCLT 303 (2 Credits- 2 Theory + 0 Tutorial)
 - Paper Title : Galpo (গল্প)
 - Class hours- 20 hours
 - Program Outcome - This course aims in
 - understanding about the forms and features of short stories of the 19th and 20th century.
 - Course Outcome - By the end of the term the students will be -
 - acquainted with a concise overview of 19th and 20th century Bengali short stories and the socio-political factors that shaped it.
- Paper Code BBNGSERT 304 (2 Credits- 2 Theory + 0 Tutorial)
 - Paper Title :Anubad O Proof Sangsodhan(অনুবাদ ও প্রুফ সংশোধন)
 - Class hours- 20 hours
 - Program Outcome- This course aims in
 - Aquanting students with aspects of proceeding and translation
 - Course Outcome - By the end of the term the students will be -
 - Proficient in translating from Bengali to English and vice versa. They will also be able to proofreading Bengali manuscripts.

Semester - 4 (CBCS) Program

- Paper Code BBNGCCRT 401 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Bhasatattwa (ভাষাতত্ত্ব)
 - Class hours – 60
 - Program Outcome – This course aims in
 - providing basic concepts concerning Bengali language including its origin, development, organs of speech, phonology , morphology and transcription in IPA.
 - Course Outcome – By the end of the term the students will be –

- proficient with various aspects of origin and development stages of Bengali language with associated minutiae.
-
- Paper Code BBNGSEHT 405 (2 Credits 2 Theory + 0 Tutorial)
 - Paper Title : Amantran Patra, Pratisthanik Chithi, Pratibedan O Prabandha Rachana (আমন্ত্রণপত্র, প্রাতিষ্ঠানিক চিঠি, প্রতিবেদন ও প্রবন্ধ রচনা)
 - Class hours – 20 hours
 - Program Outcome - This course aims in
 - Developing skills for working in a publishing media and other institution.
 - Course Outcome- by the end of the term the students will be
 - Acquainted with various types of official letter writing, report and essay writing to publish in newspapers. Employment ability skill will also develop by this course.

Semester - 5 (CBCS) Program

- Paper Code BBNDSTRT 501 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Bangla Sahityer Itihaas- Astadash Satabdhi Porjonta (বাংলা সাহিত্যের ইতিহাস- অষ্টাদশ শতাব্দী পর্যন্ত)
 - Class hours- 70
 - Program Outcome – This course aims in
 - providing a concise overview of the history of Bengali literature of the old and medieval period from 10th to 18th century.
 - Course Outcome- by the end of the term the students will be
 - acquainted with the characteristics and features of Bengali literature, such as Tantrik Sahojia Bouddha cult, origin and evolution of Radha Krishna myths in Padavali Sahitya, Mangal kabya, Translated literature and the impact of the battle of Plassey.
- Paper Code BBNGERT 503 (6 Credits- 5 Theory + 0 Tutorial)
 - Paper Title : Adhunik Bangla Sahitya Path (আধুনিক বাংলা সাহিত্য পাঠ)
 - Class hours- 60
 - Program Outcome-This course aims in
 - understanding about the forms and features of contemporary Bengali poetries, novel and drama and short stories of the 20th century.
 - Course Outcome - By the end of the term the students will be
 - able to analyse 20th century modern bengali literature with it multitudes of nuances.
- Paper Code BBNSERT 504 (2 Credits- 2 Theory + 0 Tutorial)
 - Paper Title : Dakshin-Paschim Simanta Banglar Prayogik Loksanskriti (দক্ষিণ-পশ্চিম সীমান্ত বাংলার প্রায়োগিক লোকসংস্কৃতি)
 - Class hours- 20 hours
 - Program Outcome – This course aims in

- providing a broad overview of the folkloric tradition of south-western border area of West Bengal specifically that of the district of Purulia.
- Course Outcome – By the end of the term the students will be –
 - intimately acquainted with *Bhadu, Tusu, Chhou & Jhumur* – its origin, regional variations, socio-economic factors that influence its mutation etc.

