Dum Dum Motijheel College

1, Motijheel Avenue, Dum Dum, Kolkata – 700074, West Bengal. India

Programme : Bachelor of Science (B.Sc.)

Programme Outcome (P.O.) for B.Sc.

The Undergraduate Programmes in Biological, Physical and Mathematical sciences will instill in thestudents a scientific temper and impart a holistic education through the following outcomes :

PO 1	Domain Knowledge	Acquire profound knowledge of basic concepts, theories and processes through study of core courses in respective programmes. Assess, adopt, apply and analyze domain specific knowledge to emerging areas of Academia and Industry.
PO 2	Multidisciplinary Knowledge	Identify and determine relationships across disciplines
		Acquire and apply multidisciplinary knowledge for the holistic academic development
PO 3	Critical thinking and Analytical skills	Critically integrate knowledge and enable the analysis of complex phenomena, issues and situations related to research and development.
		Apply empirical knowledge and skills to identify and collect quantitative and qualitative data to analyze and formulateevidence-based suggestions and solutions.
PO 4	Scientific writing and Presentation skills	Formulate and document results obtained laboratories, case studies, project works and field works.
		Effectively communicate through engaging presentations using methodologies appropriate to the discipline.
PO 5	Innovation and Creativity	Demonstrate transferable capabilities and intrapreneurial skillsthat are relevant to the industry and other employment opportunities.
		Develope entrepreneurial skills and generate intellectual property.
PO 6	Environmental sustainability	Critically evaluate the potentials and impacts of scientificinnovations on environment and find sustainable solution to issues pertaining to environment, public health and agriculture.
PO 7	Individuality and Team work	Perform scientific investigations in laboratories, project works and field works independently and collaboratively in a safe and efficient manner.
PO 8	Digital skills	Acquire computer skills and their application relevant toclassroom and self-directed web-based learning.
		Familiarize with and use domain related software resources,computational skills and digital tools for data analysis, visualization and interpretation.

DEPARTMENT OF BOTANY

B.Sc. Botany (Hons) CBCS Syllabus

Programme Specific Outcomes (POS)

- Demonstrate in-depth knowledge of plant taxonomy, plant anatomy, plant physiology, genetics, ecology, evolution, and plant biotechnology.
- Classify and identify plants of different taxonomic groups based on reproductive and vegetative morphology.
- Analyze internal and external structures of plants and relate them to specific functions.
- Explain various physiological processes in plants like photosynthesis, respiration, nitrogen metabolism, plant hormones, etc.
- Apply genetic principles to solve problems related to inheritance, variation, selection, and biotechnology in plant sciences.
- Evaluate relationships between plants and their environment at individual, population, and community levels.
- Describe mechanisms of organic evolution and forces that direct changes in plant populations over time.
- Demonstrate use of instruments, techniques and methods for laboratory and field investigations in diverse disciplines of botany.
- Analyze and interpret experimental data to draw meaningful conclusions applying statistical tools.
- Apply conceptual knowledge in one or more specialized areas like plant ecology, cell biology, molecular biology, economic botany, etc.
- Communicate concepts and research findings effectively using scientific report writing, seminars and presentations.

Course Outcome:

Course Name: Core Course-1

Course Code: BOTACOR01T and BOTACOR01P

Topic Name: Phycology and Microbiology

Course outcome: This course will help the students to get acquainted with the microbial world, prokaryotic and eukaryotic organisms along with understanding the general structure, ultrastructure and activities of different prokaryotic organisms like cyanobacteria, eubacteria, archaea and also viruses. Also, the field of phycology is vast, and it reveals about the crucial role that algae play in our world. The students get familiar with the taxonomic classification, identification, evolutionary significance and beneficial roles of algae, bacteria and viruses as well as the harmful and detrimental effect of these organisms on human beings, other animals, plants and our environment.

On completion of the course both theory and practical, the students will be able to

- Identify various genera of algae like *Nostoc, Volvox, Oedogonium, Fucus, Polysiphonia* etc.
- They will get hands on practice on preparation of media, sterilization of media for culturing and maintain of cultures.
- They will be able to identify bacteria by gram staining method and also perform differential staining for identification.

Course Name: Core Course-2

Course Code : BOTACOR02T and BOTACOR02P

Topic Name : Biomolecules and Cell biology

Course outcome: This is an application-based course which has a broad scope for the students. Here the students get familiarised with the chemical processes and principles which governs various life processes. The students understand the molecular structure of the various biomolecules, including the study of enzymes, their kinetics, structure, and function and also various other life sustaining chemical reactions in the biological world. The processes of cell cycle and cell division are very important to understand the development of the organism as a whole.

On completion of the course, both theory and practical, the students will be able to

- Understand the basics structure of cell and cellular organelles.
- Perform various chemical analysis to identify various biomolecules of the living system
- Identify various cellular organelles from electron micrographs
- Identify and analyse the various cell division phases both mitotic and meiotic.

Course Name : Core Course-3

Course Code : BOTACOR03T and BOTACOR03P

Topic Name : Mycology and Phytopathology

Course outcome: This course is concerned with the study of fungi, including their taxonomy, genetics, biochemical properties, and use by humans. By studying this course, the students will get familiarised with general characteristics and diversity among different fungal group. They also gain knowledge about plant diseases caused by pathogens (infectious organisms) and environmental

conditions (physiological factors) It involves the study of pathogen identification, disease etiology, disease cycles, economic impact, plant disease epidemiology, plant disease resistance, and management of plant diseases.

On completion of the course, both theory and practical, the students will be able to

- Identify fungal genera from different classes like *Rhizopus, Aspergillus, Penicillium, Ascobolus, Alternaria, Puccinia, Agaricus, Albugo etc.*
- Identify Lichens - crustose, foliose and fruticose types and mycorrhiza.
- Get the knowledge of Plant pathogens, organisms that cause infectious plant diseases, include fungi, oomycetes, bacteria, viruses, viroids, virus-like organisms, phytoplasmas, protozoa, nematodes.

Course Name: Core Course -4

Course Code: BOTACOR04T and BOTACOR04P

Topic Name: Archegoniate

Course outcome: This course deals with the study of the plant group archegoniate which includes lower plants like Bryophytes, pteridophytes and gymnosperms and understand their evolution, diversity and significance. Since it includes a diverse group of plants, a thorough knowledge is attained after studying this course.

After completing this course, students will be able to:

- Understand the lower plants like Bryophytes, Pteridophytes and Gymnosperms, their vegetative and reproductive structures.
- Identify and characterise the plants in nature.

Course Name: Core Course 5

Course Code : BOTACOR05T & BOTACOR05P

Topic Name : Morphology and Anatomy

Course outcome: This course deals with the study of external and internal structures of the plants with special reference to flowering plants. Important morphological structures like types of roots, stem, inflorescence, flowers and fruits helps us to understand the incredible diversity among the angiosperms. The anatomical study helps students to grasp the knowledge of various tissue organizations and its importance. Also helps to understand the adaptation of the plants in different environmental conditions.

After completing this course, students will be able to :

- Identify the plants on the basis of their external and internal structures.
- Identify the cellular and tissue organization of the flowering plants.
- Prepare permanent slides by double staining method for the important anatomical features of monocots and dicots.

Course outcome: This course deals with the study of external and internal structures of the plants with special reference to flowering plants. Important morphological structures like types of roots, stem, inflorescence, flowers and fruits helps us to understand the incredible diversity among the angiosperms. The anatomical study helps students to grasp the knowledge of various tissue organizations and its importance. Also helps to understand the adaptation of the plants in different

environmental conditions.

After completing this course, students will be able to :

- Identify the plants on the basis of their external and internal structures.
- Identify the cellular and tissue organization of the flowering plants.
- Prepare permanent slides by double staining method for the important anatomical features of monocots and dicots.

Course Name: Core Course 6

Course Code: BOTACOR06T & BOTACOR06P

Topic Name: Economic Botany

Course outcome: The course includes the study of plants and their products that are useful for humans. Students familiarise with the diversity, origin, cultivation, and domestication of various plant groups that provide food, oil, sugar, starch, beverages, spices, rubber, drugs, wood, fibers etc.

After completing this course, students will be able to:

- Understand the nutritional, medicinal, industrial, and cultural values of different plant products.
- Understand the importance of gene banks and germplasm diversity for the conservation and improvement of plant resources.
- Perform laboratory experiments to extract, test, and analyze different plant products.

Course Name: Core Course 7

Course Code: BOTACOR07T & BOTACOR07P

Topic Name: Genetics

Course outcome: This is also an important course which enables students to attain a solid foundation in both classical and modern molecular genetics. It focuses on understanding the principles and mechanisms for the organization, replication, expression, variation, and evolution of genetic material at a molecular level. The course also covers advanced concepts of genes and aspects of transmission genetics, quantitative genetics, and population genetics.

After completing this course, students will be able to:

- Prepare and identify the slides of the various stages of cell division- mitosis and meiosis
- Identify various genetic diseases.
- Calculate the Mendelian ratio, chi square analysis and probability tests.
- Mapping of chromosomes, anomalies in genetics through permanent slides.

Course Name: Core Course 8

Course Code: BOTACOR08T & BOTACOR08P

Topic Name: Molecular Biology

Course outcome: This is also an important application based course with tremendous scope in modern times. his course will teach students the basics of molecular biology. It will help students understand how genetic material is organized, copied, used, changed, and evolved at a tiny, molecular level. Students will also be aware of the famous experiments in genetics conducted by scientists like Griffith, Hershey & Chase, Conrat, Fraenkel, Stahl & Meselson, and Avery.

After finishing the course, students will know how to:

- Make a type of nutrient-rich liquid (called Lysogeny broth or LB medium) used for growing bacteria.
- Extract DNA from plant materials and measure the amount of DNA.
- Understand the role of RNA polymerases, which are proteins that make RNA from a DNA template.

Course Name: Core Course 9

Course Code : BOTACOR09T & BOTACOR09P

Topic Name : Plant ecology and Phytogeography

Course outcome: This course gives a vivid understanding of the ecosystem, the biotic and abiotic components and their interrelationship. It also helps to understand the rich biodiversity of our land and how to preserve and conserve it. This course helps to boost our awareness for environment protection. Phytogeography gives an insight to the geographical distribution of plants and their adaptations to different ecological conditions.

After finishing the course, students will know how to:

- Study the various abiotic factors of the environment using specific instruments.
- Study various chemical components of surrounding soil and water like concentration of oxygen , carbon dioxide, chloride, and many more.
- Study the vegetation of different localities using quadrate to analyse the diversity and frequency of plant population.

Course Name: Core Course 10

Course Code: BOTACOR010T & BOTACOR010P

Topic Name: Plant systematics

Course outcome: This study focuses on identification, nomenclature and classification of various plant species. Students are made aware of the classical and modern methods of classifying plants to their correct taxonomic ranks. The study is done with special stress to field visits which will enable the students to identify the plants in the wild and take suitable measures to protect and preserve the natural flora of a particular area.

After completing this course, students will be able to:

- Understand the various technical terms related to plant systematics.
- Identify plants in wild or their natural habitat.

- Identification up to genus level according to Bentham and Hooker's system of classification.

Course Name: Core Course-11

Course Code: BOTACOR11T & BOTACOR11P

Topic Name: Reproductive Biology of Angiosperm

Course outcome: The course contains detailed information on structure and function of reproductive organs and their significance in plant reproduction. Reproductive development, Pollination, Fertilization, self-incompatibility and its significance, Embryogenesis, polyembryony are the areas which are stressed upon.

On completion of the course both theory and practical

- Students will be able to differentiate reproductive organs at Morphological, Anatomical, Physiological and Biochemical level.
- Attain detailed knowledge of embryo, endosperm and seed.
- Learn laboratory techniques to study anther, pollen, pollen viability by using Tetrazolium.
- This knowledge will be helping to apply in agriculture for production of hybrids.
- The allergic reactions in Humans can be better understood on the basis of pollen study

Course Name: Core Course-12

Course Code: BOTACOR12T & BOTACOR12P

Topic Name: Plant Physiology

Course outcome: This course aims to educate student about the mechanism and physiology of the life processes in plants. It focuses on the plant nutrient uptake and translocation, plant water relations, transpiration, mineral nutrition, plant growth regulators, physiology of flowering, photosynthesis, respiration and nitrogen metabolism.

On completion of the course both theory and practical

- Students will be able to understand the various physiological and metabolic life processes in plants.
- They will also gain about the various uptake and transport mechanisms in plants and are able to coordinate the various processes.
- They understand the role of various hormones, signalling compounds, thermodynamics and enzyme kinetics.
- During the course students will gain knowledge about various mechanisms such as channel or transport proteins involved in nutrient uptake in plants.

Course Name: Core Course-13

Course Code: BOTACOR13T & BOTACOR13P Topic

Name: Plant Metabolism

Course outcome: This course aims to educate student about concept of metabolism; Carbohydrates, lipid, nitrogen metabolism; carbon assimilation and oxidation; mechanism of signal transduction.

On completion of the course both theory and practical

- Students will be able to understand the various physiological life processes in plants in relation to the biochemicals of their system.
- They will also gain about the various uptake and transport mechanisms in plants and are able to coordinate the various processes.
- They understand the role of various hormones, signalling compounds, thermodynamics and enzyme kinetics.

Course Name: Core Course-14

Course Code: BOTACOR14T & BOTACOR14P

Topic Name: Plant Biotechnology

Course outcome: This course explores the use of biotechnology to both generate genetic variation in plants and to understand how factors at the cellular level contribute to the expression of genotypes and hence to phenotypic variation. There is an emphasis on the molecular mechanisms directing plant gene expression under diverse environmental and developmental stimuli. The course includes plant tissue culture, recombinant DNA technology, methods of gene transfer and various applications of biotechnology including genetically engineered products for plants and humans both.

On completion of the course both theory and practical students can be able to prepare different plant tissue culture medium.

- Students can study and can construct restriction map.
- Students have an idea on micropropagation, somatic embryogenesis, different gene transfer methods, study of genetic engineering and genetically modified crops.
- Genomic DNA isolation and gel electrophoresis.

Course Name: Discipline Specific Elective- 1

Course Code: BOTADSE02T and BOTADSE02P

Topic Name: Horticultural Practices and Post - Harvest Technology
Course outcome: Horticultural practices and post-harvest technologies play an important role in the Indian economy by entrepreneurship development. It has also played a significant role by providing raw materials to various food processing industries and higher farm profitability due to the higher production and earning through foreign exchange. Hence this study is not only targeted to imparting theoretic knowledge but also is targeted towards its practical applications in generating employment.

On completion of the course both theory and practical Students will attain knowledge on identification, propagation and economic uses of different ornamental plants, fruits, vegetable crops.

- Students also become aware of the various Horticultural techniques, setting up of garden, maintain cut flowers, bonsai making etc.
- Students are familiarised with various methods of garden designing, landscaping, avenue plant, flower arrangement etc.

- They can grow an idea on disease control and management.

Course Name: Discipline Specific Elective-2

Course Code: BOTADSE03T and BOTADSE03P

Topic Name: Industrial and Environmental Microbiology

Course outcome: The content of this curriculum has been designed to acquire knowledge by the students in different field of applied microbiology.

- Learners will be able to understand how different technologies are being used to produce different industrially important microbial products in large scale.

- Students will be able to know the role of microbes in maintain quality of the environment. They will be able to identify the microbial flora of water.

- Students will be able to explain the role of microbes in agriculture and how microbes could be applied for remediation of contaminated soil.

Course Name: Discipline Specific Elective-3

Course Code: BOTADSE04T and BOTADSE04P

Topic Name: Analytical Techniques in Plant Sciences

Course outcome: This is a very interesting application-based study targeted towards understanding the various analytical tools used to study various aspects of plant sciences. These are the techniques which have mostly been developed in last few decades which have immensely helped in opening our eyes to the newer aspects of plant life systems. Few of the techniques are spectrophotometry, Molecular markers, FACS, FISH, PCR, Northern and southern hybridisation etc.

On completion of the course both theory and practical the students will be able to

- Have a theoretical knowledge of the working principle of various important tools and techniques in plant sciences.

- Perform experiments like extraction of DNA, separation of nitrogenous bases, separation of proteins, PCR reaction, gel electrophoreseis.
- Understand the principle governing cellular visualisation techniques like freeze etching, freeze fracture, negative and positive staining, FISH.

Course Name: Discipline Specific Elective-4

Course Code: BOTADSE06T and BOTADSE06P
Topic Name: Biostatistics

Course outcome: This course will enable the students to understand and interpret the data generated in biological sciences using modern Statistical Methods. The students will be able to learn through real examples by applying the statistical research techniques to variety of plant related research problems.

On completion of the course both theory and practical the students will be able to

- Perform statistical analysis of provided data series like calculation of mean, median, mode standard deviation and error measurement.

- Finding correlations between provided sets of data.
- Perform simple hypothesis-based test like student t test and chi square test.

Course Name: Skill Enhancement Course-1

Course Code: BOTSSEC01M

Topic Name: Plant diversity and Human welfare

Course outcome: This course will help the students familiarise with the diversity of the plant group as a whole and its different uses in the welfare of the society. They will understand about the importance of biodiversity and its conservation management strategies. After the completion of course, the students will

- Understand the importance of Agrobiodiversity, sustainable development and important commercial aspects of agriculture like ornamental plants, silviculture, avenue trees etc
- Understand the importance of in situ and ex situ conservation, social approaches to conservation, and biodiversity awareness programmes.
- Important organizations related to biodiversity management like IUCN, UNESCO, WWF, NBPGR etc.

Course Name: Skill Enhancement Course-2

Course Code: BOTSSEC02M

Topic Name: Ethnobotany

Course outcomes: This course deals with the study of plants useful not only for preserving traditional cultures but also for community health care and drug development. It helps in understanding the study of ethnobotany as an interdisciplinary science. Understanding how the plants were used traditionally by the ethnic groups of India for many years would have a great implication in understanding the same in relation to modern medicine.

After the completion of course, the students will

- Learn about the major and minor ethnic groups or Tribals of India, their life styles and the plants used by them for generations.
- Get familiarised with Field work, Herbarium , Ancient Literature , Archaeological findings, temples and sacred place
- Understand the Medico ethnobotanical sources in India and their applications

GENERAL COURSE IN BOTANY

Course Name: Discipline Specific Core Course 1/ General Elective 1

Course Code: BOTGCOR01T/BOTGCOR01P OR BOTHGEC01T/BOTHGEC01P

Topic Name: Biodiversity (Microbes, Algae, Fungi and Archegoniate)

Course outcome: This course will help the students to get acquainted with the microbial world, prokaryotic and eukaryotic organisms along with fungal world and archegoniate which includes lower plants like Bryophytes, pteridophytes and gymnosperms.

After completing this course both theory and practical, students will be able to:

- Understand the general structure, ultrastructure and activities of different prokaryotic organisms and recognize them under microscope.
- Identify different fungal genera from different classes.
- Understand the lower plants like Bryophytes, Pteridophytes and Gymnosperms, their vegetative and reproductive structures.
- Have a basic understanding about lichens and mycorrhiza and their economic importance.
- Identify and the plants in nature.

Course Name: Discipline Specific Core Course 2/ General Elective 2

Course Code: BOTGCOR02T/BOTGCOR02P OR BOTHGEC02T/BOTHGEC02P Topic Name: Plant ecology and Taxonomy

Course outcome: This course gives the students a vivid understanding of the ecosystem, the biotic and abiotic components, their interrelationship and gives them a basic idea of biodiversity and gain a general idea on the phytogeographical distribution of different plant genera. This course also deals with plant taxonomy which is study of identification, nomenclature and classification of various plant species. Students are made aware of the classical and modern methods of classifying plants to their correct taxonomic ranks.

After completing this course both theory and practical, students will be able to:

- Study the various abiotic factors of the environment using specific instruments.
- Study the vegetation of different localities using quadrate to analyse the diversity and frequency of plant population.
- Understand the various technical terms related to plant systematics, and able to classify them according to Bentham and Hooker's system of classification.
- Prepare an herbarium of plants mentioned in the course.

Course Name: Discipline Specific Core Course 3/ General Elective 3

Course Code: BOTGCOR03T/BOTGCOR03P OR BOTHGEC03T/BOTHGEC03P

Topic Name: Plant anatomy and Embryology

Course outcome: The course contains detailed information on structure and function of reproductive organs and their significance in plant reproduction and the process of development of embryo in plants. The anatomical aspect of this course deals with familiarising the students with the knowledge of various

tissue organization within the plants and its importance. Also helps to understand the adaptation of the plants in different environmental conditions.

On completion of the course both theory and practical, the students will be able to

- Identify the cellular and tissue organization of the flowering plants.
- Identifying the important anatomical features of monocots and dicots through permanent slides.
- Attain detailed knowledge of embryo, endosperm and seed.
- Learn laboratory techniques to study anther, pollen, pollen viability.
- Have a basis idea about alternate modes of reproduction like apomixis, polyembryony etc.

Course Name: Discipline Specific Core Course 4/ General Elective 4

Course Code: BOTGCOR04T /BOTGCOR04P OR BOTHGEC04T/BOTHGEC04P Topic

Name: Plant Physiology and Metabolism

Course outcome: This course aims to familiarize student about the various metabolic activities of the plant system plays a vital role in its survival. It focuses on the plant nutrient uptake and translocation, plant water relations, transpiration, mineral nutrition, plant growth regulators, physiology of flowering, photosynthesis, respiration and nitrogen metabolism, all of which are the vital physiological process of the plant system.

On completion of the course both theory and practical, the students will be able to

- To understand the various physiological and metabolic life processes in plants.
- Perform experiments related to osmotic potential, photosynthesis, respiration etc.
- Understand the relation of the stomatal frequency to the rate of transpiration.
- Perform basic experiments on enzymes important for metabolic processes.

Course Name: Discipline Specific Elective Course-1

Course Code: BOTGDES01T/BOTGDSE01P

Topic Name: Cell and Molecular Biology

Course outcome: This is an important course dealing with understanding the basis of life i.e. Cell as the cells are the units of the living system. The students get to know about the various organelles of the cell and their functions. Students are also familiarised with the important instruments associated with studying the cells and their components. Also, the processes of cell cycle and cell division are very important to understand the development of the organism as a whole.

On completion of the course, both theory and practical, the students will be able to

- Understand the basics structure of cell and cellular organelles.
- Identify various cellular organelles from electron micrographs.
- Identify and analyse the various cell division phases both mitotic and meiotic.

Course Name: Discipline Specific Elective Course-2

Course Code: BOTGDES04T/BOTGDSE04P

Topic Name: Analytical techniques in Plant sciences

Course outcome: This is a very interesting application-based study targeted towards understanding the

various analytical tools used to study various aspects of plant sciences. These are the techniques which have immensely helped in understanding the newer aspects of plant life systems. Few of the techniques are spectrophotometry, Molecular markers, FACS, FISH, PCR, Northern and southern hybridisation etc.

On completion of the course both theory and practical the students will be able to

- Understand the working principle of various important tools and techniques in plant sciences.
- Perform experiments like extraction of DNA, separation of nitrogenous bases, separation of proteins, PCR reaction, gel electrophoreseis.
- Understand the principle governing cellular visualisation techniques like freeze etching, freeze fracture, negative and positive staining, FISH.

Course Name: Skill Enhancement Course-1

Course Code: BOTSSEC01M

Topic Name: Plant diversity and Human welfare

Course outcome: This course will help the students familiarise with the diversity of the plant group as a whole and its different uses in the welfare of the society. They will understand about the importance of biodiversity and its conservation management strategies.

After the completion of course, the students will

- Understand the importance of Agrobiodiversity, sustainable development and important commercial aspects of agriculture like ornamental plants, silviculture, avenue trees etc.
- Understand the importance of in situ and ex situ conservation, social approaches to conservation, and biodiversity awareness programmes.
- Important organizations related to biodiversity management like IUCN, UNESCO, WWF, NBPGR etc.

Course Name: Skill Enhancement Course-2

Course Code: BOTSSEC02M Topic Name: Ethnobotany

Course outcome: This course deals with the study of plants useful not only for preserving traditional cultures but also for community health care and drug development. It helps in understanding the study of ethnobotany as an interdisciplinary science. Understanding how the plants were used traditionally by the ethnic groups of India for many years would have a great implication in understanding the same in relation to modern medicine.

After the completion of course, the students will

- Learn about the major and minor ethnic groups or Tribals of India, their lifestyles and the plants used by them for generations.
- Get familiarised with Field work, Herbarium, Ancient Literature, Archaeological findings, temples and sacred place.
- Understand the Medico-ethnobotanical sources in India and their applications.

DEPARTMENT OF COMPUTER SCIENCE

Programme Specific Outcomes

After Successful completion of undergraduate program in Computer Sciecne students will gain a strong understanding of fundamental concepts in computer science, including algorithms, data structures, computer organization, and software engineering principles.

- Develop proficiency in multiple programming languages and the ability to design, implement, and debug complex software systems.
- Acquire strong problem-solving skills and the ability to apply computational thinking to solve real-world problems.
- Gain a solid understanding of theoretical aspects of computer science, including formal languages, automata theory, and complexity theory.
- Learn the principles of database design, implementation, and management, including relational database systems.
- Understand the fundamentals of computer networks and cyber security, including protocols, network design, and security measures.
- Gain knowledge about the design and functioning of operating systems, including process management, memory management, and file systems.
- Explore concepts and techniques in artificial intelligence, machine learning, and data science.
- Understand the entire software development lifecycle, from requirements analysis and design to testing, deployment, and maintenance.
- Foster the ability to engage in research, stay updated with the latest advancements in technology, and contribute to innovation in the field.

HONOURS COURSE IN COMPUTER SCIENCE
With effect from the session: 2018 – 2019

Course Name: Core Course-1

Course Code: CMSACOR01T and CMSACOR01P

Topic Name: Programming Fundamental using C/C++

Course Outcome: After completion of this course student will understand and apply fundamental programming constructs such as variables, data types, operators, loops, and conditional statements in both C and C++. earn to define and use functions for code modularity, reusability, and maintainability. Understand the concept of parameter passing and return values. Introduce basic data structures like arrays, linked lists, stacks, and queues. Learn how to manipulate and organize data efficiently. Understand memory allocation and deallocation in C/C++ and gain insights into pointers and dynamic memory allocation. Explore file I/O operations in C/C++ to read from and write to files. Understand how to manipulate data stored in files. students will learn about OOP principles, including classes, objects, inheritance, polymorphism, encapsulation, and abstraction. Develop problem-solving skills through the implementation of algorithms and logical thinking using C/C++ programming constructs. Acquire skills in debugging code and handling errors effectively. Learn to use debugging tools and techniques. Understand and apply coding standards and best practices for writing clean, readable, and maintainable code. Gain an understanding of basic algorithms and their efficiency. Practice algorithmic thinking to solve computational problems. Apply learned concepts through hands- on projects. This may involve writing small to medium-sized programs to solve real- world problems, reinforcing the practical application of programming skills.

Course Name: Core Course-2

Course Code: CMSACOR02T and

CMSACOR02P Topic Name: Computer System Architecture

Course Outcome: From this course students will gain a deep understanding of the organization and components of a computer system, including the CPU, memory, input/output devices, and the interconnection structure. Learn about instruction sets, addressing modes, and the design principles of the instruction set architecture. Understand how instructions are executed by the CPU. Explore the design and microarchitecture of processors, including pipelining, instruction-level parallelism, and techniques for improving CPU performance. Understand the memory hierarchy, including cache memory, main memory, and secondary storage. Learn about memory management techniques and their impact on system performance. Study the principles of input/output systems, including I/O interfaces, interrupt handling, and data transfer mechanisms between the CPU and peripherals. Explore bus systems and interconnection networks that facilitate communication between different components of a computer system. Understand the principles of parallel and distributed computing, including multi-core processors, parallel architectures, and the challenges of distributed systems. Gain hands-on experience with assembly language programming to reinforce the understanding of computer architecture concepts. Learn techniques for performance evaluation and optimization of computer systems, including benchmarking, profiling, and tuning. Stay updated with current trends and advancements in computer architecture, including emerging technologies and architectures.

Course Name: Core Course-3

Course Code: CMSACOR03T and CMSACOR03P

Topic Name: Programming in Java

Course Outcome: Students will understand the basic syntax, data types, and control flow structures in Java, including variables, loops, and conditional statements. Gain a solid foundation in OOP principles, including classes, objects, inheritance, polymorphism, encapsulation, and abstraction. Familiarize yourself with the Java Standard Library (Java API) and learn how to use pre-built classes and methods for common

programming tasks. Understand the concept of exceptions in Java and learn how to handle errors and exceptions in a program. Explore basic GUI programming using libraries such as Swing or JavaFX. Learn to create interactive and user-friendly applications. Gain proficiency in reading from and writing to files, understanding file handling operations in Java. Learn about the Java Collections Framework, including data structures such as lists, sets, and maps. Understand how to use these structures for efficient data manipulation. Understand the basics of multithreading in Java, including creating and managing multiple threads to achieve concurrent execution. Explore networking concepts and how to implement networked applications in Java, including socket programming.

Course Name: Core Course-4

Course Code: CMSACOR04T and CMSACOR04P

Topic Name: Discrete Structure

Course Outcome: Students will understand the basics of set theory, including set operations, subsets, and set relations. Apply set theory concepts to solve problems and model real-world situations. Learn the principles of propositional logic, including logical operators, truth tables, and logical equivalences. Develop skills in constructing and analyzing logical expressions. Extend logical reasoning to predicate logic, including quantifiers and proofs. Understand how to express statements about elements in a set using predicate logic. Acquire proficiency in various proof techniques, such as direct proofs, proof by contrapositive, proof by contradiction, and mathematical induction. Explore fundamental concepts in number theory, including divisibility, prime numbers, greatest common divisors, and modular arithmetic. Understand counting principles, permutations, combinations, and the binomial theorem. Apply combinatorial concepts to solve problems related to arrangements and selections. Study basic concepts in graph theory, including vertices, edges, paths, cycles, and connectivity. Analyze and solve problems related to graph representations. Explore the concepts of relations and functions, including equivalence relations, partial orders, and injections/surjections. Understand how to represent and analyze relationships between sets. Introduce the concept of finite state machines and understand their application in modeling and solving problems related to computation. Learn the basics of formal languages, regular languages, and finite automata. Understand how automata theory is connected to the study of programming languages and computation. Introduce basic concepts of algorithmic complexity and analyze the efficiency of algorithms in terms of time and space complexity. Relate discrete structures to their applications in computer science, such as algorithm design, database management, and network design.

Course Name: Core Course-5

Course Code: CMSACOR05T

Topic Name: Data Structure

Course Outcome: Students will gain a solid understanding of fundamental data structures such as arrays, linked lists, stacks, and queues. Learn to analyze the time and space complexity of algorithms, with a focus on understanding the efficiency of data structure operations. Study hierarchical data structures, including binary trees, binary search trees, and AVL trees. Understand operations on trees and their applications. Explore graph data structures and algorithms, including graph traversal, shortest path algorithms, and graph connectivity. Understand the concept of hashing and hash tables. Learn how to implement and use hash functions to achieve efficient data retrieval. Study heap data structures and their applications, including priority queues and heap-based sorting algorithms. Explore more advanced data structures, such as tries and B-trees, and understand their applications in efficient data storage and retrieval.

Course Name: Core Course-6

Course Code: CMSACOR06T and CMSACOR06P

Topic Name: Operating System

Course Outcome: Define what an operating system is and explain its role in managing computer hardware and software resources. Describe the evolution of operating systems and their key components. Understand the concept of a process and the role of process management in an OS. Learn about process scheduling algorithms and how they impact system performance. Explain memory hierarchy and the role of the operating system in managing different types of memory. Understand virtual memory concepts, paging, and segmentation. Describe file system organization and structure. Learn about file operations, directory structures, and file access control. Understand I/O devices and their interaction with the operating system. Learn about I/O scheduling and how it impacts system performance. Explore issues related to concurrent processes and the need for synchronization. Study synchronization mechanisms, such as locks and semaphores. Identify and analyze deadlock situations in a system. Learn strategies for deadlock prevention, avoidance, and recovery. Understand the importance of security in operating systems. Learn about access control, authentication, and other security mechanisms. Analyze real-world operating systems as case studies. Gain insights into the design principles and trade-offs in building operating systems. Evaluate the performance of an operating system and identify bottlenecks. Explore contemporary topics and emerging trends in operating systems, such as virtualization, cloud computing, and containerization.

Course Name: Core Course-7

Course Code: CMSACOR7T

Topic Name : Computer Networks

Course Outcome : Define computer networks and understand their importance in modern computing. Explore the historical development and evolution of computer networks. Study different network topologies and their advantages and disadvantages. Understand various networking protocols and their roles in communication. Explore the functionalities of the physical and data link layers of the OSI model. Learn about error detection and correction mechanisms. Understand the role of the network layer in routing and forwarding data. Study common routing algorithms and protocols. Explore the functions of the transport layer in end-to-end communication. Learn about flow control, error recovery, and congestion control mechanisms. Examine the application layer protocols and their role in supporting network applications. Study common application layer protocols, such as HTTP, FTP, and DNS. Understand the challenges and protocols associated with wireless and mobile communication. Explore technologies like Wi-Fi, Bluetooth, and cellular networks. Learn about common security threats in computer networks. Explore security mechanisms, such as firewalls, encryption, and intrusion detection systems. Understand the principles of network management and monitoring. Analyze real-world case studies of successful network implementations. Apply theoretical knowledge to practical scenarios. Gain practical experience through hands-on labs and projects. Configure and troubleshoot network setups to reinforce theoretical concepts.

Course Name : Core Course-8

Course Code : CMSACOR08T and CMSACOR08P

Topic Name : Design & Analysis of Algorithm

Course Outcome: Understand the fundamental concepts of algorithms, including correctness, efficiency, and optimality. Learn how to express algorithms using pseudocode or a programming language. Explore various algorithm design paradigms, such as divide and conquer, dynamic programming, and greedy algorithms. Understand when to apply each design technique to solve specific types of problems. Learn how to analyze the time complexity of algorithms using Big-O notation. Understand the importance of worst-case, average-case, and best-case analysis. Understand the concept of recursion and its application in algorithm design. Learn how to use backtracking to solve problems with multiple decision points. Study and implement various sorting algorithms, such as quicksort, mergesort, and heapsort. Explore searching algorithms, including binary search. Understand and implement graph traversal algorithms (e.g., depth-first search, breadth-first search). Learn about graph algorithms for shortest paths and minimum spanning trees. Explore dynamic programming as a technique for solving optimization problems. Implement dynamic programming solutions for various problems. Learn the

principles of greedy algorithms and when to use them. Implement greedy algorithms for solving optimization problems. Understand the concept of NP- completeness and the implications for algorithmic problem-solving. Learn about reductions and the importance of solving hard problems efficiently. Explore algorithms that use randomness for solving problems. Understand the concept of probabilistic analysis. Learn about approximation algorithms for NP-hard optimization problems. Understand the trade-off between optimality and efficiency. Apply algorithmic design and analysis techniques to solve real-world problems. Practice translating problems into algorithmic solutions. Develop the ability to articulate algorithmic solutions clearly in both written and oral formats. Present and discuss algorithmic solutions in a structured manner.

Course Name : Core Course-9

Course Code : CMSACOR09T and CMSACOR09P

Topic Name: Software Engineering

Course Outcome: Understand the fundamental concepts and importance of software engineering in the development life cycle. Explore the key activities involved in software engineering processes. Learn about various models of SDLC, such as Waterfall, Agile, and Iterative models. Understand the strengths and weaknesses of different development methodologies. Study the process of gathering, analyzing, and documenting software requirements. Learn how to manage and prioritize requirements throughout the project. Understand the principles of system design, including architectural design and detailed design. Learn how to create design documentation and make design decisions. Explore best practices for coding, including code readability, maintainability, and documentation. Understand how to implement designs into executable code. Learn various testing techniques and strategies to ensure software quality. Understand the importance of test planning and test documentation. Study the challenges and techniques involved in software maintenance. Understand version control and configuration management. Learn project management principles specific to software engineering. Understand how to estimate project effort, schedule tasks, and manage resources. Explore metrics for measuring software quality, productivity, and performance. Understand how to use metrics for project tracking and improvement. Identify and analyze potential risks in software projects. Learn risk mitigation and contingency planning strategies. Understand collaborative development practices, including version control systems (e.g., Git). Learn about tools for collaboration, issue tracking, and continuou s integration. Explore ethical considerations in software engineering. Understand the responsibilities of software engineers in a professional context. Emphasize the importance of clear and effective communication in software development. Learn how to create and maintain project documentation.

Course Name: Core Course-10

Course Code: CMSACOR10T and CMSACOR10P

Topic Name: DBMS

Course Outcome: The Database Management System (DBMS) course aims to equip students with the knowledge and skills necessary to understand, design, and manage databases effectively. Students typically learn fundamental concepts of database systems, including data modeling, normalization, and query languages. They gain proficiency in designing relational databases, creating and manipulating database schemas, and implementing complex queries using SQL. The course also covers topics such as indexing, transaction management, and database security. Additionally, students are introduced to various types of database models and gain insights into emerging trends in database technologies. By the end of the course, students are expected to be capable of designing and implementing robust database solutions, ensuring data integrity, and optimizing database performance in real-world applications. The understanding of database management principles acquired in this course is essential for students pursuing careers in software development, data analysis, and other fields where efficient and organized data storage and retrieval are critical.

Course Name: Core Course-11

Course Code: CMSACOR11T and CMSACOR11P

Topic Name: Internet Technology

Course Outcome: The Internet Technology course with a focus on JSP (JavaServer Pages) and JavaScript is designed to provide students with a comprehensive understanding of web development technologies. Throughout the course, students typically learn the basics of HTML, CSS, and client-side scripting with JavaScript to create interactive and dynamic user interfaces. The integration of JSP into the curriculum allows students to explore server-side programming, dynamic content generation, and the development of web applications using Java. They gain proficiency in using JSP to connect the front-end with back-end services and databases. Additionally, students learn to enhance their skills in creating responsive and user-friendly web applications. By the end of the course, students are expected to have a strong grasp of both client-side and server-side web development, enabling them to design and implement robust, interactive, and scalable web applications using a combination of JSP and JavaScript technologies. This skill set is particularly valuable for individuals pursuing careers in web development and application programming.

Course Name : Core Course-12
Course Code : CMSACOR12T and CMSACOR12P
Topic Name : Theory of Computation

Course Outcome: The Theory of Computation course is designed to deepen students' understanding of the theoretical foundations of computation and the limits of what can be computed. Throughout the course, students typically explore formal languages, automata theory, and computational complexity. They learn about different models of computation, including finite automata, pushdown automata, and Turing machines, and study their relationships with formal language classes such as regular and context-free languages. The course delves into the concept of algorithmic decidability, addressing questions related to the solvability of problems and the existence of algorithms. Students also engage with computational complexity theory, investigating the efficiency and inherent difficulty of solving problems within various computational models. By the end of the course, students are expected to develop a profound understanding of the theoretical underpinnings of comp utation, enabling them to analyze the computational complexity of algorithms and reason about the boundaries of computation in both practical and abstract contexts. This knowledge is crucial for individuals pursuing careers in theoretical computer science, algorithm design, and advanced software development.

Course Name: Core Course-13

Course Code: CMSACOR13T and CMSACOR13P

Topic Name: Artificial Intelligence

Course Outcome: The Artificial Intelligence (AI) course aims to impart students with a deep understanding of the principles, methodologies, and applications of artificial intelligence. Throughout the course, students typically explore key topics such as machine learning, natural language processing, computer vision, and expert systems. They learn the foundations of AI algorithms, including supervised and unsupervised learning, and gain practical experience in designing and implementing AI models. The course often includes hands-on projects that involve solving real-world problems using AI techniques. Additionally, students may delve into ethical considerations and societal impacts of AI applications. By the end of the course, students are expected to be proficient in leveraging AI technologies, capable of developing intelligent systems, and understanding the potential and challenges associated with artificial intelligence. This knowledge prep ares students for diverse career paths in AI research, machine learning engineering, data science, and related fields where expertise in artificial intelligence is increasingly in demand.

Course Name: Core Course-14

Course Code: CMSACOR14T and CMSACOR14P

Topic Name: Computer Graphics

Course Outcome: The Computer Graphics course is designed to equip students with a comprehensive understanding of the principles, techniques, and applications in the field of computer graphics. Throughout the course, students typically delve into fundamental concepts such as 2D and 3D transformations, rendering, shading, and illumination models. They gain hands-on experience in programming graphics applications and working with graphics libraries and tools. The course often covers topics like raster graphics, vector graphics, and image processing. Students also explore computer animation, virtual reality, and graphical user interface (GUI) design. By the end of the course, students are expected to be proficient in creating visually appealing graphics, understanding the underlying mathematical concepts, and applying their knowledge to solve problems in areas such as gaming, simulation, design, and multimedia. This skill set is valuable for individuals pursuing careers in graphics programming, user interface design, and other fields where a strong foundation in computer graphics is essential.

Course Name: DISCIPLINE SPECIFIC ELECTIVE

Course Code: CMSADSE01T and CMSADSE01P

Topic Name: Microprocessor

Course Outcome: The Microprocessor course with a focus on 8085 and 8086 architectures is designed to equip students with in-depth knowledge of these popular microprocessors and their applications. Throughout the course, students typically explore the internal architecture, instruction set, and programming techniques specific to the 8085 and 8086 microprocessors. They learn assembly language programming, memory interfacing, and input/output operations for these processors. Hands-on experience with simulators or actual hardware is often incorporated, allowing students to implement and test programs on 8085 and 8086 microprocessor-based systems. The course may cover advanced topics such as interfacing with peripherals, interrupt handling, and system-level design using these microprocessors. By the end of the course, students are expected to be proficient in programming and interfacing with both 8085 and 8086 microprocessors, enabling them to design and implement embedded systems and understand the intricacies of microprocessor-based architectures. This skill set is valuable for individuals pursuing careers in embedded systems development, hardware design, and related fields where knowledge of specific microprocessor architectures is crucial.

Course Name: DISCIPLINE SPECIFIC ELECTIVE

Course Code: CMSADSE02T and CMSADSE02P

Topic Name: Data Mining

Course Outcome: The Data Mining course with a focus on WEKA (Waikato Environment for Knowledge Analysis) is designed to provide students with a comprehensive understanding of data mining techniques and tools, with an emphasis on practical applications using WEKA. Throughout the course, students typically learn the fundamental concepts of data mining, including data preprocessing, classification, clustering, association rule mining, and feature selection. The integration of WEKA into the curriculum allows students to gain hands-on experience in applying these techniques to real-world datasets. They learn to navigate the WEKA environment, perform data analysis, and interpret results. Additionally, students may explore advanced topics such as ensemble methods and evaluation metrics for model performance. By the end of the course, students are expected to be proficient in using WEKA for various data mining tasks, enabling them to extract valuable insights from large datasets and make informed decisions in fields such as business intelligence, healthcare, and research. This skill set is particularly valuable for individuals pursuing careers in data analysis, machine learning, and business analytics.

Course Name: DISCIPLINE SPECIFIC ELECTIVE

Course Code: CMSADSE03T and CMSADSE03P

Topic Name: Cloud Computing

Course Outcome: The Cloud Computing course is designed to equip students with a comprehensive understanding of the principles, technologies, and applications of cloud computing. Throughout the course, students typically delve into the fundamental concepts of cloud computing, including virtualization, service models (Infrastructure as a Service, Platform as a Service, Software as a Service), and deployment models (public, private, hybrid, and community clouds). Students learn about popular cloud platforms such as Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform, gaining hands-on experience in deploying and managing applications in the cloud. The course often covers topics like cloud security, scalability, and cost management. By the end of the course, students are expected to be proficient in designing, deploying, and managing cloud-based solutions, making them well-prepared for roles in cloud architecture, system administration, and application development in the rapidly evolving field of cloud computing. This skill set is crucial for individuals seeking careers where the ability to leverage cloud technologies is essential for scalable and efficient computing solutions.

Course Name: DISCIPLINE SPECIFIC ELECTIVE

Course Code: CMSADSE05T and CMSADSE05P

Topic Name: Digital Image Processing

Course Outcome: The Digital Image Processing course is designed to equip students with a thorough understanding of the principles, techniques, and applications of processing digital images. Throughout the course, students typically explore fundamental concepts such as image enhancement, restoration, segmentation, and compression. They learn about various image processing algorithms and tools used for manipulating and analyzing digital images. The course often covers topics like filtering, feature extraction, and pattern recognition within the context of image processing. Students gain hands-on experience in implementing these techniques using software tools and programming languages. By the end of the course, students are expected to be proficient in applying image processing methods to solve practical problems, enhance image quality, and extract valuable information from digital images. This skill set is valuable for individuals pursuing careers in computer vision, medical imaging, multimedia, and other fields where the manipulation and analysis of digital images play a crucial role.

Course Name: DISCIPLINE SPECIFIC ELECTIVE

Course Code: CMSADSE06P

Topic Name: Project

Course Outcome: This option to be offered only in 6th Semester. The students will be allowed to work on any project based on the concepts studied in core / elective or skill based elective courses. Typically a project-focused course in Software Engineering or Artificial Intelligence is availed and designed to provide students with hands-on experience in applying the theoretical concepts learned throughout their coursework. In a Software Engineering project, students typically work collaboratively to design, develop, and implement a software solution, emphasizing the entire software development life cycle. This includes requirements analysis, system design, coding, testing, and deployment, while also considering project management aspects. On the other hand, in an AI project, students often engage in creating intelligent systems, developing machine learning models, and solving real-world problems using AI techniques. They may explore diverse AI applications such as natural language processing, computer vision, or recommendation systems. By the end of the project, students are expected to showcase not only technical proficiency but also effective teamwork, project management skills, and the ability to apply their knowledge to solve complex problems. These project outcomes are valuable for preparing students to enter the workforce with practical experience, demonstrating their ability to bring theoretical concepts into practical fruition in the fields of Software Engineering or Artificial Intelligence.

Course Name: **SKILL ENHANCEMENT COURSE**

Course Code: **CMSSSEC01M**

Topic Name: **Programming in Python**

Course Outcome: Understand the basic syntax and structure of the Python programming language. Learn how to write and execute simple Python programs. Explore various data types in Python, such as integers, floats, strings, and booleans. Understand how to declare and manipulate variables. Learn about control flow structures, including if statements, loops, and conditional statements. Understand how to use these statements to control the flow of a program. Define and use functions to modularize code. Explore function parameters, return values, and the concept of scope. Introduction to fundamental data structures in Python, including lists, tuples, sets, and dictionaries. Learn how to perform operations on these data structures. Understand how to read from and write to files using Python. Explore file input/output operations. Learn the basics of exception handling to deal with errors gracefully. Understand try, except, and finally blocks. Introduction to OOP principles, including classes and objects. Learn how to create and use classes in Python. Understand how to use Python modules and libraries to extend functionality. Explore commonly used libraries, such as NumPy for numerical computing and matplotlib for data visualization. Introduction to web development using frameworks like Flask or Django (if covered in the course). Understand the basics of creating web applications with Python. Develop problem-solving skills using Python. Understand algorithmic thinking and basic algorithm design. Introduction to version control systems, particularly Git. Learn basic Git commands for collaborative coding and project management. Emphasize good coding practices, code readability, and style conventions. Understand the importance of documentation.

Course Name: **SKILL ENHANCEMENT COURSE**

Course Code: **CMSSSEC02M**

Topic Name: **R Programming**

Course Outcome: The course in R Programming aims to impart students with a comprehensive understanding of the R programming language and its applications in statistical analysis, data visualization, and data manipulation. Throughout the course, students typically learn the fundamentals of R, including syntax, data structures, and control flow. Emphasis is placed on statistical analysis using R, enabling students to conduct hypothesis testing, regression analysis, and exploratory data analysis. The course often covers data visualization techniques using packages like ggplot2, enhancing students' abilities to communicate insights effectively. Students may also gain proficiency in data manipulation tasks with tools like the dplyr package. Additionally, the course may introduce concepts related to reproducibility and version control, fostering good coding practices. By the end of the course, students are expected to be well-equipped to use R as a powerful tool for statistical computing and data analysis in various domains, including academia, research, and industry.

GENERAL COURSE IN COMPUTER SCIENCE

With effect from the session: 2018 – 2019

Course Code: CMSGCOR01T and CMSGCOR01P

Topic Name: Problem Solving with Computer

Course Outcome: From this course students will gain a deep understanding of the organization and components of a computer system, including the CPU, memory, input/output devices, and the interconnection structure. Learn about instruction sets, addressing modes, and the design principles of the instruction set architecture. Understand how instructions are executed by the CPU. Explore the design and microarchitecture of processors, including pipelining, instruction-level parallelism, and techniques for improving CPU performance. Understand the memory hierarchy, including cache memory, main memory, and secondary storage. Learn about memory management techniques and their impact on system performance. Study the principles of input/output systems, including I/O interfaces, interrupt handling, and data transfer mechanisms between the CPU and peripherals. Explore bus systems and interconnection networks that facilitate communication between different components of a computer system. Understand the principles of parallel and distributed computing, including multi-core processors, parallel architectures, and the challenges of distributed systems. Gain hands-on experience with assembly language programming to reinforce the understanding of computer architecture concepts. Learn techniques for performance evaluation and optimization of computer systems, including benchmarking, profiling, and tuning. Stay updated with current trends and advancements in computer architecture, including emerging technologies and architectures.

Course Code: CMSGCOR02T and CMSGCOR02P

Topic Name: DBMS

Course Outcome: The Database Management System (DBMS) course aims to equip students with the knowledge and skills necessary to understand, design, and manage databases effectively. Students typically learn fundamental concepts of database systems, including data modeling, normalization, and query languages. They gain proficiency in designing relational databases, creating and manipulating database schemas, and implementing complex queries using SQL. The course also covers topics such as indexing, transaction management, and database security. Additionally, students are introduced to various types of database models and gain insights into emerging trends in database technologies. By the end of the course, students are expected to be capable of designing and implementing robust database solutions, ensuring data integrity, and optimizing database performance in real-world applications. The understanding of database management principles acquired in this course is essential for students pursuing careers in software development, data analysis, and other fields where efficient and organized data storage and retrieval are critical.

Course Code: CMSGCOR03T and CMSGCOR03P

Topic Name: OS

Course Outcome : The course integrating Operating System Theory with practical Linux applications is designed to offer students a holistic understanding of both theoretical concepts and real-world implementation. Throughout the course, students delve into the fundamental principles of operating systems, covering topics such as process management, memory management, file systems, and system calls. The practical aspect involves hands-on experience with Linux, enabling students to apply theoretical knowledge to a Unix-like operating system. Students gain proficiency in using Linux commands, writing shell scripts, and performing system administration tasks. The course often includes projects where students configure, manage, and troubleshoot Linux systems, reinforcing theoretical concepts in a practical context. By the end of the course, students are expected to possess a solid theoretical foundation in operating systems while also being adept at navigating and utilizing Linux environments for system-related tasks. This dual focus prepares students for careers in system administration, software development, and related fields, where a comprehensive understanding of both operating system theory and practical Linux applications is highly valuable.

Course Code: **CMSGCOR04T and CMSGCOR04P**
Topic Name: **Computer System Architecture**

Course Outcome: From this course students will gain a deep understanding of the organization and components of a computer system, including the CPU, memory, input/output devices, and the interconnection structure. Learn about instruction sets, addressing mode s, and the design principles of the instruction set architecture. Understand how instructions are executed by the CPU. Explore the design and microarchitecture of processors, including pipelining, instruction -level parallelism, and techniques for improving CPU performance. Understand the memory hierarchy, including cache memory, main memory, and secondary storage. Learn about memory management techniques and their impact on system performance. Study the principles of input/output systems, including I/O interfaces, interrupt handling, and data transfer mechanisms between the CPU and peripherals. Explore bus systems and interconnection networks that facilitate communication between different components of a computer system. Understand the principles of parallel and distributed computing, including multi-core processors, parallel architectures, and the challenges of distributed systems. Gain hands-on experience with assembly language programming to reinforce the understanding of computer architecture concepts. Learn techniques for performance evaluation and optimization of computer systems, including benchmarking, profiling, and tuning. Stay updated with current trends and advancements in computer architecture, including emerging technologies and architectures.

Course Code : **CMSGDSE01T**

Topic Name : **Programming in JAVA**

Course Outcome: Students will understand the basic syntax, data types, and control flow structures in Java, including variables, loops, and conditional statements. Gain a solid foundation in OOP principles, including classes, objects, inheritance, polymorphism, encapsulation, and abstraction. Familiarize yourself with the Java Standard Library (Java API) and learn how to use pre-built classes and methods for common programming tasks. Understand the concept of exceptions in Java and learn how to handle errors and exceptions in a program. Explore basic GUI programming using libraries such as Swing or JavaFX. Learn to create interactive and user-friendly applications. Gain proficiency in reading from and writing to files, understanding file handling operations in Java. Learn about the Java Collections Framework, including data structures such as lists, sets, and maps. Understand how to use these structures for efficient data manipulation. Understand the basics of multithreading in Java, including creating and managing multiple threads to achieve concurrent execution. Explore networking concepts and how to implement networked applications in Java, including socket programming.

Course Code: **CMSGDSE02T**

Topic Name: **Discrete Structures**

Course Outcome: Students will understand the basics of set theory, including set operations, subsets, and set relations.Apply set theory concepts to solve problems and model real-world situations. Learn the principles of propositional logic, including logical operators, truth tables, and logical equivalences. Develop skills in constructing and analyzing logical expressions. Extend logical reasoning to predicate logic, including quantifiers and proofs. Understand how to express statements about elements in a s et using predicate logic. Acquire proficiency in various proof techniques, such as direct proofs, proof by contrapositive, proof by contradiction, and mathematical induction. Explore fundamental concepts in number theory, including divisibility, prime numbers, greatest common divisors, and modular arithmetic. Understand counting principles, permutations, combinations, and the binomial theorem. Apply combinatorial concepts to solve problems related to arrangements and selections. Study b asic concepts in graph theory, including vertices, edges, paths, cycles, and connectivity. Analyze and solve problems related to graph representations. Explore the concepts of relations and functions, including equivalence relations, partial orders, and injections/surjections. Understand how to represent and analyze relationships between sets. Introduce the concept of finite state machines and understand their application in modeling and solving problems related to computation. Learn the basics of formal languages, regular languages, and finite automata. Understand how automata theory is connected to the study of programming languages and computation. Introduce basic concepts of algorithmic complexity and analyze the efficiency of algorithms in terms of time and space complexity. Relate discrete structures to their applications in computer science, such as algorithm design, database management, and network design.

Course Code: CMSGDSE03T

Topic Name: Software Engineering

Course Outcome: Understand the fundamental concepts and importance of software engineering in the development life cycle. Explore the key activities involved in software engineering processes. Learn about various models of SDLC, such as Waterfall, Agile, and Iterative models. Understand the strengths and weaknesses of different development methodologies. Study the process of gathering, analyzing, and documenting software requirements. Learn how to manage and prioritize requirements throughout the project. Understand the principles of system design, including architectural design and detailed design. Learn how to create design documentation and make design decisions. Explore best practices for coding, including code readability, maintainability, and documentation. Understand how to implement designs into executable code. Learn various testing techniques and strategies to ensure software quality. Understand the importance of test planning and test documentation. Study the challenges and techniques involved in software maintenance. Understand version control and configuration management. Learn project management principles specific to software engineering. Understand how to estimate project effort, schedule tasks, and manage resources. Explore metrics for measuring software quality, productivity, and performance. Understand how to use metrics for project tracking and improvement. Identify and analyze potential risks in software projects. Learn risk mitigation and contingency planning strategies. Understand collaborative development practices, including version control systems (e.g., Git). Learn about tools for collaboration, issue tracking, and continuous integration. Explore ethical considerations in software engineering. Understand the responsibilities of software engineers in a professional context. Emphasize the importance of clear and effective communication in software development. Learn how to create and maintain project documentation.

Course Code: CMSGDSE04T

Topic Name: Computer Networks

Course Outcome: Define computer networks and understand their importance in modern computing. Explore the historical development and evolution of computer networks. Study different network topologies and their advantages and disadvantages. Understand various networking protocols and their roles in communication. Explore the functionalities of the physical and data link layers of the OSI model. Learn about error detection and correction mechanisms. Understand the role of the network layer in routing and forwarding data. Study common routing algorithms and protocols. Explore the functions of the transport layer in end-to-end communication. Learn about flow control, error recovery, and congestion control mechanisms. Examine the application layer protocols and their role in supporting network applications. Study common application layer protocols, such as HTTP, FTP, and DNS. Understand the challenges and protocols associated with wireless and mobile communication. Explore technologies like Wi-Fi, Bluetooth, and cellular networks. Learn about common security threats in computer networks. Explore security mechanisms, such as firewalls, encryption, and intrusion detection systems. Understand the principles of network management and monitoring. Analyze real-world case studies of successful network implementations. Apply theoretical knowledge to practical scenarios. Gain practical experience through hands-on labs and projects. Configure and troubleshoot network setups to reinforce theoretical concepts.

Course Name: SKILL ENHANCEMENT COURSE

Course Code: CMSSSEC01M

Topic Name: Programming in Python

Course Outcome: Understand the basic syntax and structure of the Python programming language. Learn how to write and execute simple Python programs. Explore various data types in Python, such as integers, floats, strings, and booleans. Understand how to declare and manipulate variables. Learn about control flow structures, including if statements, loops, and conditional statements. Understand how to use these statements to control the flow of a program. Define and use functions to modularize code. Explore function parameters, return values, and the concept of scope. Introduction to fundamental data structures in Python, including lists, tuples, sets, and dictionaries. Learn how to perform operations on these data structures. Understand how to read from and write to files using Python. Explore file input/output operations. Learn the basics of exception handling to deal with errors gracefully. Understand try, except, and finally blocks. Introduction to OOP principles, including classes and objects. Learn how to create and use classes in Python. Understand how to use Python modules and libraries to extend functionality. Explore commonly used libraries, such as NumPy for numerical computing and matplotlib for data visualization. Introduction to web development using frameworks like Flask or Django (if covered in the course). Understand the basics of creating web applications with Python. Develop problem-solving skills using Python. Understand algorithmic thinking and basic algorithm design. Introduction to version control systems, particularly Git. Learn basic Git commands for collaborative coding and project management. Emphasize good coding practices, code readability, and style conventions. Understand the importance of documentation.

Course Name: SKILL ENHANCEMENT COURSE

Course Code: CMSSSEC02M

Topic Name: R Programming

Course Outcome: The course in R Programming aims to impart students with a comprehensive understanding of the R programming language and its applications in statistical analysis, data visualization, and data manipulation. Throughout the course, students typically learn the fundamentals of R, including syntax, data structures, and control flow. Emphasis is placed on statistical analysis using R, enabling students to conduct hypothesis testing, regression analysis, and exploratory data analysis. The course often covers data visualization techniques using packages like ggplot2, enhancing students' abilities to communicate insights effectively. Students may also gain proficiency in data manipulation tasks with tools like the dplyr package. Additionally, the course may introduce concepts related to reproducibility and version control, fostering good coding practices. By the end of the course, students are expected to be well-equipped to use R as a powerful tool for statistical computing and data analysis in various domains, including academia, research, and industry.

Undergraduate Department of Chemistry

Programme Specific Outcomes

At the completion of this programme, students will be able to

- PSO1: Comprehend the fundamental ideas, principles applications of physical, organic and inorganic chemistry

- **PSO2:** Set up physicochemical experiments, analyse observed data, create graphs, compute physical constants and interpret the outcomes

- **PSO3:** Analyse inorganic compounds qualitatively, estimate solutions and mixtures quantitavely and acquire proficiency in utilizing analytical instruments

- PSO4: Identification/Preparation, Qualitative/ Quantitative/ Spectroscopy analysis of single organic compounds and chromatographic separation of mixtures and also study of green synthesis are all included.

- PSO5: Learn computer programs based on numerical methods

- **PSO6**: Creation and demonstration of a power point presentation on the relevant topics well-read throughout the program.

- **PSO7:** Collaborate effectively in a group and become familiar with the safety measures and upkeep procedures of a chemistry lab.

CBCS Semester System HONOURS COURSE IN CHEMISTRY
With effect from the session: 2020-21

Course Name: Core Course-1

Course Code: CEMACOR01T & CEMACOR01P

Topic Name: Organic Chemistry-1

Course Outcome

At the end of this course a student learns

1. Basics of bonding and physical properties, Valence bond theory, electronic displacements, MO theory
2. General treatment of reaction mechanism like mechanistic classification and reactant intermediates
3. Stereochemistry of carbon compounds-bonding geometries, concept of chirality and symmetry, relative and absolute configuration, optical activityof chiral compounds
4. To identify and separate some organic compounds (solid & liquid) in the practical paper

Course Name: Core Course-2
Course Code: CEMACOR02T & CEMACOR02P
Topic Name: Physical Chemistry-1
Course Outcome

At the end of this course a student learns

1. Kinetic Theory of gases, Maxwell's distribution of speed and energy and real gas and virial equation
2. The three laws of thermodynamics, understanding the spontaneity of a reaction, chemical equilibria, principle of thermochemistry and various thermodynamic reaction
3. Order of reactions, factors affecting the rate, molecularity, theory of reaction rates, principles of homogeneous catalysis
4. Physicochemical experiments based on thermochemistry, kinectics and determination of pH of a buffer (colour matching)

Course Name: **Core Course-3**
Course Code: **CEMACOR03T & CEMACOR03P**
Topic Name: **Inorganic Chemistry-1**
Course Outcome

At the end of this course a student learns

1. Atomic structure based on Bohr, Sommerfeld and wave mechanical model, electronic configuration and ground state term symbol of elements
2. Modern IUPAC periodic table and periodicity in various physical properties such as IE, EA and electronegativity, outcome of inert pair effect and Lanthanide contraction
3. Various concepts regarding acidity and basicity, SHAB principle, pH, buffer, indicator
4. Chemical reaction balancing, redox potential diagram, solubility product principle and its effect
5. Quantitative estimation of metal ions by reox titrations and mixture of compounds based on acid-base titration

Course Name: **Core Course-4**
Course Code: **CEMACOR04T & CEMACOR04P**
Topic Name: **Organic Chemistry-II**
Course Outcome

At the end of this course a student learns

1. Chirality arising out of stereoaxis, Concept of prostereoisomerism, Conformational analysis
2. Reaction thermodynamics, Concept of organic acids and bases, Tautomerism and Organic Reaction kinetics, isotope effect
3. Free-radical substitution reaction, Nucleophilic substitution reactions, Elimination reactions
4. Synthesis of some organic compound, theri purification, perecentage yield calculation and melting point determination

Course Name: **Core Course-5**
Course Code: **CEMACOR05T & CEMACOR05P** **Topic Name:** **Physical Chemistry-II**
Course Outcome

At the end of this course a student learns

1. Fick's law governing the transport processes like diffusion, viscosity and conductance, applications of viscosity and conductance measurement
2. Partial properties and Chemical potential, Chemical Equilibrium, Chemical potential and other properties of ideal substances- pure and mixtures, Condensed Phase
3. Basics of Quantum Mechanics: Wave function, Concept of Operators, Particle in a box, Simple Harmonic Oscillator
4. Experiments based on conductometry, viscosity and partition coefficient

Course Name: **Core Course-6**
Course Code: **CEMACOR06T & CEMACOR06P**
Topic Name: **Inorganic Chemistry-II**
Course Outcome

At the end of this course a student learns

1. Concept of Ionic bond and Covalent bond and their role in explaining structure and chemical properties of compounds
2. Molecular orbital concept of bonding in explaining bond order and magnetic properties
3. Metallic Bond
4. Weak Chemical Forces and hydrogen bonding and its role in biology
5. Radioactivity: Nuclear stability and nuclear binding energy, hazards and safety measures of radiation
6. Iodometric titration for estimation of Cu, Vit C, arsenite & available chlorine and estimation of metal ions in alloys and cement

Course Name: **Core Course-7**
Course Code: **CEMACOR07T & CEMACOR07P**
Topic Name: **Organic Chemistry-III**
Course Outcome

At the end of this course a student learns

1. Chemistry of alkenes and alkynes : Addition to C=C and C≡C
2. Diffenrent Electrophilic and Nucleophilic aromatic substitution reaction
3. Carbonyl and Related Compounds: Addition to C=O, Exploitation of acidity of α-H of C=O, Elementary ideas of Green Chemistry Nucleophilic addition to α,β-unsaturated carbonyl syste, Substitution at sp2 carbon (C=O system)
4. Grignard reagent; Organolithiums; Gilman cuprates in organometallics
5. Qualitative Analysis of Single Solid Organic Compounds

Course Name: **Core Course-8**
Course Code: **CEMACOR08T & CEMACOR08P** **Topic Name:** **Physical Chemistry-III**
Course Outcome

At the end of this course a student learns

1. Application of Thermodynamics in Colligative properties, Phase rule and Binary solutions
2. Electrical Properties of molecules such as Ionic equilibria Electromotive Force, Dipole moment and polarizability
3. Quantum mechanical treatment of Angular momentum, Qualitative treatment of hydrogen atom and hydrogen-like ion, LCAO and HF- SCF
4. Physicochemical experiment on potentiometry, pH-metry, solubility product and phase rule

Course Name: **Core Course-9**
Course Code: **CEMACOR09T & CEMACOR-09P**
Topic Name: **Inorganic Chemistry-III**
Course Outcome

At the end of this course a student learns

1. The principles of extracting pure metals from their ores
2. Chemistry componds of s and p block elements and comparative studies of their properties
3. Preparation and Properties of noble gas compounds and inorganic polymers
4. Coordination chemistry, IUPAC nomenclature and isomerism
5. Estimation of metal ions by complexometric titatration and preparation of some inorganic complexes.

Course Name: **Core Course-10**
Course Code: **CEMACOR10T & CEMACOR10P**
Topic Name: **Organic Chemistry-IV**
Course Outcome

At the end of this course a student learns

1. Nitrogen compounds: Amines and Nitro compounds (aliphatic and aromatic), Alkylnitrile and isonitrile, Diazonium salts and their related compounds
2. Mechanism with evidence and stereochemical features for Rearrangement to electron-deficient carbon, electron-deficient nitrogen, electron-deficient oxygen, Aromatic rearrangements, Migration from nitrogen to ring carbon and Rearrangement reactions by green approach
3. Retrosynthetic analysis, Strategy of ring synthesis, Asymmetric synthesis
4. Principles of Organic Spectroscopy: UV Spectroscopy, IR Spectroscopy, NMR Spectroscopy
5. Quantitative Estimations of various organic compounds

Course Name: **Core Course-11**
Course Code: **CEMACOR11T & CEMACOR11P**
Topic Name: **Inorganic Chemistry-IV**
Course Outcome

At the end of this course a student learns

1. Advanced coordination chemistry: Calculation of CFSE, OSSE, JT distortion, MO concept, magnetism and spectral properties
2. Properties of tranition elements, lanthanides and actinoids
3. Chromatographic separation of metal ions , gravimetric estimation, spectrophotometric determination of 10Dq

Course Name : **Core Course - 12**
Course Code: **CEMACOR12T & CEMACOR12P**
Topic Name: **Organic Chemistry-V**
Course Outcome **At the end of this course a student learns**

1. Polynuclear hydrocarbons and their derivatives, Heterocyclic compounds
2. Cyclic Stereochemistry
3. Pericyclic reactions: Mechanism, stereochemistry, regioselectivity in case of Electrocyclic reactions, Cycloaddition reactions
4. Carbohydrates: Monosaccharides and Disaccharides
5. Biomolecules: Amino acids, Peptides and Nucleic acids
6. TLC, Column chromatographic and Paper chromatographic separation of mixture of organic compounds

Course Name: **Core Course-13**
Course Code: **CEMACOR13T & CEMACOR13P**
Topic Name: **Inorganic Chemistry-V**
Course Outcome **At the end of this course a student learns**

1. Bioinorganic Chemistry:Role of Essential and beneficial elements, functioning of different proteins and enzymes and role of metals in medicine
2. Preparation, structure and functioning of organometallic compounds and their catalytic role in industrial reactions
3. Kinetics and mechanism of inorganic reactions
4. Qualitative detection of different cations and anions in practical classes

Course Name: **Core Course-14**
Course Code: **CEMACOR14T & CEMACOR14P**
Topic Name: **Physical Chemistry-IV**
Course Outcome **At the end of this course a student learns**

1. Molecular Spectroscopy: Principle and applications of Rotational, Vibrational, Raman, NMR and ESR spectroscopy
2. Photochemistry: Laws of photochemistry, different photochemical processes their kinetics and role of such reactions in biochemical processes
3. Surface phenomenon: Surface tension and energy, different adsorption isotherms, stability of colloids, their electrokinetic phenomenon, applications abd micelle formation
4. In practical classes, determination of surface tension and its application t6o measure the CMC of a surfactant, kinetic study of a reaction spectrophotometrically and verification of Lamber-Beer law

Course Name: **Discipline Specific Elective-1**
Course Code: **CEMADSE01T & CEMADSE01P**
Topic Name: **Advanced Physical Chemistry**
Course Outcome **At the end of this course a student learns**

1. Crystal Structure: Bravais Lattice and Laws of Crystallography, Crystal planes and determination of Crystal structure
2. Statistical Thermodynamics: Configuration, Boltzmann distribution and Partition function
3. Specific heat of solid, 3rd law of thermodynamics, classification, nomenclature, texture of Polymers and molecular forces and conducting polymers
4. In practical classes, Computer programs based on numerical methods for such as Roots of equations, Numerical differentiation and integration, Matrix operations etc.

Course Name: **Discipline Specific Elective-2**
Course Code: **CEMADSE02T & CEMADSE02P**
Topic Name: **ANALYTICAL METHODS IN CHEMISTRY**
Course Outcome **At the end of this course a student learns**

1. Qualitative and quantitative aspects of analysis like Sampling
2. evaluation of analytical data
3. Optical methods of analysis: UV-Vis, IR, Flame Atomic Absorption and Emission spectroscopy and their application in estimation of metal ions, geometrical isomers, keto-enol tautomerism, Techniques for the quantitative estimation of trace level of metal ions from water samples.
4. Theory of thermogravimetry and techniques for quantitative estimation of Ca and Mg from their mixture
5. Electroanalytical methods to determine equivalence points and pKa values
6. Separation techniques such as Solvent extraction and chromatographic methods of analysis: IC, GLC, GPC, TLC and HPLC.
7. In practical classes, separation of mixtures by different chromatographic methods, Solvent Extraction of Ni(II) & Fe(II) ions and analysis of soil

Course Name: **Discipline Specific Elective-3**
Course Code: **CEMADSE04T & CEMADSE04P**

Topic Name: **Green Chemistry**
Course Outcome

At the end of this course a student learns

1. About concept of green chemistry and 12 principles of green chemistry, Atom Economy, Prevention of waste and minimization of Risk.
2. Green solvents and their uses in organic Reactions (Including Water), Ionic Liquids and Solventless Processes, Concept of alternative sources of Energy, Use of catalytic reagents and Concept Of ISD.
3. Green synthesis of some organic compounds including Microwave assisted reactions in water, An efficient green synthesis of PLA made from corn, concept of green chemistry of healthier fats and oils and Oxidation Reagents and future trends of Green chemistry in Sustainable development.
4. Selection of starting materials and Surfactants for carbon dioxide
5. In practical classes they will also do some effective green reactions (hand to hand) using green solvents water and synthesis of some bioactive Schiff Bases. Photochemical Reactions and Preparation of bio-diesel, Benzoin condensation using Thiamine Hydrochloride as a catalyst instead of cyanide

Course Name: **Discipline Specific Elective-4**
Course Code: **CEMADSE05T & CEMADSE05P**
Topic Name: **INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE**
Course Outcome

At the end of this course a student learns

1. Silicate Industries: Glass, Ceramics, Cements-Manufacturing process, composition and their applications
2. Different types of fertilizers: preparations and uses.
3. Objectives of surface coatings: classification, Paints and pigments, Special paints, metal spraying and anodizing
4. Construction and working principle of industrially important battries
5. Classification, specific properties, manufacture and uses of alloys
6. General principles and properties of catalysts, application of zeolites as catalysts
7. Preparation and explosive properties of lead azide, PETN, cyclonite (RDX) and introduction to rocket propellants
8. In practical classes, Estimation of free acidity in ammonium sulphate fertilizer, Calcium in Calcium ammonium nitrate fertilizer of phosphoric acid in superphosphate fertilizer, analysis of Cement and alloys.

Course Code: **Skill Enhancement Course - 1**
Course Code: **CEMSSEC01M**
Topic Name: **Basic Analytical Chemistry**
Course Outcome **At the end of this course a student learns**

1. Introduction to Analytical Chemistry, concept of sampling, accuracy, precision, sources of error
2. Analysis of soil: Composition, Estimation of Calcium and Magnesium ions complexometrically
3. Analysis of water: water sampling and purification methods
4. Nutritional value of foods, idea about food processing and food preservations and adulteration
5. Definition, general introduction on principles of chromatography, paper chromatography, TLC, ion exchange
6. Major and minor constituents of cosmetics and their function

Course Name: **Skill Enhancement Course-2**
Course Code: **CEMSSEC02M**
Topic Name: **ANALYTICAL CLINICAL BIOCHEMISTRY**

Course Outcome **At the end of this course a student learns**

1. Structure and their biological importance of Carbohydrates, Proteins, Enzymes (biocatalysis), lipids, lipoproteins, DNA, RNA
2. Biochemistry of disease: Composition and functions of blood estimation and interpretation of data for blood sugar, urea, creatinine, cholesterol and bilirubin, Composition and estimation of constituents of normal and pathological urine.

GENERAL COURSE IN CHEMISTRY
With effect from the session :2018-2019

Course Name: Generic Elective/Discipline Specific Elective course-1(Inorganic-1,Organic -1)
Course code: CEMHGECO1T and CEMHGECO1P/CEMGCOR1T & CEMGCOR01P

Topic name: Atomic structure ,Chemical periodicity ,Acid and base, Redox reactions, General organic chemistry & Aliphatic hydrocarbons

Course outcome -At the end of the course of both theory and practical ,the students will learn the followings,

1 Fundamental of quantum mechanics & Atomic structure ,chemical periodicity, Chemistry of acid and base &Details of redox reaction

2 Fundamental of organic chemistry & concept of stereochemistry Elementary mechanistic aspects of nucleophilic substitution & elimination reactions ,Fundamental group approach of aliphatic hydrocarbons.

3 In practical classes ,they will do estimation of sodium carbonate and sodium bicarbonate present in a mixture ,Estimation of oxalic acid, water of crystallisation in Mohr's salt , Estimation of iron(II) and Copper(II) ions by different method.

4 In practical classes they will also learn qualitative analysis of single organic compounds(functional group analysis of each compound).

Course Name: Generic Elective/ Discipline Specific Elective course -2(Physical -I ,Inorganic-II)

Course code:CEMHGECO2T and CEMHGECO2P/CEMGCOR2T & CEMGCOR02P

Topic name: States of matter and chemical kinetics ,Chemical bonding & molecular structure, P-block elements

Course outcome -At the end of the course of both theory and practical, ,the students will learn the followings and develops the idea

1 The general behaviour and properties of the different state of matter Ex-solid , liquid and gas.

2 The different factors that affect the rate of a chemical reaction and the methods of determination of rate and order.

3 The various types of bonding involved in a molecular structure and concept of resonance.

4 Properties and reactions of P-block elements.

5 In regular practical classes ,they will learn hands on experience in qualitative analysis of inorganic samples and measurement of properties of liquids (viscosity, surface tension etc).

Course Name: Generic Elective/ Discipline Specific Elective course -3(Physical-II,Organic - II)

Course code: CEMHGECO3T and CEMHGECO3P/CEMGCOR3T & CEMGCOR03P Topic Name:

Chemical Energetics, Equilibria, Organic Chemistry-II

1 The basic principle and law of thermodynamics.
2 The concept of chemical equilibrium and the factors affecting it
3 Idea about Ionic equilibrium, pH scale and solubility and application of solubility product.
4 Preparation and properties and chemical reactions of organic compounds like alcohols, phenols, ethers ,carbonyl compounds.
5 Chemistry of aromatic hydrocarbon(benzene) and organometallic compounds.
6 In practical classes ,they will learn some experiments on thermochemistry and ionic equilibrium and identification of pure organic compound(solid and liquid).

Course Name: Generic Elective/ Discipline Specific Elective course (Physical-III,Analytical and environment)

Course code: CEMHGECO4T and CEMHGECO4P/CEMGCOR4T & CEMGCOR04P Topic name :

Solutions, Phase Equilibria, Conductance, Electrochemistry & analytical and environmental chemistry- 1

Course outcome -At the end of the course of both theory and practical module ,the students will learn the followings,

1 Understand the fundamental concept of basic physical chemistry based on solution , phase equilibrium ,conductance and electromotive force .They will also acquainted with the problems solving technique based on aforesaid physical phenomenon.
2 Understand few analytical concepts based on gravimetric and volumetric analysis. Side by side they will also acquainted with chromatographic methods of analysis using column and thin layer chromatography .They will also acquire some knowledge on environmental chemistry ,related pollution and their consequences.
3 They will also perform some practical classes based on aforesaid knowledge.

Course Name: Discipline Specific Elective course 1 (Green chemistry) Course Code: CEMGDSE02T & CEMGDSE02P

Topic name: Introduction to green chemistry , Green solvents and green reactions.

Course outcome -At the end of the course of both theory and practical module , the students will learn the followings and develop knowledge

1 About concept of green chemistry and 12 principles of green chemistry, Atom Economy, Prevention of waste and minimization of Risk.

2 Green solvents and their uses in organic Reactions (Including Water), Ionic Liquids and Solventless Processes, Concept of alternative sources of Energy, Use of catalytic reagents and Concept Of ISD.

3 Green synthesis of some organic compounds including Microwave assisted reactions in water, An efficient green synthesis of PLA made from corn, concept of green chemistry of healthier fats and oils and Oxidation Reagents and Green chemistry in Sustainable development.

4 In practical classes they will also do some effective green reactions (hand to hand) using green solvents water and synthesis of some bioactive Schiff Bases. Photochemical Reactions and Preparation of bio-diesel.

Course Name : Discipline Specific Elective course -2

Course Code : CEMGDSE03T & CEMGDSE03P

Topic Name: Inorganic Materials Of Industrial Importance

Course Outcome: After studying the course, both theory and practical, the following outcome is expected

1 Learning the procedure of preparation of cement , ceramics and glass and their applications.

2 Learning the procedure of preparation of important fertilizers, paints and pigments.

3 Learning the procedure of preparation of different types of batteries and alloys and their properties.

4 Learning the utility of using different catalysts in different chemical reactions.

5 Learning of different kinds of explosives.

6 Hands on experiment in analyzing useful materials like fertilisers, cement, plastic etc.

DEPARTMENT OF ECONOMICS B.A./B.Sc.

Programme Specific Outcomes

Economics Honours Programme aims to provide students a firm foundation in the discipline of Economics. The programme has a structured curricula which consists of 14 Core Courses, 4 Discipline Specific Elective (DSE) courses- 3 of which are to be chosen by the students from 5 options and the fourth one is a compulsory Project/Dissertation paper in the final semester.

The courses of Economics Honours are designed in such a manner that successful completion of the programme can bring the following outcomes:

- PO-1: Students acquire an in-depth knowledge of the two main pillars of economic theory –microeconomic theory & macroeconomic theory and their applications as well as extensions to other branches of economic analysis like International Trade, Public Finance, Financial Economics, Development Economics and Indian Economics.

- PO-2: Students learn the mathematical methods which are widely used in understanding economic theories and developing economic models. The knowledge about the synthesis of mathematics and economics paves the way to pursue higher studies in Economics & in its related fields.

- PO-3: The courses on statistical methods and econometric techniques develop student's aptitude in quantitative analysis – a crucial learning skill needed for empirical analysis.

- PO-4: The compulsory Project/Dissertation work in the final semester provides each student the opportunity to select specific economic issue of his/her interest as the topic for dissertation and apply the knowledge of economic theory and quantitative techniques to come up with conclusive findings. This exercise is expected to enhance analytical skill of the students and encourage them to take higher studies and research work in future.

- PO-5: After the completion of this programme it is expected that a student will have the necessary skills to understand and analyse in a logical manner all major economic phenomena. They can pursue higher studies in Economics and related areas and the nation will get good academicians and professionals in the future. Graduation in Economics enhances students' preparedness in different competitive examinations and even after graduation they can have a wide range of job opportunities in different sectors.

HONOURS COURSE IN ECONOMICS

Course Name: **Core Course-1**

Course Code: **ECOACOR01T**

Topic Name: **Introductory Microeconomics**

Course Outcome The student, after completion of the course will be able to

1. get an idea about the function of a free market.
2. understand the price system which effectively solve the three basic problems of theeconomy i.e., what to produce, how to produce and for whom to produce.
3. learn about consumers' behaviour, producers' behaviour and their interactions inthe market.
4. learn about the market equilibrium and stability of such equilibrium of the market.

Course Name : **Core Course-2**

Course Code: **ECOACOR02T**

Topic Name: **Mathematical Methods For Economics-I**

Course Outcome The student, after completion of the course will be able to

1. understand the fundamentals of basic mathematics that enables the creation ofeconomic theory in general.
2. understand the application of mathematical techniques to economic theory ingeneral.
3. understand the process of optimization techniques in economic theory in general.
4. in this course, particular economic models are not the ends and material is to betaught is indicated by the contents of the prescribed textbook.

Course Code: **ECOACOR03T**

Topic Name: **Introductory Macroeconomics**

Course Outcome : The student, after completion of the course will be able to

1. understand the nature of important macroeconomic variables , methods of their measurement and the relationship among them
2. understand the problems of measurement of the key economic variables
3. get an idea regarding the determination of income in short run and long run with essential impacts of fiscal and monetary policy variables in different macroeconomic,particularly, in Classical and Keynesian set up.

Course Name: **Core Course-4**

Course Code: **ECOACOR04T**

Topic Name: **Statistical Methods for Economics –I**

Course Outcome : The student, after completion of the course will be able to

1. learn the basic concepts of statistical data analysis

2. perceive the characteristics of sample data using various methods of statistical measurements
3. understand the compatibility, consistency, spreadness /concentration among different sets of sample data

4. understand the degree and direction of association in bivariate set up

5. learn various important concepts of statistical analysis which has enormous applications such as Time Series, Index Numbers, Vital Statistics.

Course Name: **Core Course-5**

Course Code: **ECOACOR05T**

Topic Name: **Intermediate Microeconomics-I**

Course Outcome The student, after completion of the course will be able to

1. learn about the features and functions of a few imperfectly competitive market – each of which are framed to explain the reality of the day.
2. have an idea about the exploitation that exist in different imperfect market.
3. Learn the concept of interdependence of one economic unit with other and the resulting conjectural behaviour of the economic agents
4. understand the behaviour of economic agents in case of events where the outcomeis uncertain

Course Code: ECOACOR06T

Topic Name: Intermediate Macroeconomics-I

Course Outcome : This course is a sequel to CC3: Macroeconomics I. After successful completion of this course students will be able to:

1. understand various alternative theories of output and employment determination in a closed economy in the short run as well as in the long run, and the role of fiscaland monetary policy in this context.
2. understand the causes and effects of different types of inflation and reason for inflation and unemployment trade-off in an economy.
3. understand different aspects of an open economy

Course Name: Core Course-7

Course Code: ECOACOR07T

Topic Name: Mathematical Methods For Economics-II

Course Outcome : The student, after completion of the course will be able to

1. understand the basic mathematics that enables the creation of economic theory ingeneral

2. understand the application of mathematical techniques to economic theory specificallythe courses on microeconomic theory, macroeconomic theory, statistics and econometrics set out in this syllabus

3. understand the application of linear Programming Problems, interdependence industryrelation and game theory

4. in this course, particular economic models are not the ends, but the end is the means forIllustrating the specific methods of applying mathematical techniques to economic theory.

Course Name: **Core Course-8**

Course Code: **ECOACOR08T**

Topic Name: **Intermediate Macroeconomics-I**

Course Outcome : After completion of this course , the student will learn

1. certain strategies adopted by the interdependent competitors to capture larger share of the market. The oligopolistic market will be explained with the help of certain mathematical tools , primarily the game theory.
2. about certain cases of market failure that arises from uncertainty and information gap in the market.
3. the idea of normative economics where value judgment plays an important role in policy making.
4. the Pareto optimality and the general equilibrium of an economy. Welfare functionthe concept and conditions of welfare maximization of the society.

Course Code: **ECOACOR09T**

Topic Name: **Intermediate Macroeconomics-II**

Course Outcome : On successful completion of this course students will be able to:

1. have an idea about the long run dynamic issues like growth and technical progress
2. gather knowledge about micro-foundations to various aggregative concepts
3. learn about different schools of Macroeconomic thought.

Course Name: **Core Course-10**

Course Code: **ECOACOR10T**

Topic Name: **Statistical Methods for Economics –II**

Course Outcome After successful completion of this course the students will be able to

1. learn conception and definitions of various statistical terms, rules and theorems along with the application of various univariate probability distribution functions
2. learn about probability distributions of discrete and continuous random variables and of joint Distributions
3. gather experience how to select samples from a population and discussion on sampling techniques used to collect survey data
4. learn basic concepts and terminology that are fundamental to statistical analysis and inference.
5. learn how to draw inferences about an unknown population with the help of sample observations.

Course Name: **Core Course-11**

Course Code: **ECOACOR11T**

Topic Name: **Introductory Econometrics**

Course Outcome After completion of this course , the student will learn

1. gather knowledge about comprehensive introduction to basic econometric concepts and techniques
2. have a thorough understanding on the statistical concepts of hypothesis testing

3. learn about estimation and diagnostic testing of simple and multiple regression models
4. learn about the consequences of and tests for misspecification of regression models.

Course Code: ECOACOR12T

Topic Name: Development Economics

Course Outcome : After successful completion of this course the students will be able to

1. understand alternative conception of development and their justification.
2. learn about various stages of growth along with various theories and models and strategy ofgrowth.
3. understand the basic demographic concepts and their evolution during the process of development along with various theories and model explaining the problems of labour surplus economy.
4. learn different measures of poverty and inequality and explore the connection between growth & inequality.
5. link the issues and strategies related with economic development and the question of sustainable development
6. understand how trade causes economic development for Less Developed Countries (LDCs),particularly with reference to the issues of Balance of Payment, economic dependency of LDC in terms of different theories.
7. understand the arguments in favour of protection and how different types of tradeprotectionist measures affect social welfare of LDCs.
8. interpret how inflow of foreign capital in terms of Multi National Corporations (MNCs)affects the economic development of host LDCs.
9. explore the debate between state and market in solving the fundamental economicproblems of an economy and how they address the issue of social welfare.
10. understand the development of different International Financial Institutions like IMF, WorldBank, WTO, etc and their functioning with special reference to LDCs.

Course Name: Core Course-13
Course Code: ECOACOR13T
Topic Name: Indian Economy

Course Outcome After successful completion of this course the students will be able to

1. understand the basic characteristics of the Indian economy with growth and distribution, sustainability and regional constraints; trends in savings and investment.
2. evaluate how the structure of the Indian economy has changed in the planning era.
3. understand the key economic issues related to Indian agriculture, industry, unemployment and poverty in both pre and post reform periods and their policy relevance.
4. understand the rational and major objectives of India's Five-Year Plans, how the emphasis of these objectives has changed over time and recent developments.
5. examine the changes in the policies of the Government in the pre and post reform periods inthe fields of money and capital market , public economics and external sectors.

Course Code: ECOACOR14T

Topic Name: International Economics

Course Outcome : After completion of this course , the student will learn

1. the basis of trade between nations and the possibility of mutual gain from international trade and the benefits of international flow of commodities, capital and finance.
2. the process of determination of exchange rate of currencies of different nations.
3. the impact of various trade barriers such as tariff, quota, voluntary export restraints imposed by the home country and the repercussion effect will also be clearly understood.
4. different policies that are adopted by the states to rectify the imbalances in balance of payment situation.

Course Code: **ECOADSE01T**

Topic Name: **Applied Econometrics**

Course Outcome On successful completion of this course students will be able to:

1. have hands on experience in data collection and data entry, analysis of data in termsof charts , diagrams both for primary and secondary data
2. do statistical measures through computers using statistical software
3. handle data , learn projects reporting, paper presentation etc. using different toolsof computers (excel, word, PowerPoint)

Course Name: **Discipline Specific Elective Course-Group A(b)**

Course Code: **ECOADSE02T**

Topic Name: **Public Economics**

Course Outcome On successful completion of the course , the student will

1. have an idea about the features of Public Goods
2. know about the sources of revenue and heads of expenditure of a government
3. types and effects of public debt

Course Name: **Discipline Specific Elective Course-Group A(c)**

Course Code: **ECOADSE03T**

Topic Name: **Economics of Health and Education**

Course Outcome The student , after successful completion of the course will be able to understand

1. the importance of health and education in the human living standard and productivity .
2. importance of health and education of its citizens are essential for a successful development drive of any economy.
3. how in a microeconomic framework the individual choice in demand for health andeducation can be analysed.
4. the impact and scope for government intervention in these area.
5. the overall framework of the health and education system of India.

Course Code: **ECOADSE04T**

Topic Name: **Contemporary Development Economics**

Course Outcome On successful completion of this course students will be able to

1. know diverse trajectories and patterns of growth to achieve their industrial transitionfollowed clearly by set of countries
2. have ideas compares the outcomes of these diverse trajectories on sectoral change, inter-sectoral relations
3. understand about labour processes and industrial relations and also compares the role ofthe state in facilitating the respective trajectories.

Course Name: Discipline Specific Elective Course-Group B(b)

Course Code: ECOADSE05T

Topic Name: Financial Economics

Course Outcome On successful completion of this course students will be able to

1. have idea on some of the basic models to benchmark valuations of assets and derivatives are studied in detail
2. understand the economics of finance and thereby its wide applications
3. know the Option Pricing models and brief idea to corporate finance.

Course Name: Discipline Specific Elective Course-Group B(c)

Course Code: ECOADSE06T

Topic Name: Project /Dissertation

Course Outcome On successful completion of this course students will

1. be introduced with the application side of the subject in this course
2. learn the methods of using the primary and/ or secondary data for testing differenthypothesis
3. learn how to apply the economic knowledge to explain the real world.
4. be introduced with the various statistical tools to analyse the data methods of forecasting the state of the economy.

Course Code: ECOSSEC01M

Topic Name: Survey Methodology

Course Outcome : On successful completion of this course students will learn

1. about the methodologies of survey, adopt ideas on large scale sample survey methodsand theoretical measurement issues including the scaling techniques
2. different methods of data collection and their relative importance
3. handling and analysing sample data

Course Name: Skill Enhancement Course-2

Course Code: ECOSSEC02M

Topic Name: Indian Official Statistics

Course Outcome : On successful completion of this course students will learn

1. about the official organisations from where secondary data can be collected.
2. different sources of data on agriculture, employment, income and other
3. macro economic variables.
4. sources of demographic data.

5. about statistical organisations of India which collect , compile and publishnational/state level data.
6. international Statistical Systems for comparing economic and socialindicators of different countries.

GENERAL COURSE IN ECONOMICS
With effect from the session: 2018 – 2019

Course Name: Generic Elective/ Discipline Specific CoreCourse-1

Course Code: ECOHGEC01T /(ECOGCOR01T)

Topic Name: Introductory Microeconomics

Course Outcome After the successful completion of the course ,the student will be able to understand
1. the concept of individual and market demand and supply of any commodity.
2. how the price of a commodity is determined in the market.
3. the consumers' behavior and the producers' behavior.
4. the features and function of a perfectly competitive market as well as a few imperfectlycompetitive market
5. the process of determination of different factor prices

Course Name: Generic Elective/ Discipline Specific CoreCourse-2

Course Code: ECOHGEC02T / (ECOGCOR02T)

Topic Name: Introductory Macroeconomics

Course Outcome After the successful completion of the course ,the student will learn
1. about the basic key macroeconomic concepts for an economy, namely, economic growth (in termsof GDP, GNP, National income), inflation (types, effects on economy and control it).
2. income determination in Keynesian model
3. money and banking system of an economy

Course Name: Generic Elective/ Discipline Specific CoreCourse-3

Course Code: ECOHGEC03T / (ECOGCOR03T)

Topic Name: DEVELOPMENT ECONOMICS

Course Outcome After the successful completion of the course ,the student will learn

1. the distinction between growth and development, indicators of growth, concept of HDI, GDI.
2. the alternative strategies of economic development and the complementary role ofagriculture and industry in economic development.
3. the relationship between population and economic development ; the role and problems ofdomestic capital formation and foreign investment.
4. role of different international institutions like IMF, World Bank and WTO in economicdevelopment of developing nations.
5. nature and extent of gender discrimination in the society.

Course Name: Generic Elective/ Discipline Specific CoreCourse-4

Course Code: ECOHGEC04T / (ECOGCOR04T)

Topic Name: INDIAN ECONOMY

Course Outcome After the completion of the course students will be able to understand

1. the changes in the sectoral distribution of National Income and occupational structure during the plan period.
2. population growth ,population policy and population projections for India.
3. problems and policies related to the growth of agricultural and industrial productionin India.
4. the use of various fiscal and monetary instruments used by the Union &State Governments and the Reserve Bank of India.

Course Name: Discipline Specific Elective Course-1a

Course Code: ECOGDSE01T

Topic Name: Elementary Statistics

Course Outcome After the completion of the course students will be able to understand

1. basic concepts and definitions of various statistical terms along with various statisticaltechniques which, in turn, helps the students to quantify the various micro and macroeconomic variables.
2. the quantitative measurement of different development indices in economic theory.

Course Name: Discipline Specific Elective Course-1b

Course Code: ECOGDSE02T

Topic Name: Economics of Social Sectors

Course Outcome After the completion of the course students will be able to understand

1 need for alleviation of poverty.

2 relationship between health, education and economic development.

3 concept of human development, gender empowerment and different development indices.

4 demographic dividend.

Course Name: **Discipline Specific Elective Course-2a**

Course Code: **ECOGDSE03T**

Topic Name: **Trade and Development**

Course Outcome After completion of this course the students will have

1. an idea about trade and gains from trade through different theories
2. how developing countries can protect themselves from international trade
3. about balance of payment, its accounting, different concepts of exchange rate and theirdetermination, devaluation of currency, etc.
4. an idea of multinational corporations, their activities specially in developing countries

Course Name: **Discipline Specific Elective Course-2b**

Course Code: **ECOGDSE04T Topic Name:** **Public Finance**

Course Outcome On successful completion of the course , the student will :

1. have an idea about the role of government in an economy.
2. understand the features of public goods and the difference between private goods and public goods.
3. know about the sources of revenue and heads of expenditure of a government.
4. have an idea about the government budget and types and effects of public debt.