Semester - 6 (CBCS) Program

- Paper Code BBNGDSRT 601 (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Bangla Sahityer Itihaas- Unish Satak O Bish Sataker Prathomardha (বাংলা সাহিত্যের ইতিহাস - উনিশ শতক ও বিশ শতকের প্রথমার্ধ)
 - Class hours- 70
 - Program Outcome – This course aims in
 - providing an overview of the history of 19th and 20th century Bengali literature.
 - Course Outcome- By the end of the term the students will be –
 - acquainted with a concise overview of 19th and 20th century Bengali literature and the socio-political factors that shaped it.
- Paper Code BBNGERT 603 (6 Credits- 5 Theory + 0 Tutorial)
 - Paper Title : byaboharik Bangla Byakaran(ব্যবহারিক বাংলা ব্যাকরণ)
 - Class hours- 60
 - Program Outcome- This course aims in
 - Improving the students' writing skill.
 - Course Outcome – By the end of the term the students will be –
 - able to comprehend the nuances of bengali syntax i.e Pad-prakarana, Shabda-prakarana, Bakya-prakarana etc.
- Paper Code BBNSERT 604 (2 Credits- 2 Theory + 0 Tutorial)
 - Paper Title : Bhasa Sikkhaner Koushal (ভাষা শিক্ষণের কৌশল)
 - Class hours- 20 hours
 - Program Outcome – This course aims in
 - Acquiring ability to writing Bengali properly.
 - Course Outcome – By the end of the term the students will be –
 - able to build proficiency required for getting employed in different streams in publishing or advertising areas.

Raghunathpur College, Purulia.
(Under SKBU)
Department of Bengali
Curriculum Framework Based on
Four Year Under Graduate Course

BENGALI MAJOR COURSE

Semester - 1

Bengali (Major-1)

- Paper Code BBNGMJ01T (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Bangla Sahityer Itihaas- Astadash Satabdi Porjonta (বাংলা সাহিত্যের ইতিহাস – অষ্টাদশ শতাব্দী পর্যন্ত)
 - Class hours- 70
 - Program Outcome – This course aims in
 - providing a concise overview of the history of Bengali literature of the old and medieval period from 10th to 18th century.
 - Course Outcome – By the end of the term the students will be
 - acquainted with the characteristics and features of Bengali literature, such as Tantrik Sahojia Bouddha cult, origin and evolution of Radha Krishna myths in Padavali Sahitya, Mangal kabya, Translated literature and the impact of the battle of Plassey.

Semester - 2

Bengali (Major-2)

- Paper Code BBNGMJ02T (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Madhyayuger Sahitya (মধ্যযুগের সাহিত্য)
 - Class hours-60
 - Program Outcome – This course aims in –
 - providing a brief outline of Bengali literature in middle ages through the selective study of *Vaishnav Padavali*, *Shrikrishnakirtan*, *Shakta Padabali*, *Chandimangal*.
 - Course Outcome – By the end of the term the students will be
 - proficient in analyzing the socio-cultural influences of middle age Bengali literature.

Semester - 3

Bengali (Major-3)

- Paper Code BBNGMJ03T (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Bangla Sahityer Itihas—Unish Satak o Bish Sataker Prathomardha (বাংলা সাহিত্যের ইতিহাস—উনিশ শতক ও বিশ শতকের প্রথমার্ধ)
 - Class hours- 60
 - Program Outcome – This course aims in
 - providing an overview of the history of 19th and 20th century Bengali literature.
 - Course Outcome – By the end of the term the students will be –
 - acquainted with a concise overview of 19th and 20th century Bengali literature and the socio-political factors that shaped it.

Semester - 4

Bengali (Major-4)

- Paper Code BBNGMJ04T (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Bhasatattwa (ভাষাতত্ত্ব)
 - Class hours – 60
 - Program Outcome – This course aims in
 - providing basic concepts concerning Bengali language including its origin, development, organs of speech, phonology , morphology and syntax.
 - Course Outcome – By the end of the term the students will be –
 - proficient with various aspects of origin and development stages of Bengali language with associated minutiae.

Bengali (Major-5)

- Paper Code BBNGMJ05T (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Chhanda O Alankar (ছন্দ ও অলংকার)
 - Class hours- 60
 - Program Outcome – This course aims in –
 - introducing Bengali rhetoric and prosody.
 - Course Outcome – By the end of the term the students will be –
 - proficient in basic dictums of Bengali rhetoric and prosody to the extent of identification and analysis of a given specimen.

Semester - 5

Bengali (Major-6)

- Paper Code BBNGMJ06T (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Unish Sataker Sahitya (উনিশ শতকের সাহিত্য)
 - Class hours- 70
 - Program Outcome – This course aims in –
 - familiarizing students with 19th century Bengali literature through the study of selected specimens.
 - Course Outcome – By the end of the term the students will be –
 - proficient in not only literary but also social cultural scenario of 19th century Bengal.