DEPARTMENT OF ELECTRONICS

Programme Specific Outcomes

Demonstrate comprehensive knowledge of electronics fundamentals including analog circuits, digital circuits, integrated circuits, and microprocessor/microcontroller architecture.

- Apply skills in analysis, design, and troubleshooting of analog, digital, and mixed signal electronic circuits.
- Use tools and instruments for analysis and testing of electronic components, circuits, and systems.
- Design, simulate, assemble, and test circuits using components like transistors, operational amplifiers, logic gates, ADCs, DACs, and microcontrollers.
- Implement communication systems using modulation, transmission line, microwave, and antenna design concepts.
- Analyze and design printed circuit boards using fabrication and assembly methods.
- Employ state-of-the-art electronics simulation software to evaluate and improve circuits and systems.
- Investigate wireless systems including antennas, propagation, and wireless networking standards.
- Apply theoretical electronics concepts, analysis techniques, and tools in practical circuits, instruments, and products.
- Demonstrate relevance of electronics fundamentals in interdisciplinary contexts.
- Work effectively as an individual and as part of a team on electronics projects with appreciation of professional ethics.

Course Outcome or Learning Outcome

Course Name : Core Course-1

Course Code : ELSGCOR01T & ELSGCOR01P

Topic Name : Network Electronics and Analog Circuits

Course Objective:

- To expose the students semiconductor device, performance characteristics and their application.
- To expose different signal processing technique and characteristics

Course Outcomes:

At the end of the course, a student will be able to:

1. Illustrate working principles of different electronic circuits and their application in real life.
2. Define semiconductor device and different operating condition and their performance Parameter.
3. Choose proper semiconductor devices depending upon application considering economic and technological up-gradation.
4. Employ mathematical and graphical analysis considering different practical issues modeling of semiconductor device; analyze the performance parameter of the system.
5. Recognize different signal processing circuits and their use in industrial, real life, modern control system applications.
6. Use modeling/simulation parameters with standard equivalent circuit models to predict. correctly the expected performance of various general-purpose electronic circuits.

Course Name : Core Course-2

Course Code : ELSGCOR02T & ELSGCOR02P

Topic Name : Linear and Digital Integrated Circuits

Course Objectives:

- To understand the basic concepts of operational amplifier and its various applications.
- To understand the basics of PLL and its practical applications.
- To know about analog multlipliers.
- To know about various analog switches and different A/D and D/A convertors.
- To understand the concepts of switched capacitor filters,Voltage regulator and various amplifiers

1. Learn about the basic concepts for the circuit configuration for the design of linear integrated circuits and develops skill to solve engineering problems.
2. Develop skills to design simple circuits using OP-AMP.
3. Gain knowledge about various multiplier circuits, modulators and demodulators.
4. Gain knowledge about PLL.
5. Learn about various techniques to develop A/D and D/A convertors.
6. Develop skills to develop simple filter circuits and various amplifiers and can solve problems related to it.

Course Name : Core Course-3

Course Code : ELSGCOR03T & ELSGCOR03P

Topic Name : Communication Electronics

Course Objectives:

- To understand the basic principles and techniques used in analog and digital communications.
- To learn analog and digital modulation techniques.
- To understand Communication receiver and transmitter design.
- To know about baseband and bandpass communication techniques.
- To know about different line coding techniques
- To do noise analysis in various transmission environments.
- To enable the student to become familiar with satellites and satellite services.
- Study of satellite orbits and launching.
- Study of earth segment and space segment components
- Study of satellite access by various users.
- To understand the basic cellular system concepts.
- To have an insight into the various propagation models and the speech coders used in mobile communication.
- To understand the multiple access techniques and interference reduction techniques in mobile communication.

Course Outcomes:

1. Identify the basic elements of a communication system.
2. Analyze baseband signals in time domain and in frequency domain.
3. Compare and contrast various analog and digital modulation and demodulation techniques.
4. Evaluate the performance of modulation and demodulation techniques in various transmission environments.
5. Explain the importance of synchronisation in communication systems.
6. Define orbital mechanics and launch methodologies.
7. Describe satellite subsystems.
8. Design link power budget for satellites.
9. Compare competitive satellite services.
10. Explain satellite access techniques.
11. Discuss cellular radio concepts.
12. Identify various propagation effects.
13. To have knowledge of the mobile system specifications.
14. Classify multiple access techniques in mobile communication.
15. Outline cellular mobile communication standards.
16. Analyze various methodologies to improve the cellular capacity.

Course Name: Core Course-4

Course Code: ELSGCOR04T & ELSGCOR04P

Topic Name: Microprocessor and Microcontroller

Course Objectives:

- To introduce students with the architecture and operation of typical microprocessors and microcontrollers.
- To familiarize the students with the programming and interfacing of microprocessors and microcontrollers.
- To provide strong foundation for designing real world applications using microprocessor and microcontroller.

Course Outcomes:

1. Assess and solve basic binary math operations using the microprocessor and explain the microproce ssors and Microcontroller's internal architecture and its operation within the area of manufacturing and performance.
2. Apply knowledge and demonstrate programming proficiency using the various addressing modes an d data transfer instructions of the target microprocessor and microcontroller
3. Compare accepted standards and guidelines to select appropriate Microprocessor (8085 & 8086) an d Microcontroller to meet specified performance requirements.
4. Analyze assembly language programs; select appropriate assemble into machine a cross assembler u tility of a microprocessor and microcontroller.
5. Design electrical circuitry to the Microprocessor I/O ports in order to interface the processor to external devices.
6. Evaluate assembly language programs and download the machine code that will provide solutions re al-world control problems.

Course Name : Discipline Specific Elective (DSE)

Course Code : ELSGDSE02T & ELSGDSE02P

Topic Name : Antenna Theory and Wireless Networks

Course Objectives:

- To develop understanding of various types of antenna radiation mechanism.
- To provide the knowledge of basic understanding of antenna operation through the application of Maxwell's equations.
- To provide the basic knowledge to calculate array factor of array antennas.
- To introduce the students various types of antennas and their performance Characteristics.
- To develop the students' ability to apply modern mathematical techniques to the solutions of antenna problems.

1. Understand the radiation mechanism of EM waves by antennas and their radiation patterns.
2. Analyze the power radiated by different antennas and their radiation characteristics.
3. Interpret the relationships between antenna parameters.
4. Design and analyze different antennas and antenna arrays.
5. Understand the wave propagation mechanism at different frequencies.

Course Name : Discipline Specific Elective (DSE)

Course Code : ELSGDSE03T & ELSGDSE03P

Topic Name : Photonic Device and Power Electronics

Course Objectives:

- Understand the basic optoelectronics including electromagnetism.
- Light propagation in waveguides, light amplification and detection.
- Lasers, modulators, and detectors.
- To introduce students to the basic theory of power semiconductor devices and passive components, their practical applications in power electronics.
- To familiarize students to the principle of operation, design and synthesis of different power convers ion circuits and their applications.
- To provide strong foundation for further study of power electronic circuits and systems.

Course Outcomes:

1. Define and explain the propagation of light in conducting and non-conducting media.
2. Define and explain the physics governing laser behaviour and light matter interaction.
3. Apply wave optics and diffraction theory to a range of problems.
4. Apply the principles of atomic physics to materials used in optics and photonics.
5. Calculate the properties of various lasers and the propagation of laser beams.
6. Calculate properties of and design modern optical fibers and photonic crystals.
7. Relate basic semiconductor physics to properties of power devices, and combine circuit mathematic s and characteristics of linear and non-linear devices.
8. Describe basic operation and compare performance of various power semiconductor devices, passive components and switching circuits.
9. Design and Analyze power converter circuits and learn to select suitable power electronic devices by assessing the requirements of application fields.
10. Formulate and analyze a power electronic design at the system level and assess the performance.
11. Identify the critical areas in application levels and derive typical alternative solutions.
12. Select suitable power converters to control Electrical Motors and other industry grade apparatus.
13. Recognize the role power electronics play in the improvement of energy usage efficiency and the applications of power electronics in emerging areas.

Course Name : Skill Enhancement Course (SEC)

Course Code : ELSSSEC01M

Topic Name : Design and Fabrication of Printed Circuit Boards

Course Objectives:

- To know the need for PCB Design, steps involved in PCB Design and Fabrication Process.
- To design a schematic/layout PCB for analog circuits, digital circuits and mixed circuits.
- To design an integral part of electronic products by understanding the PCB design.
- To design an electronic printed circuit board for a specific application using industry standard software.

Course Outcomes:

1. Overview on PCB designing flowchart.
2. Introduction to the materials required for the fabrication of PCB's.
3. Simulations of PCB using any EDA tools.
4. PCB Designing and Analyzing practice (Hardware)
5. Development of PCB for any basic electronic circuit.
6. Analyze the fabrication process of printed circuit boards.
7. Make comprehensive use of technical knowledge gained from the course.

Course Name : Skill Enhancement Course (SEC)

Course Code : ELSSSEC02M

Topic Name : Robotics

Course Objectives:

- To understand the basic concepts associated with the design and functioning and applications of Robots.
- To provide an introduction to Robotics and Automation including robot classification, design and selection, analysis and applications in industry.
- To provide information on various types of end effectors, their design, interfacing and selection.
- To provide the details of operations for a variety of sensory devices that are used on robot , the meaning of sensing, classification of sensor, that measure position, velocity & acceleration of robot joint.
- To familiarize the basic concepts of transformations performed by robot.
- To perform kinematics and to gain knowledge on programming of robots.

Course Outcomes:

1. Upon completion of this course, the students can be able to apply basic engineering.
2. To learn about knowledge for the design of robotics.
3. Will understand robot kinematics and robot programming.
4. Will understand application of Robots.
5. Will understand basic components of robotics, classification of robots and their applications.
6. Will know on types of robot grippers, their usage and design considerations.
7. Will understand about various types of sensory devices their working and applications.
8. Can apply basic transformations related to the movement of manipulator.
9. Can design a robot mechanism to meet kinematics requirements and to write simple programs.

DEPARTMENT OF GEOGRAPHY
B.Sc. Geography (Hons) CBCS Syllabus
With effect from 2018-19

Programme Specific Outcomes

Upon successful completion of the undergraduate program in Geography, students will have:

- Developed a comprehensive and systematic understanding of the various theoretical and practical concepts across the breadth of geographical study.
- Gained the ability to critically evaluate geographical phenomena across spatial and temporal dimensions, from global to local levels.
- Acquired skills to prepare and interpret diverse cartographic materials to represent geographical patterns, processes, and relationships.
- Obtained knowledge of statistical and geospatial techniques for geographic analysis, enabling application in various fields.
- Through rigorous training in geographical research methodologies including field work, gained the ability to conduct studies extracting realities at the ground level and prepare scholarly project reports.
- Overall, been equipped to apply their acquired geographic knowledge and skills in various professional spheres.

Course Outcome: or Learning Outcome
Three year B.A. /B.Sc. degree course
Under CBCS Semester System
HONOURS COURSE IN GEOGRAPHY
With effect from the session: 2018 – 2019

Course Name: Core Course-1
Course Code: GEOACOR01T & GEOACOR01P
Topic Name: Geotectonics and Geomorphology

Course Outcome:

In this foundational course, students will:

- Learn about geological timescales, interior earth structure, isostasy, plate tectonics, rocks and minerals, weathering, mass wasting, fluvial processes, and coastal, glacial, and arid geomorphology.
- Comprehend concepts underlying the Earth's surface landscapes and processes.
- Emphasize interpretation of geological maps, cross-sections, and landscape evolution models.
- Gain a thorough grounding in the forces and factors shaping the Earth's diverse landforms.
- Understand the geological foundations underlying the Earth's surface.
- Comprehend mass wasting, fluvial, coastal, glacial, and arid geomorphological processes.
- Learn about rocks, minerals, weathering, and geologic timescales.
- Emphasize map and model interpretation to understand landform evolution.
- Gain foundational knowledge of the Earth's geomorphology and surface processes.

Course Name: Core Course-2
Course Code: GEOACOR02T & GEOACOR02P
Topic Name: Cartography and Thematic Mapping

Course Outcome:

In this course, students will:

- Learn fundamental principles of cartography including map properties, coordinate systems, projections, and cartographic techniques.
- Develop skills to construct diverse map types including comparative, diagonal and vernier scales, as well as choropleth, dot, and flow maps.
- Learn to interpret Survey of India topographical sheets and conduct terrain analysis.
- Develop technical skills for cartographic visualization and representation of geographical data and phenomena.
- Gain knowledge about coordinate systems and map projections.
- Learn techniques to construct different types of thematic maps.
- Acquire skills in cartographic principles and map-making fundamentals.
- Cover concepts of map properties, scales, and coordinate systems.
- Gain fundamental cartography knowledge to visualize and represent geographical data.

Course Name: Core Course-3
Course Code: GEOACOR03T
Topic Name: Human Geography

Course Outcome:

In this course, students will:

- Examine the spatial distribution and growth of human populations, settlements, cultures, economic activities, and their interactions with the environment.
- Comprehend theories and models explaining population distribution patterns, cultural diffusion, urbanization, agricultural land use, industrialization, and resource utilization.
- Analyze the anthropological aspects of human-environment relationships across scales from tribal communities to complex modern societies.
- Study the distribution and growth of human populations and activities.
- Learn about models of population patterns, cultural diffusion, urbanization, land use, and resource utilization.
- Examine human-environment interactions across societies.
- Cover concepts of population geography, settlement patterns, and economic geography.
- Gain understanding of the spatial aspects of human organization and environmental relationships.

Course Name: Core Course-4
Course Code: GEOACOR04T & GEOACOR04P
Topic Name: Cartographic Techniques

Course Outcome:

In this course, students will:

- Develop skills in cartographic data representation, collection and analysis through practical exercises.
- Learn to draw various thematic maps, carry out compass traversing, and conduct profile leveling surveys to capture field data.
- Gain hands-on experiences in basic field mapping and survey techniques.
- Acquire foundations for advanced data analysis using GIS software.
- Practice skills in cartographic data visualization and representation.
- Use compass traversing and leveling surveys to collect spatial data in the field.
- Learn basic field mapping and spatial data gathering techniques.
- Gain practical experience in geographical data collection and field surveys.
- Develop proficiency in fundamental cartographic and field research skills.

Course Name: Core Course-5
Course Code: GEOACOR05T & GEOACOR05P
Topic Name: Climatology

Course Outcome:

In this course, students will:

- Gain a comprehensive understanding of atmospheric processes influencing weather and climate.
- Analyze interactions between the atmosphere and earth surface across scales from local to global.
- Learn weather map interpretation, climograph and hythergraph construction, and climatic classification systems.
- Comprehend the dynamics of general atmospheric circulation, jet streams, airmass boundaries and disturbances producing cyclones.
- Address issues of contemporary climatic changes including global warming.
- Study atmospheric processes and their influence on weather and climate.
- Learn techniques like weather map reading and climograph construction.
- Analyze interactions between the atmosphere and earth's surface.
- Cover atmospheric circulation patterns and cyclone formation.

- Examine contemporary climate change issues such as global warming.

Course Name: Core Course-6
Course Code: GEOACOR06T
Topic Name: Geography of India

Course Outcome:

In this course, students will:

- Gain an integrated understanding of the physical and human geography of the Indian subcontinent.
- Do detailed regional analysis examining the terrain, natural resources, climate, population dynamics, tribal communities, agricultural systems, industries, transport patterns, urban settlements, and developmental disparities across India.
- Specifically analyze the physical and human landscapes of West Bengal.
- Study the geography, both physical and human, of India and West Bengal.
- Examine terrain, climate, resources, population, tribes, agriculture, industry, transportation, settlements, and development across Indian regions.
- Learn about the regional geography of India, including detailed analysis of West Bengal.
- Integrate knowledge on the physical and human geography of the subcontinent.
- Analyze geographic variations across India in climate, land use, population, transportation, industry, and development.
- Understand the diverse regional geography within the country.

Course Name: Core Course-7
Course Code: GEOACOR07T & GEOACOR07P
Topic Name: Statistical Methods in Geography

Course Outcome:

In this course, students will:

- Learn foundational statistical skills and concepts to scientifically analyze quantitative geographical data.
- Study diverse data types, sampling methods, frequency distributions, central tendencies, dispersions, correlations, regressions, time series, and more.
- Gain hands-on exercises in statistical techniques for testing spatial patterns and models.
- Develop expertise in data matrix construction, interpretation and visualization using statistical software.
- Acquire foundational statistical skills for geographical data analysis.
- Study quantitative data types, sampling, distributions, correlations and regressions.
- Practice statistical techniques for spatial analysis through hands-on exercises.
- Build skills in geographical data matrices, interpretation, and visualization.
- Learn key statistical methods and concepts for geography and spatial analysis.

Course Name: Core Course-8
Course Code: GEOACOR08T
Topic Name: Regional Planning and Development

Course Outcome:

In this course, students will:

- Examine theoretical models and practical methods for regional development planning.
- Analyze regional delineation, growth disparities, and development indicators to formulate balanced planning for underdeveloped areas.

- Cover sustainable resource utilization, environmental conservation, infrastructure provision, poverty alleviation and grassroots participatory approaches within comprehensive regional plans.
- Use case studies to understand regional planning in the Indian context.
- Learn about models and methods for regional development planning.
- Analyze regional delineation, disparities, and indicators for balanced planning.
- Examine sustainable resource use, conservation, infrastructure, poverty alleviation, and participation in regional plans.
- Study Indian case studies to understand regional planning approaches.
- Gain knowledge on theoretical and practical regional planning.

Course Name: Core Course-9
Course Code: GEOACOR09T
Topic Name: Economic Geography

Course Outcome:

In this course, students will:
- Learn theoretical foundations and contemporary applications of economic geography.
- Analyze location factors, transportation networks, spatial interaction models, trade patterns, and geographic industry concentrations.
- Cover concepts like economic space, comparative advantage, economies of scale, and technological diffusion.
- Examine globalization, outsourcing, multinational networks, and related impacts.
- Study foundations and applications of economic geography.
- Analyze location factors, transportation, trade patterns, and industry geography.
- Learn about economic space, comparative advantage, economies of scale, and diffusion.
- Examine globalization, outsourcing, multinationals, and impacts.
- Gain knowledge on theoretical and applied economic geography.

Course Name: Core Course-10
Course Code: GEOACOR10T & GEOACOR10P
Topic Name: Environmental Geography

Course Outcome:

In this course, students will:
- Be introduced to the nature and scope of environmental geography and contemporary ecological issues.
- Learn concepts of ecosystems, food chains, nutrient cycling, carrying capacity, and sustainability to examine environmental problems.
- Comprehend issues like pollution, waste, deforestation, biodiversity losses and soil degradation.
- Understand global environmental policies, resource ethics, EIA procedures, and local perceptions.
- Do practical exercises in questionnaire surveys, impact assessment, and data analysis for environmental planning.
- Get an introduction to environmental geography and ecology.
- Learn about ecosystems, sustainability, and examining ecological issues.
- Comprehend environmental problems like pollution, deforestation, and biodiversity loss.
- Study environmental policies, ethics, impact assessment, and perceptions.
- Gain practical training in surveys, impact assessment, and environmental data analysis.

Course Name: Core Course-11
Course Code: GEOACOR11T & GEOACOR11P
Topic Name: Field Work and Research Methodology
Course Outcome:

In this course, students will:

- Get hands-on training in geographical field data collection and research techniques.
- Gain practical experience in reconnoitering landscapes, observing physical and human features, conducting surveys using questionnaires and interviews, mapping land use patterns, and compiling secondary data.
- Learn field ethics, safety, teamwork, and the use of GPS, surveying instruments, photography, data recording formats, and field notebooks.
- Prepare integrated field reports incorporating maps, data tables, photographs, and results of statistical analysis.
- Receive practical training in geographical field research and data collection.
- Get experience in landscape observation, surveys, mapping, and secondary data compilation.
- Learn about field ethics, safety, teamwork, and using GPS, instruments, photography, and notebooks.
- Prepare integrated field reports with maps, tables, photos, and analysis.
- Develop hands-on skills in geographical fieldwork, surveying, and report preparation.

Course Name: Core Course-12
Course Code: GEOACOR12T & GEOACOR12P
Topic Name: Remote Sensing and GIS

Course Outcome:

- Develop technical skills in geospatial data analysis methods including satellite image processing, GIS, and Remote Sensing through practical exercises using industry-standard software.
- Learn image rectification, enhancement, classification, and interpretation for feature identification and thematic mapping.
- Cover spatial data generation, management, overlay analysis and output generation using GIS and case study datasets.
- Integrate remote sensing with GIS for sophisticated geographic analysis and modeling applications.
- Gain practical skills in satellite image processing, GIS, and remote sensing software.
- Study image rectification, enhancement, classification, and interpretation.
- Use GIS for spatial data handling, analysis, and mapping with case studies.
- Integrate GIS and remote sensing for advanced analysis and modeling.
- Acquire technical expertise in geospatial data analysis using industry-standard GIS and remote sensing software.

Course Name: Core Course-13
Course Code: GEOACOR13T
Topic Name: Evolution of Geographical Thought

Course Outcome:

In this course, students will:

- Trace the history of geographical and environmental ideas from ancient to modern times.
- Comprehend the contributions of influential geographers, cartographers, explorers, scholars, and schools of thought across the centuries.
- Emphasize developments in philosophical paradigms, human-environment perspectives, and interlinkages between geography and sister disciplines.
- Develop a holistic understanding of the evolution of geographical knowledge and its applications for human society.
- Learn the history of geography and environmental ideas from ancient to modern times.
- Study influential geographers, cartographers, explorers, scholars, and schools of thought.
- Examine developments in paradigms, human-environment perspectives, and interdisciplinary linkages.
- Gain a holistic understanding of the evolution of geographical knowledge and its applications.

- Cover the chronological history of geographic and environmental thought.
- Analyze key contributions to the field across different eras.

Course Name: Core Course-14
Course Code: GEOACOR14T & GEOACOR14P
Topic Name: Disaster Management

Course Outcome:

In this course, students will:

- Develop a comprehensive understanding of approaches to natural and human-induced disaster analysis and mitigation.
- Examine geophysical hazards, vulnerability models, disaster prevention, preparedness, rehabilitation and reconstruction across scales from local to international.
- Prepare case studies and disaster management plans for at-risk regions incorporating risk communication, early warning systems, emergency response, refugee relief strategies and community participation.
- Gain knowledge on disaster analysis and mitigation approaches.
- Study hazards, vulnerabilities, prevention, preparedness, rehabilitation, and reconstruction.
- Prepare disaster case studies and management plans incorporating communication, warnings, response, relief, and participation.
- Learn comprehensive approaches for natural and human-induced disaster mitigation.
- Examine vulnerabilities, preparedness, rehabilitation, and community-level capacity building.
- Develop skills in disaster analysis, planning, and risk reduction.

Course Name: Discipline Specific Elective-1
Course Code: GEOADSE01T
Topic Name: **Soil and Bio Geography**

Course Outcome:

- Understand the fundamental concepts of soil science, including soil formation, classification, and properties.
- Analyze the role of soil in supporting plant life and ecosystems.
- Evaluate the impact of human activities on soil quality and fertility.
- Demonstrate knowledge of various soil types and their geographical distribution.
- Explore the relationship between soil characteristics and vegetation patterns.
- Examine the influence of climate, topography, and parent material on soil development.
- Discuss the role of microorganisms in soil ecosystems and their contribution to nutrient cycling.
- Identify key soil conservation techniques and sustainable land management practices.
- Assess the significance of soil in global biogeochemical cycles.
- Apply geographical principles to analyze spatial patterns of soil distribution and its implications for biodiversity.
- Critically evaluate case studies and research related to soil and bio-geography.
- Develop practical skills in soil sampling, analysis, and interpretation.
- Gain an appreciation for the interdisciplinary nature of soil and bio-geography and its relevance to environmental science and agriculture.

Course Name: Discipline Specific Elective-2
Course Code: GEOADSE02T
Topic Name: Settlement Geography

Course Outcome:

- Understand the basic concepts and principles of settlement geography.

- Analyze the spatial patterns and distribution of human settlements.
- Examine the factors influencing the location and growth of settlements.
- Evaluate the impact of physical, social, economic, and cultural factors on settlement patterns.
- Explore the historical development and evolution of settlements.
- Identify different types of settlements, such as rural, urban, and peri-urban, and their characteristics.
- Discuss the role of transportation, infrastructure, and land use planning in shaping settlements.
- Examine the challenges and opportunities associated with rural and urban settlements.
- Analyze the socio-economic and demographic characteristics of various settlements.
- Investigate the role of technology in influencing settlement patterns and dynamics.
- Apply spatial analysis techniques to study settlement morphology and patterns.
- Explore the relationship between settlements and the environment, including issues related to sustainability and resilience.
- Develop critical thinking skills through the analysis of case studies and real-world examples in settlement geography.
- Gain practical knowledge in settlement planning and management.
- Understand the global context of settlement geography and its implications for regional and urban development.

Course Name: Discipline Specific Elective-3
Course Code: GEOADSE04T
Topic Name: Hydrology and Oceanography

Course Outcome:

- Understand the fundamental principles and concepts of hydrology and oceanography.
- Examine the water cycle and its components, including precipitation, evaporation, and runoff.
- Analyze the physical properties of water and their influence on hydrological and oceanographic processes.
- Evaluate the impact of human activities on water resources and ocean ecosystems.
- Explore the distribution and movement of water in rivers, lakes, oceans, and other water bodies.
- Investigate the role of climate in shaping hydrological and oceanographic patterns.
- Examine the interaction between oceans and the atmosphere, including ocean currents and atmospheric circulation.
- Identify the characteristics of coastal zones and their vulnerability to natural hazards.
- Understand the principles of oceanography, including marine biology, chemistry, and geology.
- Analyze the role of oceans in global climate regulation and the carbon cycle.
- Explore the impact of climate change on hydrological cycles and ocean dynamics.
- Discuss water management strategies and their implications for sustainable development.
- Apply quantitative methods and tools for analyzing hydrological and oceanographic data.
- Develop an understanding of the interdisciplinary nature of hydrology and oceanography and its relevance to environmental science.
- Gain practical skills in conducting field studies and laboratory analyses related to hydrology and oceanography.

Course Name: Discipline Specific Elective-4
Course Code: GEOADSE06T
Topic Name: Resource Geography

Course Outcome:

- Understand the fundamental concepts and principles of resource geography.
- Identify and classify various natural resources, including renewable and non-renewable resources.
- Analyze the spatial distribution of natural resources on a global, regional, and local scale.

- Examine the factors influencing the exploitation and utilization of resources.
- Evaluate the environmental, economic, and social impacts of resource extraction and management.
- Explore the role of technology in resource exploration, extraction, and processing.
- Investigate the geopolitical issues related to the distribution and control of natural resources.
- Discuss sustainable resource management practices and their implications for future generations.
- Analyze the role of government policies and international agreements in resource governance.
- Understand the concept of resource scarcity and its implications for global development.
- Explore the interdisciplinary nature of resource geography, incorporating aspects of geology, economics, and environmental science.
- Develop analytical and critical thinking skills through case studies and real-world examples in resource geography.
- Identify and assess alternative and renewable sources of energy.
- Gain practical knowledge in conducting resource assessments and environmental impact assessments.
- Apply geographic information systems (GIS) and remote sensing techniques for resource mapping and analysis.

Course Name: Skill Enhancement Course 1
Course Code: GEOSSEC01M
Topic Name: Remote Sensing

Course Outcome:

- Understand the fundamental principles and concepts of remote sensing.
- Identify the various platforms used in remote sensing, such as satellites, aerial platforms, and unmanned aerial vehicles (UAVs).
- Learn the electromagnetic spectrum and its relevance to remote sensing applications.
- Develop proficiency in interpreting and analyzing remotely sensed images and data.
- Explore the applications of remote sensing in different fields, including agriculture, forestry, geology, environmental science, and urban planning.
- Acquire knowledge of different types of sensors used in remote sensing and their specific applications.
- Understand the process of image acquisition, including sensor calibration and geometric correction.
- Analyze the role of geographic information systems (GIS) in conjunction with remote sensing data.
- Examine the use of remote sensing in monitoring and managing natural resources.
- Explore the applications of remote sensing in disaster management and response.
- Gain practical skills in image interpretation, classification, and digital image processing.
- Understand the ethical and societal implications of remote sensing technologies.
- Evaluate the limitations and challenges associated with remote sensing data, including atmospheric effects and resolution issues.
- Develop the ability to design and implement remote sensing projects for specific applications.

Course Name: Skill Enhancement Course 2
Course Code: GEOSSEC02M
Topic Name: Spatial Statistical Techniques

Course Outcome:

- Develop a foundational understanding of spatial statistical techniques.
- Acquire knowledge of basic statistical concepts and methods relevant to spatial data analysis.
- Understand the principles of spatial autocorrelation and its applications in spatial statistics.
- Learn different spatial data models and their implications for statistical analysis.
- Gain proficiency in the application of exploratory spatial data analysis (ESDA) techniques.

- Develop skills in spatial interpolation methods for estimating values at unobserved locations.
- Explore the use of geostatistical techniques for modeling spatial variability and uncertainty.
- Understand the principles of spatial regression analysis and its applications in modeling spatial relationships.
- Learn about cluster analysis techniques for identifying spatial patterns and hotspots.
- Explore the integration of Geographic Information Systems (GIS) with spatial statistical techniques.
- Analyze real-world spatial datasets using appropriate statistical software.
- Develop the ability to interpret and communicate results of spatial statistical analyses.
- Understand the ethical considerations and limitations associated with spatial statistical techniques.
- Apply spatial statistical methods to solve practical problems in various fields, including environmental science, epidemiology, and urban planning.

DUM DUM MOTIJHEEL COLLEGE DEPARTMENT OF MATHEMATICS

B. Sc. Mathematics (Hons.) CBCS Syllabus Issued by the West Bengal State University

With effect from the session 2018-19

Programme Specific Outcomes (PSOs)

Algebra, calculus, geometry, differential equations, mechanics, numerical analysis, logic, programming language and several other important branches of mathematics are accumulated in UG programme syllabus in Mathematics (Hons.).

Bachelor's degree in mathematics is the attainment of in-depth knowledge of algebra, calculus, geometry, differential equations, probability and statistics, mechanics and several other branches of mathematics. It helps study of computer science, quantification and numerical applications and many more branches of applied mathematics. It provides a solid background of learners for studying higher mathematics.

It enhances the knowledge, skill and analytical reasoning for solving the real life problems. It also develops the logical analysis of different types of mathematical problems.

They also share ideas and insights while seeking and benefitting from knowledge and insight of others. This helps them to learn behave responsibly in a rapidly changing interdependent society.

Students completing this programme will be able to present mathematics clearly and precisely, make vague ideas precise by formulating them in the language of mathematics, describe mathematical ideas from multiple perspectives and explain fundamental conceptsof mathematics to non-mathematicians.

Completion of this programme will also enable the learners to join teaching profession in primary and secondary schools. This programme will also help students to enhance their employability for government jobs, jobs in banking, insurance and investment sectors, data analyst jobs and jobs in various other public and private enterprises.

DUM DUM MOTIJHEEL COLLEGE

Course Outcome or Learning OutcomeThree year B.A. /B.Sc. degree course Under CBCS Semester System

HONOURS COURSE IN MATHEMATICS

With effect from the session: 2018 – 2019

Course name: Core Course-1
Course Code: MTMACOR01T
Topic: Calculus, Geometry and Ordinary Differential Equation

Course Outcomes: After successful completion of this course students will be able to:

Sketch curves in Cartesian and polar coordinate systems.

Learn reduction formulae, derivations and illustrations of reduction formulae for theintegration.

Solve problem related to arc length, arc length of parametric curves, area of surface of revolution.

Understand how to analyze and synthesize given data to solve problems in geometry.

5. Understand the basic ideas of conics and explain the ideas of conics and their various applications.

Course name: Core Course-2**Course Code**: MTMACOR02T**Topic**: Algebra
Course Outcomes: After successful completion of this course students will be able to:

1) Learn elementary complex numbers and its properties, theory of equations along with solving techniques of cubic & bi-quadratic algebraic equation and inequality with special emphasis on the relation AM, GM & HM.
2) Learn the integers in detail along with the elementary principles such as 'well ordering principle', 'principle of induction', 'division algorithm' etc. and also some important concepts such as congruence, properties of prime numbers, fundamental theorem of arithmetic etc.
3) Learn relations and mapping along with the concept of equipotent sets and cardinality.
4) Learn matrix, its inverse, rank of the matrix, concept of eigen value and eigen vectors.
5) Learn to solve a system of linear equations: homogeneous as well as non-homogeneous and also the consistency in terms of linear independence and dependence.

Course name: Core Course-3
Course Code: MTMACOR03T
Topic: Real Analysis

Course Outcomes: This course will enable the students to

1. understand the Real number system in detail, e.g., open and closed sets, limit point of a set, concept of Infimum, Supremum, Archimedian properties, etc., and several topological properties.
2. gather deep concept of Sequence and Infinite series of real numbers together with graphical interpretations, e.g., convergence and divergence of sequence and series using several Mathematical tools and computation of limits of sequence and series.

Course Name: Core Course-4
Course Code: MTMACOR04T
Topic: Differential Equation and Vector Calculus

Course Outcomes: After successful completion of this course students will be able to:

1. Learn existence and uniqueness of a differential equation
2. Learn second order differential equations, concept of Wronskian and its solution by themethod of variation of parameters as well as operator methods.
3. Learn the power series solution to the differential equation about an ordinary point.
4. Learn dynamical system, concept of phase plane and equilibrium point.
   Learn vector triple product and some basic vector calculus such as differentiation andintegration of vector functions

Course Name: Core Course-5 **Course Code**: MTMACOR05T **Topic**: Theory of Real Functions

Course Outcomes: After successful completion of this course students will be able to:
Understand many properties of the real line $\mathbb{R}$ and learn to define sequence in terms offunctions from $\mathbb{R}$ to a subset of $\mathbb{R}$.

Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate theirlimit superior, limit inferior, and the limit of a bounded sequence.

Apply the ratio, root, alternating series and limit comparison tests for convergence and absoluteconvergence of an infinite series of real numbers.

Handle fundamental properties of the real numbers that lead to the formal development of real analysis and understand limits and their use in sequences, series, continuity and differentiation. Students will appreciate how abstract ideas and rigorous methods in mathematical analysis can beapplied to important practical problems.

Course Name: Core Course-6**Course Code**: MTMACOR06T**Topic**: Group Theory I
Course Outcomes: This course will enable the students to understand:

1. the Group of Symmetry, Dihedral Group, Permutation Group via several examples.
2. gather knowledge about basic properties of Group, Subgroups, Cyclic Groups, Normal subgroupsvia a lot of examples
3. the deep concept of permutation
4. understand the basic concept of External direct product of Groups with many examples
5. understand the Group homomorphisms deeply with a lot of examples and its consequences.

Course Name: Core Course-7
Course Code: MTMACOR07P & MTMACOR07T
Topic: Numerical Methods
Course Outcomes: After successful completion of this course students will be able to

1. Obtain numerical solutions of algebraic and transcendental equations
2. Find numerical solutions of system of linear equations and to check the accuracy of the solutions
3. Learn about various interpolating and extrapolating methods to find numerical solutions
4. Solve initial and boundary value problems in differential equations using numerical methods
5. Apply various numerical methods in real life problems
6. Obtain numerical solutions of algebraic and transcendental equations in programming language C
7. Find numerical solutions of system of linear equations and check the accuracy of the solutions inprogramming language C

8. Learn about various interpolating and extrapolating methods in programming language C.9) Solveinitial and boundary value problems in differential equations using numerical methods in programming language C

Course Name: Core Course-8
Course Code: MTMACOR08T
Topic: Riemann Integration and Series of Functions
Course Outcomes: After successful completion of this course students will be able to

1. Demonstrate knowledge of the concepts and theorems of Riemann Integration and to apply themin solving advanced integration problems. They will master basic Calculus concepts, including integration techniques, improper integrals, convergence of integrals and the convergence of sequence and the series of functions
2. Apply of some simple techniques for testing the convergence of sequences and series offunctions, and confidence in applying them.
3. Apply Calculus concepts to solve physics, geometry and numerical approximation problems
4. Students will understand the usage of proper mathematical notation in relation to the abovetopics and learn some of the applications of the fundamental theorems of integration.

Course Name: Core Course-9
Course Code: MTMACOR09T
Topic: Multivariate Calculus

Course Outcomes: After successful completion of this course students will be able to

1. Learn the calculus of several variables such as functions, limit, continuity, partial derivatives, directional derivatives, chain rules, differentiation of the functions of two & three variables and extrema.
2. Learn double and triple integrals along with various applications.
3. Learn the vector fields, curl, divergence and line integrals with applications.
4. Learn Green's, Stoke's and Guass divergence theorem with technique to solve variousproblems.

Course Name: Core Course-10
Course Code: MTMACOR010T
Topic: Ring Theory and Linear Algebra I

Course Outcomes: After successful completion of this course students will be able to

1. Write precise and accurate mathematical objects in ring theory
2. Know the fundamental concepts in ring theory such as the concepts of ideals, quotient rings,integral domains, and fields and the concept of ring homomorphism
3. Understand the basic ideas of vector algebra: linear dependence and independence and spanning
4. Know how to find the row space, column space and null space of a matrix, and be familiar with the concepts of dimension of a subspace and the rank and nullity of a matrix, and to understandthe relationship of these concepts to associated systems of linear equations;
5. Be familiar with the notion of a linear transformation and its matrix.

Course Name: Core Course-11
Course Code: MTMACOR011T
Topic: Partial Differential Equations and Applications of Ordinary Differential Equations

Course Outcomes: After successful completion of this course students will be able to

1. Learn some important topics such as central force, constrained motion, varying mass, tangent and normal acceleration and planetary motion from the field of particle dynamics and solving technique of various problems as the applications of ordinary differential equations.
2. Learn first order partial differential equations, construction, the canonical forms, solving the quasilinear pde by using the method of characteristics, solution of first order pde by the method of separation of variables.
3. Learn to form heat equation, wave equation and Laplace equation in one and three dimensionsand to solve those by the method of separation of variables.
4. Learn to classify of second order linear equations as hyperbolic, parabolic or elliptic and techniqueof reduction to their canonical forms.
5. Get acquainted with Cauchy problem, its uniqueness and applications to various problems such asinfinite & semi-infinite strings (with homogeneous and non-homogeneous initial and boundary conditions).

Course Name: Core Course-12**Course Code**: MTMACOR012T**Topic**: Group Theory II

Course Outcomes: After successful completion of this course students will be able to

1. Apply the concept of Automorphisms for constructing new groups from the given group. Theknowledge of automorphism helps them to study more on field theory.
2. Learn on direct products, group actions, class equations and their applications with proof of allresults . This course helps them to opt for more advanced courses in algebra and linear classicalgroups.
3. External direct product applies to data security and electric circuits.
4. Recognize and use the Sylow's theorems to characterize certain finite groups and theirapplications to check nonsimplicity of finite groups.

Course Name: Core Course-13
Course Code: MTMACOR013T
Topic: Metric spaces and Complex Analysis

Course Outcomes: This course will enable the students to understand

1. the topological properties of metric spaces.
2. about convergence and divergence of sequences abstractly in Metric spaces.
3. the concept of the Fixed Point Theorem (Banach) in metric spaces and its applications.
4. deeply the complex number system and its topological properties in Complex Analysis.
5. the limit, derivative of complex-valued functions of complex variables and computation of them.
6. Analytic functions and their properties.
7. Sequence and series (Laurent series, power series) and their convergence with severalexamples.
8. the concept of complex integration, specially Contour integral and their computation and applications.

Course Name: Core Course-14
Course Code: MTMACOR014T
Topic: Ring Theory and Linear Algebra II

Course Outcomes: After successful completion of this course students will be able to:

1. Write precise and accurate mathematical objects in ring theory.
2. Know the fundamental concepts in ring theory such as the concepts of ideals, quotient rings,integral domains, Euclidean domains, unique factorization domains and fields.
3. Learn in detail about polynomial rings.
4. Check the irreducibility of higher degree polynomials over rings.
5. Have an understanding of matrices, and their representation of linear transformations of vectorspaces, including change of basis.
6. Understand the beginnings of the theory of eigenvectors and eigen values and appreciate theapplications of diagonalizability.
7. Find canonical form of linear transformations.
8. Obtain various variants of diagonalization of linear transformations.
9. Apply Cauchy-Schwarz inequality for deriving metric on inner product spaces and obtainorthonormal basis using Gram-Schmidt orthogonalization.

Course Name: Discipline Specific Elective-1

Course Code: MTMADSE01T

Topic: Linear Programming Problem

Course Outcomes: After successful completion of this course students will be able to:

1. find graphical solutions of linear programming problems with two variables, and illustrate theconcept of convex set and extreme points.
2. Understand the theory of the simplex method.
3. Know about the relationships between the primal and dual problems, and to understandsensitivity analysis.
4. Analyze and solve linear programming models of real life situations.
5. Learn about the applications to transportation, assignment and two-person zero-sum gameproblems.

Course Name: Discipline Specific Elective-2

Course Code: MTMADSE03T

Topic Name: Probability & Statistics

Course Outcome: This course will enable the students to:

1. Understand distributions in the study of the joint behaviour of two random variables.
2. Establish a formulation helping to predict one variable in terms of the other that is, correlationand linear regression.

3. Understand central limit theorem, which establish the remarkable fact that the empiricalfrequencies of so many natural populations, exhibit a bell shaped curve.
4. Know about Markov Chains, Chapman-Kolmogorov equations and classification of states.
5. Perceive the characteristics of sample data using various methods of statisticalmeasurements.

Course Name: Discipline Specific Elective-3
Course Code: MTMADSE04T
Topic Name: Theory of Equations

Course Outcome: After successful completion of this course students will be able to:

1. Describe the relation between roots and coefficients
2. Find the sum of the power of the roots of an equation using Newton's Method.
3. Transform the equation through roots multiplied by a given number, increase the roots,decrease the roots, removal of terms
4. Solve the reciprocal equations.
5. Analyze the locate and describe the nature of the roots of an equation.

Course Name: Discipline Specific Elective-4
Course Code: MTMADSE06T
Topic Name: Mechanics
Course Outcome: After successful completion of this course students will be able to

1. Learn problem solving technique in the field of Analytical Statics with topics: Co-planar forces, Astatic equilibrium, friction, equilibrium of a particle on a rough curve, virtual work, forces in three dimensions, general conditions of equilibrium, centre of gravity for different bodies, stable and unstable equilibrium.
2. Learn rotating axes, motion of a projectile in a resisting medium, stability of nearly circular orbits, motion under the inverse square law, various cases on slightly disturbed orbits, motion of artificial satellites, particle in three dimensions, motion on a smooth sphere, cone, and on any surface of revolution.
3. Learn Rigid Dynamics with special emphasis on problem solving on the following topics: degrees of freedom, moments and products of inertia, principal axes, D'Alembert's principle, motion about a fixed axis, compound pendulum, motion of a rigid body in two dimensions under impulsive forces, conservation of momentum and energy.

Course Name: Skill Enhancement Course-1

Course Code: MTMSSEC01M **Topic Name**: C- Programming**Course Outcome**:

1. Theoretical study of C Language
2. HLL VS C Similarity
3. History of H.L. Language Revolution
4. Problem based C Coding
5. Practical Problem solving

Course Name: Skill Enhancement Course-2

Course Code: MTMSSEC02M**Topic Name**: Logic and Sets **Course Outcome**:

1. Definition for Logic
2. To solve problems using logic

DUM DUM MOTIJHEEL COLLEGE DEPARTMENT OF MATHEMATICS

Course Outcome or Learning OutcomeThree year B.A. /B.Sc. degree course Under CBCS semester system
GENERAL COURSE IN MATHEMATICS
With effect from the session: 2018 – 2019

Course Name: Generic Elective/Department Specific Core Course-1
Course Code: MTMHGEC01T / MTMGCOR01T
Topic: Differential Calculus
Course Outcomes: This course will enable the students to:

1. Calculate the limit and examine the continuity and understand the geometrical interpretation ofdifferentiability.
2. Understand the consequences of various mean value theorems and compute maxima-minima andindeterminate forms.
3. Draw curves in Cartesian and polar coordinate systems.
4. Understand the concept of successive differentiation, partial differentiation and homogeneousfunctions.
5. Understand and compute the Tangents and Normals, Curvature, Asymptotes, Singular points.

Course Name: Generic Elective/Department Specific Core Course-2
Course Code: MTMHGEC02T / MTMGCOR02T
Topic: Differential Equations
Course Outcomes: This course will enable the students to:

1. Understand the genesis of ordinary as well as partial differential equations.
2. Learn various techniques of getting exact solutions of certain solvable first order differentialequations and linear differential equations of second order.
3. Understand Wronskian, and its properties. Learn about the method of variation of parameters, the Cauchy-Euler equation, Simultaneous differential equations and Totaldifferential equations.
4. Learn about solution of first order linear partial differential equations using Lagrange'smethod and non-linear partial differential equations using Charpit's method.
5. Know how to classify second order partial differential equations into elliptic, parabolic andhyperbolic

Course Name: Generic Elective/Department Specific Core Course-3
Course Code: MTMHGEC03T / MTMGCOR03T
Topic: Real Analysis
Course Outcomes: This course will enable the students to:

1. understand the Real number system, e.g., open and closed sets, limit point of a set, concept ofInfimum, Supremum, Archimedian properties, etc., and some topological properties.
2. gather concept of Sequence and Infinite series of real numbers, e.g., convergence and divergenceof sequence and series using several Mathematical tools and computation of limits of sequence and series.
3. gather concepts of sequence and series of functions, e.g., pointwise and uniform convergence ofsequence and series of functions using several mathematical tools and computation of limits of sequence and series of functions.

Course Name: Generic Elective/Department Specific Core Course-4
Course Code: MTMHGEC04T / MTMGCOR04T
Topic: Algebra
Course Outcomes: This course will enable the students to:

1. understand Binary relations and functions sufficiently.
2. understand the concept of Group, Cyclic group, General Linear group, Group of symmetries,permutation group, subgroup together with basic properties and examples.
3. understand the concept of Ring, Subring, Ideal, Integral Domain, Field together with their basicproperties and examples

Course Name: Department Specific Elective-1
Course Code: MTMGDSE01T
Topic: Matrices

Course Outcomes: This course will enable the students to:

1. Learn vector spaces over R, standard basis and concept of Linear Independence anddependence.
2. Learn various properties of matrices including inverse, rank, concept of eigen values and eigenvectors and diagonalization of a matrix.
3. Learn to solve a system of linear equations by the matrix method.

Course Name: Department Specific Elective-2
Course Code: MTMGDSE02T
Topic: Linear Programming
Course Outcomes: This course will enable the students to:

1. Analyse and solve linear programming models of real life situations.
2. Provide graphical solutions of linear programming problems with two variables, andillustrate the concept of convex set and extreme points.
3. Understand the theory of the simplex method, two-phase method, Big-M methodand their comparison.
4. Know about the relationships between the primal and dual problems, and to understandeconomic interpretation of the dual and sensitivity analysis.