Bengali (Major-7)

- Paper Code BBNGMJ07T (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Bangla Natak O Prahosan (বাংলা নাটক ও প্রহসন)
 - Class hours- 60
 - Program Outcome – This course aims in –
 - familiarizing students with the oeuvre of Bengali drama and farce through the study of selected specimens.
 - Course Outcome – By the end of the term the students will be –
 - proficient with not only literary but also performative aspects of Bengali drama as well as farce.

Semester - 6

Bengali (Major-8)

- Paper Code BBNGMJ08T (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Bangla KathaSahitya —Part-1 (বাংলা কথাসাহিত্য—পর্ব-১)
 - Class hours- 65
 - Program Outcome – This course aims in –
 - familiarizing students with the oeuvre of Bengali novels and short stories i.e *KathaSahitya* - Part-1 through the study of selected specimens.
 - Course Outcome – By the end of the term the students will be –
 - thoroughly acquainted with origin, development and variations of Bengali *Kathasahitya*(novel and short stories) of 19th century and 1st 30 years of 20th century

Bengali (Major-9)

- Paper Code BBNGMJ09T (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Bangla Prabandho (বাংলা প্রবন্ধ)

- Class hours- 60
 - Program Outcome – This course aims in –
 - familiarizing students with an overview of Bengali essays selective yet diverse study of specimens.
 - Course Outcome – By the end of the term the students will be –
 - intimately acquainted with the nuanced approaches towards essays as a literary johnware and its importance to Bengali literature as well as culture as a whole.

Bengali (Major-10)

- Paper Code BBNGMJ10T (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Bish Satoker Bangla Kabita (বিশ শতকের বাংলা কবিতা)
 - Class hours- 60
 - Program Outcome – This course aims in –
 - familiarizing students with an overview of 20th century Bengali poetry through selective study of poems by various poets such as Rabindranath Tagore, Kazi Nazrul Islam, Satyendranath Dutt, Jibanananda Das, Amiya Chakrabarty, Samar Sen etc.
 - Course Outcome – By the end of the term the students will be –
 - acquainted with the themes and characteristics that defined 20th century Bengali poetry.

Semester - 7

Bengali (Major 11)

- Paper Code BBNGMJ11T (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Puruliar Sahitya - Sanskriti (পুরুলিয়ার সাহিত্য - সংস্কৃতি)
 - Class hours- 60
 - Program Outcome – This course aims in
 - familiarizing studios with the culture of Purulia through a selective study of not only literary text but also festivals, rituals, dancers, music etc.
 - Course Outcome – By the end of the term the students will be –
 - able to understand the intricacies of local culture of the district most of them belong to and hopefully will be more active in its preservation and development.

Bengali (Major 12)

- Paper Code BBNGMJ12T (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Sahitya Tattwa O Sahitya Chinta (সাহিত্য তত্ত্ব ও সাহিত্য চিন্তা)
 - Class hours- 60
 - Program Outcome – This course aims in –

- familiarizing students with not only Bengali literary and cultural theory but how it ties into the global matrices of the literary and cultural theory as a whole.
- Course Outcome – By the end of the term the students will be –
 - thoroughly acquainted with the Bengali literary and cultural theory; the societal forces that shaped it and the societal forces it in turn shaped.

Bengali (Major 13)

- Paper Code BBNGMJ13T (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Research Methodology (গবেষণা- প্রকরণ ও পদ্ধতি)
 - Class hours- 60
 - Program Outcome – This course aims in –
 - familiarizing students with the theoretical and practical aspects of research.
 - Course Outcome – By the end of the term the students will be –
 - acquainted with the nuts and bolts of writing research articles following the current academic norms.

Semester - 8

Bengali (Major 14)

- Paper Code BBNGMJ14T (4 Credits- 3 Theory + 1 Tutorial)
 - Paper Title : Pragadhunik Sahitya (প্রাগধুনিক সাহিত্য)
 - Class hours- 48
 - Program Outcome – This course aims in –
 - familiarizing students with pre-modern Bengali literature through a selective study of literary texts.
 - Course Outcome – By the end of the term the students will be –
 - intimately acquainted with the pre-modern Bengali literature.