Dum Dum Motijheel College

Department of Microbiology

CBCS curriculum is effective from 2018-'19 Academic year

Programme : B.Sc. In Microbiology (Honours)

Programme Specific Outcome (PSO) for B.Sc. Microbiology

	On completion of B.Sc. in Microbiology, our students will be able to :
PSO-01	Demonstrate through knowledge of principles and concepts of basic and applied microbiology.
PSO-02	Demonstrate the presence of microorganisms using different microscopic techniques, and cultivate, isolate, identify, enumerate and preserve them.
PSO-03	Employ safe laboratory practices and follow the rules of biosafety.
PSO-04	Understand biochemical and physiological aspects of microbes and develop broader perspective to identify innovative solutions for present and future challenges posed by microbes.
PSO-05	Demonstrate how the study of microorganisms can provide insights into the working of higher organisms.
PSO-06	Understand microbial life processes and device strategies to use microorganisms in healthcare, pharma, food, agriculture, beverage, nutraceutical and many other industries to get life-saving and valuable products.
PSO-07	Understand most complex cellular processes with molecular level explanation in most primitive living forms to most complex higher organisms.
PSO-08	Analyze and interpret experimental data statistically.
PSO-09	Impart profound knowledge and understand about the natural protective system i.e. immune system present in different living forms.
PSO-10	Accumulate insight knowledge of concepts of advanced biology like metabolomics, proteomics, genomics, transcriptomics.
PSO-11	Demonstrate the ability to identify ethical issues related to recombinant DNA technology, Genetically Modified Organisms (GMOs), GM foods, intellectual property rights, biosafety and biohazards.
PSO-12	Apply the knowledge of his/her core competency to develop solutions to environmental, social and economic problems.

Programme : B.Sc. In Microbiology (Honours) Course Outcomes (COs) for B.Sc.

Microbiology Semester - I

Course title : Introduction to Microbiology and Microbial Diversity
Course code : MCBACOR01T & P

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Know the developmental history of Microbiology and the contributions made by different noted scientists.
CO 2	Understand about the scopes of Microbiology in different fields and their opportunities in different fields.
CO 3	Recognize, name members of the microbial world and state their position on the Universal Phylogenetic tree. Discuss the basic concepts of microbial taxonomy and classification systems.
CO 4	Identify and illustrate various prokaryotic and eukaryotic cellsand their structures. Compare and contrast the three cell types of Bacteria, Archaea and Eucarya.
CO 5	Relate structure with function of various cell components and demonstrate their functions using experimentation.
CO 6	Define basic terms and understand principles of microscopy, recognize, illustrate and label various structural components ofa microscope and relate structure with function.
CO 7	Cultivate fungi under laboratory conditions and learn the staining technique of fungi.

Course title : Bacteriology
Course code : MCBACOR02T & P

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Gain profound knowledge about the morphology and structure of Bacterial cells.
CO 2	State nutritional requirements, different types of culture media and growth of bacteria.
CO 3	Understand the effect of Environment on Microbial Growth.
CO 4	Learn different types of staining techniques of bacterial cells.
CO 5	Compare Important features of archaeal and eubacterial groups
CO 6	Isolate pure culture of bacteria.
CO 7	Enumerate bacterial cells.

Semester - II

Course title : Biochemistry
Course code : MCBACOR03T & P

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Identify and draw the structures of biomolecules.
CO 2	Describe the role of biomolecules in the biological system, relate the importance of chemical bonds in formation of stable macromolecular structures and discuss the unique properties ofwater.
CO 3	Know about the structural details of different types of carbohydrates, compare different types sugars and their properties.
CO 4	Collect structural and functional details of Lipid, Protein and Nucleic acids.
CO 5	Gather information about genetic materials like DNA and RNA.
CO 6	Define terms in enzymology, classify enzymes, and discuss theeffect of various factors on enzyme activity.
CO 7	Learn qualitative and quantitative estimation of biomolecules.
CO 8	Know the effects of temperature, pH and heavy metals on enzyme activity.

Course title : Environmental Microbiology
Course code : MCBACOR04T & P

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Know about the distribution pattern of certain species of microorganisms in different places of the environment, principally bacteria, in order to use them as bioindicators of contamination and other environmental impacts.
CO 2	Understand extremophiles and life in extreme and unusual little-explored habitats
CO 3	Gain advanced knowledge of microbial interactions and microbial processes in the environment.
CO 4	Describe principles of microbial ecology, illustrate, compareand contrast the biogeochemical cycles and state the significance of each cycle and the overall interconnection between them.
CO 5	Learn the modern and advanced techniques of waste management.
CO 6	Estimate the presence and load of microorganisms in different part of environment.
CO 7	Use diverse array of microorganisms for the detoxification of environmental pollutants in the form of Bioremediation and help in sustainable development.

Semester - III

Course title : Microbial physiology and metabolism
Course code : MCBACOR05T & P

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Know about physiology of microorganisms.
CO 2	Understand the process of nutrient transport and the importance of it in living system, especially in microbial cells.
CO 3	Define catabolism and anabolism occur in different microorganisms under different conditions.
CO 4	State the role of ATP and reducing power in metabolism, describe the processes for ATPgeneration.
CO 5	Differentiate between fermentation and respiration.
CO 6	Estimate the effects of pH, Temperature, Carbon and Nitrogen sources on a specific model bacteria, *E.coli*
CO 7	Demonstrate alcoholic fermentation in the laboratory using normal substrates.

Course title : Cell Biology
Course code : MCBACOR06T & P

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Learn about the structural and functional aspects of different components of eukaryotic cells.
CO 2	Analyze and explain the basic mechanisms of protein sorting and transport in living cells.
CO 3	Understand the components involved, molecular mechanism and importance of cell signaling both in microbial and eukaryotic system.
CO 4	Describe the eukaryotic cell cycle, the different phases of eukaryotic cell division and compare and contrast mitosis and meiosis
CO 5	Compare apoptosis and necrosis.
CO 6	Adopt advance knowledge of cancer biology.
CO 7	Learn the cytochemical staining technique of DNA.

Course title : Molecular Biology
Course code : MCBACOR07T & P

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Describe, draw and differentiate between the structures ofDNA and RNA, compare different forms of DNA.
CO 2	Explain chromatin structure, differentiate between euchromatinand heterochromatin, illustrate and explain organization of DNA in prokaryotic and eukaryotic chromosome, state the significance of histones, nucleosomes, kinetochores, centromere and telomeres.
CO 3	Illustrate the process of DNA replication, transcription and translation, also describe the enzymes involved in the processes.
CO 4	Explain the central dogma of molecular biology, predict thepolypeptide sequence of a given DNA fragment.
CO 5	Understand the molecular mechanism to regulate gene expression in living cells.
CO 6	Isolate, visualize, purify and estimate cellular DNA, RNA and protein from microbial cells.
CO 7	Run gel electrophoresis to separate nucleic acids and proteins.

Course title : Food fermentation technique. Course code : MCBSSEC01M

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Define different kinds of prebiotics and probiotics.
CO 2	Explain different beneficial health aspects of pro and pre-biotics.
CO 3	Illustrate the industrial process of making important fermented food from normal natural substances.
CO 4	Demonstrate microbial strain development in food and beverage industries.
CO 5	Illuminate the down stream processing of fermentation process in industry

Semester IV

Course title : Microbial genetics
Course code : MCBACOR08T & P

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Define and describe the basic terminology in genetics anddescribe, analyze and interpret the results for various experiments in genetics.
CO 2	Describe mutation and different kinds of agents causing mutation (mutagens).
CO 3	Explain the effects of molecular mutagens on microbial cells.

CO 4	Know about extrachromosomal inheritance of microbials cells and the advantages to inherit those molecules.
CO 5	Illustrate natural gene transfer mechanisms occurring in microbial cells.
CO 6	Explain about transposable genetic elements of microbial cells and the mechanism of transposition.
CO 7	Prepare master plates of microbial culture and the replica of that.

Course title : Virology
Course code : MCBACOR09T & P

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Explain diversity, architecture, classification and nomenclature of virus.
CO 2	Discuss mechanism of viral entry and multiple mode of multiplication in host cells.
CO 3	Describe diverse array of host response mechanism to viral infection.
CO 4	Explain the mechanisms of different viral diseases and illustrate the diagnosis, control and prevention of viral diseases.
CO 5	Illuminate oncogenic virus and their pathophysiology.
CO 6	Explain the limitations of antiviral agents and estimate the success story of advanced antiviral agents.
CO 7	Demonstrate the plaque assay and the enumeration of viral count.

Course title : Food and Dairy Microbiology
Course code : MCBACOR10T & P

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Understand the significance and activities of microorganisms in food the role of intrinsic and extrinsic factors on growth and survival of microorganisms and attain information on microbial food spoilage.
CO 2	Describe the principles in traditional food preservation techniques including salting, pickling, refrigeration, freezing, oxidation, and canning/bottling and chemical preservation.
CO 3	Analyze types of starter cultures like Lactic acid bacteria, fermented milk products, probiotics, SCP and Edible mushrooms.
CO 4	Acquire & remember the microbes causing food intoxications and food infections.

Course title : Microbiological analysis of air and water
Course code : MCBSSEC02M

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Describe and demonstrate the microbial abundance, distribution and significance in air and water.
CO 2	Understand the concept of Bioaerosols, fate of Bioaerosols and different inactivation mechanisms of Bioaerosols.
CO 3	Analyze the microbial standard of Potable or drinking water.
CO 4	Estimate the coliforms present in any water sample by IMViC test and predict the total microbial load in a water body by Most Probable Number count.
CO 5	Describe the disease mechanisms of air and water borne pathogens.

Semester V

Course title : Industrial Microbiology
Course code : MCBACOR11T & P

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Understand the basics of fermentation technology, screening techniques, microbial culture preservation techniques etc.
CO 2	Know the concepts of inoculum development and media sterilization for fermentation process.
CO 3	Learn about the typical structure of fermenter and its parts, types of fermentation processes and synchronous growth.
CO 4	Aware about the detail downstream process of fermentation of important microbial products.
CO 5	Demonstrate the processes adopted in the industry to get specific fermentation products like Ethanol, Citric acid, Vit.B12, Penicillin, Amylase etc.
CO 6	Immobilize the microbial enzymes produced by fermentation technique.
CO 7	Translate the academic knowledge into industry.

Course title : Immunology
Course code : MCBACOR12T & P

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Learn about the structural features of the components of the immune system as well as their function.
CO 2	Understand basic concepts of Immunology, properties of immune system and types of immunity.
CO 3	Compare and contrast the innate versus adaptive immune systems. Also compare and contrast humoral versus cell-mediated immune responses.
CO 4	Understand the concepts of antigen and immunogen. Distinguish and characterize antibody isotypes, development, and functions
CO 5	Explain the role of cytokines in immunity and immune cell activation; and be able to identify and characterize cytokines of particular immune importance.
CO 6	Understand the significance the Major Histocompatibility Complex in terms of immune response and transplantation.
CO 7	Illustrate the mechanism of complement activation and function.
CO 8	Describe the immunological disorders like Autoimmunity and Hypersensitivity.
CO 9	Demonstrate different modern immunological techniques like ELISA, ELISPOT, Western blotting, Precipitation, Agglutination, Flow cytometry etc.

CO 10	Elucidation of immunodiagnostic procedures and monoclonal antibodies.

Course title : Biomathematics and Biostatistics
Course code : MCBADSE02T & P

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Recognize the definition of statistics, its subject and its relation with the other sciences
CO 2	Collect data relating to variable/variables which will be examined and calculate descriptive statistics from these data
CO 3	Identify distribution form relating to the variable/variables.
CO 4	Define some concepts about hypothesis testing and apply hypothesis testing to the data through these concepts.
CO 5	Arrange the results of the hypothesis testing and make a statistical decision.
CO 6	Define the principal concepts of probability and equate to resolve the problems.

Course title : Inheritance Biology
Course code : MCBADSE03T & P

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Understand the basic concepts of heredity and genetics including Mendelian genetics.
CO 2	Acquainted with genetics of single gene, polygenic and chromosomal disorders.
CO 3	Understand the complex concepts of multiple allele and different types of genetic interactions, incomplete dominance, co-dominance, Epistasis, penetrance, expressivity etc.
CO 4	Know about genetic Linkage, Crossing over and extrachromosomal inheritance in eukaryotic systems.
CO 5	Explain the concepts of genetic recombination.
CO 6	Analyze pedigree and conclude the relation of a disease with gene/s.
CO 7	Illustrate genetic disorders caused by structural and numerical chromosomal abnormalities.

Semester VI

Course title : Medical Microbiology
Course code : MCBACOR13T & P

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Describe the human anatomy and diverse array of microorganisms present under normal condition in different parts of human body.
CO 2	Explain the modes of transmission, pathogenesis, diagnosis, prophylaxis, and treatment of some significant pathogens that establish infection.
CO 3	Describe the process of clinical specimen collection, handling and transport, and demonstrate multiple methods of pathogen identification from clinical specimen.
CO 4	Explain the pathophysiology of different Bacterial, Viral, Fungal and Protozoan diseases.
CO 5	Compare the mode of action of the principal groups of antibacterial agents.
CO 6	Elucidate the mechanisms of microbial drug resistance and describe methods of testing.
CO 7	Demonstrate medically important tests to identify and signify antimicrobial agents.

Course title : Recombinant DNA Technology
Course code : MCBACOR14T & P

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Understand the concepts of Recombinant DNA technology and Biotechnology.
CO 2	Illustrate the strategies, tools and methods of molecular cloning.
CO 3	Demonstrate nucleic acid sequencing methods and amplification techniques like, PCR, RT-PCR and Real Time PCR.
CO 4	Discuss the practical aspects of applying recombinant DNA technology in different fields to get the beneficial results for mankind.
CO 5	Explain the significance of model organisms in recombinant DNA technology.
CO 6	Describe the construction different DNA libraries like c-DNA and Genomic DNA libraries.
CO 7	Illustrate recombinant gene amplification and expression systems.

Course title : Microbes in Sustainable Agriculture and Development
Course code : MCBADSE04T & P

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Realize of the various beneficial effects of soil microorganisms on soil health, which is instrumental in the production of food and fibre. Conversely, learned that some soil microbes are deleterious to agronomic crops.
CO 2	Describe taxonomical, physiological, and environmental aspects of soil microorganisms.
CO 3	Illustrate the roles of soil microbes, such as decomposing dead organic matter, enriching the soil with nutrients, increasing water infiltration, improving soil texture, etc.
CO 4	Learn that the soil is an excellent habitat for multitude of microorganisms balancing the soil ecosystem.
CO 5	Focus on using soil microorganisms to fight against plant pathogens and sustainable development.
CO 6	Describe the beneficial use of Biogas, Biofuels and Bio manure.
CO 7	Acquainted with the biofertilizer production technology and the bottlenecks in the technology.
CO 8	Explain the production of genetically modified agricultural products and their roles.

Course title : Instrumentation and Biotechniques
Course code : MCBADSE06T & P

Sl. No.	On completion of the course in Microbiology, our students will be able to :
CO 1	Describe the applications of Biophysical principles in biological techniques.
CO 2	Demonstrate the knowledge and skills of using instruments in biological fields.
CO 3	Perform techniques involved in molecular biology for the diagnosis of different diseases.
CO 4	Learn number of techniques to separate biomolecules from mixtures
CO 5	Understand the fundamental concept and applications of the instruments that are routinely used for the characterization of biomolecules.

Molecular Biology course outcome

Course Code (Course name)	
MLBGCOR01T/P OR MLBHGEC01T/P : (MOLECULAR BASIS OF LIFE)	In this course we offer to the students to update their knowledge of basic and fundamental concept of molecular biology. We emphasize the topic on proteins, enzyme and metabolism, microbial genetics, immunology, basic virology and epidemiology, bioinformatics and basic biostatics. We also teach about some physiochemical techniques and the concepts of recombinant DNA technology
MLBGCOR02T/P OR MLBHGEC02T/P: PROTEINS, ENZYMES AND METABOLISM	
MLBGCOR03T/P OR MLBHGEC03T/P: FUNDAMENTALS OF MOLECULAR BIOLOGY	
MLBSSEC01M: (FUNDAMENTALS OF BIOSTATISTICS AND BIOINFORMATICS)	
MLBGCOR04T/P OR MLBHGEC04T/P: PHYSICOCHEMICAL TECHNIQUES AND MICROBIAL GENETICS	
MLBSSEC02M: (BIOTECHNOLOGY IN SUSTAINABLE DEVELOPMENT)	
MLBGDSE01T/P: FUNDAMENTALS OF MOLECULAR SIGNALLING	
MLBGDSE02T/P: GENERAL MICROBIOLOGY	
MLBGDSE03T/P: RECOMBINANT DNA TECHNOLOGY AND FUNDAMENTALS OF IMMUNOLOGY	
MLBGDSE04T/P: VIROLOGY AND EPIDEMIOLOGY	

COURSE OUTCOMES (COs) FOR THE THREE-YEAR DEGREE COURSE IN MOLECULAR BIOLOGY (GENERAL)

In this course we offer to the students to update their knowledge of basic and fundamental concept of molecular biology. We emphasize the topic on proteins, enzyme and metabolism, microbial genetics, immunology, basic virology and epidemiology, bioinformatics and basic biostatics. We also teach about some physiochemical techniques and the concepts of recombinant DNA technology.

DUM DUM MOTIJHEEL COLLEGE
UNDERGRADUATE DEPARTMENT OF PHYSICS
B.Sc. Physics (Hons) CBCS Syllabus With effect from 2018-19

Programme Specific Outcomes

- Upon concluding the undergraduate Physics program, students will acquire fundamental knowledge of the subject along with a comprehensive understanding of the functioning of various scientific and engineering instruments. This acquired knowledge will prove beneficial in their future professional endeavors. Physics, being inherently analytical, aims to cultivate a mindset that questions and comprehends concepts based on logic rather than accepting information without rationale.
- PSO 1: The impact extends to the everyday experiences of individuals, where one gains insights into the fundamental principles governing the properties of matter and the interconnections between various principles. This understanding is facilitated through the study of mathematical and analytical physics. Students delve into essential aspects such as mechanics, general properties of matter, sound, optics, and more, revealing the foundational characteristics of matter.
- PSO 2: This motivates students to conduct experiments in areas like mechanics, general properties of matter, optics, electronics, etc., and subsequently compare the obtained values with theoretical predictions.
- PSO 3: The structure of this course is crafted to enable students to engage in diverse laboratory experiments corresponding to each theoretical concept. This approach aids in establishing a solid understanding of the subject and serves as a source of motivation for students to delve into experimental physics.
- PSO 4: Students are encouraged to explore specialized topics in Physics, including astrophysics, nuclear and particle physics, communication electronics, etc. Additionally, they are motivated to prepare themselves for competitive examinations.

Course Name:
Course

Dum DUM MOTIJHEEL COLLEGE

Course Outcome or Learning Outcome

Three year B.A. /B.Sc. degree course
Under CBCS semester system HONOURS COURSE IN PHYSICS

With effect from the session: 2018 – 2019

Course Name: Core Course-1
Course Code: PHSACOR01T & PHSACOR01P
Topic Name: Mathematical Physics and LAB

Course Outcome: Upon successful completion of this course, students will acquire the following:

1. A comprehensive understanding of Calculus, facilitating the clear analysis and estimation of infinitesimal dynamic variations in both Space and Time domains.
2. Proficiency in Vector Calculus, enabling the comprehension of direction-specific variations in 1D, 2D, and 3D Space within a time-dependent coordinate system.
3. Familiarity with Probability, providing insights into the statistical behavior of extensive databases.
4. Enrichment in specific Mathematical tools for investigating and comprehending issues in Physical, Chemical, and Biological domains, along with theoretical concepts.
5. Proficiency in the fundamentals of Python programming, a universally accepted open-source language.
6. Knowledge of the open-source advanced operating system Linux.
7. Competence in operating Gnuplot for graphical analysis, aiding students in visually interpreting various problems.
8. Application of diverse computational techniques in theoretical and experimental physics across different branches.

Course Name: Core Course-2
Course Code: PHSACOR02T & PHSACOR02P
Topic Name: Mechanics and LAB

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

1. Acquire knowledge about Gravitation and its influence on the dynamic Universe.
2. Gain insights into the elastic properties of matter and its practical applications in construction, including the bending of beams and measurement of various elastic constants.
3. Comprehend the relativity of motion and rest, with an understanding that the speed of light is the ultimate velocity in the universe.
4. Explore the movement of fluids and the application of conservation theorems in this context.
5. Engage in hands-on experiences within the classical mechanical domain, reinforcing theoretical learning.
6. Cultivate fundamental skills for future laboratory experiments.
7. Familiarize themselves with various techniques for measuring physical properties, such as the flexure method, Searle's method, and Poiseuille's method.
8. Understand the utility of different apparatus, including the Torsional Pendulum, Sextant, Bar Pendulum, and Kater's Pendulum.
9. Master the art of systematic experimental observation, data collection, recording, and other essential laboratory practices. Additionally, develop proficiency in graph plotting techniques and the determination of different parameters from graphs.
10. Learn to estimate errors in experimental data

Course Name:

Course

Course Name: Core Course-3
Course Code: PHSACOR03T & PHSACOR03P
Topic Name: Electricity and Magnetism and LAB

Course Outcome: Upon successful completion of this course, students will attain knowledge in the following areas:

1. Understanding Electrostatics, Gauss Law, and Capacitance concepts, including their application to Capacitors.
2. Exploration of Dielectric Properties of Materials and the concept of Polarization in various media, along with practical applications.
3. Comprehension of the existence and generation of Magnetic Fields and Forces, Concepts of Magnetic Dipole formation, Amperes Circuital Law, and its applications.
4. Study of Magnetic properties of matter, covering Magnetization, Magnetic susceptibility, permeability, Ferromagnetism, and the development of the Hysteresis phenomenon.
5. Examination of Electromagnetic Induction, Lenz's Law, and the Reciprocity theorem.
6. Analysis of Electrical circuits, their types, and applications. Development of Network theorems and their practical uses, providing insights into the design and fabrication of motors, dynamos, etc., at both large and small scales.
7. Familiarity with various electrical components, power supply, multimeter, and various other measuring instruments such as the Potentiometer, Carey Foster's Bridge, Anderson's Bridge, Galvanometer, etc.
8. Hands-on experimentation on various topics related to electricity and magnetism covered in the course.

Course Name: Core Course-4
Course Code: PHSACOR04T & PHSACOR04P
Topic Name: Wave and Optics and LAB

Course Outcome: (1) I conducted online classes due to the prevailing pandemic situation.

(2) Topics covered in the condensed course included Huygen's wave theory-based Interference and Diffraction phenomena, excluding most of Fresnel's theory.

(3) Students were provided with e-study materials and web resources, in addition to regular online classes.

(4) The students demonstrated a solid grasp of the course content, evident from their responses in the final online examination scripts and their interactions on WhatsApp, both during and outside of scheduled online class sessions.

(5) Students undertook additional work by solving nonlinear equations of diffractions through graphical analysis and Python computer programming, a commendable effort.

(6) Familiarity with various instruments/parts such as (i) Spectrometer (ii) EDF Prism (iii) Sodium source and Sodium Vapour Lamp, Mercury Vapour Lamp (iv) Diffraction Grating (v) wedge-shaped Film, etc. (7) Understanding different experimental setups like (i) Fresnel Biprism (ii) Newton's Rings (iii) Michelson's interferometer, etc.

Course Name: Core Course-5
Course Code: PHSACOR05T & PHSACOR05P
Topic Name: Mathematical methods II and LAB

Course Outcome: Upon successful completion of this course, students will have the ability to:

1. Engage in mathematical modeling and subsequently solve various physical problems.
2. Cultivate proficiency in diverse mathematical domains.
3. Grasp advanced topics in mathematical physics, including Fourier series, special functions, special integrals, integral transforms, partial differential equations, and probability. These topics are crucial for delving into the theoretical aspects of various branches of physics.
4. Acquire knowledge about various numerical analysis techniques, such as the utilization of arrays, numerical solutions for matrix algebra problems, numerical integration, interpolation, differential equation solutions, and curve fitting.

Course Name:

Course

Course Name: Core Course-6
Course Code: PHSACOR06T & PHSACOR06P
Topic Name: Thermal Physics and LAB

Course Outcome:

(1) Examining the first law of thermodynamics offers students insights into the equivalence between work
and energy, fostering a fundamental comprehension of the mechanisms at play in thermal engines.
(2) The concept of entropy provides a grasp of the inherent directionality within natural processes.
(3) The fundamental principles of thermodynamics act as a pathway for understanding the macroscopic thermal characteristics of a system.
(4) The study of kinetic theory equips students with a foundational understanding of developing microscopic theories related to the thermal properties of matter. This knowledge proves valuable for students involved in researching applications of kinetic theory, particularly in fields like economics and social science.
(5) Through participation in the laboratory course, students acquire knowledge about measuring diverse physical parameters associated with the thermal properties of matter.
(6) Specific practical exercises incorporate electronic circuits for the measurement of thermal parameters, offering students a distinctive opportunity to observe the creation of prototype machines.

Course Name: Core Course-7
Course Code: PHSACOR07T & PHSACOR07P
Topic Name: Digital Systems and Applications and LAB

Course Outcome: Upon successful completion of this course, students will have the ability to:

1. Comprehend the process of constructing Integrated Circuits (ICs) and gain knowledge about the historical development of IC formation.
2. Understand various number systems and Boolean Algebra. Additionally, students will be capable of simplifying digital circuits using Boolean expression simplification methods.
3. Grasp the design and functionality of different combinational digital circuits, including Adders, Subtractors, Multiplexers, De-Multiplexers, Encoders, and Decoders.
4. Construct application-oriented digital circuits using Karnaugh Map simplification based on specific requirements.
5. Differentiate between synchronous and asynchronous counters, understanding their formation techniques.
6. Recognize the utility of shift registers as random sequence generators.
7. Familiarize themselves with various discrete components and accessories such as resistances, breadboards, ICs, voltmeters, multimeters, and DC power supplies.
8. Identify the pin diagrams of various TTL ICs (e.g., 7400, 7404, 7408, 7410, 7411, 7432, 7473, 7476, 7483, 7486, etc.) and create circuits on a breadboard.

Course Name: Core Course-8
Course Code: PHSACOR08T & PHSACOR08P
Topic Name: Mathematical Physics III and LAB

Course Outcome: (1) The complex variable course empowers students to apply its principles across diverse fields such as electrical
network theory and quantum mechanics. An essential component of the course, contour integration, facilitates the assessment of improper integrals commonly encountered in physics problems.

(2) The exploration of integral transforms allows students to understand the correlation between the physical properties of a system in a specific space and its reciprocal space.
(3) Proficiency in techniques for solving boundary value problems proves highly advantageous in addressing physical challenges related to electrostatics, wave mechanics, heat conduction, and more.
(4) The study of matrices provides a fundamental grasp of linear operators, with versatile applications in theoretical physics.

Course Name:
Course

(5) This coursework covers a variety of numerical methods essential for students to acquire proficiency in fundamental numerical techniques.
(6) Numerical methods play a crucial role in offering a practical visualization of specific mathematical techniques discussed in the corresponding theory paper.
(7) This coursework enhances students' capacity to write computer codes.
(8) The discussed numerical techniques are invaluable for undertaking advanced research endeavours.

Course Name: Core Course-9
Course Code: PHSACOR09T & PHSACOR09P
Topic Name: Elements of Modern Physics and LAB

Course Outcome: Upon successful completion of the course, students will acquire the following abilities:

1. Comprehend the principles of relativistic dynamics, exploring the dynamics from a relativistic perspective, and gaining proficiency in the application of 4-vectors.
2. Understand the evolution and significance of quantum theory, including the resolution of the ultraviolet catastrophe through Planck's hypothesis. Gain insight into the dual nature of particles and waves inherent in quantum theory.
3. Grasp the concept of LASER and its applications, recognizing its emergence as a crucial technology influenced by quantum theory.
4. Attain foundational knowledge in nuclear and particle physics, enabling an understanding of the fundamental forces in nature, the properties of atomic nuclei (constituents of atoms), and the various particles in the universe.
5. Acquire knowledge about nuclear radiation and detectors, understanding the different types of radiation (α, β, and γ rays) and the appropriate detectors for radiation containment. This knowledge holds practical significance in the field of medical physics.
6. Gain insights into nuclear reactions, acquiring knowledge on harnessing nuclear energy as a sustainable and environmentally friendly energy source.
7. Develop an understanding of particle physics, essential for comprehending the standard model and the unification of forces.

Course Name: Core Course-10
Course Code: PHSACOR10T & PHSACOR10P
Topic Name: Analog Systems and Applications and LAB

Course Outcome:
Upon successful completion of this course, B.Sc (Honours) Physics students should be able to:

1. Grasp the fundamental principles of semiconductor physics and comprehend its practical applications.
2. Gain understanding in the operation, characteristics, and diverse applications of various components such as diodes, transistors, field-effect transistors, operational amplifiers (OPAMP), and oscillators.
3. Comprehend the working principles of amplifiers, feedback amplifiers, and oscillators. Students will be capable of distinguishing between different amplifier types and selecting an appropriate amplifier for specific applications.
4. Identify various circuit components, including resistors, capacitors, inductors, diodes, transistors, and operational amplifier integrated circuits (ICs) such as the 741.
5. Construct different analog circuits on a breadboard.
6. Acquire knowledge about essential equipment such as the Cathode Ray Oscilloscope (CRO), Function Generator, and Regulated Power Supply.
7. Gain practical experience in handling different Trainer Kits, including those for Diode Experiments, BJT & FET Characteristics study, CE-Amplifier Experiments, and OP-AMP Experiments.
8. Develop the skills to create diverse circuits on a breadboard, empowering students to design circuits for unknown hardware applications.

Core Course-11
Code: PHSACOR11T & PHSACOR11P

Course Name:

Course

Topic Name: Quantum Mechanics and its Applications and LAB

Course Outcome:

Upon successful completion of this course, students are anticipated to acquire knowledge in the following areas:

1. Fundamental concepts of Quantum Mechanics (QM), including the formalism of Hamiltonian, the importance of Hermitian operators, development of wave-function, Eigen values, and practical applications of uncertainty principles.
2. Understanding of Time-Dependent and Time-Independent Schrodinger Equation, Quantum Mechanical Scattering, and Tunnelling in 1D Step Potential, Rectangular Potential barrier, and the Tunnelling effect in Alpha Decay. Introduction to Scanning Tunnelling Microscopes (STM) is also covered.
3. Knowledge of the existence of Bound states in arbitrary Potentials and the Quantum Theory of Hydrogenlike atoms, Helium ions, etc.
4. Application of Quantization rules in Atomic Physics, with a focus on the Zeeman Effect, attracting students interested in Quantum Mechanical Phenomena and Systems in Physics, Chemistry, and Nano-materials. 5. Inclusion of lessons on Quantum Mechanics-related numerical practicals, covering topics beyond the Undergraduate core course theory syllabus.
6. Learning how to transform a time-independent Schrodinger equation involving dimensionless variables, employing two methods: (a) shooting method, (b) direct matrix method. The former involves iterative numerical solutions using RUNGE KUTTA methods, while the latter employs diagonalization as a singleshot method.
7. Independent coding using the Python programming language, excluding the diagonalization procedure.
8. Output interpretation involving probability distribution and eigenvalues, demonstrating proficiency in applying proper boundary conditions specific to various quantum mechanical problems.
9. Solving advanced problems like the isotropic anharmonic oscillator and Quantum Morse oscillator, extending beyond their Undergraduate syllabus.
10. Preparation and submission of an electronic Lab Notebook (e-LNB) at the term end, demonstrating a high standard of work.
11. Equipping students with the capability to numerically solve Schrodinger equations, enabling exploration of more complex problems in higher physics during their future studies.

Course Name: Core Course-12
Course Code: PHSACOR12T & PHSACOR12P
Topic Name: Solid State Physics and LAB

Course Outcome: Upon successful completion of this course, students will achieve the following:

1. Gain knowledge about the classification of solid materials into amorphous and crystalline structures, understanding how the properties of matter are influenced by both structure and electronic configuration.
   Additionally, comprehend the study of matter structure using X-ray techniques.
2. Understand how lattice oscillations impact the properties of matter.
3. Acquire knowledge about magnetic properties, various types of magnetic behaviors, and dielectric properties of matter. Familiarity with Drude's theory, including the conduction of electrons through matter and concepts such as drift velocity.
4. Explore the development of band theory and its successful explanation of various properties of matter.
5. Learn about the recently emerged material property known as superconductivity and its practical applications.
6. Develop an understanding of electric current carried by charges, distinguishing between negative and positive charges. Proficiency in determining the type of carriers (negative or positive) through Hall voltage measurements.
7. Gain insights into the widespread use of magnetism in daily life and industries, understanding the different types of magnets with various properties. Learn to assess the characteristics of a particular magnet through B-H experiments, which reveal how magnetic field strength (B) and magnetic field intensity (H) vary within the magnet, along with energy loss.

Course Name:
Course

8. Recognize the extensive use of semiconductors in various industries and technologies. Understand that semiconductor properties are primarily dependent on the band gap between the valence and conduction bands. Develop the ability to estimate the band gap by measuring voltage with temperature.

Course Name: Core Course-13
Course Code: PHSACOR13T & PHSACOR13P
Topic Name: Electromagnetic Theory and LAB

Course Outcome:

Upon successful completion of this course, students will acquire knowledge in the following areas:

1. Understanding Maxwell's Equations and their characteristics in free space and various media, including the application of Poynting Theorem and vectors, as well as exploring energy density and field energy density.
2. Studying the propagation of Electromagnetic (EM) waves in both bounded and unbounded media, along with gaining insights into the polarization of EM waves.
3. Exploring the concepts and applications of waveguides and optical fibers, providing students with a comprehensive understanding of Optical Communication, Wave Propagation, and Transmission Theory.

Core Course-14
Code: PHSACOR14T & PHSACOR14P
Topic Name: Statistical Mechanics and LAB

Course Outcome:

(1) Statistical mechanics offers a method to comprehend microscopic aspects of physical systems while establishing connections with their macroscopic properties.

(2) Quantum statistical mechanics aids students in grasping the behavior of systems at low temperatures.

(3) The fundamental framework of statistical mechanics equips students to apply it across a broad spectrum of physical systems.

(4) Proficiency in statistical physics significantly benefits students engaging in research across advanced physics branches such as condensed matter physics and particle physics.

(5) Through this computational lab course, students gain a distinctive opportunity to experiment with various statistical mechanics methods.

(6) The course introduces fundamental concepts for conducting numerical research related to statistical physics.

(7) Participation in this course enhances the students' capability to write numerical codes.

Course Name:

Course

Course Name: Discipline Specific Elective-1
Course Code: PHSADSE02T
Topic Name: Advanced Dynamics

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

1. Comprehend the dynamics and derivation of Lagrange's equations.
2. Solve dynamics problems involving both time-dependent and time-independent constraints.
3. Gain an understanding of the dynamics of rigid bodies and fluid dynamics.
4. Grasp the concepts of phase space, autonomous and non-autonomous systems.
5. Analyze the behavior of one-dimensional autonomous systems, two-dimensional dynamical systems, etc.
6. Understand the notion of limit cycles, discrete-time dynamical systems, iterative maps, and logistic maps.
7. Evaluate the impact of parameter dependence on steady, periodic, and chaotic states.
8. Acquire knowledge about the concept of chaos and Lyapunov exponents.

Discipline Specific Elective-2
Code: Topic Name: PHSADSE03T, Nuclear and Particle Physics

Course Outcome: Upon concluding the course, students will be capable of:

1. Understanding the fundamental principles of nuclear and particle physics.
2. Gaining expertise in advanced nuclear and particle physics concepts.
3. Applying the principles of nuclear and particle physics for the sustainable development of the nation.

Course Name: Discipline Specific Elective-3
Course Code: PHSADSE04T
Topic Name: Advanced mathematical physics
Course Outcome:
Upon successfully finishing the course, students will have the capability to:

1. Resolve various problems that incorporate modern mathematics, statistics, and calculus.
2. Develop a substantial amount of knowledge and skill in formulating scientific laws across interdisciplinary subjects.

Course Name: Discipline Specific Elective-4 Course Code: PHSADSE06T & PHSADSE06P
Topic Name: Communication Electronics and LAB

Course Outcome:
Upon completing this course, students will have the ability to:

1. Comprehend the practical applications of modern communication systems, both analog and digital.
2. Gain knowledge about various modulation techniques such as AM, FM, PM, FSK, PSK, ASK, BPSK, etc., providing a foundation for advanced studies.
3. Understand the techniques involved in satellite communication.
4. Build and analyze modulator and demodulator circuits, and demonstrate proficiency in calculating various parameters of modulated waves.
5. Grasp the principles and practical implementation of transmitter circuits.

Course Name: Skill Enhancement Course-1

Course Name:
Course
Course Code: PHSSSEC01M
Topic Name: Basic Instrumentation Skills

Course Outcome: Upon completion of the course, students will have the capability to:

(1) Develop practical skills in using various instruments crucial for physical measurements.

(2) Apply the acquired knowledge in their future professional endeavors.

(3) Gain a comprehensive understanding of cathode ray oscilloscope (CRO), including the basics of its operation, construction of cathode ray tubes (CRTs), electron gun functionality, electrostatic focusing and acceleration, and a brief discussion on screen phosphor.

(4) Comprehend the principles and operations of digital meters, make comparisons between analog and digital instruments, and understand the functioning of digital voltmeters.

(5) Understand the operation of a digital multimeter, enabling them to measure current, voltage, frequency, and other parameters using this instrument.

Course Name: Skill Enhancement Course-2
Course Code:PHSSSEC02M
Topic Name: Computational Physics

Course Outcome:

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

1. Grasp the practical applications of fundamental Linux commands.
2. Acquire proficiency in using the LaTeX word processor, including creating basic LaTeX files and documents, preparing input files, compiling LaTeX files, utilizing LaTeX tags for different environments, defining commands and environments, modifying type styles, representing equations and formulas, handling figures and floating bodies, generating tables of contents, bibliography, and citations, exploring various fonts, using the picture environment, and incorporating colors.
3. Understand graphical analysis, recognizing its limitations, and recognizing the significance of visualizing computational and computational data. Gain competence in basic gnuplot commands, such as creating simple plots, plotting data from a file, saving, and exporting.
4. Familiarize themselves with essential Linux commands commonly needed in various contexts.
5. Participate in a course on F90 programming, mastering the ability to write elementary codes. Students independently conducted programming related to the course and compiled their work into an e-Notebook for evaluation.
6. Apply F90 programming knowledge to elementary projects such as the numerical solution of central force orbits, projectile motion, and simple harmonic motion.
7. Successfully complete an online examination at the end of the term, presenting their project work codes, and achieving good results.
8. Learn and apply GNUPLOT in 1D and 2D data visualization.
9. Demonstrate a solid understanding of the course, showcasing the ability to apply F90 programming skills in future endeavors.

Dum Dum Motijheel COLLEGE
Course Outcome or Learning Outcome
Three year B.A. /B.Sc. degree course
Under CBCS semester system
GENERAL COURSE IN PHYSICS
With effect from the session: 2018 – 2019
Generic Elective/Department Specific Core Course-1
PHSHGEC01T & PHSHGEC01P / PHSGCOR01T & PHSGCOR01P Mechanics and LAB

Course Name:
Course Code:
Topic Name: Upon successful completion of this course, students will be able to learn about:

Course Outcome:

1. Operations involving vectors.
2. Fundamental laws of mechanics, including Newton's laws, conservation of momentum, and energy.
3. Laws governing the motion of particles, including celestial bodies like Earth and the Sun, under the influence of gravity.
4. The dynamics of fluids, including understanding streamline and turbulent motion.
5. Concepts related to frames of reference, the absence of absolute rest, and the acknowledgment that the velocity of light is the highest in the universe, as per the special theory of relativity.
6. Application of slide calipers and screw gauges, enabling students to measure dimensions such as length, breadth, width of a bar, diameter of a cylinder, and diameter of a wire.
7. Use of a stopwatch to determine the time period of a body, as well as the application of a telescope in experiments like determining Young's experiment.
8. Determination of the moment of inertia of a regular body using another auxiliary body and a cradle suspended by a metallic wire.
9. Understanding how to determine Young's Modulus through the flexure method, and the determination of the Modulus of Rigidity of a wire using a torsional pendulum.

Course Name:
Course Code: **Generic Elective/Department Specific Core Course-2**
Topic Name: **PHSHGEC02T & PHSHGEC02P / PHSGCOR02T & PHSGCOR02P**
Electricity and Magnetism and LAB
Course Outcome:

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

1. Comprehend the electrostatic field, electric flux, Gauss's theorem, and its applications in electrostatics. Understand the electric potential due to an electric dipole, capacitance of an isolated spherical conductor, parallel plate condenser, and polarization.
2. Understand Biot-Savart's law, its applications, Ampere's circuital law, and magnetic properties of materials.
3. Grasp Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, and the energy stored in a magnetic field.
4. Understand Thevenin's, Norton's, maximum power transfer, superposition theorems, and the basics of Anderson's bridge.
5. Understand Maxwell's equations, Poynting's vector, electromagnetic wave (EM) propagation through a vacuum, transverse nature of EM waves, and polarization.
6. Gain knowledge about measuring resistance, capacitance, current, and voltages using a multimeter. Understand the series/parallel connections of ammeters/voltmeters and their applications for measuring currents/voltages.
7. In the laboratory, be able to determine an unknown low resistance using Carey Foster's bridge.
8. Verify Thevenin's, Norton's, superposition, and maximum power transfer theorems.
9. Study the response curve of a series LCR circuit, determining its resonant frequency, impedance at resonance, quality factor Q, and bandwidth.
10. Study the characteristics of a series RC circuit.

Course Name: **Generic Elective/Department Specific Core Course-3**
Course Code: **PHSHGEC03T & PHSHGEC03P / PHSGCOR03T & PHSGCOR03P Thermal Physics Statistical**
Topic Name: **Mechanics and LAB**

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

1. Grasp various thermodynamic processes, apply the first and second laws of thermodynamics, understand system entropy, and comprehend the Carnot cycle.
2. Understand Maxwell's law of velocity distribution, apply it to determine average, root mean square (r.m.s.), and most probable velocities, and explore various transport phenomena such as viscosity, conduction, and diffusion.
3. Understand black body radiation, including Planck's law, Wien's distribution law, Rayleigh-Jeans law, Stefan-Boltzmann law, and Wien's displacement law.
4. Comprehend the fundamentals of Statistical Mechanics, including concepts like phase space, macrostate, microstate, entropy, and thermodynamic probability. Gain basic knowledge of Fermi-Dirac and BoseEinstein statistics.
5. Understand the practical use of a traveling microscope for measuring disc width in experiments related to the coefficient of thermal conductivity. Acquire skills in using a thermometer for temperature measurement.
6. Verify Stefan's law using a torch bulb.
7. Determine the coefficient of thermal conductivity of a poor conductor through the Lee and Charlton's disc method. Additionally, understand Newton's law of cooling in this experiment.
8. Study the variation of thermo-electromotive force (thermo-emf) of a thermocouple with the temperature difference at its two junctions.

Course Name:
Course Code:
Topic Name: **Generic Elective/Department Specific Core Course-4**
PHSHGEC04T & PHSHGEC04P / PHSGCOR04T & PHSGCOR04P Waves and Optics and LAB

Course Outcome:

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

1. Comprehend binary-to-decimal and vice-versa conversions, as well as perform operations such as addition, subtraction, multiplication, and division with binary numbers. Understand
2. logic gates like OR, AND, NOT, NOR, NAND, XOR, XNOR, and apply De Morgan's theorems.
3. Additionally, grasp the concepts of half and full adders/subtractors.
4. Understand the biasing of p-n diodes, their operational mechanisms, and applications. Gain
5. insights into the operations and uses of LEDs, photodiodes, and solar cells. Comprehend the
6. characteristics of transistors under various biasing conditions (CB, CE, and CC), and their
7. applications in different amplifier implementations (A, B, AB, and C).

   Understand the characteristics of operational amplifiers (OPAMPs) and their applications in inverting and non-inverting amplifiers, adders, subtractors, differentiators, integrators, and oscillators.

   Grasp the applications of Cathode Ray Oscilloscopes (CRO) and different rectifiers such as half-wave, fullwave, and bridge rectifiers.

   Recognize the pin configurations of OPAMPs, as well as logic gates including OR, AND, NOT, NAND, NOR, XOR, and XNOR gates.

   Verify and design logic gates (AND, OR, NOT, XOR) using NAND gates. Minimize given logic circuits, design them, and create corresponding truth tables. Additionally, verify De Morgan's theorems by implementing circuits with different Integrated Circuits (ICs).
8. Verify the outputs of half adders/subtractors and full adders/subtractors, preparing respective truth tables.

Course Name: **Department Specific Elective-2**
Course Code: **PHSGDSE03T & PHSGDSE03P**
Topic Name: **Solid State Physics and LAB**

Course Outcome:

Upon successful completion of this course, students will achieve the following:

1. Differentiate between crystal and amorphous solid materials, understanding their distinctions in terms of structure, electrical properties, optical characteristics, and more.
2. Gain knowledge that all atoms or molecules within materials are continually oscillating, even if the bulk matter may appear at rest.
3. Acquire an understanding of the magnetic properties of materials, the various types of magnetic behaviors, and their practical applications.
4. Explore how, following the limitations of the free electron theory in explaining observed properties, the band theory effectively elucidates major properties of matter, facilitating the classification of materials into conductors, semiconductors, and insulators.
5. Learn about emerging materials with zero resistivity, presenting promising possibilities for various applications.
6. Comprehend the fundamentals and biasing of p-n junction diodes, along with understanding their characteristics.
7. Understand the variation of semiconductor resistivity with temperature. Students will be able to design necessary circuit arrangements to measure the resistivity of a Germanium semiconductor with temperature (under reverse bias), thereby determining its band gap.
8. Develop the ability to design requisite circuit arrangements for studying the temperature coefficient of a semiconductor (NTC thermistor).

DUM DUM MOTIJHEEL COLLEGE

DEPARTMENT OF ZOOLOGY

B.Sc. Zoology (Hons) CBCS Syllabus

Issued by the West Bengal State University

With effect from 2018-19

Programme Specific Outcomes

- Students gain knowledge and skill in the fundamentals of animal sciences, recognizes the complex interactions among various living organisms and correlates with extinct animals.
- Apply the knowledge of internal structure of cells, tissue organizations and their functions in coordination and control of various metabolic functions of organisms.
- Analyze complex interactions among the various animals of different phyla, their distribution and their relationship with the environment and their natural histories.
- Understand the physiological processes of animals and relationship of organ systems including comparative studies.
- Preliminary studies on Agro based small-scale and cottage industries as Skill Enhancement courses aquarium fish farming and vermicomposting to enhance the knowledge of self independence.
- Understands about various concepts of genetics, molecular biology and its importance in human health and welfare; and the physiological aspects of human and other vertebrates and invertebrates.
- This program covers theoretical studies and practical proficiency training which may help in their placement at several pharmaceutical/ biotechnology/ microbiology/ based laboratory and/ or preparation of M.Sc. entrance examination for universities & institutes including NET, SET, GATE etc.
- The students will get a flavor of research besides improving their writing skills and making them well versed with the current trends, and enable the students to think and interpret individually due to different aspects chosen, after successful completion of this course.

DUM DUM MOTIJHEEL COLLEGE

Course Outcome or Learning Outcome

Three year B.A. /B.Sc. degree course

Under CBCS semester system

HONOURS COURSE IN ZOOLOGY

With effect from the session: 2018 – 2019

Course Name: Core Course-1

Course Code: ZOOACOR01T & ZOOACOR01P

Topic Name: Animal Diversity- Non-Chordates I

Course Outcome:

Non-Chordate: Protozoa to Nemathelminths

Both theory and practical paper based on systematic animal diversity and evolution.

1. Different groups of invertebrate animals are studied in this course including Protozoa, Porifera, Cnidaria, Ctenophora, Plathyhelminthes, and Aschelminthes, General characters and classification up to classes are studied. Some special features, organs, pathogenecity, life history and significance are studied here.
2. It will help the students to aware of basic taxonomy of non-chordates (acoelomate and pseudocoelomates).
3. Students will acquire knowledge about the modern classification system of the Protozoa.
4. Student will learn to identify non-chordates from their special features.
5. Understanding the mode of infection of parasites, their evolution and adaptation.
6. Students also learn about the life cycles of the non-chordates.

Course Name: Core Course-2

Course Code: ZOOACOR02T & ZOOACOR02P

Topic Name: Ecology

Course Outcome:

Ecology:

Both theory and practical paper cover basic ecology such as study of physical factor and its interaction with the environment, population, community and eco system and the application of ecological knowledge in the field of conservation of wild life and natural recourses.

1. Understand the basic concepts of ecology, biogeochemical cycles autecology and synecology.
2. Understand the study of population, life history pattern, fertility rate , survivorship and age structure i.e. study of demography.
3. Understand the types and function of ecosystem, Characteristics of Community; Ecological Succession and Major Biomes of the world.
4. Students will involve in the protection and conservation of nature and natural resources.
5. Students will directly observe human-animal conflict and conservation measures through field studies (within the state).

Course Name: **Core Course-3**

Course Code: **ZOOACOR03T & ZOOACOR03P**

Topic Name: **Non-Chordate II**

Course Outcome:

The course covering both theory and practical makes a detailed comparison of the anatomy of the different taxa of non- chordates (the coelomates phyla). The course gives an overview of the intricate life processes and adaptive radiations in non chordates.

1. The students will able to develop the power to understand the characters used to classify and being able to differentiate the organisms belonging to different taxa (up to class level).
2. They have hands on experience of materials demonstrating the diversity of coelomate non-chordates.
3. Understand the relative position of individual organs and associated structures through dissection or photographs of the systems of the invertebrate representatives (Cockroach and Earthworm only).
4. Understand some special features like torsion of molluscs, water vascular system of Echinodermata, filter feeding of lower chordates, metamorphosis of insects and its hormonal control and study of different larval forms.
5. Get a flavor of research by doing literature review on invertebrate larvae improving their writing skills, analytical power and thorough interpretation.

Course Name: **Core Course-4**

Course Code: **ZOOACOR04T & ZOOACOR04P**

Topic Name: **Cell Biology**

Course Outcome:

The course provides a detailed insight into basic concepts of cellular structure and function. It also gives an account of the complex regulatory mechanisms that control cell functions and cellular abnormalities like cancer, tumor. Understand the functioning of nucleus and extra nuclear organelles like mitochondria, RER, Golgi bodies, cytoskeleton and understand the intricate cellular mechanisms involved. Thus-

1. The students acquire the detailed knowledge of different pathways related to cell cycle, cell signaling and apoptosis, PCD, Necrosis which enable them to understand the biology of cancer.
2. Understand clinical aspects, including epidemiology, tumor cell metabolism, cancer stem cells, DNA viruses, metastasis and therapeutic strategies.
3. Get new avenues of joining research in areas such as cancer research, researches related to signal transduction pathways, cell viability assays, diabetes research etc.
4. Understand the basic knowledge of histochemistry by staining mucopolysaccharides and nucleic acids.
5. Identifying sex cytologically by observing Barr body.

Course Name: **Core Course-5**

Course Code: **ZOOACOR05T & ZOOACOR05P**

Topic Name: **Chordates**

Course Outcome:

The course (both theory and practical) deals with the amazing diversity of living forms of Chordata from simple to complex one. It also deals with the differences and similarities between organisms on the basis of their morphology and anatomy which led to their grouping into taxa and clades.

After successfully completing this course, the students will be able to:

1. Develop understanding on the diversity of life with regard to chordates.
2. Group animals on the basis of their morphological characteristics/ structures from Lower Chordates to Agnatha, Fishes, Amphibia, Reptilia, Birds and Mammals as per the evolutionary chronology.
3. Understand how morphological changes due to change in environment helps drive evolution over a long period of time.
4. The practical lab works will also give them a flavor of research to find the process involved in studying biodiversity and taxonomy .besides improving their writing skills. It will further enable the students to think and interpret individually due to different animal species chosen.

Course Name: **Core Course-6**

Course Code: **ZOOACOR06T & ZOOACOR06P**

Topic Name:

Physiology: Controlling and Coordinating System

Course Outcome:

The course offers insight into the physiology of chordates, mammals while giving an account of their anatomy. The course deals with various physiological functions in mammals. It also gives an account of the metabolic/ biochemical pathways and the probable impact of environment on them. The major objective of this course is to provide students with a sound coverage of human reproductive biology within the framework of Human Biology. It also envisages the detailed structure and function of the male and female reproductive tracts, gametogenesis, fertilization, early embryogenesis, fetal development and preparation for birth, and maternal adaptations to pregnancy. The students will also be taught about the types of synapse, neurotransmitters and their receptors besides other related aspects. The course envisages information on endocrine system with emphasis on the structure of hypothalamus and anterior pituitary. The associated hormones and the related disorders will be explained. After successfully completing this course, the students will be able to:

1. Understand how cells, tissues, and organisms function at different levels.
2. Understand the physiology at cellular and system levels.
3. Understand the organization of nervous system and process of nerve conduction.
4. Understand the process of muscle contraction.
5. Explain and contrast the processes of spermatogenesis, oogenesis.
6. Demonstrate an understanding of the hormonal control of reproduction in males and females.
7. Understand the structure of brain and improved methods to study it.

8. Develop treatments for neurodegenerative diseases (such as Alzheimer's and Parkinson's diseases) and mental illnesses.
9. Understand the structure of different lobes of the brain and their corresponding functions.
10. Understand intricacies of nerve impulse conduction.
11. Understand neurohormones and neurosecretions.
13. Learn about hypothalamo - hypophysial axis.
14. Understand about different endocrine glands and their disorders.
15. Understand the mechanism of hormone action.
16. Develop an understanding of the related disciplines, such as cell biology, neurophysiology, pharmacology, biochemistry, endocrinology etc.
17. Get a flavor of research besides improving their writing skills and making them well versed with the current trends. It will further enable the students to think and interpret individually due to different aspects chosen.

Course Name: **Core Course-7**

Course Code: **ZOOACOR07T & ZOOACOR07P**

Topic Name: **Biochemistry**

Course Outcome:

The course provides an introduction to the structure of biomolecules with emphasis on the techniques used for structure determination and analysis. The course covers basic aspects of sample preparation for analysis and aims to enlighten the students how structural information can be utilized for better understanding of biological processes.

The course aims to provide an advanced understanding of the core principles and topics of Biochemistry and their experimental basis, and to enable students to acquire a specialized knowledge and understanding of selected aspects by means of a stem/branch lecture series and a research project.

After successfully completing this course, the students will be able to:

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. Learn the preparation of models of peptides and nucleotides.
6. Learn biochemical tests for amino acids, carbohydrates, proteins and nucleic acids.
7. Learn measurement of enzyme activity and its kinetics.
8. Develop an understanding of the related disciplines, such as cell biology, neurophysiology, pharmacology, biochemistry, endocrinology, recombinant DNA technology, genetic engineering, cloning vector biology, cell culture etc.
9. The practical and technical skills through laboratory-based work will prepare a student well for a research or technical position. Obtaining some work experience, for example a summer internship in a research laboratory or company, will help the students to boost chances of finding a job.

Course Name: **Core Course-8**

Course Code: **ZOOACOR08T & ZOOACOR08P**

Topic Name: **Comparative Anatomy**

Course Outcome: In this paper the students will study the comparative anatomy of different organ of the vertebrate that will give them an idea of structure of the organs, their structural development and how they become modified according to their mode of their life (Adaptation). After completion of the student the students will be able to-

Know about the pattern of evolution through comparative study of the systems.

1. Acquaint about the development of complexity in circulatory, nervous, excretory and reproductive system.
2. Acquire the knowledge about the trend of evolution in vertebrates.

Course Name: **Core Course-9**

Course Code: **ZOOACOR09T & ZOOACOR09P**

Topic Name: **Physiology- Life Sustaining System**

Course Outcome: Course outcome:

After successfully completing this course: Student will able to

1. Students gain fundamental knowledge of animal physiology
2. Know the physiological mechanism the work to keep the animal body alive and functioning.
3. Interaction and interdependence of physiological and biochemical process.
4. Any abnormalities or disease caused by metabolic error.
5. Students will gain skill to execute the roles of a biology teacher or medical lab technicians with training as they have basic fundamentals

Course Name: **Core Course-10**

Course Code: **ZOOACOR10T & ZOOACOR10P**

Topic Name: **Immunology**

Course Outcome: Course outcome:

1. Provides basics knowledge about immune system (Molecules, cells and tissue involved in host defence mechanism) and allows the student to create awareness as how to boost their immune system for good health.
2. Understand the Basic structure, classes and function of Antibodies, Types of immunity (Innate and Adaptive, Humoral and Cellular), Antigen-Antibody interaction, Complements and MHC.
3. Understand the types of hypersensitivity reactions and auto immune diseases.
4. Understand the immune mechanisms in disease control.

5. They will know the immune diffusion technique, ELISA , RIA , Hybridoma technology and monoclonal antibody production.
6. They will know the manipulation of immune responses for the benefit of mankind, vaccines.

Core Course-11

ZOOACOR11T &
ZOOACOR11P

Molecular Biology

Course Outcome:

1. Develop an understanding of concepts, mechanisms and evolutionary significance and relevance of molecular biology in the current scenario.

2. Understanding recombinant DNA technology which holds application in biomedical & genomic science, agriculture, environment management, etc. Knowledge 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.Provide new avenues of joining research in related areas such as therapeutic strategies or related opportunities in industry

Course Name: **Core Course-12**

Course Code: **ZOOACOR12T & ZOOACOR12P**

Topic Name:

Genetics

Course Outcome:

1. Understand the mechanism how DNA encodes genetic information and the function of mRNA and tRNA2

2. Apply the principles of Mendelian inheritance.

3. Understand the cause and effect of alterations in chromosome number and structure.

4. Relate the conventional and molecular methods for gene manipulation in other biological systems.

5. Discuss and analyse the epigenetic modifications and imprinting and its role in diseases.

6. Provide new avenues of joining research in related areas such as genetic engineering of cells, cloning, genetic disorders, human fertility programme, genotoxicity.

Course Name: **Core Course-13**

Course Code: **ZOOACOR13T & ZOOACOR13P**

Topic Name:

Developmental Biology

Course Outcome:

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

1. Develop critical understanding how a single-celled fertilized egg transforms into an embryo and then a fully formed adult by complex processes of cell division, cell differentiation and morphogenesis.

2. Understand the initial developmental procedures involved in frog and chick.

3. Appreciate the mechanisms that support growth and development and process of gene function.

4. Learn interesting and unique post embryonic development that happens in vertebrates.

5. Learn implication of developmental biology in medicine or its role in development of diseases.

6. Identify whole mounts of developmental stages of chick embryo growth and differentiation in different hours of incubation through permanent slides. Students will be able to recognize embryonic tissue and organ morphology and structure in clinical specimens.

7. Gain a basic knowledge on the life cycle of the model organism Drosophila and its developmental stages.

8. Acquire knowledge on the different sections of placenta and their histogenesis through micrograph or slides.

9. The students can analyze variations at different stages of embryonic development and distinguish between healthy and pathological tissues in specimens.

10. Learn the techniques of Drosophila culture and chick embryo development through short term project.

Course Name: **Core Course-14**

Course Code: **ZOOACOR14T & ZOOACOR14P**

Topic Name: **Evolutionary Biology**

Course Outcome: After successful completion of this course students will be able to:

1. Understand the origin and evolution of universe and earliest life.

2. Develop the historical concept of the process and theories in evolutionary biology and the role of evidences in support of evolution.

3. Develop knowledge about sources of variation and concept of population genetics and can apply them in relevant experimentation.

4. Understand species concept, extinction and molecular phylogeny and able to apply it in their lives and community analysis.

5. Examine the evolutionary changes in different taxa based on statistical analysis.

6. Learn how to study a fossil from model or photograph and analyze homology and analogy of structures from suitable specimens.

They can observe and interpret about the events that took place in geologic past.

7. Think critically and logically to make relationship between evidence and explanations.

8. Verify Hardy-Weinberg equilibrium in a population by learning the chi-square calculation method and other statistical analysis from collected data.

Course Name: **Discipline Specific Elective-1**

Course Code: **ZOOADSE01T & ZOOADSE01P**

Topic Name: **Animal Behaviour and Chronobiology**

Course Outcome:

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

Course Name: **Discipline Specific Elective-3**

Course Code: **ZOOADSE03T & ZOOADSE03P**

Topic Name:

Endocrinology

Course Outcome:

1. Understand neurohormones and neurosecretions.

2. Learning about hypothalamo and hypapophysial axis.

3. Understand about different endocrine glands and their disorders

4.Understand the mechanism of hormone action.

Course Name: **Discipline Specific Elective-5**

Course Code: **ZOOADSE05T & ZOOADSE05P**

Topic Name:

Parasitology

Course Outcome:

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

1. Understand parasitism, diversity of symbiotic associations and the biology behind host-parasite interactions.

2. Learn about epidemiological concepts of parasitic infections of global importance.

3. Gain knowledge of numerous diseases which have significant impact on human health. 4 Diagnose, identify and detect some important protozoan, helminth and arthropod parasites of human and livestock.

5. Analyze challenges in diagnosis, treatment and control of parasitic infections in humans and in veterinary context. Also learn pathological changes associated with parasite infections.

6. Identify, describe and contrast different protozoan, helminth and arthropod parasites responsible for causing various human and veterinary diseases through permanent slides o micrphotographs.

7. Prepare and observe live parasitic specimens from fish gills and intestine of poultry birds This gives them an idea of size, shape, colour pattern and unique morphological features and location of important external and internal pathogens and parasites from different phyla.

8. Learn the techniques to identify plant parasitic root knot nematodes from soil samples which will be beneficial for further advance knowledge generation.

9. Develop the skill to isolate, identify and fixation and preservation of different parasites from animal body in laboratory using microscopes

Discipline Specific
Elective-6
ZOOADSE06T &
ZOOADSE06P

Wildlife and Conservation

Course Outcome:

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

1. Develop an understanding of general principles of ecology and how animals interact with each other and their natural environment

2. Apply knowledge to solve problems related to wildlife conservation and management.

3. To identify common local flora and fauna and how they related to terrestrial and/or aquatic plant and animal conservation and management.

4. Critically evaluate current events and public information related to man animal conflict and other wildlife conservation issues.

5. Understand conservation ethics and acts practiced in India.

6. Develop skills for field study and biodiversity analysis.

7. Identify common local flora and fauna like mammalian, avian and herpetofauna and their normal habitat.

8. Acquainted with the basic equipment and their uses for wildlife study.

9. Develop the skill for estimation of flora and fauna diversity and relative abundance through variuos ecological tools and field techniques.

Course Name: **Skill Enhancement Course-1**

Course Code: **ZOOSSEC01M**

Topic Name: **Aquarium Fish Keeping**

Course Outcome:

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

Course Name: **Skill Enhancement Course-2**

Course Code: **ZOOSSEC02M**

Topic Name: **Vermicompost Production**

Course Outcome:

1. Understanding the role of worm farming in Modern Farming
2. Understanding the potential of vermicompost as an alternative to chemical fertilizers
3. Role of vermiculture in maintaining the health of soil and humans
4. Economic importance of vermiculture
5. Role of Vermiculture in protecting the environment and managing the waste

DUM DUM MOTIJHEEL COLLEGE

Course Outcome or Learning Outcome

Three year B.A. /B.Sc. degree course

Under CBCS semester system

GENERAL COURSE IN ZOOLOGY

With effect from the session: 2018 – 2019

Course Name: **Generic Elective/Department Specific Core Course-1**

Course Code: **ZOOHGEC01T & ZOOHGEC01P / ZOOGCOR01T & ZOOGCOR01P**

Topic Name: **Animal Diversity**

Course Outcome:

Knowledge on the followings:

1. Develop understanding on the diversity of life with regard to protists, non-chordates and 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.
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.

Course Name:

Course Code:

Topic Name:

Course Outcome:

Course Name:

Course Code:

Topic Name:

Course Outcome:

Course Name:

Course Code:
Topic Name:

7. It will further enable the students to think and interpret individually due to different animal species chosen.

Course Outcome:

Generic Elective/Department Specific Core Course-2

ZOOHGEC02T & ZOOHGEC02P / ZOOGCOR02T & ZOOGCOR02P Human Physiology & Biochemistry

Knowledge on the followings

1. Understand the process of digestion and its control.

2. Develop understanding in muscle structure and contraction mechanism.

3. Learn the process of respiration and transport of gases.

4. Understand kidney structure and regulation of urine formation.

5. Understand heart structure and functioning.

6. Understand function of endocrine glands and formation of gametes.

7. Understand about the importance and scope of biochemistry.

Generic Elective/Department Specific Core Course-3

ZOOHGEC03T & ZOOHGEC03P / ZOOGCOR03T & ZOOGCOR03P

Insect Vectors and Diseases

Knowledge on the followings

1. To learn understand the general features of insects and gain knowledge about their distribution and success on Planet Earth and to learn Insect's taxonomy, general morphology and physiology

2. Learn about vector and vector borne diseases.

3. Describe the mechanisms for transmission, virulence and pathogenicity in pathogenic micro-organisms.

4. Diagnose the causative agents, describe pathogenesis and treatment for important diseases like malaria, leishmaniasis, Dengue, Chikungunya, Viral encephalitis, Filariasis

5. Explain how the infectious disease can transmit to human.

6. Properly understand the prevention and control mechanism of infectious diseases

7. Develop education, communication programme and learn how to maintain proper WHO guidelines about infectious diseases.

Generic Elective/Department Specific Core Course-4

ZOOHGEC04T & ZOOHGEC04P / ZOOGCOR04T & ZOOGCOR04P 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.

Department Specific Elective-1

ZOOGDSE01T & ZOOGDSE01P Applied Zoology

Course Outcome: Knowledge on the followings

1. Describe the mechanisms for transmission, virulence and pathogenicity in pathogenic micro-organisms. 2. Diagnose the causative agents, describe pathogenesis and treatment for important diseases like Tuberculosis, Typhoid ,*Entamoeba*

histolytica, Plasmodium vivax and *Trypanosoma gambiense , Ancylostoma duodenale* and *Wuchereria bancrofti* etc

3. Develop an understanding of the classification of fishes and integrating structure, function and physiology

4. Gain an overview of the fishery and aquaculture industry

5. Express the importance of aquaculture

6. To understand the techniques involved in aquaculture practices.

7. To udestand artificial insemination in cattle.

8. Get basic knowledge in poultry keeping.

Course Code: ZOOGDSE04T & ZOOGDSE04P Course Name: Immunology

Course Outcome:

Knowledge on the followings

1. Understand and apply relevant scientific principles in the area of Immunology.
2. Employ scientific methodologies such as experimentation and data analysis in the area of immunology.
3. Critically analyze, interpret and evaluate antigen-antibody reactions and Blood groups.
4. Appreciate the multidisciplinary nature of the study of immunology.
5. Explore some of the unique features like graft rejection , hypersensitivity etc.
6. Develop employable skills and knowledge in vaccination.

Programme Outcomes of Bachelor of Arts

Dum Dum Motijheel College

1, Motijheel Avenue, Dum Dum , Kolkata 700074, West Bengal, India

Programme : Bachelor of Arts (B.A.)

Programme Outcome (P.O.) for B.A.

The Undergraduate Programmes in Humanities are designed to achieve the following outcomes :

PO 1	**Analytical Mind**	Programmes infuse a strong sense of analytical approach which helps the students to delve deeper into the subject, Help to understand the challenges and to proceed for further studies.
PO 2	**Critical Awareness**	Create an opportunity for developing a critical perception of the society Courses are so designed to correlate sensitivity with skill. A student with Journalism and Media Studies as one's core subject with any of the other subjects of humanities develop a better understanding of the society which tends to leave a distinct mark on his profession in later days Helps the students to have a more inclusive perspective as they enter their professional world.
PO 3	**Interdisciplinary Aptitude**	Infuse a strong inter disciplinary aptitude. It helps to give a wider view of any particular discipline in perspective of other disciplines Encourages the students to venture for higher studies with a more matured academic mindset.
PO 4	**Competitive Ability**	The assessment system helps them develop a competitive ability. Matched with it are the subjects which inspires them to appear for different competitive examinations
PO 5	**Effective Communication**	The method of teaching enables the student to acquire a wonderful sense of assimilating and balancing the reading, listening, writing techniques of the traditional teaching form with the fast changing advanced technique of digitization
PO 6	**Understanding Environment and Sustainability**	Different disciplines have their own approach of making an awareness for Environmental issues and sustainable development.
PO 7	**Gender Sensitivity**	A strong sense of gender sensitivity is inculcated with much care in the teaching process of various disciplines specially History, Political Science, Sociology, English, Bengali, Human Development and so on

		▯ It brings a remarkable change in their personality as well as in their perspective of viewing the society
PO 8	**Ethicality**	▯ inculcates moral and ethical values among its students so that they become socially responsible citizens of the country and take the journey of life with challenge and dignity ▯ Makes them learn empathy and compassion to serve the society at large.

DUM DUM MOTIJHEEL COLLEGE
DEPARTMENT OF EDUCATION

Programme specific Outcomes

Three year B.A Degree course

Under CBCS Semester system, Education

With effect from Session 2018-19

PSO1:
Students develop a clear idea about the subject Education, like nature, scope and aim of Education, factors, different agencies of education and child centric Education.

PSO2:
Students develop knowledge about the details history of Indian Education system.

PSO3:
Students gather knowledge about Educational Psychology, theories of psychology and their role and importance & impact in the field of education and education system.

PSO4:
Students develop knowledge about basic of Indian as well as Western Philosophy. They also develop knowledge about the importance of different schools of philosophy in the field of Education.

PSO5:
Students internalize the basic of Sociology, relation between Sociology and Education, theories of Educational Sociology and importance of Educational Sociology in the field of Education.

PSO6:
Students develop the concept of an ideal organization in educational institutions, the essential functions of educational management and they understand the different aspects of planning.

PSO7:
Students develop the concept of guidance and counselling, various types of Guidance and basic data necessary for Guidance.

PSO8:
Students develop an understanding of educational technology, use of computer in education and communication, develop an understanding of ICT & e-learning and they also get acquainted with the instructional techniques and different models of teaching.

PSO9:
Students develop an understanding about concept, nature, types and major approaches of curriculum, the relation among curriculum, pedagogy and assessment, understanding about curriculum development and national curriculum framework, 2005, get acquainted with content selection and selected theories in this regard and develop an understanding of evaluation & reform of curriculum.

PSO10:
Justifying the difference between adjustment and maladjustment by citing suitable examples and their remedial measures.

PSO11:
Students understand the meaning of Inclusion and exclusion, types of exclusion and their causes, and how to bring about inclusion in different spheres.

PSO12:
Students develop understanding of the concepts of measurement and evaluation in education, process of Evaluation, types of measuring instruments and their uses, concepts of validity and reliability and their importance in educational measurement and principles of test construction. They also understand the criteria of constructing standardized tests and utility of statistics in the field of education.

PSO13:
Learners develop the concept of statistics and to develop skill in analyzing descriptive measures, concept of Normal Probability Curve and its uses in education, measures of relationship and organize relevant educational data and to represent educational data through graphs and to develop skill in analyzing and displaying data.

PSO14:
Learners understand the concept of adjustment, maladjustment and some commonly found problem, multi-axial classification of mental disorders, different coping strategies for stressful situation and administration, scoring and interpretation of the psychological tests behavior.

PSO15:
Students develop a concept of educational research, various steps to be followed for conducting a research and write a research proposal and review research papers.

PSO16:
The learners also develop an excellent communication skill, Skill for Democratic Citizenship and related theories, teaching skills, life skill education, peace and value education.

PSO17:
Develop consciousness about great educators and their thoughts, gender and society, population explosion and teacher education.

PSO18:
The learners develop knowledge about Open and Distance Learning, Human Right Education and women Education.

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DEPARTMENT OF EDUCATION

Course Outcome

Three year B.A Degree course

Under CBCS Semester system, Education

With effect from Session 2018-19

Core Course 1: Educational Philosophy (EDCACOR01T)

Course Outcome

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

- Understand the foundation of Education and disciplinary relationship between Education & Philosophy.
- Get an idea of the Philosophical bases in Education.
- Acquire knowledge of the Western & Indian Schools of Philosophy and their impact on Education.
- Perceive the values enshrined and educational provisions in the Indian Constitution.
- Understand contributions of some great educators and their Philosophies of Education.

Core Course 2: Educational Psychology (EDCACOR02T)

Course **Outcome**

- Develop a concept of Psychology, and its relationship with Education.
- Get an idea of Educational Psychology.
- Understand the different aspects of child development and relate that with Education.
- Learn about Psychology of Intelligence and Creativity and relate that with Education.
- Understand different aspects of Learning Psychology in the context of Education.

Core Course 3: Educational Sociology (EDCACOR03T)

Course Outcome

1. Understand the meaning of Sociology and its different perspectives related to Education.
2. Realize the relationship between Education and Sociology;
3. Acquaintance with the concept of Culture and its relationship with Education
4. Understand about National Integration & International Understanding
5. Get an idea of social development and role of Education
6. Connect with some social issues in education

Core Course 4: Pedagogy (EDCACOR04T)

Course **Outcome**

- Get an idea of Pedagogy as an academic discipline
- Understand about different bases of Pedagogy.

- Develop an understanding of philosophical, sociological and psychological bases of Pedagogy
- Learn about Pedagogy as a science of teaching and Pedagogy of teaching - learning
- Get acquainted with some contemporary issues of Pedagogy and its application in class room situation.

Core Course 5: Education in Pre independence India (EDCACOR05T)

Course Outcome

- Develop an idea of education in ancient and medieval India
- Know about the education under East India Company
- Perceive the development of education under British rule
- Develop a concept of education from 1917-1947.

Core Course 6: Education in Post-independence India (EDCACOR06T)

Course Outcome

- Understand about the development of education from 1947-1953
- Develop a concept of education from 1964-1968
- Know about the education from 1986-1992
- Learn about the development of education from 1993 onwards

Core Course 7: Contemporary Issues in Indian education (EDCACOR07T)

Course **Outcome**

- Explore the Traditional issues, Social issues and Educational issues of Indian educational system.

Core Course 7: Field tour & Report writing (EDCACOR07P)

Course **Outcome**

- Gather experience regarding places of Philosophical, Psychological &Historical importance
- Field study includes proper planning, execution of journey and report writing.
- Students will able to link their learning with experience.

Core Course 8: Educational Management (EDCACOR08T)

Course Outcome

- Develop the concept, nature, types and need of educational management.
- Understand the importance of leadership in management.

- Know the agencies of educational management in Indian context.
- Understand the importance of planning and management in Education

Core Course 9: Basics of Educational Research and Evaluation (EDCACOR09T)

Course **Outcome**

- Have preliminary concepts on research methodology
- Learn about Sampling and hypothesis
- Know about Evaluation and Measurement
- Explore the steps in standardization of a test

Core Course 10: Statistics in Education (EDCACOR010T)

Course Outcome

- Develop the basic concept of Statistics
- Organize and tabulate data
- Learn about descriptive statistics
- Learn the calculation of Inferential Statistics

Core Course 10: Statistics in Education (EDCACOR010P)

Course Outcome

- Learn about data Collection
- Explore the method of data Analyses by any excel/ software and manual both
- Gather experience about statistical report writing

Core Course 11: Guidance and Counseling (EDCACOR011T)

Course Outcome

- Develop the basic concept of Guidance and Counseling.

- Understand the concepts of adjustment and maladjustment.
- Get acquainted with the basic data necessary for guidance, process of testing and diagnosis in Guidance and Counseling.

Core Course 12: Educational Technology (EDCACOR012T)

Course Outcome

- Acquire knowledge about the concept and approaches of educational technology.
- Understand the concepts, components and basic models of communication used in Education.
- Know the techniques of instructional technology used in Education.

Core Course 12: Basic ICT (EDCACOR012P)

Course Outcome

- Learn about computer and its components
- Know how to operate DTP & Excel
- Oral Presentation with PPT along with report writing

Core Course 13: Curriculum Studies (EDCACOR013T)

Course **Outcome**

- Develop a concept of Curriculum
- Understand the aims and objectives of Curriculum.
- Get acquainted with the development of Curriculum.
- Learn about the evaluation of Curriculum.

Core Course 14: Special Education (EDCACOR014T)

Course **Outcome**

- Acquire knowledge about basic concept of Special Education.
- Understand the development and organization of Special Education.
- Learn about Gifted and Slow Learners.
- Gather experiences about the different types of exceptionality.

DSC 1A (EDCGCOR01T)/GE-1 (EDCHG01T) Philosophical Foundation of Education.
Course Outcomes:

After completion of this course the students will be able to understand the followings;

- The meaning nature and scope of education;
- The aims, forms and factors of education;
- The meaning and importance of value and the relation between value and education; and
- The life And contributions of great educators in the field of education;

DSC 1B (EDCGCOR01T)/GE-2 (EDCHG02T) Psychological Foundations of Education.

Course Outcomes:

After completion of this course the students will be able to understand the followings;

- The relationship between education and psychology;
- The meaning and nature of educational psychology and the contribution of educational psychology to education;
- The meaning, principles, types and stages of human development and their educational significance;
- The meaning, nature and types of attention and memory and the causes of forgetting and the role of education good memorisation; and
- The meaning, characteristics, types and measurement of personality and its importance in education.

DSC 1C (EDCGCOR03T)/GE-3 (EDCHG03T) Development of educational policies since Independence

Course Outcomes:

After completion of this course the students will be able to understand the followings;

- The educational scenario of India from 1813 AD to 2016 AD;
- The educational provisions under the British Rule;
- The recommendations of various Committees and commissions on education in India;
- Various policies on education and educational schemes on education in India like SSM, RUSA and NPE etc.

DSC 1D (EDCGCOR04T)/GE-4 (EDCHG04T) Evaluation in education.

Course Outcomes:

After completion of this course the students will be able to understand the followings;

- The meaning, principles, types and importance of evaluation in education;
- Tools and techniques of evaluation, their advantages and disadvantages in education;
- The meaning, types and characteristics of tests such as educational tests and psychological tests; and
- The meaning and utility of statistics and calculate central tendency and variability of a distribution.

DSE 1A (EDCGDSE01T) Sociological Foundations of Education.

Course Outcomes:

After completion of this course the students will be able to understand the followings;

- The meaning nature and scope of sociology and educational sociology and their inter relationship;
- The meaning and types and social groups and their role in socialization process;
- The meaning, nature and types of social agencies and their role as agencies of education; and
- Various social issues and their causes and impact on social life.

DSE 1A (EDCGDSE02T) Psychology of Learning.

Course Outcomes:

After completion of this course the students will be able to understand the followings;

- The meaning, scope, theories and measurement of Intelligence.
- The meaning, characteristics and type of learning and what are the factors influencing learning
- Various theories of learning and their educational implications;
- The meaning, scope and characteristics of creativity and its measurement techniques; and
- The relationship between creativity and intelligence.

DSE 1B (EDCGDSE03T) Ancient Indian Education and contemporary Issues in Indian Education.

Course Outcomes:

After completion of this course the students will be able to understand the followings;

- The system , aims, curriculum, methods of teaching and women education in Brahmanic and Budhhistic period;
- The problems of equality in education and structure and functions of various controlling and policy making agencies i. e. UGC, NCERT, and NCTE etc.;
- The problems of Backward sections of the society and problems of vocational education in India; and
- Understand the current educational Acts such as PWD, SSA andRTE.

DSE 1A (EDCGDSE01T) Guidance and Counselling in Education.

Course Outcomes:

After completion of this course the students will be able to understand the followings;

- The meaning, scope and need for adjustment and causes and remedies for maladjustment;
- Meaning, scope , types and importance of guidance and its need in secondary and higher secondary schools;
- The meaning, nature, scope, types and importance of Counselling;
- The techniques of data collection for guidance and counselling; and the students may use this knowledge in their own life situation.

SSEC-1 (B.A. EDCA and EDCG Students) Developmental skill for Social Awareness (EDCSSEC01M)

Project outcome:

After completion of this course the students will be able to understand the followings;

- The meaning and nature of Social awareness and its need;
- How to plan and execute a social awareness programme; and
- The student will develop the skill to organise various social awareness programmes.

SSEC-2 (B.A. EDCA and EDCG Students) Development of Observational Skill (EDCSSEC02M)

Project outcome:

After completion of this course the students will be able to understand the followings;

- The meaning, nature and characteristics of observation;
- The types of observation ways to plan and execute an observation programme; and
- The student will develop the skill to observe an event, record the event and report on the event meticulously.

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DEPARTMENT OF EDUCATION

Course Outcome

3Year B.A Degree Course

Under 1+1+1 System

Honours course in Education

(EDCA 01): Philosophical and Sociological Foundations of Education

After the completion of the course the learners will be able to:

Group A: Educational Philosophy

Learning Outcome

1. Understand the nature of Educational Philosophy, relationships between Education and Philosophy.
2. Understand the roles of Philosophical bases in Education;
3. Acquaintance with the Western and Indian Schools of Philosophy and their impacts on Education.
4. Acquaintance with the values enshrined and educational provisions in the Indian Constitution;
5. Understand contributions of some great educators and their Philosophies of Education.

Group B: Educational Sociology

Learning Outcome

1. Understand the meaning of Sociology and its different perspectives related to Education;
2. Understand the relationship between Education and Sociology, nature of Educational Sociology.
4. Understand Culture, its relationship with Education.
5. Understand of social development and role of Education and some social issues in education.

Course (EDCA 02): Educational Psychology and Pedagogy

After the completion of the course the learners will be able to:

Group-A: Educational Psychology

Learning Outcome

1. Understand the meaning of Psychology, and be acquainted with its different perspectives.
2. Realize the relationship between Psychology and Education.
3. Understand the concept of Educational Psychology.
4. Understand different aspects of child developments and relate that with Education.
5. Acquaintance with the Psychology of Intelligence and Creativity and relate that with Education.
6. Understand different aspects of Learning Psychology in the context of Education.

Group-B: Pedagogy

Learning Outcome

1. Learn the importance of Pedagogy as an academic discipline.
2. Understand the concept of Pedagogy and its different perspectives
3. Learn the philosophical, sociological and psychological bases of
4. Pedagogy;
5. Understand the relationship between Pedagogy and Education;
6. Acquaintance with some contemporary issues of Pedagogy.

(EDCA 03): Development of Educational Policies and Contemporary Issues in Indian Education

After the completion of the course the learners will be able to:

Group A: Development of Educational Policies

Learning Outcome

1. Understand the development of educational policies in ancient and medieval period.
2. Understand the development of educational policies for the period 1813 to 1947.
3. Understand the development of educational policies for the period 1947 to 1970.
4. Understand the development of educational policies for the period 1970 to 2010.

Group B: Contemporary Issues in Indian Education: Probable Causes and Solutions[NPE 1986 onwards]

Learning Outcome

1. Understand the significance of traditional issues in education.
2. Understand the significance of social issues in education.
3. Understand the significance of educational issues.
4. Understand the significance of current issues in education.

Course (EDCA 04): Educational Technology and Educational Management

After the completion of the course the learners will be able to:

Group A: Educational Technology

Learning Outcome

1. Understand the concept and approaches of educational technology.
2. Understand the concepts, components and basic models of communication used in Education.
3. Understand and apply the techniques of instructional technology used in Education.
4. Understand the emerging issues of educational technology.

Group B: Educational Management

Learning Outcome

1. Understand the concept, nature and need of educational management.
2. Understand the importance of leadership in management.
3. Learning about the agencies of educational management in Indian context.
4. Understand the importance of planning and management in Education.

(EDCA 05): Comparative Education and Curriculum Studies

Group A: Comparative Education

1. Understand the foundations of Comparative Education.
2. Acquaintance with the system of Comparative Education.
3. Understand the structure of Comparative Education.
4. Understand various issues related with Comparative Education.

Group B: Curriculum Studies

1. Understand the concept of Curriculum Studies.
2. Acquaintance with the aims and objectives of Curriculum.
3. Understand with the development of Curriculum.
4. Understand the evaluation of Curriculum.

Course (EDCA 06): EDUCATIONAL GUIDANCE AND COUNSELLING AND SPECIAL EDUCATION

Group A: Educational Guidance and Counselling

1. Understand the basic concept of Guidance and Counselling.
2. Understand the concepts of adjustment and maladjustment.
3. Acquaintance with the process of testing and diagnosis in Guidance and Counselling.
4. Acquaintance with the special areas and skills of Guidance and Counselling.

Group – B Special Education

1. Understand the basic concept of Special Education.
2. Acquaintance with the history and development of Special Education.
3. Learn about Gifted and Slow Learners.
4. Acquaintance with the different types of exceptionality.

Course (EDCA 07): EVALUATION AND STATISTICS IN EDUCATION

Group A: EVALUATION WITH BASIC RESEARCH CONCEPT

1. Understand the basic concept of Evaluation and Measurement.
2. Acquaintance with the basic tools of evaluation.
3. Learn the procedure of standardisation of a test.
4. Acquaintance with preliminary concept of Research Methodology.

GROUP – B. STATISTICS IN EDUCATION

1. Understand the basic concept of Statistics.
2. Understand Descriptive Statistics.
3. Understand Inferential Statistics.
4. Learn about Derived Scores and its uses.

Course (EDCA 08): Practicum

Group A: ICT based Statistics Practical

Part-1. Basic ICT Practical

1. Acquaintance with computer and its different parts.
2. Understand DTP Operation & its application.
3. Understand Excel Operation & its application.

4. Understand PPT Operation & its application.
5. Learn to write a report with the above application.

Part-II. Statistics Practical

1. Learn data collection.
2. Understand analysis of data through excel/ Software & manually.
3. Learn how to write a report with help of one & two.

Group B: Project Work

Part-1. Field Study

1. Understand the aims, objectives, need & significance of field study.
2. Learn the importance of group activity.
3. Learning documentation with photo session.
4. Understand how toprepare a report on field work.

Part-II. Oral Presentation with PPT

1. Understand the relevance of PPT
2. Learn how to prepare a PPT & make a presentation on it.

DUM DUM MOTIJHEEL COLLEGE

DEPARTMENT OF ENGLISH

B.A. English (Hons.) CBCS Syllabus

Issued by the West Bengal State University

With effect from 2018-19

Programme Specific Outcomes

PSO1 Knowledge Gathered

- Students engage with texts of Sanskrit classical literature as well as Greco-Roman culture, and interpret these from contemporary perspective.
- Students learn about the History and evolution of the English Language.
- Students grasp the socio-political and cultural context of England and its impact on literary output. They acquaint themselves with various stages in the development of works in English literature.
- Students receive a comprehensive view of women's literary contributions.
- Students learn about the nuances of Indian Writing in English and American literature. They also familiarize themselves with texts of various postcolonial countries and learn about their diverse cultural uniqueness. They learn about partition narratives coming from different parts of the Indian subcontinent.
- Students engage in literary appreciation of popular fiction.
- Students gain knowledge about key concepts of poetry, drama and fiction along with some vital related literary terms. They also study literary criticism that helps them appreciate various texts.
- Students learn to scan verse passages to study metrical patterns. They also learn about rhetoric or figures of speech in English language.
- Students learn multiple innovative methods employed in English Language Teaching. They develop skills in creative writing, narrative perspective and content development etc.

PSO2 Practical application of the course in securing jobs

- After completion of the course, students are eligible to teach in schools with an added B.Ed. degree.
- Students can train for teaching spoken English.
- Students can further pursue courses in Linguistics and/or Language training to secure jobs.
- Students can also apply for jobs in the field of education and methodology of language teaching, and research at length; they may also avail opportunities of teaching at training colleges.
- Students can opt for jobs in the fields of editing and publishing. They may work towards building a career in the field of independent creative writing and in media houses .

DUM DUM MOTIJHEEL COLLEGE
Course Outcome or Learning Outcome
Three year B.A. /B.Sc. degree course
Under CBCS semester system
HONOURS COURSE IN ENGLISH
With effect from the session: 2018 – 2019

Course Name: **Core Course-1**
Course Code: **ENGACOR01T**
Topic Name: **INDIAN CLASSICAL LITERATURE**

Course Outcome:
1. Students will have an idea of the Sanskrit aesthetics.
2. Students will have proper knowledge of the Sanskrit texts.
3. Students can learn the diacritical marks.

Course Name: **Core Course-2**
Course Code: **ENGACOR02T**
Topic Name: **EUROPEAN CLASSICAL LITERATURE**

Course Outcome:
After the completion of this course the students will be able to:
1. Historically situate classical European (Greco-Roman) literary cultures and their socio-political and cultural contexts.
2. Read and understand the translated versions of the prominent texts of classical literary traditions.
3. Appreciate the classical literature of Europe from the beginning till the 5th century AD.
4. Learn about human and literary values of classical period.
5. Grasp the evolution of European literary thinking and its reception over time.
6. Trace the nature of influence that these classical texts have on modern English literatures.
7. Interpret these texts from a contemporary point of view.

Course Name: **Core Course-3**
Course Code: **ENGACOR03T**
Topic Name: **INDIAN WRITING IN ENGLISH**

Course Outcome:
After the completion of this course the students will be able to:
1. Gain a comprehensive idea of the origin, growth, and development of Indian Writing in English from colonial times till the present
2. Critically engage with major literary works of Indian English Literature in terms of colonialism/postcolonialism, regionalism, and nationalism.
3. Appreciate the evolution of various genres of Indian Writing in English.
4. Critically appreciate the creative use of the English language in Indian Writing in English.
5. Develop the ability to pursue research in the field of Indian English Literature.

Course Name: **Core Course-4**
Course Code: **ENGACOR04T**
Topic Name: **British Poetry and Drama 14th to 17th Century**

Course Outcome:
After completion of this paper the students will
1. Gain a clear understanding of the socio-political, cultural milieu of Early Modern Britain and its impact on contemporary literature.
2. Get a glimpse of Middle English poetry through the works of Chaucer.
3. Learn about the transition from Middle English language to the English language as we know it today.
4. Have a fair understanding of the works of Shakespeare and his contemporary dramatists.
5. Understand the evolution of Early Modern English poetry from the Petrarchan sonnet to the seventeenth century Metaphysical and Cavalier poetry.

Course Name: **Core Course-5**
Course Code: **ENGACOR05T**
Topic Name: **American Literature**

Course Outcome: After the completion of this paper the students will
1. Have some understanding about the growth and evolution of English literature in America.
2. Gain some idea about the complex, pluralistic nature of the American culture and identity and the politics of its representation in literature.
3. Get acquainted not only with the canonical works of American literature, but also with the works of authors from marginalized communities like the Black Americans and American Indians.
4. Be able to appreciate the specificities and peculiarities of American literature as opposed to the British literature of the same historical period.

Course Name: **Core Course-6**
Course Code: **ENGACOR06T**
Topic Name: **POPULAR LITERATURE**

Course Outcome: After the completion of this course the students will be able to:
1. Know the meaning of Popular Literature and its distinctive features of the different sub-genres of canonical and non-canonical literature.
2. Read and understand the popular literary pieces included in the syllabus.
3. Use various methods of literary analysis to interpret popular literature and its relevance.
4. Gain a critical understanding of the literary and aesthetic merits of popular fiction.
5. to make students develop taste and skills for the imaginary beyond a world of reality.
6. Investigate the role of popular fiction as part of the linguistic cultures across the world.

Course Name: **Core Course-7**
Course Code: **ENGACOR07T**
Topic Name: **BRITISH POETRY & DRAMA (17TH-18TH C)**

Course Outcome: 1. Students get knowledge of the history, politics and socio-cultural background of the age and its impact on literature.
2. Students learn about the new forms and styles of poetry.
3. Students get a complete picture of the theatre of decadence and Restoration theatre.
4. Students get acquainted with a female playwright who wrote to earn her livelihood.

Course Name: **Core Course-8**
Course Code: **ENGACOR08T**
Topic Name: **18th Century British Literature**

Course Outcome: After completing this paper the students will
1. Gain some understanding of the European Enlightenment with its emphasis on reason and its influence on the literature and culture of the time.
2. Have a fair understanding of the Augustan satire.
3. Gain some idea about the emergence of the novel as a genre during the eighteenth century.
4. Get acquainted with the eighteenth century precursors of Romanticism.

Course Name: **Core Course-9**
Course Code: **ENGACOR09T**
Topic Name: **BRITISH ROMANTIC LITERATURE**

Course Outcome: 1. Students learn about the social, political and intellectual developments of the age and their impact on literature.
2. Students learn about the poetry as well as the fictional and nonfictional writings of the age.

Course Name: **Core Course-10**
Course Code: **ENGACOR10T**
Topic Name: **19th Century British Literature**

Course Outcome: (1) Students will be able to understand the socio-economic background of 19th century England that shapes the literature of the timing.
(2) Students will be able to isolate several factors that lead to the transition from tradition to modernity.
(3) Students will be acquainted with several writers point of view and nature of writing by studying selected texts and contexts.
(4) They will be able to compare the 19th century British literary trends with the perspective of world literature at large.

Course Name: **Core Course-11**
Course Code: **ENGACOR11T**
Topic Name: **Women's Writing**

Course Outcome: Completion of this course will provide the students with
(1) A comprehensive view of Women's Contribution in literature
(2) Introduce before the students the socio-cultural factors behind the emergence of women's writing.
(3) Give the students a detailed analysis of sexual and gender politics
(4) Enable the students to relate the women's perspectives with class, caste, race and ethnic discriminations, prevalent in our society.

Course Name: **Core Course-12**
Course Code: **ENGACOR12T**
Topic Name: **Early Twentieth Century British Literature**

Course Outcome: After completing this paper the students will
1. Gain some understanding of the avant garde literary and artistic movements of the early twentieth century, particularly Modernism.
2. Understand the impact of the Great Wars on British literature and thought.
3. Have some familiarity with Freudian psychoanalysis, Marxism, feminism and other currents of thought that shaped 20th century literature.
4. Be familiar with the writings of the authors of high Modernism like T S Eliot, Virginia Woolf, D H Lawrence and others.

Course Name: **Core Course-13**
Course Code: **ENGACOR13T**
Topic Name: **Modern European Drama**

Course Outcome: Successful completion of this course will enable the students to acquire adequate knowledge on
(1) Major trends in Modern European Drama
(2) Socio-political and literary contexts of 20th century Europe
(3) Innovative techniques employed by the modern playwrights
(4) Detailed study of selected plays gives textual explanations to heighten the students' literary sensibility and analytical power.

Course Name: **Core Course-14**
Course Code: **ENGACOR14T**
Topic Name: **Postcolonial Literature**

Course Outcome: After completing this paper the students will
1. Have an understanding of the various nuances of colonial and postcolonial history, politics, identity and thought.
2. Get acquainted with texts from various postcolonial nations and understand their commonalities as well as cultural specificities.
3. Appreciate the contemporary realities of postcolonial nations, the persistence of colonial hegemony, neo-colonialinfluences, the impact of globalization and the politics of representation of the marginalized.
4. Appreciate the pluralistic nature of English language and literature.