Bengali (Major 15)

- Paper Code BBNGMJ15T (4 Credits- 3 Theory + 1 Tutorial)
 - Paper Title : Bangla Kathasahitya- Part-2 (বাংলা কথাসাহিত্য- পর্ব ২)
 - Class hours- 48
 - Program Outcome – This course aims in –
 - familiarizing students with the oeuvre of Bengali novels and short stories i.e *Kathasahitya* - Part-2 through the study of selected specimens.
 - Course Outcome – By the end of the term the students will be –
 - thoroughly acquainted with origin, development and variations of Bengali *post-Rabindranath Katha Sahitya*(novel and short stories).

Bengali (Major 16)

- Paper Code BBNGMJ16T (4 Credits- 3 Theory + 1 Tutorial)
 - Paper Title : Bish Satoker Bangla Natak (বিশ শতকের বাংলা নাটক)
 - Class hours- 60
 - Program Outcome – This course aims in –
 - providing and outline of Bengali drama through the textual study of diverse yet limited number of specimens from 20th century.
 - Course Outcome – By the end of the term the students will be –
 - able to study drama as a genre and how to analyse plot, character , thought, dialogues etc. studing of different types of drama they will achieve the ability of criticism.

Bengali (Major 17)

- Paper Code BBNGMJ17T (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Bibidha Godya (বিবিধ গদ্য)
 - Class hours- 60
 - Program Outcome – This course aims in –
 - reading and writing various types of non fictional prose and
 - Course Outcome – By the end of the term the students will be –
 - able to enhance their ability of thinking and to develop art of writing non fictional proses.

Bengali (Major 18)

- Paper Code BBNGMJ18T (6 Credits- 5 Theory + 1 Tutorial)
 - Paper Title : Bharatiya Sahitya (ভারতীয় সাহিত্য)
 - Class hours- 60
 - Program Outcome – This course aims in –
 - familiarizing students with the Indian regional language literatures.
 - Course Outcome – By the end of the term the students will –
 - acquire a critical overview of Indian Bhasha Literatures through selective study of works translated into Bengali such as Vijay Tendulkar’s “Chup Adalot Cholche”, T. S. Pillai’s "Chingri" , Munsri Premchand’s “Kafan”, U.R. Ananthmurthy’s “Ekti Aprtyasita Sakhsatkar”, Amrita Pritam’s “Dui Nari” etc.

Semester - 8

Honours with Research

Major 14 ,15 , 16 &

Research project/ Dissertation(12 credit course)

- Program Outcome – This course aims in
 - preparing students for undertaking future research .
- Course Outcome – By the end of the term the students will-
 - proficient in the theory and practical aspects of research. It will also consist of students writing dissertation papers to be presented in a student seminar and will have possibilities to be published in peer reviewed and scopus indexed journals.

Raghunathpur College, Purulia.
Department of Bengali

**Curriculum Framework Based on
Four Year Under Graduate Course**

BENGALI MINOR & COMMON COURSE

**Semester - 1
Bengali (Minor - 1)**

- Paper Code BBNGMEA11T (4 Credits- 3 Theory + 1 Tutorial)
 - Paper Title : Bangla Sahityer Itihas— Adhunik Yug (বাংলা সাহিত্যের ইতিহাস—আধুনিক যুগ)
 - Class hours : 50 hours
 - Program Outcome – This course aims in

- providing an overview of the history of 19th and 20th century modern Bengali literature.
- Course Outcome – By the end of the term the students will be –
 - acquainted with a concise overview of 19th and 20th century modern Bengali literature and the socio-political factors that shaped it.

Semester - 3
Bengali (Minor - 2)

- Paper Code BBNGMEA23T (4 Credits- 3 Theory + 1 Tutorial)
 - Paper Title : Bangla Bhasa Porichoy (বাংলা ভাষা পরিচয়)
 - Class hours : 50 hours
 - Program Outcome – This course aims in
 - providing basic concepts concerning Bengali language including its origin, development, organs of speech, phonology , morphology and syntax.
 - Course Outcome – By the end of the term the students will be –
 - proficient with various aspects of origin and development stages of Bengali language with associated minutiae.

Semester - 5
Bengali (Minor - 3)

- Paper Code BBNGMEA35T (4 Credits- 3 Theory + 1 Tutorial)
 - Paper Title : Bangla Sahitya Path (বাংলা সাহিত্য পাঠ)
 - Class hours : 50 hours
 - Program Outcome – This course aims in –
 - understanding about the forms and features of contemporary Bengali poetries, short stories and essays.
 - Course Outcome – By the end of the term the students will be –
 - able to analyse pre-modern and modern bengali literature with it multitudes of nuances.