Course Name: **Discipline Specific Elective-1**
Course Code: **ENGADSE01T**
Topic Name: **OLD ENGLISH, PHILOLOGY, RHETORIC & PROSODY**

Course Outcome: 1. Students learn about the background of the Old English literature and get acquainted with the texts.
2. Students learn about the history of the English language.
3. Students learn about the various figures of speech and how they are used in literature.
4. Students learn to scan the passages of poems and see the metrical pattern.

Course Name: **Discipline Specific Elective-2**
Course Code: **ENGADSE02T**
Topic Name: **LITERARY TYPES & TERMS**

Course Outcome: After the completion of this course the students will be able to:
1. Understand key concepts of poems, plays and fiction included in the syllabus.
2. Learn important literary terms related to poetry, drama, and the novel.
3. Learn to distinguish the features of and form a critical understanding of specific literary genres, i.e., poetry, drama and fiction.
4. Demonstrate conceptual and textual understanding through tests, exams, and projects.

Course Name: **Discipline Specific Elective-3**
Course Code: **ENGADSE04T**
Topic Name: **LITERARY CRITICISM**

Course Outcome: 1. Students learn about the various literary criticisms.
2. Students are better equipped to appreciate other literary texts after a thorough study of the various essays that are in the syllabus.

Course Name: **Discipline Specific Elective-4**
Course Code: **ENGADSE05T**
Topic Name: **PARTITION LITERATURE**

Course Outcome: After the completion of this course the students will be able to:
1. Explain historical and socio-cultural factors responsible for the Partition of Indian Sub-continent.
2. Demonstrate critical understanding of manifestations of the experience of the partition through the representative texts included in the syllabus.
3. Interpret the texts based on partition of India and relate it to their socio-historical-cultural contexts.
4. Gain an understanding of the different terms such as nation, nationalism, communication, violence, exile, refugee, rehabilitation, border, etc.
5. Critically interpret literary responses to the partition in different parts of Indian continent.

Course Name: **Skill Enhancement Course-1**
Course Code: **ENGSSEC01M**
Topic Name: **ELT**

Course Outcome: After the completion of this course the students will be able to:
1. Know about various innovative ways of using English language in verbal and nonverbal communications.
2. Critically interpret the relation between language and literature.
3. Demonstrate conceptual and textual understanding of the syllabus, its structure and development.
4. Understand the structure of a textbook and its use.
5. Grasp the strategies used by a teacher to teach language and understand different types of tests used in a language class.
6. Demonstrate the ways in which technology can be used for learning language.
7. Emerge as perspective writers, editors, content developers, teachers etc.

Course Name: **Skill Enhancement Course-2**
Course Code: **ENGSSEC02M**
Topic Name: **Creative Writing**

Course Outcome: 1. Enhancement of writing Skill.
2. Innovation.
3. Critical Analysis,
4. Observation.
5. Sense of relevance

DUM DUM MOTIJHEEL COLLEGE
Course Outcome or Learning Outcome
Three year B.A. /B.Sc. degree course
Under CBCS semester system
GENERAL COURSE IN ENGLISH
With effect from the session: 2018 – 2019

Course Name: **Compulsory English Language Core-1**
Course Code: **ENGLCOR01T**
Topic Name: **LANGUAGE THROUGH LITERATURE**

Course Outcome:
1. Students take immense interest in the Course Material
2. Interactive sessions between the teacher & students help the students to have proper grasp of the material
3.The texts selected are easy to understand and therefore the B.A General Students usually don't find it quite difficult
4. The MCQ End Sem Exam pattern prescribed by the University demands a thorough and detailed study of the texts which is a boon for the students.

Course Name: **Compulsory English Language Core-2**
Course Code: **ENGLCOR02T**
Topic Name: **A Selection of Poetry and Prose**

Course Outcome:
1. The Course structure is lucid for the students to grasp.
2. Course Material has been prepared keeping in mind the need of B.A General students and the students take much interest in it.
3. Students participate in Classroom Discussions to have a better understanding of the subject.
4. The MCQ pattern of End Sem Exam is helpful for students in getting good grades.

Course Name: **Generic Elective/Department Specific Core Course-1**
Course Code: **ENGHGEC01T / ENGGCOR01T**
Topic Name: **THE INDIVIDUAL & SOCIETY**

Course Outcome:
1. Students take great interest in the course structure.
2. Interactive Classroom teaching proves quite helpful
3.Students take part in the discussion about the topics taught.
4. Diversified course structure, i.e Indian & British literature, helps in comparative analysis.

Course Name: **Generic Elective/Department Specific Core Course-2**
Course Code: **ENGHGEC02T / ENGGCOR02T**
Topic Name: **POEMS & SHORT STORIES**

Course Outcome:
1. Students take interest in their lessons.
2. Dalit literature helps to enrich the students' knowledge which was hitherto unknown to them.
3. Indian Writing in English seems quite interesting to the students which they can easily relate to their own social background.
4. Women's' Literature adds special flavour to the Course Material.

Course Name: **Generic Elective/Department Specific Core Course-3**
Course Code: **ENGHGEC03T / ENGGCOR03T**
Topic Name: **Novel and Play**

Course Outcome: After completing this course students will
1. Have some understanding of the novel and drama as genres.
2. Get acquainted with two major writers of the English literary canon, namely Shakespeare and Dickens.
3. Learn about the social and cultural backgrounds of Elizabethan and Victorian Age.
4. Be sensitised about issues of class, race, gender and religious politics through their depiction in the prescribed texts.

Course Name: **Generic Elective/Department Specific Core Course-4**
Course Code: **ENGHGEC04T / ENGGCOR04T**
Topic Name: **Essays, Short Fiction and Poetry**

Course Outcome: 1. A fair amalgamation of British, American & Indian Literature.
2. Literary pieces by Wordsworth, Frost or Ruskin Bond intellectually captivate the students within the Course Structure.
3. Interactive Discussions on lessons taught prove quite helpful for the students.
4. Students take immense interest in the background of the poets and their works, which helps them to probe deeply within their course structure.

Course Name: **Department Specific Elective-1**
Course Code: **ENGGDSE01T**
Topic Name: **THE INDIVIDUAL & SOCIETY**

Course Outcome: 1. Students take interest in the Course Material.
2. The material is diverse and in tune with the requirement of the times.
3. Vivid discussions on Class Struggle prove helpful for the Students.
4. Students are introduced for the first time to Dalit Literature and its various aspects.

Course Name: **Department Specific Elective-2**
Course Code: **ENGGDSE04T**
Topic Name: **Prose and poetry**

Course Outcome: 1. Knowledge about Indian Author.
2. Can grow the knowledge of American writer.
3. Development of family values and commitment.
4. Acquire positive vibes.

Course Name: **Generic Elective Course (GE)-1**
Course Code: **ENGGGEC01T**
Topic Name: **Media and Communication**

Course Outcome: 1. Students are acquainted with a new topic altogether, i.e. Mass Communication which have never studied before
2. Students of the present generation take interest especially about the Role of Social Media in Mass Communication
3. The flourish of Advertisement in almost every commercial sector helps students in comprehending the course material, related to this, intensely
4. Teacher-Students interactive sessions in Classroom prove quite helpful for the students.

Course Name: **Generic Elective Course (GE)-2**
Course Code: **ENGGGEC02T**
Topic Name: **Gender & Human Rights**

Course Outcome:
1. International Human Rights Movement is something that the students should know about and they take interest in it too
2. Mulk Raj Anand's Novel ; Untouchable' helps the students to understand better the evils of Caste System in Society.
3. Mahesweta Devi's Short Story 'Draupadi' is brilliant testimony of the Class conflict and exploitation in which students take keen interest.
4. Knowledge of Media & Mass Communication may help the students to pursue other related courses of study after Graduation.

Course Name: **Ability Enhancement Compulsory Course (AECC)**
Course Code: **ENGSAEC01M**
Topic Name: **Communication and Writing Skill**

Course Outcome:
1. Improved Reading Skill.
2. Development of writing style.
3. Improved Speaking power.
4. Increased communication approach.

DUM DUM MOTIJHEEL COLLEGE

DEPARTMENT OF HISTORY

B.A. History (Hons) CBCS Syllabus

Issued by the West Bengal State University

With effect from 2018-19

Programme Specific Outcomes

- The under graduate course in History has given a strong grounding in the different areas of the subjects to the students. This would help them while deciding on the specialization for the M.A. course, and later if they enter the world of research and teaching.
- A sense of History and enthusiasm in the subject was generated which presumably enabled them to appreciate our past and the importance of preserving our cultural heritage.
- They were introduced to the writings of eminent authors and debates in the subject.
- This grounding in the subject equipped them to pursue higher studies and research.
- Through skill enhancement course the students got acquainted with the functions of archives, which would help them to pursue research work in the future.
- The undergraduate course in History also opened many career opportunities like a career in teaching, museums or the field of archaeology.
- They can also opt for administrative services in which their knowledge of History would be of great help.

DUM DUM MOTIJHEEL COLLEGE
Course Outcome or Learning Outcome
Three year B.A. /B.Sc. degree course
Under CBCS semester system
HONOURS COURSE IN HISTORY
With effect from the session: 2018 – 2019

Course Name: **Core Course-1**
Course Code: **HISACOR01T**
Topic Name: **Paper CC I: History of India – I (From Earliest Times to c.300 BCE)**

Course Outcome: After finishing the course, the students are enable to
(1) about the life style of pre-historic people in the Neolithic and Chalcolithic age,
(2) to understand the first urban civilization in India, the Harappan civilization,
(3) get the knowledge about the settlement patterns of Aryan,
(4) get the information what were the rules and regulations of ancient society, religious and economy. How did the ancient peopleabide the laws from law books,
(5) How the ancient people used the different materials such as pottery, iron objects etc for their daily livelihood,
(6) to understand the important of literature in society,
(7) to observe the early classical Tamil or Sangam literature which helped to understand the life of people during Cholas, Cheras, Pandyas and Megaliths people in south India.

Course Name: **Core Course-2**
Course Code: **HISACOR02T**
Topic Name: **Social Formation and Cultural Patterns of the Ancient World.**

Course Outcome: After completion of the above course the students are enabled to
(1) understand the different stages of evolution of human,
(2) learn how the cultural progression including society and economy took place in the ancient world,
(3) understand the formation and dynamic of stratified society,
(4) comprehend the contribution of tools and technology to the mankind for socio-economic development,
(5) get an idea of different political ideologies evolved and emulated by the prehistoric people,
(6) enrich themselves about the various philosophical schools, religious traditions albeit the making of a civilisation.

Course Name: **Core Course-3**
Course Code: **HISACOR03T**
Topic Name: **Paper CC III: History of India – I (300 BC- 750 AD)**

Course Outcome: After completion this course, students were understood
(1) ancient agrarian system and trading economy
(2) how the varna and Jati system were developed,
(3) various languages and their used in different religious and social texts,
(4) to know about ancient history, students have to critically examine various Sanskrit, Pali, tamli texts even of course art and architectures, constructed in various dynasties for example Mauryan, Post-Mauryan, Gupata and Post-Gupta.

Course Name: **Core Course-4**
Course Code: **HISACOR04T**
Topic Name: **Social Formations and Cultural Patterns of the Medieval World**

Course Outcome: The above course enabled the students to
(1) understand the process of Empire Formation within the Republicn system during the Roman period,
(2) help them how the mode of production changed from Slave mode to Feudal mode of production,
(3) comprehend the processes how religion and its upholders became more powerful than the political ruler, the King and ruled people of the Medieval World,
(4) delve into the various thesis and interpretations regarding feudalism and the crisis of it in late mediaeval period,
(5) form an idea how the Abrahamic religions Christianity and Islam manipulated the minds of the medieval men and successfully established the rules through religions,
(6) understand the dynamics of religions to contribute to the development of trade, commerce and urbanisation which ultimately resulted in the formation of Nation States.

Course Name: **Core Course-5**
Course Code: **HISACOR05T**
Topic Name: **History of india (c 750_ 1206)**

Course Outcome:
1. Most of the students developed an understanding of the economic and political processes in early medieval India.
2. They got an idea about the sources available for this period of Indian history.

Course Name: **Core Course-6**
Course Code: **HISACOR06T**
Topic Name: **Rise of the Modern West-I**

Course Outcome: After successful completion of this Course Students will be able to:
1. Understand the debate on transition from feudalism to capitalism,rise of modern science, development of enlightenment.
2. Understand the meaning of the European Renaissance and its impact on European society, economy,polity and culture,and emergence of new ideologies.
3. Gets an idea the rise of national monarchy and European state system.

Course Name: **Core Course-7**
Course Code: **HISACOR07T**
Topic Name: **History of India 1206_ 1536**

Course Outcome:
1. After completing the course the students developed a good sense of the social, economic and political history of medieval India.
2. Through a reading of the syncretic culture of medieval India, students gained an understanding of pluralism, the distinguishing feature of India's cultural heritage.

Course Name: **Core Course-8**
Course Code: **HISACOR08T**
Topic Name: **Paper CC VIII: Rise of the Modern West -II**

Course Outcome: After the fulfillment and finishing the course, students would understand
(1) how did the Renaissance materialized to develop the European economy,
(2) new thought which emerged by revolution helped the countries like Spain, Portugal, England and others to voyages in Asian countries,
(3) how did monarchies become absolute in Europe,
(4) what are the main issues helped a country to develop industrial revolution.

Course Name: **Core Course-9**
Course Code: **HISACOR09T**
Topic Name: **History of India-V(1526 CE - 1757 CE)**

Course Outcome: After successful completion of this course students will be able to :
1. Understand the evolution of the political & socio-economic power structures of Medieval India.
2. Gets an idea how the establishment, expansion and consolidation of the Mughals and Marathas were laid.
3. Point out strengths and weaknesses of a historical argument.
4. Develop ideas through the analysis of evidence and sources in support of an argument that drives a progressive structure.

Course Name: **Core Course-10**
Course Code: **HISACOR10T**
Topic Name: **History of India -VI (1757CE-1857CE)**

Course Outcome: This course enabled my students to
(1) understand the process of colonisation in India since 1757 by the English East India Company,
(2) comprehend the conditions of the fragmented Indian state during the Mughal rule, and how they could not withstand the Company power,
(3) gather knowledge on the working of the colonial system through administrative, military, police, and educational institutions,
(4) understand the nature of colonial exploitation through trade and commerce and various means,
(5) form an idea how the colonial power exercised forces to commercialise Indian agriculture deindustrialise the country,
(6) contest the idea of Renaissance as a response to colonialism or it was not a response but a indegenious efforts, and
(8) categorise the various responses to the colonial rule through popular uprisings by different social groups.

Course Name: **Core Course-11**
Course Code: **HISACOR11T**
Topic Name: **Paper CC XI: History of Modern Europe -1 (1789-1919)**

Course Outcome: After the completion of above paper, students will enable to understand
(1) how the common/general people would make the revolution through their will power,
(2) students can learn the meaning of equality-liberty from the French revolution,
(3) also understand there is need the wise monarch otherwise the country faced danger,
(4) also knew how the concept of nationalism was literary emerged in Germany and Italy and how they unified through their will power,
(5) also learned impact of 1st world war and they obviously believed world wants peace not war.

Course Name: **Core Course-12**
Course Code: **HISACOR12T**
Topic Name: **History of India -VII (1858CE-1947CE)**

Course Outcome: This course was much helpful to the students to
(1) make an estimate of the changes that took place in Indian history after the power of ruling East India Company transferred to the British Crown,
(2) understand the formation of various political groups to challenge the British Rule thus the formation of the Indian National Congress,
(3) comprehend the emergence of Indian nationalism which gave birth to different ideologies and ultimately anti-colonial mentality,
(4) provide a clear picture of various trends of nationalism, background to the rise of new kind of leadership in MK Gandhi who started a mass movement against the British Rule,
(5) understand the British response to Indian nationalism and how the British ruled the nation by 'divide and rule' policy which resulted in the Hindu Muslim conflicts,
(6) make an estimate of the socio-economic conditions of the peoples and the reaction of the peasants and working class people to fight the British,
(7) comprehend how the communal politics play havoc during the last phase of the Indian National movement when India attained independence with partition and mass migration.

Course Name: **Core Course-13**
Course Code: **HISACOR13T**
Topic Name: **History of India -VII (India since 1947 CE)**

Course Outcome: This course enabled the students to
(1) understand the problems of Post-Independent India viz. prevailing social injustice, integration problem with India etc
(2) comprehend the possibilities and prospects of new Democracy in Indian situation,
(3) understand properly the post-riot situation and corresponding mass migration and rehabilitation which were the burning issues of Post-Independent India,
(4) understand the enactment and working of Indian Democracy including the prospect of electoral politics and compatibility with the former,
(5) aware of the women question, role of media and science and education of modern society in a developing country,
(6) clarify the idea of India envisioned by our first Prime Minister Pandit Jawaharlal Nehru which we inherited.

Course Name: **Core Course-14**
Course Code: **HISACOR14T**
Topic Name: **Trends in World Politics (1919 CE - 2001 CE)**

Course Outcome: After successful completion of this Course Students will be able to:
1. Develop knowledge about Europe between the two world wars with reference to issues like the great depression, the Spanish Civil War etc.
2. Understand the post-war developments of Political and Socio-economic scenarios of the World, Decolonization and the emergence of the Third world.
3. Understand the origin of Cold War and changing world politics.
4. Gets an idea of the historical developments of West Asian and Southeast Asian countries.
5. Understand the Globalization and its impact on world politics.

Course Name: **Discipline Specific Elective-1**
Course Code: **HISADSE01T**
Topic Name: **Aspects of the History of Modern South East Asia 1**

Course Outcome: Students acquired some idea of the polity, economy , society and culture of pre- colonial South East Asia. They developed an understanding of the process of colonial penetration in the region and indigenous response.

Course Name: **Discipline Specific Elective-2**
Course Code: **HISADSE02T**
Topic Name: **Aspects of the History of Modern South East Asia II**

Course Outcome: After successful completion of this Course Students will be able to :
1. Good understanding and knowledge of the history of Southeast Asia's Socio-economic and Political culture.
2. Understand the impact of the West, decolonization and national movements during the Cold War.
3. Understand the emergence of modern nations and states with reference to Burma, Indonesia,Vietnam.
4. Understand the Cold War politics and the Regional cooperation initiatives with reference SEATO,ASA,ASEAN, and NAM.

Course Name: **Discipline Specific Elective-3**
Course Code: **HISADSE04T**
Topic Name: **History of Modern East Asia I (1839 CE - 1939 CE)**

Course Outcome: Completion of the course made the students well known to
(1) the history of China and Japan for the period 1939 and 1919 CE with special reference to the debate on their coming of modernity,
(2) the Anglo-China relation which resulted in the Opium War and the collapse of Canton trade,
(3) the idea of nationalism in China and Japan and the process of formation of various political parties which contributed to the emergence of Marxism and revolutionary ideologies,
(4) the idea of process of modernisation and establishment of Constitution,
(5) the expansionist policy of Japan which led to the Sino-Japanese War, Russo-Japanese War and ultimately joining the First World War.

Course Name: **Discipline Specific Elective-4**
Course Code: **HISADSE06T**
Topic Name: **History of modern East Asia (1919 CE-1939 CE)**

Course Outcome: The students acquired some knowledge on nationalism in China, and the emergence of the republic. They also learned about the foundation of the communist party and about the Chinese revolution(1949) and the establishment of the People's Republic of China. Apart from that, they developed an understanding of the modernizing process in Japan.

Course Name: **Skill Enhancement Course-1**
Course Code: **HISSSEC01M**
Topic Name: **Paper I:Archives and Museums in India**

Course Outcome: Through this course we introduced students
(1) how much important to maintain the documentary, visual and material remains of the past to understand the history of it,
(2) museums and archives are among the most important repositories,
(3) We encouraged the students to undertake collection, documentation and exhibition of such materials in their localities and college.

Course Name: **Skill Enhancement Course-2**
Course Code: **HISSSEC02M**
Topic Name: **Understanding Indian art**

Course Outcome: The students were familiarised with the basics of Indian art from ancient to contemporary times. An attempt was made to help them learn how to appreciate the diversity, aesthetics and richness of Indian art. They developed some understanding of art as a medium of cultural expression.

DUM DUM MOTIJHEEL COLLEGE
Course Outcome or Learning Outcome
Three year B.A. /B.Sc. degree course
Under CBCS semester system
GENERAL COURSE IN HISTORY
With effect from the session: 2018 – 2019

Course Name: **Generic Elective/Department Specific Core Course-1**
Course Code: **HISHGEC01T / HISGCOR01T**
Topic Name: **History of India from earliest times to 300 CE**

Course Outcome: The students were taught about the sources from this period. They studied the Harappan civilization in detail. They also learned about the Vedic period, its polity, economy, society and religion. They were familiarised with the doctrines of Buddhism and Jainism. They learned about Satavahanas, the Mauryan empire with a special emphasis on Ashoka's dhamma, the sangam age and the age of the shakas.

Course Name: **Generic Elective/Department Specific Core Course-2**
Course Code: **HISHGEC02T / HISGCOR02T**
Topic Name: **Paper GE II: History of India – I (300- 1206 AD)**

Course Outcome: After the completion of this paper, students will enable to understand
(1) the administrative systems of the kingdom of ancient and early medieval India,
(2) India had great learning institutions such as Nalanda, Vikramshila where people and students came from different places to enrich their knowledge,
(3) the braveness and greatness of Rajput kings and their fights with foreign invaders,
(4) how did indigenous powers became weak for their own disarray.

Course Name: **Generic Elective/Department Specific Core Course-3**
Course Code: **HISHGEC03T / HISGCOR03T**
Topic Name: **History of India from 1206 CE to 1707 CE**

Course Outcome: After successful completion of this Course Students will be able to:
1. Learn the evolution of the political structures of Medieval India.
2.Learn how the establishment, consolidation and expansion of the Delhi Sultanate, Mughals and Marathas were laid.
3. Gets an idea how political and socio- economic structures affect the historical change.

Course Name: **Generic Elective/Department Specific Core Course-4**
Course Code: **HISHGEC04T / HISGCOR04T**
Topic Name: **History of India (1707 - 1950 CE.)**

Course Outcome: After successful completion of this course students will be able to:
1. Understand and explain how the English East India Company's Rule in India was established after the battle of Plessey and Legitimized the Regulating Act,Socio- religious reform movements,Judiciary and Educational Reforms.
2. Gets an idea the land revenue system, trade and commerce under the Company's Rule in India.
3. Understand the Indian Nationalism and the freedom struggle.
4. Understand how the Constitution of India become effective and the provisions of human rights and social justice introduced in the Constitution.

Course Name: **Department Specific Elective-1**
Course Code: **HISGDSE01T**
Topic Name: **Society and Economy of Modern Europe:c.15th-18th century**

Course Outcome: Th the course enabled my students to
1. 15th to 18th century-this course seeks to understand the process of transition to modernity in Europe Between the 15th and the 18th centuries,
2. Understand Renaissance: origin, spread and dominant features,
3. Beginning of the era of colonization,
4. Economic developments of the 16 century, shift of economic balance from the 14th Mediterranean to the Atlantic,
5. Transition from feudalism to capitalism: industrial revolution in England

Course Name: **Department Specific Elective-2**
Course Code: **HISGDSE03T**
Topic Name: **Political history of modern Europe c.15th -18th century**

Course Outcome: This course enabled students to :
1) historiographical trends
2) comprehend conditions of feudal
crisis
3) also gather knowledge for Renaissance: origin, spread, dominant features
3) understand the knowledge of European reformation: genesis nature and impact
4) also understand the beginning of era of colonization
5) and the economic development of 16th century
6) transition from feudalism to capitalism - industrial revolution

Course Name:
Generic Elective Course (GE)-1
Course Code: **HISGGEC01T**
Topic Name: **History of Indian Journalism : Colonial and Post Colonial Period**

Course Outcome: After completion of study, students will be able to learn,
1. The massive new outlets and audiences for their electronically distributed products
2. Communication skills and increase the quality of storytelling
3. Research ability and critical analysis
4. Commitment to work against deadlines
5. The growth of technology and trade
6. Evaluate various forms of folk media and its relevance

Course Name: **Generic Elective Course (GE)-2**
Course Code: **HISGGEC02T**
Topic Name: **Some Perspectives on Women's Rights in India**

Course Outcome: After completion of study, students will be able to learn,
1. The basic rights and freedom of every human in the world
2. Irrespective of their color, caste, religion, gender, every individual must be treated the same
3. Every person has the right to hold opinions, can express their own belief
4. Right to live free from violence, slavery, discrimination
5. To be educated, to own property, to vote and to earn a fair & equal wage

Course Name: **Skill Enhancement Course-3**
Course Code: **HISSSEC03M**
Topic Name: **An introduction to archaeology**

Course Outcome: 1. Introduction to archaeology provides teachers and students with background on the field of archaeology as well as the work that archaeologists do.
2. by analysing physical remains, archaeologists interpret the people and cultures they study.
3. the goal of archaeology is to understand how and why human behaviour has changed over time.
4. archaeology analyses the physical remains of the past in persuit off broad and Comprehensive understanding of human archaeologists score high Li on open Ness which means they are usually curious, imaginative and value variety.

Course Name: **Skill Enhancement Course-4**
Course Code: **HISSSEC04M**
Topic Name: **Understanding people culture**

Course Outcome: 1. Lots of problems can arise from misunderstanding .
2. culture is a strong part of people's lives. We are working with people and building relationships with culture study, in general, allows us to understand how the different cultures came it provides a deeper understanding of how culture, human agency, society and politics work ok and engage students in the examination of the country's current human development goals.
3. Culture allows people to develop an understanding of viewing the world.

DUM DUM MOTIJHEEL COLLEGE

DEPARTMENT OF HUMAN DEVELOPMENT

B.A. Human Development (Hons)

CBCS Syllabus

Issued by the West Bengal StateUniversity

With effect from 2018-19

Programme Specific Outcomes

- **Understanding Lifespan Development:**
  Gain a comprehensive understanding of human development across the lifespan, including physical, cognitive, and socio-emotional aspects.
- **Applying Developmental Theories:**
  Explore and apply various developmental theories to analyze and explain human growth and behaviour.
- **Cultural and Contextual Factors:**
  Examine the influence of cultural, societal, and environmental factors on human development.
- **Critical Thinking and Analysis:**
  Develop critical thinking skills to analyze and evaluate research findings, case studies, and real-world applications in the field of human development.
- **Ethical Considerations:**
  Understand and apply ethical considerations in researching and studying human development, considering issues of diversity, inclusion, and social justice.
- **Practical Application of Knowledge:**
  Apply theoretical knowledge to practical situations, considering implications for education, healthcare, counselling, and other relevant fields.
- **Communication Skills:**
  Enhance communication skills to effectively convey complex concepts related to human development to diverse audiences.
- **Self-awareness and Reflection:**
  Foster self-awareness and reflective practices, encouraging personal growth and understanding of one's own development.
- **Interdisciplinary Perspectives:**
  Explore interdisciplinary perspectives by integrating knowledge from psychology, sociology,biology,andotherrelevantdisciplinestogainaholisticunderstanding of human development.
- **Research and Evaluation:**
  Develop basic research and evaluation skills to critically assess studies in the fieldof human development and contribute to the knowledge base.
- **Problem-Solving Skills:**
  Cultivate problem-solving skills to address challenges and issues related to human development in various contexts.

These outcomes aim to provide students with a solid foundation in the study of human development,preparingthemtoapplytheirknowledgeindiverseprofessionalsettings and to contribute to the well-being and understanding of individuals and communities.

DUM DUM MOTIJHEEL COLLEGE
Course Outcome or Learning Outcome
Three year B.A. /B.Sc. degree course
Under CBCS semester system
HONOURS COURSE IN HUMAN DEVELPMENT
With effect from the session: 2018 – 2019

Course Name: **Core Course-1**

Course Code: **HMDACOR01T/01P**

Topic Name: **INTRODUCTION TO HUMAN DEVELOPMENT**

Course Outcome: The "Introduction to Human Development" course provides students with a broad overview of the field, introducing foundational concepts and theories in human development. Students will explore the life span perspective, theories of development, and the interaction of biological, cognitive, and socio-emotional factors. The curriculum serves as a foundational framework for more in-depth studies in specific developmental stages. Graduates will have a comprehensive understanding of the principles shaping human development, setting the stage for further exploration in specialized areas within the field.

Course Name: **Core Course-2**

Course Code: **HMDACOR02T/02P**

Topic Name: **HUMAN DEVELOPMENT: CONCEPTION THROUGH EARLY CHILDHOOD**

Course Outcome: The course on "Human Development: Conception Through Early Childhood" focuses on the foundational stages of human development. Students will explore prenatal development, infancy, and early childhood, addressing the physical, cognitive, and socio-emotional aspects of growth. The curriculum covers topics such as attachment, language development, and early learning experiences. Emphasis is placed on understanding the critical influences during these formative years. Graduates will be prepared to contribute to programs and initiatives that support optimal development during early childhood.

Course Name: **Core Course-3**

Course Code: **HMDACOR03T/03P**

Topic Name: **HUMAN DEVELOPMENT: MIDDLE CHILDHOOD THROUGH OLDAGE**

Course Outcome: The course on "Human Development: Middle Childhood through Old Age" offers students a comprehensive understanding of the developmental stages from middle childhood to old age. Students will explore the physical, cognitive, and socio-emotional aspects of development during these life phases. The curriculum covers topics such as identity formation, cognitive changes, and socio-emotional well-being. Emphasis is placed on understanding the unique challenges and opportunities associated with each stage. Graduates will be well-prepared to work in various fields, considering the diverse needs of individuals across different life stages.

Course Name: **Core Course-4**

Course Code: **HMDACOR04T/04P**

Topic Name: **CAREANDEDUCATIONININFANCYANDCHILDHOOD**

Course Outcome: The "Care and Education in Infancy and Childhood" course focuses on the early years of development, addressing the unique needs of infants and young children. Students will explore theories of early childhood development, best practices in caregiving, and educational strategies for this critical stage. The curriculum covers topics such as attachment theory, play-based learning, and the role of caregivers in fostering a supportive environment. Graduates will be prepared to contribute to the well-being and educational growth of infantsand young children, whether in educational settings or community programs

Course Name: **Core Course-5**

Course Code: **HMDACOR05T/05P**

Topic Name: **PSYCHOLOGICAL BASES OF HUMANDEVELOPMENT**

Course Outcome: The course on the "Psychological Bases of Human Development" explores the foundational psychological theories and principles influencing human development across the lifespan. Students will examine cognitive, emotional, and social aspects of development, considering diverse psychological perspectives. The curriculum emphasizes the integration of psychological concepts into understanding human behavior and the application of theories to real-life scenarios. Graduates will have a deepened understanding of the psychological underpinnings of human development, preparing them for roles in fields such as counseling, education, and social work.

Course Name: **Core Course 6**

Course Code: **HMDACOR06T/06P**

Topic Name: **PSYCHOLOGICAL ASSESSMENT AND STATISTICS**

Course Outcome: In the "Psychological Assessment and Statistics" course, students will gain proficiency in psychological assessment tools and statistical methods. The curriculum covers the principles of psychological testing, assessment techniques, and the application of statistical analyses in psychological research. Emphasis is placed on ethical considerations, interpretation of assessment results, and the use of statistics in evidence-based decision-making. Graduates will be well-equipped to conduct psychological assessments, analyze data, and contribute to research in the field of psychology.

Course Name: **Core Course 7**

Course Code: **HMDACOR07T/07P**

Topic Name: **GUIDANCE AND COUNSELLING OF CHILDREN IN DISTRESS**

Course Outcome: The "Guidance and Counselling of Children in Distress" course prepares students to address the psychological and emotional needs of children facing distressing situations. The curriculum covers counselling theories, intervention strategies, and ethical considerations. Students will develop skills in providing guidance and support to children experiencing trauma, grief, or challenging life circumstances. Graduates will be well-prepared to work in counselling roles, offering assistance to children in distress and contributing to their emotional well-being.

Course Name: **Core Course 8**

Course Code: **HMDACOR08T/08P**

Topic Name: **MARRIAGE AND FAMILY REALTIONS**

Course Outcome: In the "Marriage and Family Relations" course, students will explore the dynamics of marital and familial relationships. The curriculum covers theories of marriage, family structures, and the impact of cultural and societal factors on relationship dynamics. Emphasis is placed on communication, conflict resolution, and understanding diverse family systems. Graduates will be prepared to contribute to fostering healthy relationships, providing support to families, and addressing challenges within the context of marriage and family life.

Course Name: **Core Course 9**

Course Code: **HMDACOR09T/09P**

Topic Name: **LEGISLATION AND POLICY ISSUES IN CHILD WELFARE**

Course Outcome: The course on "Legislation and Policy Issues in Child Welfare" provides students with a comprehensive understanding of legal and policy frameworks governing the welfare of children. Students will explore child protection laws, adoption policies, and social services for vulnerable children. The curriculum emphasizes critical analysis of policies, ethical considerations, and strategies for effective advocacy. Graduates will be well-equipped to engage in policy development and implementation, ensuring the protection and well-being of children in diverse contexts.

Course Name: **Core Course 10**

Course Code: **HMDACOR10T/10P**

Topic Name: **LEGISLATION AND POLICY ISSUES IN FAMILY WELFARE**

Course Outcome: In the course on "Legislation and Policy Issues in Family Welfare," students will delve into the legal and policy frameworks shaping family welfare initiatives. The curriculum covers family-related legislation, healthcare policies, and social welfare programs. Students will analyze the impact of policies on family dynamics, reproductive health, and socio-economic well-being. Emphasis is placed on understanding the intersectionality of family welfare with broader social issues. Graduates will be prepared to critically evaluate and contribute to the development of policies that positively impact family welfare and societal well-being.

Course Name: **Core Course 11**

Course Code: **HMDACOR11T/11P**

Topic Name: **ORGANISATION AND MANAGEMENT OF EARLY CHILDHOOD EDUCATION CENTRES**

Course Outcome: In the "Organisation and Management of Early Childhood Education Centres" course, students will gain insights into the administrative aspects of early childhood education settings. The curriculum covers organizational structures, leadership principles, and effective management strategies for early childhood education centers. Students will explore aspects such as staffing, budgeting, and maintaining a safe and enriching learning environment. Emphasis is placed on understanding the regulatory frameworks and quality standards in early childhood education. Graduates will be well-equipped to take on leadership roles in the management and administration of early childhood education centers, ensuring optimal conditions for the growth and development of young children.

Course Name: **Core Course 12**

Course Code: **HMDACOR12T/12P**

Topic Name: **CURRICULUM FOR EARLY CHILDHOOD EDUCATION**

Course Outcome: The course on "Curriculum for Early Childhood Education" focuses on the design and implementation of effective educational programs for young children. Students will explore developmental theories, age-appropriate curriculum design, and pedagogical approaches that support early learning. The curriculum covers play-based learning, literacy and numeracy development, and the integration of technology in early childhood education. Emphasis is placed on creating inclusive and culturally responsive curricula that meet the diverse needs of young learners. Graduates will be prepared to contribute to the development of high-quality early childhood education programs, fostering positive learning experiences for young children.

Course Name: **Core Course 13**

Course Code: **HMDACOR13T/13P**

Topic Name: **THE CHILD WITH SPECIAL NEEDS**

Course Outcome: The course on "The Child with Special Needs" is designed to equip students with a comprehensive understanding of the development, education, and support of children with diverse abilities. Students will explore foundational concepts in special education, including early identification and intervention, individualized education plans (IEPs), and inclusive education practices. The curriculum emphasizes the importance of adapting curriculum and instruction, fostering positive parent-teacher relationships, and utilizing assistive technology. Graduates will be prepared to advocate for the rights of children with special needs, design inclusive learning environments, and contribute to creating a more accessible and supportive educational landscape.

Course Name: **Core Course 14**

Course Code: **HMDACOR14T/14P**

Topic Name: **PARENT AND COMMUNITY EDUCATION**

Course Outcome: In the Parent and Community Education course, students will gain the knowledge and skills necessary for effective engagement and collaboration with parents and communities in educational settings. The curriculum covers foundational communication skills, cultural competence, and strategies for fostering positive relationships with parents. Students will explore models of parent involvement, family literacy initiatives, and effective methods for conducting parent-teacher conferences. The course emphasizes the importance of community engagement, including outreach, advocacy, and the development of parent education programs. Graduates will be well-prepared to facilitate positive parent-teacher relationships, promote family involvement in education, and contribute to the creation of supportive educational environments within communities.

Choose any two (theory, practical combined) from three options-HMDADSE01T, HMDADSE01P/ HMDADSE02T, HMDADSE02P/ HMDADSE03T, HMDADSE03P

Course Name: **Discipline Specific Elective**

Course Code: **HMDADSE01T/01P**

Topic Name: **GENDER MEDIA AND SOCIETY**

Course Outcome: The "Gender, Media, and Society" course is designed to critically examine the complex relationships between gender, media representations, and societal norms. Students will explore theoretical foundations, historical perspectives, and the influence of media on shaping gender roles. The curriculum covers media analysis, representation of women and men, and emerging trends in gender and media. Emphasis is placed on understanding the intersectionality of gender with other social categories and the role of media in both reinforcing and challenging societal norms. Graduates will be equipped to engage in media literacy, advocate for gender equality, and contribute to positive changes in media representation.

Course Name: **Discipline Specific Elective**

Course Code: **HMDADSE02T/02P**

Topic Name: **CHILDHOOD IN INDIA**

Course Outcome: The course on "Childhood in India" provides students with a nuanced understanding of the various dimensions of childhood within the Indian context. Students will explore socio-cultural perspectives, historical contexts, and diverse childhood experiences in India. The curriculum covers child rights, education, health, and issues such as child labor and migration. Students will analyze the impact of cultural and economic factors on childhood in India and explore advocacy strategies for improving the well-being of children. Graduates will be prepared to contribute to informed discussions, policies, and interventions aimed at promoting the rights and welfare of children in the Indian context.

Course Name: **Discipline Specific Elective**

Course Code: **HMDADSE03T/03P**

Topic Name: **ELEMENTS OF RURAL ECONOMICS AND RURAL SOCIOLOGY**

Course Outcome: In the course on "Elements of Rural Economics and Rural Sociology," students will delve into the economic and sociological dimensions of rural communities. The curriculum covers agricultural economics, rural livelihoods, and natural resource management. Students will explore the social structures of rural communities, addressing issues such as education, health, and gender dynamics. Emphasis is placed on understanding the economic aspects of rural life, including infrastructure development, finance, and government policies. Graduates will be equipped to contribute to sustainable rural development, address socio-economic disparities, and engage with the unique challenges and opportunities present in rural settings.

Course Name: **Discipline Specific Elective**

Course Code: **HMDADSE04T/04P**

Topic Name: **GENDER AND SOCIAL JUSTICE**

Course Outcome: The Gender and Social Justice course is designed to deepen students' understanding of the intersections between gender and broader social justice issues. Students will explore historical perspectives, feminist theories, and global dimensions of gender injustice. The curriculum emphasizes the importance of intersectionality, examining how gender interacts with other social categories such as race, class, and sexuality. Students will delve into legal frameworks, violence against women, economic disparities, and LGBTQ+ rights. The course aims to empower students to critically analyze and address gender-based discrimination, fostering an awareness of cultural competence and ethical considerations in promoting social justice. Graduates will be prepared to contribute to positive social change, advocate for equality, and work towards creating more just and inclusive societies.

Course Name: **Discipline Specific Elective**

Course Code: **HMDADSE05T/05P**

Topic Name: **DYNAMICS OF COMMUNICATION AND EXTENSION**

Course Outcome: The course in Dynamics of Communication and Extension aims to equip students with a comprehensive understanding of effective communication strategies within the context of extension services and community outreach. Students will explore various communication models, interpersonal skills, and group facilitation techniques essential for building positive relationships with diverse communities. The curriculum emphasizes the use of technology and media in outreach efforts and includes training in conflict resolution and negotiation. Students will develop the ability to assess community needs, plan communication strategies, and evaluate the impact of extension programs, preparing them for roles where effective communication is crucial for successful community engagement and development initiatives.

Course Name: **Discipline Specific Elective**

Course Code: **HMDADSE06T/06P**

Topic Name: **HOME SCIENCE AND EXTENSION EDUCATION**

Course Outcome: The course on Home Science and Extension Education aims to equip students with a comprehensive understanding of home science principles and effective extension education strategies. Students will delve into the multidisciplinary nature of home science, exploring nutrition and health promotion, family and human development, textile and apparel sciences, and resource management. The curriculum emphasizes the application of knowledge in designing community-based programs that address specific needs related to nutrition, textiles, and family well-being. Additionally, students will develop skills in extension education methods, communication, and counseling, enabling them to engage with individuals and communities effectively. Entrepreneurial aspects of home science, sustainable living practices, and the integration of technology in education are also highlighted. The course places a strong emphasis on community needs assessment, advocacy for family and community well-being, and the evaluation of program impact, preparing students for roles in community development, education, and entrepreneurship where expertise in home science and extension education is essential for fostering positive change within communities.

Course Name: **Skill Enhancement Course**

Course Code: **HMDSSEC01M**

Topic Name: **ADOLESCENT DEVELOPMENT AND CHALLENGES**

Course Outcome: The course on "Adolescent Development and Challenges" focuses on the unique developmental stage of adolescence. Students will explore physical, cognitive, and socio-emotional aspects of adolescent growth, coupled with the challenges commonly faced during this period. The curriculum addresses issues such as identity formation, peer relationships, and risk behaviors. Emphasis is placed on understanding diverse cultural perspectives and implementing strategies for positive youth development. Graduates will be equipped to support adolescents through their challenges and contribute to programs promoting their overall well-being.

Course Name: **Skill Enhancement Course**

Course Code: **HMDSSEC02M**

Topic Name: **CHILD RIGHTS AND SOCIAL ACTION**

Course Outcome: The course on "Child Rights and Social Action" is designed to empower students with a deep understanding of the rights of children and the social action needed to protect and promote these rights. Students will explore international conventions and legal frameworks related to child rights, coupled with strategies for social advocacy and mobilization. The curriculum emphasizes the importance of social awareness, ethical considerations, and the role of individuals and communities in advocating for the well-being of children. Graduates will be equipped to actively engage in social action initiatives, contributing to the creation of environments that nurture and safeguard the rights of children.

DUM DUM MOTIJHEEL COLLEGE
Course Outcome or Learning Outcome
Three year B.A. /B.Sc. degree course
Under CBCS semester system
GENERAL COURSE IN HUMAN DEVELOPMENT
With effect from the session: 2018 – 2019

Course Code: **HMDGCOR01T/01P & HMDHGEC01T/01P**

Topic Name: **INTRODUCTION TO HUMAN DEVELOPMENT**

Course Outcome: The "Introduction to Human Development" course provides students with a broad overview of the field, introducing foundational concepts and theories in human development. Students will explore the lifespan perspective, theories of development, and the interaction of biological, cognitive, and socio-emotional factors. The curriculum serves as a foundational framework for more in-depth studies in specific developmental stages. Graduates will have a comprehensive understanding of the principles shaping human development, setting the stage for further exploration in specialized areas within the field.

Course Code: **HMDGCOR02T/02P & HMDHGEC02T/02P**

Topic Name: **MARRIAGE AND FAMILY RELATIONS**

Course Outcome: In the "Marriage and Family Relations" course, students will explore the dynamics of marital and familial relationships. The curriculum covers theories of marriage, family structures, and the impact of cultural and societal factors on relationship dynamics. Emphasis is placed on communication, conflict resolution, and understanding diverse family systems. Graduates will be prepared to contribute to fostering healthy relationships, providing support to families, and addressing challenges within the context of marriage and family life.

Course Code: **HMDGCOR03T/03P & HMDHGEC03T/03P**

Topic Name: **MARRIAGE AND FAMILY RELATIONS**

Course Outcome: The course on the "Psychological Bases of Human Development" explores the foundational psychological theories and principles influencing human development across the lifespan. Students will examine cognitive, emotional, and social aspects of development, considering diverse psychological perspectives. The curriculum emphasizes the integration of psychological concepts into understanding human behavior and the application of theories to real-life scenarios. Graduates will have a deepened understanding of the psychological underpinnings of human development, preparing them for roles in fields such as counseling, education, and social work.

Course Code: **HMDGCOR04T/04P & HMDHGEC04T/04P**

Topic Name: **CHILDHOOD PROBLEMS AND WELFARE**

Course Outcome: The course on "Childhood Problems and Welfare" is designed to equip students with a comprehensive understanding of the various challenges and issues affecting children. Students will explore the identification and intervention strategies for problems such as abuse, neglect, and behavioral disorders. The curriculum emphasizes the role of welfare programs, community resources, and legal frameworks in safeguarding the well-being of children. Graduates will be prepared to contribute to initiatives promoting the welfare of children and advocating for the prevention and intervention of childhood problems.

Course Code: **HMDGDSE01T/01P**

Topic Name: **CHILDREN WITH DISABILITIES**

Course Outcome: The "Children with Disabilities" course focuses on the unique needs and challenges faced by children with diverse abilities. Students will explore the principles of inclusive education, individualized support plans, and assistive technologies. The curriculum addresses the social, emotional, and educational aspects of children with disabilities, fostering an understanding of diversity and inclusion. Emphasis is placed on collaborative approaches involving families, educators, and community services. Graduates will be well-prepared to work in roles that support and advocate for the inclusion and well-being of children with disabilities.

Course Code: **HMDGDSE02T/02P**

Topic Name: **CHILD RIGHTS AND GENDER EMPOWERMENT**

Course Outcome: The course on "Child Rights and Gender Empowerment" integrates the principles of child rights with a focus on gender equality. Students will explore legal frameworks, international conventions, and advocacy strategies aimed at promoting the rights of children, with a specific emphasis on gender empowerment. The curriculum addresses issues such as education, health, and protection within the context of gender-sensitive approaches. Graduates will be prepared to actively contribute to initiatives fostering gender equality, advocating for the rights of children, and creating environments that empower children, irrespective of gender.

Course Code: **HMDGDSE03T/03P**

Topic Name: **LIFE SPAN DEVELOPMENT I**

Course Outcome: The "Life Span Development 1" course offers an in-depth exploration of human development from infancy to adolescence. Students will examine physical, cognitive, and socio-emotional aspects of growth during the early stages of the lifespan. The curriculum covers key theories and research findings, emphasizing the interplay of genetics, environment, and cultural influences on development. Graduates will have a foundational understanding of the factors shaping human development in the early years, informing their work in various fields such as education, counseling, and social services.

Course Code: **HMDGDSE04T/04P**

Topic Name: **LIFE SPAN DEVELOPMENT II**

Course Outcome: Building upon the foundational concepts introduced in Life Span Development 1, the "Life Span Development 2" course extends the exploration of human development from young adulthood through late adulthood. Students will delve into theories and research related to cognitive aging, socio-emotional changes, and the impact of cultural and societal factors on development. The curriculum addresses challenges and opportunities across different life stages, fostering a holistic understanding of the aging process. Graduates will be well-equipped to apply this knowledge in roles involving counseling, gerontology, and community services.

Course Name: **GENERIC ELECTIVES**

Course Code: **HMDGGEC03T/03P**

Topic Name: **PREVIEW TO HUMAN DEVELOPMENT-I**

Course Outcome: The "Preview to Human Development - 1" serves as an introductory exploration into the fundamental principles and theories that shape human development. Students will engage with key concepts, theories, and research findings spanning the lifespan from conception to adolescence. The curriculum provides a broad overview, setting the stage for more in-depth studies in subsequent courses. Graduates will have a foundational understanding of the multifaceted nature of human development, serving as a solid basis for further specialization in specific developmental stages.

Course Name: **GENERIC ELECTIVES**

Course Code: **HMDGGEC04T/04P**

Topic Name: **PREVIEW TO MARRIAGE AND FAMILY RELATIONS–I**

Course Outcome: The "Preview to Marriage and Family Relations-1" course introduces students to foundational concepts and theories that underpin the dynamics of marriage and family life. Students will explore topics such as family structures, communication patterns, and societal influences on relationships. The curriculum lays the groundwork for further exploration of marriage and family relations in subsequent courses, providing a broad understanding of the factors shaping family dynamics.

Course Name: **GENERIC ELECTIVES**

Course Code: **HMDGGEC05T/05P**

Topic Name: **PREVIEW TO HUMAN DEVELOPMENT-II**

Course Outcome: In continuation of the foundational exploration in "Preview to Human Development - 1," the second part of the course offers an overview of human development in the later stages of the lifespan. Students will delve into theories and research spanning young adulthood through late adulthood, addressing cognitive, socio-emotional, and physical aspects of development. The curriculum provides a comprehensive preview, preparing students for more detailed studies in subsequent courses and applications in various professional contexts.

Course Name: **GENERIC ELECTIVES**

Course Code: **HMDGGEC06T/06P**

Topic Name: **PREVIEW TO MARRIAGE AND FAMILY RELATIONS–II**

Course Outcome: Building on the foundational concepts introduced in the first part of the course, "Preview to Marriage and Family Relations-2" delves deeper into the complexities of marital and familial relationships. Students will explore issues such as conflict resolution, cultural influences on family life, and contemporary challenges faced by families. The curriculum provides an in-depth preview, preparing students for more advanced studies and practical applications in the realm of marriage and family relations.

DUM DUM MOTIJHEEL COLLEGE
DEPARTMENT OF JOURNALISM AND MASS COMMUNICATION
B.A. JORA (Hons.) CBCS Syllabus
Issued by the West Bengal State University
With effect from 2018-19

Programme Specific Outcomes

- Focus on in-depth knowledge of practical and theoretical aspects in different areas of Journalism and Mass Communication.
- Help students sharpen their specialization skills in the field of Mass Media.
- Enable students to write specialized stories for various media.
- Teach students to use Public Relation tools like Press release, news etc.
- Help students understand the importance of media surveys and media seminars.
- Create awareness among students about mass media research.
- Sharpen the research skills of students.
- Enable students to acquire knowledge of Research report writing.
- Generate a sense of News and enthusiasm in the subject to appreciate the importance of news, media and culture.
- Open career opportunities in news reporting, editing, advertising, public relations and corporate communications.
- Prepare students for deciding on specialization for higher education and careers in research and teaching.

DUM DUM MOTIJHEEL COLLEGE
Course Outcome or Learning Outcome
Three year B.A. /B.Sc. degree course
Under CBCS semester system
Honours Course in Journalism & Mass Communication
With effect from the session: 2018–19

Course Name: **Core Course-1**
Course Code: **JORACOR01T**

Topic Name: **Paper CC I: Introduction to Journalism**

Course Outcome: After finishing the course, the students are enable to

1) Understand the basic concepts in Journalism and give a knowledge about the various aspects and latest developments in the field of Journalism
2) give inputs that help identify skills suitable for aspiring a career in Journalism
3) Develop the ability to write clear, concise, accurate and interesting news stories
4) Demonstrate basic skills and techniques in newsgathering and newswriting
5) Judge the newsworthiness of events and ideas and analyze stories for content, form and style
6) Gain a wide range of practical experience in basic news coverage

Course Name: **Core Course-2**
Course Code: **JORACOR02T**
Topic Name: **HISTORY OF THE MEDIA**

Course Outcome: After completion of the above course the students are enabled to

1) be aware of significant events and people in media history
2) understand major themes in our media history and how they resonate in contemporary media
3) understand the advantages of historical consciousness or "thinking in time."

Course Name: **Core Course-3**
Course Code: **JORACOR03T**
Topic Name: **Reporting and Editing for Print**

Course Outcome: After completion this course, students were understood
(1) about reporting and editing for the print media
(2) Structure and function of print media
(3) Responsibility of different departmental head.

Course Name: **Core Course-4**
Course Code: **JORACOR04T**
Topic Name: Introduction to Media and Communication

Course Outcome: The above course enabled the students to
(1) Students will demonstrate the ability to communicate effectively in actuality
(2) Students will be able to analyse communication in the light of various communication models.
(3) Students will be able to analyse media content in the light of communication models and media theories

Course Name: **Core Course-5**
Course Code: **JORACOR05T**
Topic Name: **Introduction to Broadcast Media**

Course Outcome:

1) Grow concept on various types and aspects of both radio and television
2) A basic concept on the functioning of broadcast media are grown in them
3) They both theoretically and practically learn to write and present programs in both types of media.

Course Name: **Core Course-6**
Course Code: **JORACOR06T**
Topic Name: **Media and Cultural Studies**

Course Outcome: After successful completion of this Course Students will be able to:

1) They grow the theoretical knowledge of communication and mass communication
2) They get to better understand how culture, audience and technologies affect the communication process
3) This paper helps them further in research and academic analysis.

Course Name: **Core Course-7**
Course Code: **JORACOR07T**
Topic Name: **Advertising and Public Relations**

Course Outcome: This course enables the students to:

1) They learn the techniques and tactics of advertising and public relations
2) They practically (both written and through software) learn to present ad copies and public relation documents as a professional
3) It further helps them pursue careers in advertising and public relations

Course Name: **Core Course-8**
Course Code: **JORACOR08T**
Topic Name: **Introduction to New Media**

Course Outcome: This course enables the students to:

1) Students grow the basic concept of the most neo form of media i.e. Mew Media
2) They are taught the basic terminologies and it's functioning
3) Basic skills regarding this form of media are grown which further helps them to specialise as a communicator in new media

Course Name: **Core Course-9**
Course Code: **JORACOR09T**
Topic Name: **Development Communication**

Course Outcome: This course enables the students to:

1) Through the study of development communication models and theories students grow a theoretical concept of this paper.
2) They understand the important role of media in the development of societies of all types that are rural, urban, communities etc.
3) An understanding on the functioning and importance of development communication helps them in future research and contributing in this field of communication.

Course Name: **Core Course-10**
Course Code: **JORACOR10T**
Topic Name: **Media Ethics and the Law**

Course Outcome: This course enables the students to:

1) Students of Journalism who are tomorrow's budding journalist grow a concept of the laws and ethics of media that govern the functioning of journalists
2) They understand the laws of media, know about the regulatory bodies to whom they are answerable and also their responsibilities towards women, children and the society as a whole.
3) As this paper helps students to learn the laws that govern the different media, it helps them in their professional field later.

Course Name: **Core Course-11**
Course Code: **JORACOR11T**
Topic Name: **Global Media and Politics**

Course Outcome: After the completion of above paper, students will enable to understand

1) an in-depth understanding of the relation of mass media with different aspects of the society like global markets, international communication and its effect on global culture
2) the serious issues of media giants, their effects in global news and the counter measures taken by developing countries.
3) how media functioned during different global conflicts and they propaganda techniques thus understanding the politics of media

Course Name: **Core Course-12**
Course Code: **JORACOR12T**
Topic Name: **Advanced Broadcast Media**

Course Outcome: This course enables the students to:

1) grow an in-depth knowledge of broadcast media through this paper. They learn the different types of radio, their functioning and their contribution in development of the society.
2) Students get an idea of the different broadcasting models, policies and laws along with different genres and concerns regarding broadcast media.
3) They are also given concepts of broadcast production.

COURSE NAME: JORA-DSE02
COURSE CODE: JORADSE02T
TOPIC NAME: Print Journalism and Production
COURSE OUTCOME: This course enables the students to:

1) Gain an in-depth knowledge of print journalism and different aspects related to it
2) They are taught various aspects like specialized journalism, page make up and advanced editing techniques which help them in their professional field.
3) The students are also taught the latest trends of print journalism and technologies of print to prepare them for the competitive market

COURSE NAME: JORA-DSE03
COURSE CODE: JORADSE03T
TOPIC NAME: Photographical Appreciation
COURSE OUTCOME: This course enables the students to:

1) acquire the required concept and techniques of photography
2) gain technical aspects, editing and their implementation techniques are taught along with its practical training
3) get idea and knowledge on digital photography and photojournalism helps them in professional field and become an ace photographer

Course Name: **Core Course-13**
Course Code: **JORACOR13T**
Topic Name: **Advanced New Media**

Course Outcome: This course enabled the students to:

1) the basics of the New media and its frameworks and genres like Memes, Virality, digital art, gaming and player culture
2) comprehend the possibilities and prospects of sociology of the new media and Internet, digital divide, economy of new media and ethical issues regarding new media and netiquettes.
3) understand properly the aspects of new media and popular culture, net neutrality and various relevant issues regarding control of new media.
4) understand the enactment and working of new media, cyber security and the issues of privacy in the age of new media.
5) understand the aspects of convergence culture and participatory culture of new media
6) will also gain knowledge regarding digital fandom, online communities and identity issues of digital media and communication

Course Name: **Core Course-14**
Course Code: **JORACOR14T**
Topic Name: **Communication Research and Methods**

Course Outcome: After successful completion of this Course Students will be able to:

1. Develop knowledge about basics of research, steps of research, research questions and hypothesis
2. Understand the different types of methodologies and techniques regarding mass communication research
3. Understand the areas of sampling and methods of selecting the samples for different types of research methods
4. Gets an idea of the how to write the analysis and research report and how internet can be used as a source for research
5. Understand about different types of mass media surveys and analysis. It also helps to study the ethical issues of research.

Course Name: Discipline Specific Elective
Course Code: JORADSE04T

Topic Name: Media , Gender and Human Rights

Course Outcome: Completion of the course made the students well known to
1) the debate on media and the social world, the rural-urban divide and the history of the grass-root media.
2) the history of gender rights with special reference to India and the theories of mass media and society in the aspects of gender empowerment and identity.
3) the theory of media and masculinity in India
4) the idea of the public sphere and gender issues. The concept of genres regarding gender issues.
5) the history of UDHR, theoretical perspective of mass media and human rights in India

Course Name: Discipline Specific Elective
Course Code: JORADSE06T

Topic Name: Introduction to Film Studies

Course Outcome: After the completion of this paper,

1) Students will be able to understand the different aspects of film as a mass medium.
2) The students will also acquire knowledge about the history of film as a mass medium and the different film forms, styles and movements around the world.
3) Students are also going to study Hindi films of the 1950s and the different government audio visual organizations of India.
4) The students are also going to have knowledge regarding the language of cinema, basic camera angles, process of editing and different aspects of film editing process.

Course Name: Skill Enhancement Course-1
Course Code: JORSSEC01M
Topic Name: Radio Production

Course Outcome: Through this course we introduced students
1) get an idea of radio production details
2) The students through practical classes learn to produce different radio programs from pre-production to post production
3) A knowledge in radio production helps them further in professional field as radio broadcaster

Course Name: **Skill Enhancement Course-2**
Course Code: JORSSEC02M
Topic Name: **Documentary Production**

Course Outcome: This course enables the students to:

1) Students grow a concept on the making and presentation of documentaries.
2) A detailed idea on the production, pre-production and editing is given
3) Students are able to create documentaries on their own and later take it up as their professional.

DUM DUM MOTIJHEEL COLLEGE
Course Outcome or Learning Outcome
Three year B.A. / B.Sc. degree course
Under CBCS semester system
General Course in Journalism & Mass Communication
With effect from the session: 2018– 19

COURSE NAME: DSC 1A
COURSE CODE: JORGCOR01T
TOPIC NAME: : Basics of Journalism
COURSE OUTCOME: This course enables the students to:

1. The students get a detailed idea of the concept of news and news making.
2. A detailed knowledge of how news are collected, written and edited are given to the students along with concepts of citizen journalism which help them later in their professional life.
3. The students grow concepts of other aspects of journalism like yellow journalism, responsibilities towards society and ethics of journalism.

COURSE NAME: DSC 1B
COURSE CODE: JORGCOR02T
TOPIC NAME: : Photography
COURSE OUTCOME: This course enables the students to:

1. The students acquire the required concept and techniques of photography. They also learn and master the latest trends of photography.
2. All technical aspects of photography along with the use of lighting and equipment are taught. Students also learn different editing techniques and their implementation tactics in this paper.
3. Idea and knowledge on specialized fields of photography like sports, news, nature and portrait photography helps students later in their professional life and become an ace photographer.

COURSE NAME: DSC 1C
COURSE CODE: JORGCOR03T
TOPIC NAME: Film Appreciation
COURSE OUTCOME: This course enables the students to:

1) Students learn the rich history international and national history of film
2) They grow a basic concept of film language and techniques for future studies.
3) They know the government organizations related to film.

COURSE NAME: DSC1D
COURSE CODE: JORGCOR04T/DSC1D:
TOPIC NAME: Introduction to Documentary
COURSE OUTCOME: This course enables the students to:

1) Students grow a concept on the making and presentation of documentaries

2) A detailed idea on the production, pre-production, editing and grammar of documentary making is given.
3) Students are able to create documentaries on their own and later take it up as their profession.

COURSE NAME: GE1
COURSE CODE: JORGGEC01T
TOPIC NAME: Multimedia Journalism
COURSE OUTCOME: This course enables the students to

1) The students learn here the concept, techniques and tactics of multimedia journalism in depth.
2) The students are taught on how to use multimedia in different types media like print, photographs and audio-video content, which further help them professionally.
3) They are taught the techniques of mobile journalism which help them later

COURSE NAME: DSE1A
COURSE CODE: JORGDSE02T
TOPIC NAME: Print Journalism and Production
COURSE OUTCOME: This course enables the students to:

1) Students are given an in-depth knowledge of print journalism and different aspects related to it
2) They are taught various aspects like specialized journalism, page make up and advanced editing techniques which help them in their professional field.
3) The students are also taught the latest trends of print journalism and technologies of print to prepare them for the competitive market

COURSE NAME: DSE1B
COURSE CODE: JORGDSE04T
TOPIC NAME: Media, Gender and Human Rights
COURSE OUTCOME: Completion of the course made the students well known to
1) the debate on media and the social world, the rural-urban divide and the history of the grass-root media.
2) the history of gender rights with special reference to India and the theories of mass media and society in the aspects of gender empowerment and identity.
3) the theory of media and masculinity in India
4) the idea of the public sphere and gender issues. The concept of genres regarding gender issues.
5) the history of UDHR, theoretical perspective of mass media and human rights in India

COURSE NAME: GE2
COURSE CODE: JORGGEC02T
TOPIC NAME: Introduction to Film Studies
COURSE OUTCOME: After the completion of this paper, students will be able to understand

1) The different aspects of film as a mass medium.
2) The students will also acquire knowledge about the history of film as a mass medium and the different film forms, styles and movements around the world.
3) Students are also going to study Hindi films of the 1950s and the different government audio

visual organizations of India.

4) The students are also going to have knowledge regarding the language of cinema, basic camera angles, process of editing and different aspects of film editing process.

DUM DUM MOTIJHEEL COLLEGE
DEPARTMENT OF PHILOSOPHY
B.A. PHILOSOPHY (HONS) CBCS SYLLABUS
ISSUED BY THE WEST BENGAL STATE UNIVERSITY
WITH EFFECT FROM THE SESSION : 2018 – 2019

PROGRAM SPECIFIC OUTCOMES

PSO1- ACADEMIC

- The study of Philosophy in general develops the faculty of understanding of the students.
- The study of Logic enriches one's thinking skill and sharpens one's analytical abilities. It equips students to grasp the different issues discussed in mathematics, computer science etc.
- The study of Psychology gives the opportunity for the students to learn about brain states, different personality traits, the sub-conscious and conscious reasons for human .
- The study of Ethics helps a student to gain the ability to evaluate an individual morally so that they can make themselves to become a proper social being.

PSO- RESEARCH

- The Honours course enables the students to develop an insight into the intricacies of the subject and prepare them for more advanced courses like research on subject in various universities.
- Critical Thinking as a course helps the students in their research field hugely.
- Study of Logic helps the students to cope up the logical reasoning portion in the competitive exams.
- Enhance the skill of analysis which help in their research.

PSO-SOCIAL

- Develops the ability to think critically, which makes us more prominent in understanding day-to-day life.
- The ability to solve problems is increased to assess proposed solutions.
- It enhances the quality of writing and speaking, which is not only helpful in our academic area but also in our social life.
- It is the foundation of all knowledge and when utilized properly, can provide us with huge benefits.
- The study of philosophy also helps us to develop communicative skill.

DUM DUM MOTIJHEEL COLLEGE
Course Outcome or Learning Outcome
Three year B.A. /B.Sc. degree course
Under CBCS semester system
HONOURS COURSE IN PHILOSOPHY
With effect from the session: 2018 – 2019

Course Name: CORE COURSE – 1

Course Code: PHIACOR01T

Topic Name: WESTERN PHILOSOPHY - 1

Course Outcomes:

- Building a foundation on the historical evolution of western philosophy covering the Ancient, medieval and modern period.
- To be able to appreciate the profound ideas that sprung from the minds of great philosophers of the modern western world.
- Knowledge about great ancient and modern philosophers' views on Rationalism.
- To enable the students to witness how philosophers who are either predecessors or contemporaries evaluated the theories of others.
- Students get an opportunity to learn both the aspects of Western Philosophy, i.e. the metaphysical and the epistemological aspects.

Course Name: CORE COURSE – 2

Course Code: PHIACOR02T

Topic Name: WESTERN LOGIC - I

Course Outcomes:

- Augments mental capabilities for reasoning, argumentation and derivation.
- Improves the analytical skills and knowledge of the formal techniques of evaluating arguments.
- Enhances ability of critical thinking skills which is very important for our daily life.
- Foundation on Western Logic helps in preparation for competitive examinations .

Course Name: CORE COURSE – 3

Course Code: PHIACOR03T

Topic Name: OUTLINES OF INDIAN PHILOSOPHY

Course Outcome:

- To provide a background on the historical evolution of Indian philosophy covering major schools of thought.
- To learn the meaning and basic characteristics of Indian Philosophy and distinctions between different schools of Indian Philosophy.

- End goal for this course is to go through critically and examine the major issues and important concepts of Indian Philosophy.
- Creating foundation on key concepts of three Nastika Schools (Cārvāka, Buddha and Jaina Philosophy) and two Astika school (Nyāya and Vaiśeṣika Philosophy).
- Advanced understanding on these concepts from both the epistemological and the metaphysical aspects.

Course Name: CORE COURSE – 4

Course Code: PHIACOR04T

Topic Name: WESTERN LOGIC – II

Course Outcome:

- Introduces to the understanding of Quantificational Logic
- Augmentation of the analytical skills and knowledge of the formal techniques of evaluating arguments.
- Ability to understand different kinds of Inductive arguments.
- Enhancement of the mathematical application and reasoning aptitudes by continuous practice of causal arguments, Probability etc.

Course Name: CORE COURSE – 5

Course Code: PHIACOR05T

Topic Name: WESTERN PHILOSOPHY – II

Course Outcome:

- Introduces empirical approach of Western Philosophy along with critically approach of Kantian philosophy
- Enable the students to witness how philosophers who are either predecessors or contemporaries evaluated the theories of others.
- Advanced understanding on different aspects of epistemology and metaphysics from empirical and Kantian perspectives.

Course Name: CORE COURSE – 6

Course Code: PHIACOR06T

Topic Name: OUTLINES OF INDIAN PHILOSOPHY – II

Course Outcome:

- Understanding major concepts of some astika schools,i.e. Sankhya, Yoga, Mimansa and Vedanta.
- Enhancement of comprehensive view of the different philosophical systems
- Foundation on the spiritualistic and holistic aspect of Indian philosophy .
- To understand the ultimate relation between philosophy and life.

Course Name: CORE COURSE – 7

Course Code: PHIACOR07T

Topic Name: WESTERN ETHICS

Course Outcome:

- Introducing the code of conducts related to our voluntary actions.
- Acquire basic knowledge of morality and other ethical theories of west.
- To develop a sense of values and building a path towards an ethical human being.

Course Name: CORE COURSE – 8

Course Code: PHIACOR08T

Topic Name: SOCIAL AND POLITICAL PHILOSOPHY

Course Outcome:

- Foundation related to the primary concepts of social and political philosophy.
- To develop a sense on the contemporary social issues and concerns.
- To acquire the idea after complete the course about the relationship of philosophy with the prevailing social and political systems across ages.
- Better preparing thoughtful and responsible citizens.

Course Name: CORE COURSE – 9

Course Code: PHIACOR09T

Topic Name: PSYCHOLOGY AND PHILOSOPHY OF MIND

Course Outcome:

- Introducing the functioning of human mind.
- To know the definition, nature and scope of psychology.
- To be able to analyze and clarify the different theories of learning, philosophical theories of mind, consciousness, personality, intelligence etc.
- Enhance abilities to analyze psychological issues through scientific reasoning.

Course Name: CORE COURSE – 10

Course Code: PHIACOR10T

Topic Name: Indian Logic: TARKASAMGRAHA

Course Outcome:

- Epistemology consists of the theory of knowledge which also includes a description of inferences related to Indian logic.
- To engage the students in a framework to critically and creatively look at epistemological traditions within a textual reference of "Nyaya-Vaisesika Philosophy" by Annambhatta.
- To get a flavor of how to read and analyze a particular text.

Course Name: CORE COURSE – 11

Course Code: PHIACOR11T

Topic Name: PHILOSOPHY OF LANGUAGE: INDIAN AND WESTERN

Course Outcome:

- Introduction to the physical world and the theory of knowledge as viewed by the western philosophers and Indian philosophers.
- Logical presentation of language as a key attribute to this knowledge by teaching specific texts dealing with this subject is taught in this paper.
- Ability to compare the different approaches of philosophy of language from Western and Indian perspectives as well as modern and traditional views.
- Learn the Speech-Act Theory of P.A Stine.
- Enhanced ability to analysis of language for critical thinking.

Course Name: CORE COURSE – 12

Course Code: PHIACOR12T

Topic Name: ETHICAL AND SOCIAL PHILOSOPHY OF INDIA

Course Outcome:

- Understanding the nature of Indian Ethics and to realize the fact that an ethical life would lead them to attain the highest goal.
- To appreciate the importance of Indian ethical values which are the important building blocks of our human nature.

- Ability to understand the sense of duties and responsibility from traditional Indian perspective.

Course Name: CORE COURSE – 13

Course Code: PHIACOR13T

Topic Name: WESTERN EPISTEMOLOGY AND METAPHYSICS

Course Outcome:

- Introduction to the physical world and the theory of knowledge as viewed by the western philosophers.
- Logical presentation of language is a key attribute to this knowledge.
- Ability to understand and analyze Specific texts dealing with this subject.
- To learn various notions that are beyond the empirical world and understand the distinction between appearance and reality.
- Enhanced power to do the analysis of language for critical thinking.

Course Name: CORE COURSE – 14

Course Code: PHIACOR14T

Topic Name: SOME MODERN INDIAN THINKERS

Course Outcome:

- Foundational knowledge of the works of Indian Philosophers.
- Understanding on the power Nationality and commitments towards the nation.
- Enrichment from the different ethical, spiritual, social and political concepts in pre-independence era.
- To realize the value of karma, the power of truth and its application to daily life.

Course Name: DISCIPLINE SPECIFIC ELECTIVE - 1

Course Code: PHIADSE01T

Topic Name: ELECTIVE LOGIC

Course Outcome:

- Knowledge on how to solve problems in particular method as like set theory.
- Improvement on the analytical skills and knowledge of the formal techniques of evaluating arguments.
- To increase the ability of argumentation, application of reason and logical aptitude.

Course Name: DISCIPLINE SPECIFIC ELECTIVE - 2

Course Code: PHIADSE02T

Topic Name: PRACTICAL ETHICS

Course Outcome:

- Ability to develop own moral values in practical situations.
- Better way of providing guidance to our lives and pathway to principle based decision making.
- Awareness about rights, equality, doctor- patient relationship in health issues, protection of environment etc.
- Understanding professional and theoretical experiences.

Course Name: DISCIPLINE SPECIFIC ELECTIVE - 3

Course Code: PHIADSE03T

Topic Name: THE PHILOSOPHY OF RELIGION

Course Outcome:

- Foundation on philosophy of religion dealing with different religious traditions and their implications.
- Introduction to the theories of orthodox and heterodox schools of philosophy.
- Arguments for the existence and non existence of God, the religious language etc. .

Course Name: DISCIPLINE SPECIFIC ELECTIVE - 4

Course Code: PHIADSE04T

Topic Name: RABINDRANATH SADHANA

Course Outcome:

- Ability to learn and realize the relation between the Individual and the Universal.
- Higher knowledge about sense of Beauty and Infinite.
- To be able to recognize the problem of Evil, Soul and indentify Soul consciousness.

Course Name: DISCIPLINE SPECIFIC ELECTIVE - 5

Course Code: PHIADSE05T

Topic Name: RUSSELL : PROBLEMS OF PHILOSOPHY

Course Outcome:

- To be able to analyze the problems of Philosophy.
- Ability to distinguish between appearance and reality.
- Appreciating value of Philosophy.
- To understand the problems that arise through our simple perception and reasoning.

Course Name: DISCIPLINE SPECIFIC ELECTIVE - 6

Course Code: PHIADSE06T

Topic Name: HUME : AN ENQUIRY CONCERNING HUMAN UNDERSTANDING

Course Outcome:

- Ability to read and learn the text of David Hume ,a renowned philosopher.
- Understand the empirical knowledge as the source of cognition.
- Explain the metaphysical problems from empirical standpoint.
- Critically evaluate the concept of metaphysics, concept of causality and skepticism from Hume' view.

Course Name: SKILL ENHANCEMENT COURSE - 1

Course Code: PHISSEC01M

Topic Name: MEDIA ETHICS

Course Outcome:

- To be able to know the ethical responsibility of media, its role and functions in society.
- To understand the internal relationship between media and democracy as media is an important pillar of democracy.
- Knowledge on the important positive and negative principals which are effective in case of reporting any incident.
- Preparing a scope to consider this field as future profession.

Course Name: SKILL ENHANCEMENT COURSE - 2

Course Code: PHISSEC02M

Topic Name: BUSINESS ETHICS

Course Outcome:

- Knowledge about the ethical values which should be adopted in Business
- To be able to understand the scope and limitation of advertisements in business field.
- Ability to analyze the problem from ethical point of views, profit is necessary but ethical reasoning is one of the inner force of business.

DUM DUM MOTIJHEEL COLLEGE
Course Outcome or Learning Outcome
Three year B.A. /B.Sc. degree course
Under CBCS semester system
GENERAL COURSE IN PHILOSOPHY
With effect from the session: 2018 – 2019

NAME OF THE COURSE : GENERIC ELECTIVE / INTERDISCIPLINARY (GE)

COURSE CODE : PHIHGEC01T

TITLE OF THE PAPER : LOGIC

SEMESTER - I

COURSE OUTCOME :

- Learning and Practicing Logic helps to know the basic foundation of arguments, which is very necessary to know any subject.
- It enhances the power of ability for applying the Skill and Tools to know the same.
- It develops value feeling and reasoning power of the students'.

COURSE CODE : PHIHGEC02T

TITLE OF THE PAPER : WESTERN EPISTEMOLOGY AND METAPHYSICS

SEMESTER - II

COURSE OUTCOME :

- Learning and reading of Western Epistemology and Metaphysics students will get to know the definition and conditions of valid knowledge from the western perspective.
- It helps to know the reason to read the Metaphysical theories and its connotation.
- It enhances the power of ability to get knowledge more rightly.

COURSE CODE : PHIHGEC03T

TITLE OF THE PAPER : INDIAN EPISTEMOLOGY AND METAPHYSICS

SEMESTER - III

COURSE OUTCOME :

- Learning and reading of Indian Epistemology students will get to know the definition and ways to get knowledge from the Indian perspective.

- It helps to know the reason to read the epistemological and metaphysical theories and its connotation.
- Learning of different epistemological theories students may get to know different types of valid knowledge (Prama) and also about Invalid Knowledge (Aprama).
- It enhances the power of ability to get knowledge more rightly.

COURSE CODE : PHIHGEC04T

TITLE OF THE PAPER : ETHICS INDIAN AND WESTERN

SEMESTER - IV

COURSE OUTCOME :

- Learning and reading of Ethics Indian and Western students will get the knowledge of Right and Wrong behaviour from Indian and western both perspective.
- It helps to build value feeling and its connotation in their life.
- Learning of different ethical theories from the Indian ethical perspective students come to know in which path a person may get the ultimate goal of life, that is Moksha .
- In a same way learning of different ethical theories from the Western ethical perspective students come to know which of the human behaviour may be identified as right or wrong or ethical or moral .
- It helps the students to know how and why moral action may be the reason punishment .
- It helps to build the justification power of students .

NAME OF THE COURSE : DISCIPLINE ELECTIVE COURSE

COURSE CODE : PHIGDSE01T

TITLE OF THE PAPER : APPLIED ETHICS

SEMESTER - V

COURSE OUTCOME :

- By reading Applied Ethics students able to know about some practical problems and their probable solutions related to their practical life .
- It defines how morality or moral action is an important factor to live a life in a sustainable environment.
- Students may aware about connotation of moral value feeling in their daily life from the western ethical perspective.
- In a same way learning and practical application of different ethical theories from the Western ethical perspective students come to know which of the human behaviour may be identified as right or wrong or ethical or moral .

- It also helps to build the justification power of students .

COURSE CODE : PHIGDSE03T

TITLE OF THE PAPER : SOCIAL AND POLITICAL PHILOSOPHY

SEMESTER - VI

COURSE OUTCOME :

- Learning and reading of Social Political Philosophy students will acquire knowledge about the nature and scope of Social and Political Philosophy and their inter relation.
- Students able to know about the criterion to establish Society and state in their highest position, which may change as per the necessity.
- It defines the necessity and activity of different Institution, Culture, Societal groups.
- Students may aware about the Class and Cast and community .
- It also helps to Understand different types of Political theories and its pragmatic necessity .

NAME OF THE COURSE : GENERIC ELECTIVE (GE)

COURSE CODE : PHIGGEC01T

TITLE OF THE PAPER : THE PHILOSOPHY OF SELF - DEVELOPMENT

SEMESTER - V

COURSE OUTCOME :

- By reading of different theories related to syllabus of Philosophy of Self Development students may get to know the highest valued path to live the life.
- It helps to build Students' personality .
- Different theories encourages students to do the best always to be a good human being .
- It helps the students to do their societal roll.
- It helps to understand the value and moral justification of different socio – political theories.

COURSE CODE : PHIGGEC02T

TITLE OF THE PAPER : CRITICAL THINKING

SEMESTER - VI

COURSE OUTCOME :

- By reading Critical Thinking students will get to know how a situation may be define in various way.

- It helps to understand different levels to get a justified knowledge .
- It helps to build the power to make a right decision according to the situation .
- It also helps to build Students' personality .
- It helps to understand the draw back of partiality.
- It helps the students to understand their societal role in a justified manner.

NAME OF THE COURSE : SKILL ENHANCEMENT COURSE

COURSE CODE : PHISSEC01M

TITLE OF THE PAPER : MEDIA ETHICS

SEMESTER - III & V

COURSE OUTCOME :

- By reading of Media Ethics students able to know about the Ethical role in Media.
- It helps to understand the importance and role of Media in society.
- It also helps to understand the role of media in democratic life .

COURSE CODE : PHISSEC02M

TITLE OF THE PAPER : BUSINESS ETHICS

SEMESTER - IV & VI

COURSE OUTCOME :

- By reading of Business Ethics students able to know about the ethical role in Business.
- It helps to understand the importance and justification of ethics in business.
- It also helps to understand the role of business in proper way in our societal life .

DUM DUM MOTIJHEEL COLLEGE

DEPARTMENT OF POLITICAL SCIENCE

B.A. POLITICAL SCIENCE (HONOURS) CBCS SYLLABUS

ISSUED BY WEST BENGAL STATE UNIVERSITY

WITH EFFECT FROM 2018-19

PROGRAMME SPECIFIC OUTCOMES

- This program helps the students understand the world they're living in better through the knowledge of structures and institution that govern them nationally and also at the global level. Students in this program learn about various aspects of political as well as socio-economic relations in national and international spheres, with special emphasis on the approaches and theories which is the essence of the subject. They learn how global and national developments affect the society at large.

- The point of knowledge gathering and accumulation on the part of the beneficiaries (students) may be stated. Theoretical and practical knowledge from projects and assignments made by them discloses enough testimony to the mental development in thinking process of the students. This will of course lead them to the path of progressive thinking.

- This course augments rapidly the task/area of socialisation of the students. From informal to formal, metaphysical to real situation, they experience newer values and fellow feelings, sense of cooperation accommodative spirit and overall a mentality of broadness and active participation in the socio- political structure of the country.

- The point of awareness on a large basis is an important factor in this respect. The students study state and society, political culture, modernisation public administration along with Indian socio-political thought as well as of the different political systems of the world. They are given lessons in the light of social and political development so that they can link present with the past and look forward for the future.

- This course further helps the students for their placement in the local, national and global field. By correct application of the theoretical knowledge to practice, they are hereby empowered to establish themselves in different areas of activity. The question of multiple choice widening the horizon of thinking and innovation thus enables them to look into the future development, economic, social and political.

- In this course, social and political thought is organically linked with interplay of factors involving society, economy and politics. The critical importance of the milieu in which ideas get articulated is emphasized. Given the dialectical interaction between ideas and their context, it provides a persuasive format that is relative to the circumstances. This is an approach that gives space to the search for alternatives within a framework that adequately underlines the organic nature of ideas which are always in constant flux and hence their fluid nature. What is most determining in the entire process is the organic link with a particular reality that always leaves an imprint in the construction of ideas. European nationalist ideas which influenced the Indian nationalists did have limitations

in the particular socio-economic context of Africa and Asia due to their alien origin. Thus the European nationalist trail is indigenised substantially by inventing indigenous equivalents and investing these with additional meanings and nuances.

- The two basic forces or elements of nationalism and democratisation are imparted in the courses esp. Constitutional and comparative political processes. These enable and will be of great assistance for the students who will pursue higher studies in different fields. These will help them in choosing their future professions. So, this course definitely helps as a career builder for the student community.
- The subject provides the students with a multidisciplinary approach and prepares them for further academic study and also for career in public and private sectors. They learn how to evaluate data and build critical and analytical thinking and creative writing skills. They understand the world and the structures governing citizens, good governance, global governance and societal awareness. They also learn to inculcate a multidisciplinary approach to world problems.

DUM DUM MOTIJHEEL COLLEGE
Course Outcome or Learning Outcome
Three year B.A. /B.Sc. degree course
Under CBCS semester system
HONOURS COURSE IN POLITICAL SCIENCE
With effect from the session: 2018 – 2019

COURSE OBJECTIVES(HONOURS/CORE COURSE)

COURSE NAME: Paper – 1
COURSE CODE: PLSACOR01T
TOPIC NAME: Understanding Political Theory
COURSE OUTCOME:
This course introduces the students to the idea of political theory, its history and approaches, and an assessment of its critical and contemporary trends and is designed to reconcile political theory and practice through reflections on the ideas and practices related to democracy.

COURSE NAME: Paper – 2
COURSE CODE: PLSACOR02T
TOPIC NAME: Constitutional Government and Democracy in India
COURSE OUTCOME:
This course acquaints students with the constitutional design of state structures and institutions, and their actual working over time. It further encourages a study of state institutions in their mutual interaction, and in interaction with the larger extra-constitutional environment.

COURSE NAME: Paper – 3
COURSE CODE: PLSACOR03T
TOPIC NAME: Political Theory-Concepts and Debates
COURSE OUTCOME:
This course helps the student familiarize with the basic normative concepts of political theory. Each concept is related to a crucial political issue that requires analysis with the aid of our conceptual understanding. This exercise is designed to encourage critical and reflective analysis and interpretation of social practices through the relevant conceptual toolkit. It further introduces the students to the important debates in the subject.

COURSE NAME: Paper – 4
COURSE CODE: PLSACOR04T
TOPIC NAME: Political Process in India
COURSE OUTCOME:
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.

COURSE NAME: Paper – 5
COURSE CODE: PLSACOR05T
TOPIC NAME: Introduction to Comparative Government and Politics
COURSE OUTCOME:
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.

COURSE NAME: Paper – 6
COURSE CODE: PLSACOR06T
TOPIC NAME: Perspectives on Public Administration
COURSE OUTCOME:
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.

COURSE NAME: Paper – 7
COURSE CODE: PLSACOR07T

TOPIC NAME: Perspectives on International Relations and World History
COURSE OUTCOME:
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; then the 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 analyse the same from different perspectives. A key objective of the course is to make students aware of the implicit Euro- centrism of International Relations by highlighting certain specific perspectives from the Global South.

COURSE NAME: Paper – 8
COURSE CODE: PLSACOR08T
TOPIC NAME: Political Processes and Institutions in Comparative Perspective
COURSE OUTCOME:
In this course students will be trained in the application of comparative methods to the study of politics. The course is comparative in both what we study and how we study. In the process the course aims to introduce undergraduate students to some of the range of issues, literature, and methods that cover comparative political arena

COURSE NAME: Paper – 9
COURSE CODE: PLSACOR09T
TOPIC NAME: Public Policy and Administration in India
COURSE OUTCOME:
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, financial management, citizens and administration and social welfare from a non-western perspective.

COURSE NAME: Paper – 10
COURSE CODE: PLSACOR10T
TOPIC NAME: Global Politics
COURSE OUTCOME:
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. It imparts an understanding of the working of the world economy, 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.

COURSE NAME: Paper – 11
COURSE CODE: PLSACOR11T
TOPIC NAME: Classical Political Philosophy
COURSE OUTCOME:
One of the major objectives of this course is to introduce the students to the key debates and ideas in Classical political philosophy. The course gives an introduction to Political Thought processes and Theory making in the Western countries. From the Greek Political

thinkers to down the ages including Utilitarians, this course introduces the student to the richness and variations in the political perceptions of Western Thinkers.

COURSE NAME: Paper – 12
COURSE CODE: PLSACOR12T
TOPIC NAME: Indian Political Thought-I
COURSE OUTCOME:
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.

COURSE NAME: Paper – 13
COURSE CODE: PLSACOR13T
TOPIC NAME: Modern Political Philosophy
COURSE OUTCOME:
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.

COURSE NAME: Paper – 14
COURSE CODE: PLSACOR41T
TOPIC NAME: Indian Political Thought-II
COURSE OUTCOME:
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 essential readings are meant for teachers as well as the more interested students.

COURSE NAME: Discipline Specific Elective-1
COURSE CODE: PLSADSE01T
TOPIC NAME: Reading Gandhi
COURSE OUTCOME: This course introduces the students to the important characteristics of Gandhian philosophy. As a student of political science it is important to understand the Gandhian ideology of Satyagraha, ahimsa, women empowerment, sustainability, decentralisation e.t.c which is quite relevant in the modern world.

COURSE NAME: Discipline Specific Elective-2
COURSE CODE: PLSADSE03T
TOPIC NAME: Understanding Global Politics
COURSE OUTCOME: This course highlights to the students the key debates on the meaning and nature of globalization by addressing its political, economic, social, cultural and technological dimensions. It imparts an understanding of the working of the world

economy, 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.

COURSE NAME: Discipline Specific Elective-3
COURSE CODE:PLSADSE04T
TOPIC NAME: Public Policy in India
COURSE OUTCOME: This course helps the students understand the basic concepts of public policy making, theories of state, political economy, interest groups and social movements. The students will learn to analyse the policy decisions of various states and models of decision making. This course also highlights the various models of policy like Nehruvian vision, Economic Liberalisation and other developments.

COURSE NAME: Discipline Specific Elective-4
COURSE CODE: PLSADSE06T
TOPIC NAME: Governance: Issues and Challenges
COURSE OUTCOME: This course provides a basic understanding about the functioning, ideas, principles, motivation and challenges of governance, particularly, democratic 'good' governance. It also highlights the importance of green governance, CSR, RTI, e-governance in present times. The students develop an understanding about the relationship between citizenship and governance.

COURSE NAME: Skill Enhancement Course-1
COURSE CODE: PLSSSEC01M
TOPIC NAME: Democratic Awareness with Legal Literacy
COURSE OUTCOME: The Proposed course aims to acquaint student with the structure and manner of functioning of the legal system in India. Fundamental rights and the rule of law have been established in the knowledge of students through this paper. The students will be well acquainted with laws related to daily life like Child Marriage Prevention Act, Cyber Law, Consumer Protection Act , Dowry Prevention Act etc .The students will be informed about filing an FIR, information about the detention, information about the rights of the detainees after detention, which is a very important for their social life.

COURSE NAME: Skill Enhancement Course-2
COURSE CODE: PLSSSEC02M
TOPIC NAME: Public Opinion and Survey Research
COURSE OUTCOME: This course will introduce the students to the debates, principles and practices of public opinion polling in the context of democracies, with special reference to India. It will familiarize the students with how to conceptualize and measure public opinion using quantitative methods, with particular attention being paid to developing basic skills pertaining to the collection, analysis and utilization of quantitative data.

DUM DUM MOTIJHEEL COLLEGE
Course Outcome or Learning Outcome

Three year B.A. /B.Sc. degree course

Under CBCS semester system
GENERAL COURSE IN POLITICAL SCIENCE
With effect from the session: 2018 – 2019

COURSE NAME: Generic Elective/ General (Core) Course-1
COURSE CODE: PLSHGEC01T / PLSGCOR01T

TOPIC NAME: Introduction to Political Theory
COURSE OUTCOME: This course will introduce the students to basic concepts of politics and political science. The objective is to familiarise the students with concept democracy, liberty, rights, justice, gender and civil society. This will act as a pathway to gain and develop political knowledge.

COURSE NAME: Generic Elective/ General (Core) Course-2
COURSE CODE: PLSHGEC02T / PLSGCOR02T

TOPIC NAME: Indian Government and Politics
COURSE OUTCOME: This course acquaints students with the constitutional design of state structures and institutions, and their actual working over time. It further encourages a study of state institutions in their mutual interaction, and in interaction with the larger extra-constitutional environment.

COURSE NAME: Generic Elective/ General (Core) Course-3
COURSE CODE: PLSHGEC03T / PLSGCOR03T

TOPIC NAME: Comparative Government and Politics
COURSE OUTCOME: 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.

COURSE NAME: Generic Elective/ General (Core) Course-4
COURSE CODE: PLSHGEC04T / PLSGCOR04T

TOPIC NAME: Introduction to International Relations
COURSE OUTCOME: 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; then the 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 analyse the same from different perspectives.

COURSE NAME: Discipline Specific Elective-1
COURSE CODE: PLSGDSE01T
TOPIC NAME: Reading Gandhi
COURSE OUTCOME: This course introduces the students to the important characteristics of Gandhian philosophy. As a student of political science it is important to understand the Gandhian ideology of Satyagraha, ahimsa, women empowerment, sustainability, decentralisation e.t.c which is quite relevant in the modern world.

COURSE NAME: Generic Elective Course -1
COURSE CODE: PLSGGEC01T
TOPIC NAME: Human Rights in a Comparative Perspective
COURSE OUTCOME: This course highlights to the students the basic concept, nature and importance of human rights. It helps in developing awareness about importance of human rights in national and international sphere. The students learn about the cultural and ideological similarities and differences in the approach towards Human rights in among nations across the globe. This helps in understanding the different dimensions and challenges of human rights.

COURSE NAME: Discipline Specific Elective-3
COURSE CODE:PLSGDSE04T
TOPIC NAME: Public Policy in India
COURSE OUTCOME: This course helps the students understand the basic concepts of public policy making, theories of state, political economy, interest groups and social movements. The students will learn to analyse the policy decisions of various states and models of decision making. This course also highlights the various models of policy like Nehruvian vision, Economic Liberalisation and other developments.

COURSE NAME: Generic Elective Course -2
COURSE CODE: PLSGGEC02T
TOPIC NAME: Governance: Issues and Challenges
COURSE OUTCOME: This course provides a basic understanding about the functioning, ideas, principles, motivation and challenges of governance, particularly, democratic 'good' governance. It also highlights the importance of green governance, CSR, RTI, e-governance in present times. The students develop an understanding about the relationship between citizenship and governance.

DUMDUM MOTIJHEEL COLLEGE

UNDER GRADUATE DEPARTMENT OF SANSKRIT
B.A. Sanskrit (programme) CBCS Syllabus
With effect from 2018-19

Programme Specific Outcomes

- The undergraduate course in Sanskrit (programme course) has been designed in a way so that the students can learn a variety of traditional disciplines in Sanskrit studies and they can strengthen their knowledge of the language.
- After successfully completing the course the students will obtain a clear vision about Vedic studies, the huge volume of literature like – prose, poetry and drama literary criticism; vyakarana which covers a large area of linguistics; darshana i.e. philosophy and logic; dharma Shastra which covers many areas of sociology and legal studies.
- The Programmes course will especially focus on issues which have a contemporary resonance.
- Through the project works they can enhance their ideas about research.
- Since the programme also offers a wide range of elective courses (Discipline specific electives) to the students, skills learnt during the entire course will immensely help the students to pursue their post graduate studies and undertake further research in these disciplines.

DUMDUM MOTIJHEEL COLLEGE

Course Outcome or Learning Outcome
Three year B.A. /B.Sc. degree course
Under CBCS semester system
PROGRAMME COURSE IN SANSKRIT
With effect from the session: 2018 – 2019

Course Name: Discipline Specific Core1A
Course Code: SANGCOR01T
Topic Name: Sanskrit Poetry
Course Outcome: After successful completion of this course the students will be able to:
1. Understand the compositions and writing style of the great Poet Kalidasa.
2. Understand the compositions and writing style of Bharavi, another great poet after Kalidasa.
3. Understand the ethical values of Nitishatakam.
4. Understand the history of Sanskrit Poetry.

Course Name: Discipline Specific Core1B
Course Code: SANGCOR02T
Topic Name: Sanskrit Prose
Course Outcome: After successful completion of this course the students will be able to:
1. Understand the prose compositions based on Shukanasopadesha.
2. Understand the prose compositions of modern writings based on Shivarajavijayam.
3. Understand the comparison of ancient and modern prose writings.
4. Understand the short history of prose in Sanskrit.

Course Name: AECC
Course Code: SANSAEC01M
Topic Name: Sanskrit Language structure
Course Outcome: After successful completion of this course the students will be able to:
1. Understand the prose compositions based on Sanskrit passage.
2. Understand the prose compositions of modern writings in Sanskrit .
3. Understand the comparison of ancient and modern prose writings.
4. Understand structure of Sanskrit.

Course Name: Discipline Specific Core1C
Course Code: SANGCOR03T
Topic Name: Sanskrit Drama
Course Outcome: After successful completion of this course students will be able to:
1. understand the drama Svapnavasavadattam of Bhasa
2. learn the famous drama Abhijnana Sakuntalam of the great poet and dramatist Kalidasa.
3. Understand structure of Sanskrit Language

Course Name: Modern Indian Language
Course Code: SANLCOR01T
Topic Name: Prastavana& 1st two stories from Mitralabha & Nitishatakam–Bhatrihari(1-20 Verses, 1st two Paddhatis)
Course Outcome: After successful completion of this course students will be able to:
1. Understand short stories written in Sanskrit.
2. Learn stories from Mitralabha.
3. Understand short verses in Sanskrit.
4. Learn selected verses from Nitishatakam

Course Name: Discipline Specific Core1D

Course Code: SANGCOR04T
Topic Name: Sanskrit Grammar
Course Outcome: After successful completion of this course the students will be able to:
1. Understand basic Sanskrit Grammar.
2. Understand Sanjaprakaran according to Laghusiddhantakaumudi.
3. Understand Sandhiprakarana.
4. Understand Karakaprakarana

Course Name: Discipline Specific Core1D
Course Code: SANLCOR02T
Topic Name: Sanskrit Grammar
Course Outcome: After successful completion of this course students will be able to:
1. Understand basic Sanskrit grammar.
2. Learn Sanskrit Karaka.
3. Learn sandhis.
4. Understand short stories from Panchatantra.