Semester - 7
Bengali (Minor - 4)

- Paper Code BBNGMEA47T (4 Credits- 3 Theory + 1 Tutorial)
 - Paper Title : Bangla Sahitya O Sanskrity (বাংলা সাহিত্য ও সংস্কৃতি)
 - Class hours : 55 hours
 - Program Outcome – This course aims in –
 - understanding about the forms and features of contemporary Bengali drama , novel and folk literature of Purulia district.

- Course Outcome – By the end of the term the students will be –
 - able to analyse modern bengali drama and novel , with it multitudes of nuances.

Subject : Bengali (SEC)
common course

- Paper Code BBNBSEC01T (3 Credits- 3 Theory + 0 Tutorial)
 - Paper Title : Prayogik Bangla Shiksha(প্রায়োগিক বাংলা শিক্ষা)
 - Class hours : 30 hours
 - Program Outcome – This course aims in –
 - providing working knowledge of proof-reading , newspaper report writing, official letter writing, advertisement writing, dialogue writing.
 - Course Outcome – By the end of the term the students will be –
 - With the process of writing application specific content that will be helpful for the improvement of employment opportunities

Subject : Bengali AEC(MIL)
common course

- Paper Code BAECBN04T (4 Credits- 4 Theory + 0 Tutorial)
 - Paper Title : Bangla Bhasar Bhasik Sangjog (বাংলা ভাষার ভাষিক সংযোগ)
 - Class hours : 40 hours
 - Program Outcome – This course aims in –
 - familiarizing with bengali syntax and proverbs.
 - Course Outcome – By the end of the term the students will be –
 - proficient in using the language with all its nuances.

Model Curriculum

Name of the Degree Program: B.A. / B.Sc. (Basic / Honours) Degree in Geography

Discipline Core: Geography

Total Credits for the Program: 170

Starting year of implementation: 2023-2024

Program Outcomes:

By the end of the program the students will be able to:

PO1: Relating to Knowledge

By the end of the program the students will be able to:

- a) Defining key terms and providing an explanation of geography concepts.
- b) Provide a more thorough description of the pertinent geological ideas, hypotheses, and models.
- c) Demonstrate thorough knowledge of human activity and environmental processes and variables.

PO2: Understanding and application

By the end of the program the students will be able to:

- a) Explain the significance of time and space scales.
- b) Understand how the natural and social settings are dynamic and complicated.
- c) Define the significance of the similarities and differences among different locations, environments, and individuals.
- d) Understand the impact that processes have on distributions, environments, and systems.

PO3: Students Skills

Students will be able to:

- a) Interpret various forms of geographic data and sources and realise their limits by the conclusion of the programme.
- b) Explain geographic reasoning, ideas, and evidence.
- c) Find trends and patterns using geographic data.
- d) To illustrate geographic concepts, use diagrams and rough maps.
- e) Show evidence of the ability to analyse and synthesise geographic data.

PO4: Students Evaluation

Students will be able to:

- a) Critically assess geographic principles, theories, and models by the end of the course.
- b) Evaluate how geographic processes and change affect the natural and social settings.
- c) Examine the interactions between various stakeholders' points of view, potential conflicts of interest, and other factors in the management of the natural and built ecosystems.
- d) Determine if initiatives were largely successful or unsuccessful.

Syllabus Aims:

The B.A./B.Sc. geography program's objectives are outlined in the curriculum. The instructional setting in which syllabus material should be viewed is described in this purpose. Numerous of these goals may be accomplished through the utilisation of pertinent case studies, the application of geographic knowledge, and hands-on fieldwork.

The BA./B.Sc Geography syllabus aims to enable students to:

- a) Know the numerous processes operating at different scales in both physical and human settings, as well as the importance of scale in geography.
- b) Develop awareness of the importance of geography to understanding and resolving current environmental concerns
- c) Understanding of the fundamental principles of both human geography and physical geography, as well as how they are related to one another.
- d) Explain the causes and effects of change over space and time on physical and human environments
- e) Increase knowledge of, and capacity to utilise and apply, suitable skills and practise including fieldwork
- f) Develop a concern for accuracy and objectivity in obtaining, recording, processing, presenting, analysing, and interpreting geographic data.
- g) Improve a logical approach to offer a structured, cohesive, and evidence-based argument.