Course Name: Discipline Specific Elective1A
Course Code: SANGDSE01T
Topic Name: Veda & Darshana
Course Outcome: After successful completion of this course the students will be able to :
1. Understand vedic literature
2. Understand Rudradhyaya of Shuklayajurveda.
3. Understand Vedanta literature.
4. Understand Brihadaranyaka Upanisad.

Course Name: Discipline Specific Elective1A
Course Code: SANGDSE02T
Topic Name: Vyakarana & Kavya
Course Outcome: After successful completion of this course
the students will be able to :
1.Understand computational linguistics.
2.Understand the application of computational linguistics.
3.Understand the Kavya literature.

Course Name: Course Name: SEC1 (Skill Based)
Course Code: SANSSEC01M
Topic Name: Basic Sanskrit
Course Outcome After successful completion of this course the students will be able to
1. Attain ability to translate Sankrit passage into other languages
2. Attain ability to translate other languages into Sanskrit
3. Attain ability to write paragraph in Sanskrit language
4. Attain ability to write letter in Sanskrit language

Course Name: Course Name: SEC2 (Skill Based)
Course Code: SANSSEC02M
Topic Name: Spoken Sanskrit & Computer, Awareness for Sanskrit
Course Outcome: After successful completion of this course the students will be able to
1. Ability to read Sankrit passage

2. Attain ability to speak in Sanskrit
3. Attain ability to type paragraph in Sanskrit language

Course Name: Generic Elective Course
Course Code: SANGGEC01T
Topic Name: Basic Sanskrit
Course Outcome: After successful completion of this course students will be able to :

1. Understand basic grammar of Sanskrit.
2. Learn declensions of nouns and pronouns.
3. Learn active and passive forms of verbs.
4. Learn sandhi and pratyayas.
5. Understand the philosophy of Gita (12th chapter).

Course Name: Generic Elective Course
Course Code: SANGGEC02T
Topic Name: Critical Survey of Sanskrit Literature
Course Outcome: After successful completion of this course students will be able to :

1. Understand Vedic literature
2. Understand the brief history of Vyakarana, Darshana and poetics.
3. Learn Ramayana as a source text and its cultural importance
4. Understand the encyclopaedic nature of Mahabharata and its cultural importance.
5. Understand the social, cultural and historical importance of the Puranas.

DUM DUM MOTIJHEEL COLLEGE

DEPARTMENT OF SOCIOLOGY

B.A. Sociology (Hons) CBCS Syllabus

Issued by the West Bengal StateUniversity

With effect from 2018-19

Programme Specific Outcomes

- PSO 1 Understand basic concepts and ideas of sociological theory and how they are used in sociologicalexplanation of social behavior.
- PSO 2 Understand how to collect, analyze and interpret empirical evidence in sociological research.
- PSO 3 Gain familiarity with and develop an understanding of core substantive areas of sociological inquiry.PSO 4 Express sociological ideas clearly and coherently both in writing and in oral presentations.

DUM DUM MOTIJHEEL COLLEGE
Course Outcome or Learning Outcome
Three year B.A. /B.Sc. degree course
Under CBCS semester system
HONOURS COURSE IN SOCIOLOGY
With effect from the session: 2018 – 2019

Course Name: **Core Course -01**
Course Code: **SOCACOR01T**
Topic Name: **Introduction to Sociology I**

Course Outcome: The course will help the students to develop a sociological way of thinking. Students will gain knowledge about the emergence of Sociology as an independent subject of enquiry as well as the basic concepts of Sociology, social institutions and social processes.

Course Name: **Core Course -02**
Course Code: **SOCACOR02T**
Topic Name: **Sociology of India I**

Course Outcome: In this paper the students will have a deep understanding into the core of Indian society. The students will be able to understand the different concepts and institutions of Indian Society such as caste, tribe, village, kinship, religion and different courses such as Colonial discourse, Nationalist discourse, sub-altern critique.

Course Name: **Core Course -03**
Course Code: **SOCACOR03T**
Topic Name: **Introduction to Sociology II**

Course Outcome: Students would be able to gain knowledge about the emergence and development of Sociology and the pioneers of the subject like Auguste Comte, Karl Marx, Emile Durkheim , Max Weber, Vilfredo Pareto etc. and some of their important classical theories along with the development of sociological thoughts in India.

Course Name: **Core Course -04**
Course Code: **SOCACOR04T**
Topic Name: **Sociology of India II**

Course Outcome: After completion of the course, the learners would be in a position to understand different ideas of Gandhi, Ambedkar, G.S. Ghurye, Louis Dumont, M.N. Srinivas, S. C. Dube; different movements in India such as Women's movement, peasant movement, ethnic movements; challenges to Civilization, State and Society such as communalism, secularism, nationalism etc.

Course Name: **Core Course -05**
Course Code: **SOCACOR05T**
Topic Name: **Political Sociology**
Course Outcome: The course will help the students to understand the major theoretical debates and concepts in Political Sociology and the political relationships through the notions of power, governance, state and society.

Course Name: **Core Course -06**
Course Code: **SOCACOR06T**
Topic Name: **Sociology of Religion**
Course Outcome: After completion of the course, the learners would be in a position to understand the social functions of religion, theory of religion of Emile Durkheim, Karl Marx and Max Weber; concepts of sacred, myth, rituals etc.

Course Name: **Core Course -07**
Course Code: **SOCACOR07T**
Topic Name: **Sociology of Gender**

Course Outcome: The course will help the students to know about gender as a critical sociological lens of enquiry in relation to various social fields.

Course Name: **Core Course -08**
Course Code: **SOCACOR08T**
Topic Name: **Economic Sociology**
Course Outcome: After completion of the course, the student would be in a position to understand the meaning of new economic sociology, forms of exchange i.e. reciprocity and gift, system of production in hunting and gathering society, capitalism, socialism etc; meaning of development and globalization. The students will also be in a position to comprehend how the material conditions of life are produced.

Course Name: **Core Course -09**
Course Code: **SOCACOR09T**
Topic Name: **Sociology of Kinship**

Course Outcome: The course will help to understand the general principles of kinship and marriage with substantiated ethnographies and new directions in kinship studies.

Course Name: **Core Course -10**
Course Code: **SOCACOR10T**
Topic Name: **Social Stratification**

Course Outcome: After completion of the course, the students would be in a position to understand the meaning of social stratification, open and closed patterns of social stratification, different theories of stratification, functional stratification theory, social mobility and social reproduction.

Course Name: **Core Course -11**
Course Code: **SOCACOR11T**
Topic Name: **Sociological Thinkers- I**

Course Outcome: With the completion of course, the students will get further in-depth knowledge about the classical theories of eminent sociologist Emile Durkheim as well as classical theories of Max Weber and Karl Marx which enriched the subject of sociology.

Course Name: **Core Course -12**
Course Code: **SOCACOR12T**
Topic Name: **Sociological Research Methods**

Course Outcome: After the course, the students will understand the meaning, scope and importance of social research, scientific method and its logic. They will gain knowledge about the types of research, techniques of data collection.

Course Name: **Core Course -13**
Course Code: **SOCACOR13T**
Topic Name: **Sociological Thinkers I**

Course Outcome: Students undersood history of social theory, social and political understanding of the society, thoughts of Talcott Parsons, Claude Levi Strauss, G. H. Mead, Erving Goffman, Peter L. Berger, Thomas Luckmann, Max Horkheimar, T.W. Adorno, Herbert Marcuse and Pierre Bourdieu.

Course Name: **Core Course -14**
Course Code: **SOCACOR14T**
Topic Name: **Sociological Research Methods II**

Course Outcome: Students understood Scientific Method in Social Science Research, quantitative and qualitative approach. Research motivated to continue higher studies in Research.

Course Name: **Discipline Specific Elective**
Course Code: **SOCADSE01T**
Topic Name: **Urban Sociology**

Course Outcome: This course will help to analyze the evolution and structure of the urban community as a socio- spatial system. The students will able to examine the social, historical, political, cultural, economic and environmental forces that have shaped urban environments.

Course Name: **Discipline Specific Elective**
Course Code: **SOCADSE02T**
Topic Name: **Agrarian Sociology**

Course Outcome: After completion of the course, the student will understand the social, economic and power structure of Rural Indian Society and examine the changing trends in Indian villages. The students will able to analyze the rural development, strategies, policies and programmes and understand the methods and approaches forthe study of rural development in India.

Course Name: **Discipline Specific Elective**
Course Code: **SOCADSE04T**
Topic Name: **SOCIOLOGY OF WORK**

Course Outcome: The course will familiarize students with the basic concepts of work and industry and capitalistic notion in Sociology. It will provide basic understanding of the social structure of Society and sources towards formation of industry and technology. The students will able to understand the development of Sociological Thought.

Course Name: **Discipline Specific Elective**
Course Code: **SOCADSE06T**
Topic Name: **Indian Sociological Traditions**

Course Outcome: The course will ensure that students have conceptual clarity and can articulate the main debates and arguments with regard to Sociology in India. It acquaints the students to the continuities and contradictions in Indian society. It ensures that students have understood the formation of the discipline in India and the challenges that it has faced.

Course Name: **Skill Enhancement Courses**
Course Code: **SOCSSEC01M**
Topic Name: **Theory and Practice of Development**

Course Outcome: After completion of the course, the students would be able to understand different ideas of, and approaches to, development. The students will be able to explain the dynamics between developmental institutions, actors, policies, theories, approaches, and ideas and the implementation, consequences, and experiences of development. They will be able to critically analyse the key features of developmental processes in postcolonial India.

Course Name: **Skill Enhancement Courses**
Course Code: **SOCSSEC02M**
Topic Name: **Gender Sensitization**

Course Outcome: It will help the students to develop an understanding of ‘sex’, ‘sexuality’, and ‘queer’ terminologies. They will be able to identify the main agents of gender socialization and their impact on children’s and adult’s gender construction. It provides students an understanding about how femininities and masculinities vary by race, ethnicity, class and sexuality, and how this affects gender relations and experiences.

DUM DUM MOTIJHEEL COLLEGE
Course Outcome or Learning Outcome
Three year B.A. /B.Sc. degree course
Under CBCS semester system
GENERAL COURSE IN SOCIOLOGY
With effect from the session: 2018 – 2019

Course Name: **CORE COURSE 1**
Course Code: **SOCGCOR01T**
Topic Name: **Introduction to Sociology**

Course Outcome: The course will help the students to develop a sociological way of thinking. Students will gain knowledge about the emergence of Sociology as an independent subject of enquiry as well as the basic concepts of Sociology, social institutions and social processes.

Course Name: **CORE COURSE 2**
Course Code: **SOCGCOR02T**
Topic Name: **Introduction to Sociology**

Course Outcome: In this paper the students will have a deep understanding into the core of Indian society. The students will be able to understand the different concepts and institutions of Indian Society such as caste, tribe, village, kinship, religion and different courses such as Colonial discourse, Nationalist discourse, sub-altern critique.

Course Name: **CORE COURSE 3**
Course Code: **SOCGCOR03T**
Topic Name: **Sociological Theories**

Course Outcome: With the completion of course, the students will get further in-depth knowledge about the classical theories of eminent sociologist Emile Durkheim as well as classical theories of Max Weber and Karl Marx which enriched the subject of sociology.

Course Name: **CORE COURSE 4**
Course Code: **SOCGCOR04T**
Topic Name: **Methods of Sociological Enquiry**

Course Outcome: After the course, the students will understand the meaning, scope and importance of social research, scientific method and its logic. They will gain knowledge about the types of research, techniques of data collection.

Course Name: **Discipline Specific Elective 02**
Course Code: **SOCGDSE02T**
Topic Name: **Marriage, Family and Kinship**

Course Outcome: After completing the course, the students are expected to possess a fundamental knowledge about the structure and functioning of the basic institutions of the Marriage, Family and Kinship. The students are also expected to be well acquainted with the all-round changes that have taken place in the structure and functioning of these institutions over a period of time.

Course Name: **Discipline Specific Elective 03**
Course Code: **SOCGDSE03T**
Topic Name: **Social Stratification**

Course Outcome: After completing the course, the students will learn about the socio-historical context of stratification theoretical concerns and problems and contemporary issues related to inequalities and its forms. The students will able to examine forms of stratification, understanding the relevance of caste, race and ethnic identities in contemporary world.

Course Name: **Generic Elective 01**
Course Code: **SOCGGEC01T**
Topic Name: **Polity and Society in India**

Course Outcome: After going through this course, students will be able to discuss the social system in India and explain the elements of diversity in India. The students will be able to explain the meaning and importance of national integration and also the highlights the present day caste politics in India.

Course Name: **Skill Enhancement Courses**
Course Code: **SOCSSEC01M**
Topic Name: **Theory and Practice of Development**

Course Outcome: After completion of the course, the students would be able to understand different ideas of, and approaches to, development. The students will be able to explain the dynamics between developmental institutions, actors, policies, theories, approaches, and ideas and the implementation, consequences, and experiences of development. They will be able to critically analyse the key features of developmental processes in postcolonial India.

Course Name: **Generic Elective 02**
Course Code: **SOCGGEC02T**
Topic Name: **Economy and Society**

Course Outcome: After completion of the course, the student would be in a position to understand the meaning of new economic sociology, forms of exchange i.e. reciprocity and gift, system of production in hunting and gathering society, capitalism, socialism etc; meaning of development and globalization. The students will also be in a position to comprehend how the material conditions of life are produced and reproduced through social pressures, social cause and effect of various economic phenomena.

Course Name: **Skill Enhancement Courses**
Course Code: **SOCSSEC02M**
Topic Name: **Gender Sensitization**

Course Outcome: It will help the students to develop an understanding of 'sex', 'sexuality', and 'queer' terminologies. They will be able to identify the main agents of gender socialization and their impact on children's and adult's gender construction. It provides students an understanding about how femininities and masculinities vary by race, ethnicity, class and sexuality, and how this affects gender relations and experiences.

Department of English
Dum Dum Motijheel College
Name of the Academic Program: M. A. in English

Program Specific Outcomes (PSO)

After successful completion of M.A. in English, students gain the knowledge of the following:

- Students will be able to use language efficiently and to employ language abilities for professional growth.
- Students will be able to enhance the learners' language awareness and help them to describe, analyse and explain language in a systematic manner.
- Students will be able to understand and analyze colonial and contemporary Indian realities like identity, caste, class, gender, race, borders, religion and communal issues.
- Students will be able to learn to connect the thoughts and ideologies of the Indian writers with the established Western literary canon and also find out how in terms of form and content these writers have challenged, modified and re-appropriated the Western canon.
- Students will be able to apply for jobs in both the academia (teaching) as well as sectors such as journalism, advertising, content writing, social service schemes, etc, which demand knowledge of the social dynamics on the field.
- Students will be able to learn how to use style sheet in formatting research papers and documenting critical sources.
- Students will be able to grasp the development of the British English literature and contextualize it in an important age of the English literature.
- Students will be able to learn how the literature of the Tudor age is transformed and appropriated in the Jacobean age.
- Students will be able to shift from understanding of rigid neoclassicism and public or occasional poetry to an expressive and emotional mode is explained in the context of social and political change.
- Students will be able to understand diverse concerns of contemporary society and the varieties of prose writings in Eighteenth Century.
- Students will be able to understand the concept of English widening to include writings translated into English, with themes and narratives shared across the Global South as found in the geographical terrain of South Asia.
- Students will be able to edit copies efficiently and effectively for popular consumption in print media.
- Students will be able to contextualize the development of British Romantic literature in one of the most significant and influential time that saw the emergence of iconic literary figures in the British Romantic literature**.**
- Students will be able to comprehend the emergence of different kinds of Nineteenth Century prose fiction.

Department of English
Dum Dum Motijheel College

Name of the Academic Program: M. A. in English

- Students will be able to understand and analyze Victorian Poetry & Non-Fictional Prose**.**
- Students will be able to understand and evaluate Modern & Postmodern Critical Theory including its historical, cultural and social context.
- Students will be able to apply their knowledge of English Language Teaching.
- Students will be able to discuss the difficulties and contradictions in defining 'popular literature' using sociological and genre theories.
- Students will be able to critique the European writings of the twentieth century.
- Students will be able to innovations that characterized the spirit of modernist literature in the context of the early twentieth century drama and fiction.
- Students will be able to emphasize the importance of the 'other' literatures written in English.
- Students will be guided in the reading of texts, to write a dissertation and to appear for a viva voce to defend their thesis.
- Students will be able to have an opportunity to learn and execute the classroom application of different pedagogical practices.

Dum Dum Motijheel College
Department of English (PG Unit)

Name of the Academic Program: M.A. in English

Course Code: Core 1
Course Title: Language Studies I
Course Outcome (COs):
1. In this course, learners will be introduced to structural aspects of linguistics like phonetics and phonology, morphology, syntax as well as functional aspects like register and marker, stylistics.
2. Learners will also learn about language varieties and diversities and its social, political and pedagogic implications.
3. The outcome of the course is the development of language awareness. This course enables students to use language efficiently and to employ language abilities for professional growth.

Course Code: Core 2
Course Title: Language Studies II
Course Outcome (COs):
1.The course is designed to introduce the learners to aspects of English language and to help them understand how English as a language is organised and how it functions.
2.The course will enhance the learners' language awareness and help them to describe, analyse and explain language in a systematic manner.
3.This course will provide a foundation that may be supplemented by the fourth semester optional course in ELT.

Course Code: Core 3
Course Title: Colonial & Postcolonial Indian Writing (Fiction & Non-Fiction)
Course Outcome (COs):
1.The course enables the students to engage with colonial and contemporary Indian realities like identity, caste, class, gender, race, borders, religion and communal issues.
2.Writings from main- stream literature and also from the North-east of India have been divided on the basis of genre into two 50 marks sections, one of which is prose- fiction and non-fiction.

Course Code: Core 4
Course Title: Colonial & Postcolonial Indian Writing (Drama & Poetry)
Course Outcome (COs):
1.In this course the drama pieces focus on issues of genre, gender, caste and nationhood.
2.The students learn to connect the thoughts and ideologies of the Indian writers with the established Western literary canon and also find out how in terms of form and content these writers have challenged, modified and re-appropriated the Western canon.

Course Code: Core 5
Course Title: Indian Literature from the Margins
Course Outcome (COs):
1.The course aims to widen the curricula to include the margins which have become increasingly significant in the postmodern world. Studied along with the courses on mainstream literatures, this course introduces voices from the periphery.
2. This course equips the students better to apply for jobs in both the academia (teaching) as well as sectors such as journalism, advertising, content writing, social service schemes, etc, which demand a knowledge of the social dynamics on the field.

Course Code: AECC
Course Title: Academic Writing
Course Outcome (COs):
1.This course aims at orienting the students towards professional academic writing.
2.The students learn how to use style sheet in formatting research papers and documenting critical sources.
3.They also learn how to avoid plagiarism and how to prepare book and film reviews.

Dum Dum Motijheel College
Department of English (PG Unit)

Name of the Academic Program: M.A. in English

Course Code: Core 6
Course Title: Shakespeare & Earlier English Renaissance
Course Outcome (COs):
1.The expected outcome of the course is that the learners are able to grasp the development of the British English literature and contextualise it in an important age of the English literature.
2.The students' readings of Shakespeare, Marlowe and other Elizabethan writers are likely to enhance their critical insight and skills in literary criticism.

Course Code: Core 7
Course Title: The Literature of the Later English Renaissance
Course Outcome (COs):
1. This course is closely linked with both the literature of the early Renaissance/Tudor/Shakespearean age and that of the long eighteenth century that follows.
2.The students learn how the literature of the Tudor age is transformed and appropriated in the Jacobean age, and literature of the Jacobean age presages and reflects the trends of eighteenth century literature.

Course Code: Core 8
Course Title: Literature of the Long Eighteenth Century (Drama & Poetry)
Course Outcome (COs):
1. This course introduces, for students, the marked change in writing of poetry in this age like satire, mock-epic and imitations of the classical poets.
2. The learners are exposed to the shift from rigid neoclassicism and public or occasional poetry to an expressive and emotional mode is explained in the context of social and political change.

Course Code: Core 9
Course Title: Literature of the Long Eighteenth Century (Fiction & Non-Fictional Prose)
Course Outcome (COs):
1. The students are provided with an account of the rise of the novel and the socio-cultural background that led to the emergence of this new genre.
2. The course on prose introduces the students to diverse concerns of contemporary society and the varieties of prose writings are grouped under certain subheadings.

Course Code: Core 10
Course Title: South Asian Literatures
Course Outcome (COs):
1. The course aims to update the English literature curricula in accordance with the trends seen in the academia of the world.
2. This course acquaints the students with the concept of English widening to include writings translated into English, with themes and narratives shared across the Global South as found in the geographical terrain of South Asia.

Course Code: SEC
Course Title: Language Essentials for Copy Editing/ Course on Data Curation
Course Outcome (COs):
1. The aim of this skill enhancement course equips learners with sufficient language proficiency so that they can apply and get desk jobs primarily in print media.
2. At the end of the course, learners are able to edit copies efficiently and effectively for popular consumption in print media.

Dum Dum Motijheel College
Department of English (PG Unit)

Name of the Academic Program: M.A. in English

Course Code: Core 11
Course Title: Romantic Literature
Course Outcome (COs):
1. The outcome of the course is for learners to be able to contextualize the development of British English literature in oneof the most significant and influential time that saw the emergence of iconic literary figures in the British English literature**.**

Course Code: Core 12
Course Title: Nineteenth Century Fiction
Course Outcome (COs):
1. This particular course helps students comprehend the emergence of different kinds of prose fiction and traces the interface between various social discourses and literature.

Course Code: Core 13
Course Title: Victorian Poetry & Non-Fictional Prose
Course Outcome (COs):
1. This paper acquaints the students with the diverse canonical and lesser known poetic voices of the nineteenth century.

Course Code: Core 14
Course Title: Modern & Postmodern Critical Theory
Course Outcome (COs):
1. The course enables the students to be better prepared for jobs injournalism, business management, academia, advertising, content writing for various web pages, products marketing, etc.

Course Code: DSE
Course Title: English Language Teaching I/ American Literature I
Course Outcome (COs):
1. The course introduces students to the theoretical principles of first and second language acquisition and help them understand the variables affecting language acquisition and learning.

Course Code: GEC
Course Title: Literature & Popular Culture/Gender & Literature
Course Outcome (COs):
1. This course assists students to deal with various ways in which the concept of literature as ‘high art’ and as a part of ‘elite/high culture’ has been interrogated and challenged through the discursive practices of popular culture.
2. It also aims to discuss the difficulties and contradictions in defining ‘popular literature’ using sociological and genre theories.

Course Code: Core 15
Course Title: Modernism & After I
Course Outcome (COs):
1. This course on Twentieth Century prose and poetry aims to critique the European writings of the twentieth century and introduce students to the diverse forms of narratives that have been created and shaped by the events and movements of the century.

Course Code: Core 16
Course Title: Modernism & After II
Course Outcome (COs):
1. This course seeks to help students study these themes and the innovations that characterized the spirit of modernist literature in the context of the early twentieth century drama and fiction.

Dum Dum Motijheel College
Department of English (PG Unit)

Name of the Academic Program: M.A. in English

Course Code: Core 17
Course Title: Other Literatures Written in English
Course Outcome (COs):
1. The modules offered in this core course push the boundaries of the so-called English canon and emphasize the importance of the 'other' literatures written in English. For the students the course introduces an emergent corpus of writing in English often from erstwhile colonies.

Course Code: Core 18
Course Title: Project/Dissertation
Course Outcome (COs):
1.This course is offered to train students in academic research. It provides a comprehensive contextual and theoretical grounding in the area being offered.
2. Students are guided in the reading of texts, to write a dissertation and to appear for a viva voce to defend their thesis.

Course Code: DSE
Course Title: English Language Teaching II/American Literature II
Course Outcome (COs):
1. The objective of the course is to provide students with an opportunity to learn and execute the classroom application of different pedagogical practices.

DUM DUM MOTIJHEEL COLLEGE

DEPARTMENT OF MATHEMATICS

M. SC. IN MATHEMATICS

PROGRAM SPECIFIC OUTCOMES

After successful completion of the two-year M.Sc. course in Mathematics students will enable to

1. Approach and analyse the problems arising in their chosen careers in a logical manner and apply these skills to any real-life situation.
2. Apply computational and modelling skills to specific tasks, especially in the emerging and developing processes and industries.
3. Independently pursue research work in any area of Pure or Applied Mathematics; work in a group confidently and contribute significantly to any research project.
4. Acquire a systematic knowledge of fundamental aspects of various branches of Mathematics which would help them in qualifying National and State-level examinations
5. Think and analyse independently, and apply their skills in mathematical logic to any profession of their choice.
6. Take up pedagogy in Mathematics or related subjects if they are so inclined.

Course Code : MTMP COR01T

Paper: Algebra

Course Outcomes: On successful completion of this course, the students will be able to identify, analyze, classify, demonstrate and explain the acquired knowledge mainly on the following :

i) Sylow's theorems and its applications,
ii) Jordan Holder Theorem, Solvable groups,
iii) Prime and maximal ideals,
iv) Jacobsons radical, semisimple ring, Hilbert Basis Theorem, Unique Factorization Domain,
v) Basics of Field extension & Galois theory.

Also there is a scope for applying the acquired knowledge of the above methods/ tools of Algebra, to solve complex mathematical problems in all of its relevant fields of applications, to develop abstract mathematical thinking as well as in discovering new avenues, that facilitates for higher research and its extensions. It also helps to crack lectureship and fellowship exams approved by UGC & CSIR, GATE and SET.

Course Code : MTMP COR 02T

Paper: Linear Algebra

Course Outcomes: Oncompletion of this course, the students will be able to identify, analyze, classify, demonstrate and explain the acquired knowledge on the following:

i) Modules with chain conditions (Noetherian and Artinian), Dual Modules, Free Modules,
ii) Dual Spaces, Dual Basis, Dimension of Quotient space,
iii) Minimal Polynomial, Diagonalization of Matrices, Reduction to Triangular Forms,
iv) Jordan Canonical Forms, Rational Canonical Forms, Smith Normal Form,
v) Bilinear Forms , Quadratic Forms, Hermitian Forms,
vi) Direct sum decomposition theorem, Principal Minor Criterion,
vi) Sylvester Law Of Inertia, Simultaneous Reduction of Pair of Forms.

Also there is a scope for applying the acquired knowledge of the above methods/ tools of Linear Algebra, to solve complex mathematical problems in all of its relevant fields of applications, to develop abstract mathematical thinking as well as in discovering new avenues, that facilitates for higher research and its extensions. It also helps to crack lectureship and fellowship exams approved by UGC & CSIR, GATE and SET.

Course Code : MTMP COR 03T

Paper : Real Analysis

Course Outcomes: Upon completion of this course, the student will be able to understand the basics of Real Analysis and improve the logical thinking.

Course Code : MTMP COR 04T

Paper: Complex Analysis

Course Outcomes: On completion of this course, the students will be able to identify, analyze, classify, demonstrate and explain the acquired knowledge mainly on the following :

i) Stereographic Projection, Riemann's sphere, point at infinity, extended complex plane,
ii) Cauchy-Goursat Theorem, Cauchy's integral formulas, Morera's theorem, Liouville's theorem,
iii) Fundamental theorem of classical algebra, Schwarz Reflection Principle, Maximum Modulus Principle,
iv) Cauchy-Hadamard Theorem, Taylor's theorem and Laurent's theorem,
iv) Riemann's Removal singularity thorem, Weierstrass-Casorati,
v) The Cauuchy's Residue Theorem, Argument principle and their applications
vi) Conformal mapping, Bilinear transformation, Idea of analytic continuation.

Also there is a scope, for applying the acquired knowledge of the above concepts/ methods/ tools of Complex Analysis, to solve complex mathematical problems in all of its relevant fields of applications, to develop abstract mathematical thinking as well as in discovering new avenues, that facilitates for higher research and its extensions. It also helps to crack lectureship and fellowship exams approved by UGC & CSIR, GATE and SET.

Course Code: MTMP COR 05T

Paper: Mechanics

Course Outcomes :

1. Students will be able to apply the equations of motion to solve analytically the problems of motion of a single particle/a system of particle or rigid body under conservative force fields.
2. Use the Hamilton's principle for deriving the equations of motion of a system.
3. Gain knowledge of Hamiltonian system and phase planes from the point of view of mechanics.
4. Use the theory of normal modes for solving problems related to oscillations and vibrations.
5. Students will learn the basics of classical mechanics and STR required for further studies in solid and quantum mechanics.

Course Code: MTMP AEC 01M
Paper: Computational Techniques and Introduction to LaTeX

Course Outcomes: At the end of this course a student should be able to :

- understand the purpose of basic computer programming language,
- understand and apply control statements, implementation of arrays, functions, etc.,
- enhance ability to program writing skills for solving several real life and Mathematical problems,
- use LaTeX and develop typeset documents containing tables, figures, formulas, common book elements like bibliographies, indexes etc. and modern PDF features.

Semester : II

Course Code: MTMP COR 06T

Topic: Topology

Course Outcomes: On completion of this course, the students will be able to identify, analyze, classify, demonstrate and explain the acquired knowledge on the following :

i) Axiom of choice, Continuum hypothesis, Cardinal and Ordinal numbers,
ii) Basics of Topological spaces, Relative topology, homeomorphism and topological properties ,
iii) Alternative methods of defining a topology in terms of Kuratowski closure operator, interior operator and neighbourhood systems,
iv) Countability axioms, Heinei's continuity criterion,
v) Lower & higher separation axioms, Urysohn's lemma and Tieze's extension theorem and their applications,
vi) Connected and disconnected spaces, path connected spaces, Compactness, Alexander subbase theorem, equivalence of various compactness in metric spaces,
vii) Product and box topology, Tychonoff product theorem,
viii) Quotient spaces, Local Connectedness, Path- connectedness, Total disconnectedness,

Also there is a scope, for applying the acquired knowledge of the above topological methods/ tools, to solve complex mathematical problems in all of its relevant fields of applications, to develop abstract mathematical thinking as well as in discovering new avenues, that facilitates for higher research and its extensions. It also helps to crack lectureship and fellowship exams approved by UGC & CSIR, GATE and SET.

Course Code: MTMP COR 07T

Paper: Functional Analysis

Course Outcomes : On successful completion of this course, students will be able to appreciate how functional analysis uses and unifies ideas from vector spaces, the theory of metrics, and complex analysis. Moreover, students will be able to understand and apply fundamental theorems from the theory of normed and Banach spaces, Hilbert spaces.

Course Code: MTMP COR 08T
Paper: Ordinary Differential Equations and Special Functions

Course Outcomes:

1. Students will learn about existence and uniqueness of solutions and Picard's method of approximation . This can be directly applied for a numerical approximation.
2. Knowledge of the properties of eigenvalues and eigenfunctions will be useful in studying Mathematical physics.
3. An acquaintance with special functions will be useful for students interested in research in continuum mechanics or theoretical physics.
4. An acquaintance with special functions will be useful for students interested in research in continuum mechanics or theoretical physics.
5. Introductory ideas of phase plane analysis and stability can be utilised by students while studying dynamical systems or mathematical biology.
6. Students will be able to solve/analyse odes arising in different areas of physics.

Course Code: MTMP COR 09T

Paper: Gr. A - Numerical Analysis and Gr. B - Integral Transforms

Course Outcomes: After completion of the course, the student is expected to :

- understand basic theories of numerical analysis,
- formulate and solve numerically problems from different branches of science,
- grow insight on computational procedures,
- learn theory and properties of Fourier transform, Laplace Transform and Z-Transform and their applications to relevant problems.

Course Code: MTMP COR 10T
Paper: Differential Manifold

Course Outcomes: Oncompletion of this course, the students will be able to identify, analyze, classify, demonstrate and explain the acquired knowledge mainly on the following :

i) tangent and cotangent spaces; submanifolds,
ii) vector fields and their flows; the Frobenius Theorem,
iii) multilinear algebra, differential forms, the Lie derivative,
iv) Lie groups and Lie algebras,
v) Integration on manifolds, theorems of Stoke, integration on a Lie group,

Also there is a scope, for applying the acquired knowledge of the above methods/ tools of Differentiable manifolds to solve complex mathematical problems in all of its relevant fields of applications, to develop abstract mathematical thinking as well as in discovering new avenues, that facilitates for higher research and its extensions.

Course Code: MTMP SEC 01M
Paper: Computer Aided Numerical Analysis using C/ Matlab/ Mathematica

Course Outcomes: At the end of this course a student should be able to :

- solve different type of numerical problems,
- understand better relevant theoretical concepts,
- apply programming skills in interdisciplinary areas such as biological system, physical system etc.,
- analyze data set of various size and interpret outcomes helping her/him to compete in the financial sector.
- apply programming skills in graphics animation, computerized abstract art.

Semester : III

Course Code: MTMP COR 11T

Paper: Partial Differential Equations and Calculus of Variations

Course Outcomes: At the end of this course a student should be able to :

- learn to solve different types of PDE,
- test the stability of the solution,
- apply PDE to problems of geometry and physics,
- understand basic theories of calculus of variations,
- formulate and solve problems from allied branches of science.

Course Code: MTMP COR 12T
Paper: Nonlinear Differential Equations and Dynamical Systems

Course Outcomes:

1. On the completion of this course students will be able to study the nature linear stability and general stability of critical points and solutions ; also investigate the existence of periodic solutions ; and identify a bifurcation through change of parameters ; further, have a basic idea of perturbation methods.

2. These methods can be applied by the students to study problems of population biology and nonlinear wave propagation.

Course Code: MTMP COR 13T
Paper: Gr. A-Electromagnetic Theory & Gr. B- Integral Equations

Course Outcomes: After completing this course, the student will be able to:

- build up strong application capability of graduate level mathematics,
- understand and apply the basic theories of electromagnetism,
- get an exposure to the Einstein's Theory of Relativity,
- grow interest in electrical engineering,
- distinguish between differential and integral equations,
- understand the theory of existence and uniqueness of solutions of linear integral equations,
- find solutions of linear integral equations of first and second type (Volterra and Fredhlom) and singular integral equations using several techniques.

Course Code: MTMP COR 14T
Paper: Measure and Integration

Course Outcomes: On completion of this course, the students will be able to identify, analyze, classify, demonstrate and explain the acquired knowledge mainly on the following :

i) Lebesgue measure, Vitali's theorem concerning existence of non-measurable sets,
ii) measurable functions, Theorem relating to non negative μ-measurable function as a limit of a monotonically increasing sequence of non negative simple μ-measurable functions,
iii) Lebesgue's monotone convergence theorem and its applications, Fatou's lemma, Lebesgue's dominated convergence Theorem,
iv) Interrelation between Riemann & Lebesgue integration,
v) Concept of L^p-spaces and its completeness,
vi) Characterizations of Convergence in Measure, Almost Uniform Convergence, Egoroff theorem,
vii) Product Measure. Fubini's Theorem,
viii) Signed Measure and the Hahn Decomposition, Radon-Nikodym Theorem.

Also there is a scope, for applying the acquired knowledge of the above methods/ tools of Measure and Integration, to solve complex mathematical problems in all of its relevant fields of applications, to develop abstract mathematical thinking as well as in discovering new avenues, that facilitates for higher research and its extensions. It also helps to crack lectureship and fellowship exams approved by UGC & CSIR, GATE and SET.

Course Code: MTMP DSE 01T
(Optional Paper*)

Pure Stream

Paper: P1.Operator Theory and Banach Algebra

Course Outcomes : Students will be able to understand the fundamentals of spectral theory, and appreciate some of its power. Students will have the knowledge and skills to apply problem solving using functional analysis techniques applied to diverse situations in physics, engineering and other mathematical contexts.

Paper: P2.Number Theory and Equations over Finite Fields

Course Outcomes: On completion of this course, the students will be able to identify, analyze, classify, demonstrate and explain the acquired knowledge mainly on the following :

i) Wilsons Theorem, Linear congruence; $ax \equiv b(\text{mod } n)$,
ii) Chinese Remainder Theorem, Euler's Theorem,
iii) applications of primitive roots, Structure of $U(Z/nZ)$,
iv) law of quadratic reciprocity,
v) Equations over Finite Fields: Chevalley-Warning Theorem,

vi) Quadratic Forms over finite fields,

vii) p-adic numbers and its applications.

Also there is a scope, for applying the acquired knowledge of the above methods/ tools ofNumber Theory and Equations over Finite Fields, to solve complex mathematical problems in all of its relevant fields of applications, to develop abstract mathematical thinking as well as in discovering new avenues, that facilitates for higher research and its extensions.

Applied Stream

Paper: A1.Continuum Mechanics

Course Outcomes:

- The students will learn a new approach, namely, the continuum approach for both solid and fluid motion.
- Students will learn the general forms of balance laws and energy equation.
- This course will prepare the students for further courses on fluid and/or solid dynamics.

Paper: A2. Magneto-hydrodynamics

Course Outcomes: At the end of this course a student should be able to :

- describe the properties of Magneto-hydrodynamic equations,
- explain MHD waves,
- apply the MHD equations to a number of astrophysical problems as well as to problems related to laboratory physics.

Course Code: MTMP GEC 01T

Paper: Mathematics and Some Applications - I

Course Outcomes: On completion of this course, the students will be able to identify, analyze, demonstrate and apply the acquired knowledge of the following :

i) Basics of Group, Subgroups, Normal Subgroups, Abelian Groups, Cyclic groups,
ii) Symmetric Groups, Lagrenge's Theorem, Cayley's Theorem,
iii) Ring, sub-ring. Field, sub-field
iv) Basic game theory and graph theory,
v) Inner Product Space, Orthogonal sets and Bases, Eigenvalues, Eigenvectors, Diagonalization of matrices and metric spaces,
vi) Solve partial differential equations and its application to physical problems.
vii) Laplace transforms and its application in differential equations.

Semester : IV

Course Code: MTMP COR 15T

Paper: Graph Theory/ Operations Research/ Fuzzy sets & Their applications

Course Outcomes : After the course the student will have a strong background of graph theory. The students will be able to apply principles and concepts of graph theory in practical situations such as computer science, physical and engineering sciences.

Paper: Operations Research

Course Outcomes: After completing this course, the student will be able to :

- solve nonlinear programming problems using Lagrange multiplier, Kuhn-Tucker conditions, Wolfe's and Beale's method,
- find optimal solution of dynamic programming problem,
- learn theory of sequencing models and inventory control and their applications,
- understand Queueing Theory and its applications,
- identify and formulate some real life problems into nonlinear programming problem.

Paper: Fuzzy sets & Their applications

Course Outcomes: After completing this course, the student will be able to:

- understand basic knowledge of Fuzzy sets and Fuzzy logic,
- apply basic Fuzzy inference and approximate reasoning,
- apply basic Fuzzy system modeling methods.

Courses Codes: MTMP DSE 02T, MTMP DSE 03T and MTMP DSE 04T

Pure Stream

Paper: P1. Advanced Topology I

Course Outcomes: On completion of this course, the students will be able to identify, analyze, classify, demonstrate and explain the acquired knowledge on the following :

i) Inadequacy of sequences, Nets and Filters , Chracterizations of compactness and continuity and adherent point in terms of nets and filters,

ii) Local Compactness and One Point Compactification, Stone- CechCompactification, Extension property of βX and Cardinality of βN,

iii) The UrysohnMetrization Theorem. The Nagata – Smirnov Metrzation Theorem,

iv) Paracompactness, Partition of unity, A. H. Stone's Theorem,

v) Uniform spaces and Uniform topology, uniform continuity and product uniformity, Uniformity generated by a family of pseuometrics, Completion of uniform spaces,

vi) Inductive and projective limits, Function spaces.

Also there is a scope, for applying the acquired knowledge of the above methods/ tools of Advanced Topology I, to solve complex mathematical problems in all of its relevant fields of applications, to develop abstract mathematical thinking as well as in discovering new avenues, that facilitates for higher research and its extensions. It also helps to crack lectureship and fellowship exams approved by UGC & CSIR, GATE and SET.

Paper: P2. Advanced Topology II

Course Outcomes: On completion of this course, the students will be able to identify , analyze, classify, demonstrate and explain the acquired knowledge mainly on the following :

i) Covering spaces and covering maps, Path lifting property and Homotopy ifting,

ii) Monodromy theorems, Deck transformation, Van Kampen's theorem,

iii) Singular Homology, Mayer-Vietoris sequence, Idea of Cohomology,

iv) C-embedding & C -embedding and their relation, Urysohn's extension theorem,

v) maximal ideals, prime ideals, Z- ideals; Z-filters, Z- ultrafilters,

vi) fixed maximal ideals of C (X) and C (X), their characterizations,Structure spaces.

vii) Topological groups.

Also there is a scope, for applying the acquired knowledge of the above methods/ tools of Advanced Topology II, to solve complex mathematical problems in all of its relevant fields of applications, to develop abstract mathematical thinking as well as in discovering new avenues, that facilitates for higher

research and its extensions. It also helps to crack lectureship and fellowship exams approved by UGC & CSIR, GATE and SET.

Paper: P 3. Advanced Functional Analysis

Course Outcomes: Upon successful completion, students will have the knowledge and skills to explain the fundamental concepts of functional analysis and their role in modern mathematics and applied contexts. Moreover, students will be able to demonstrate accurate and efficient use of functional analysis techniques.

Paper: P4. Algebraic Topology

Course Outcomes: On completion of this course, the students will be able to identify, analyze, classify, demonstrate and explain the acquired knowledge mainly on the following :

i) Homotopy, Contractible spaces, deformation, strong deformation retraction,
ii) Covering spaces and covering maps,Path lifting property and Homotopy lifting,
iii) Fundamental groups of Circle, Cylinder, punctured plane, Torus, etc.,
iv) Simplicial complexes Polyhedra and Triangulation, barycentric subdivision and simplicial approximation theorem,
v) Simplicial Homology, homology groups, no-retraction theorem, Brower's fixed point theorem.

Also there is a scope, for applying the acquired knowledge of the above methods/ tools of algebraic topology to solve complex mathematical problems in all of its relevant fields of applications, to develop abstract mathematical thinking as well as in discovering new avenues that facilitates for higher research and its extensions. It also helps to crack lectureship and fellowship exams approved by UGC & CSIR, GATE and SET.

Paper: P5. Advanced Real Analysis

Course Outcomes: After completing the course, the students should be able to recognize, understand and apply concepts and methods in advanced real analysis. Also, they will be able to apply the acquired knowledge in signals and Systems, Digital Signal Processing etc. and conduct researches on high international level in advanced real analysis.

Paper: P6. Advanced Complex Analysis

Course Outcomes: Oncompletion of this course, the students will be able to identify, analyze, classify, demonstrate and explain the acquired knowledge mainly on the following :

i) Basic properties of holomorphic functions,
ii) The Phragmen- Lindeloff Method, a converse of Maximum Modulus Theorem,
iii) the Mittag-Leffler's theorem for Meromorphic function,
iv) the Weierstrass Factorization Theorem, Jensen's formula, The Muntz-Szasz theorem,
v) Monodromy theorem and its consequence, the Little Picard Theorem,

vi) the Riemann mapping Theorem,
vii) multilinear algebra, differential forms, the Lie derivative..

Also there is a scope, for applying the acquired knowledge of the above methods/ tools of AdvancedComplex Analysis, to solve complex mathematical problems in all of its relevant fields of applications, to develop abstract mathematical thinking as well as in discovering new avenues, that facilitates for higher research and its extensions.

Paper: P7 .Harmonic Analysis

Course Outcomes: On completion of this course, the students will be able to identify, analyze, classify, demonstrate and explain the acquired knowledge mainly on the following :

i) Fourier series, convergence of Fourier series, Riemann-Lebesgue lemma
ii) Basics of Topological groups,
iii) Haar measure and Haar integral
iv) Banach Algebra andGelfand topology,
v) Fourier transform on locally compact topological groups,
vi) Plancheral theorem, Pontrjagin Duality theorem.

Also there is a scope, for applying the acquired knowledge of the above methods/ tools of Harmonic Analysis, to solve complex mathematical problems in all of its relevant fields of applications, to develop abstract mathematical thinking as well as in discovering new avenues, that facilitates for higher research and its extensions.

Paper: P8.Commutative Algebra

Course Outcomes: On successful completion of this course, students will be able to apply its methods in related subjects of Mathematics. Moreover, they should be able to participate in scientific discussions and begin with own research in commutative algebra.

Applied Stream

Paper : A1.Quantum Mechanics

Course Outcomes: At the end of this course a student should be able to :

- Understand the fundamentals of quantum mechanics,
- Create better grasp on different branches of mathematical physics,
- Provide an opportunity to recapitulate application of higher pure mathematics,
- Open the gateway to modern electronics and nano science.

Paper: A2.Plasma Dynamics

Course Outcomes: At the end of this course a student should be able to :

- understand collective nature of plasma dynamics by developing concepts of Debye screening collective behavior and quasi neutrality,
- describe motion of charged particles in electric and magnetic fields,
- derive the basic set of fluid equations to study plasma properties,
- know the concept of Landau damping,
- describe the propagation of waves in plasmas and understand the concept of nonlinearity and dispersion relation.

Paper: A3.Theory of Waves in Solids

Course Outcomes:

1. On completion of the course, students will be conversant with propagation of waves in rods, plates and half-spaces.
2. They will be introduced to the basic seismological waves and acoustic waves.
3. The course will be beneficial to students interested in research in applied mechanics or geophysics.

Paper: A4.Advanced Dynamical Systems and Chaotic Dynamics

Course Outcomes: On completion of this course the students would be able to :

1. apply the ideas of dynamical systems theory to understand and explain various complex phenomena of physics and biology,

2. pursue research in complex dynamical systems, mathematical biology , fractal set theory and other related fields.

Paper: A5.Solid Mechanics

Course Outcomes:

- This course is intended to give the students an introduction to different types of problems arising in the Theory of linear Elasticity.
- On completion of this course students will have learnt the fundamental concepts required for research in Applied Mechanics or Geophysics.

Paper: A6.Mathematical Biology

Course Outcomes:

- After completion of this course, students should be able to formulate realistic mathematical models for diverse biological phenomena and analyse them mathematically to explain the observations as obtained from experiments, clinical trials and observations.
- Students would learn to mathematically predict the outcome in a situation by constructing and theoretically analysing a model.
- The students will learn how to develop mathematical models which provide ways to design and evaluate protocols to manage and control animal populations, natural resources like forests, wildlife, fisheries, and outbreak of diseases.

Paper: A7.Advanced Operations Research

Course Outcomes: Upon completion of this course, the student will be able to**:**

- formulate operation research models to solve real life problem,
- understand the mathematical tools that are needed to solve optimization problems,
- describe Optimal Control Theory and their applications,
- analyze game theory,
- understand skills and knowledge of operations research and its application in industry.

Paper: A8.Advanced Fluid Dynamics

Course Outcomes:

1. This course introduces fundamental ideas of fluid dynamics which can be further applied to problems of mechanical engineering.

2. On completion of this course, students would be able to enter research work in Advanced Fluid Theory and Computational Fluid Dynamics (CFD).