# 2018-19

**PARVATIBAI CHOWGULE COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)**
**MARGAO, GOA**

# B.SC. IN BOTANY

**Programme Outcomes(PO):**

**PO1:** Recognize all forms of plant groups (Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms) and infer/ predict their Phylogenetic linkages. Illustrate distinct features.

**PO2:** Recognize cell organelles and bio molecules including enzymes, Predict and interpret their significances in cell metabolism/functioning and Pathways.

**PO3:** Apply physiological mechanism of plants to analyze synthesis of valuable plant products (Primary/ Secondary) with economic potential and health effects through the field of Horticulture.

**PO4:** Analyze the techniques and working principles of Instruments used in Botanical studies and apply the knowledge in Basic and applied Plant research (Microbiology, Plant Physiology, plant breeding, Fungi, Plant Tissue Culture, Plant Genetic Engineering, Ecology, plant drug technology. etc.) through bio statistical parameters.

**PO5:** Analyze applications of online biological database, data handling in plant drug discovery and interactions.

**PO6:** Appraise the students knowledge in Botany including fundamental basis of all living organisms (Plant and Microbes) and applying the same in sustainable usage of resources for the quality human survival on planet earth.

**Course Outcome (CO)**

| Sr. No. | Course Code | Course Title | Course Outcomes |
|---|---|---|---|
| 1. | **BOT-I.C-1** | Plant diversity | **CO1:** Recognise and understand the evolutionary aspects of different plant groups of lower plants.<br>**CO2:** classify lower plants.<br>**CO3:** describe the lower plant groups.<br>**CO4:** sketch the morphology and anatomy of selected lower plants. |
| 2. | **BOT-I.C-2** | Cell Biology & Biomolecules | **CO1:** Recognise, classify cell, explain cell theory, evolution and biogenesis<br>**CO2:** Define, describe, classify and explain cytoskeleton, cell organelle, biomolecules<br>**CO3:** Define, describe, compare, explain, illustrate cell |

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| | | | wall and plasma membrane<br>**CO4:** Predict and interpret the importance of cell organelles and biomolecules in cell functioning |
| **3.** | **BOT-II.C-3** | Plant Anatomy and Embryology | **CO1:** Define, describe and explain the basic plant anatomical and embryological features<br>**CO2:** Compare the interrelatedness of organ-systems and their functions<br>**CO3:** Examine the features through histological techniques.<br>**CO4:** Define, describe, explain, compare theories in organization of tissues |
| **4.** | **BOT-II. C-4** | Microbiology | **CO1:** appraise the student knowledge to fundamental basis of all living microbes and their interaction with the environment.<br>**CO2:** Apply the knowledge of microbial world towards the sustainable usage of resources for the quality human survival on the planet Earth. |
| **5.** | **BOT-III.C-5** | Physiology of Plants | **CO1:** Analyse Physiological processes in plants.<br>**CO2:** Formulate and design experiments to analyse and interpret data.<br>**CO3:** Learn to describe the processes through practicals and mini projects.<br>**CO4:** Estimate and evaluate methods of quantitation of pigments, enzymes and metabolites. |
| **6.** | **BOT-IV.C-6** | Cytogenetics | **CO1:** To restate fundamentals of genetics<br>**CO2:** To identify different stages of cell division.<br>**CO3:** To construct chromosome maps.<br>**CO4:** To review the effects of mutagens on seed germination. |
| **7.** | **BOT-V.C-7** | Plant Molecular Biology | **CO1:** Outline, memorize and express process of central dogma<br>**CO2:** Estimate and evaluate methods of quantitation of macromolecules<br>**CO3:** Understand molecular basis of life<br>**CO4:** Learn and demonstrate basic molecular technique of DNA isolation and separation through electrophoresis. |
| **8.** | **BOT-VI.C-8** | Genetic Engineering | **CO1:** Apply the basic knowledge of Plant Genetic Engineering in research<br>**CO2:** Perform experiments by themselves<br>**CO3:** Compare and assess the different DNA sequencing techniques<br>**CO4:** Design experiments in plant genetics |
| **9.** | **BOT- III.E-1** | Ecology & Conservation | **CO1:** To discuss role and importance of biotic and abiotic environment factors in the sustenance of plant life<br>**CO2:** To analyze the pollution scenario of the area.<br>**CO3:** To estimate the oxygen and Carbon dioxide from different water samples.<br>**CO4:** To evaluate and determine minimum area of sampling unit (using quadrat) for the study of local vegetation. |

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| **10.** | **BOT-III.E-2** | Techniques and Instrumentation in Botany | **CO1:** Learn the Principle and working of techniques and instruments used in Botanical research<br>**CO2:** Analyze the research problem and formulate the methodology for carrying out research/experiment<br>**CO3:** Examine various parameters before setting up an experiment<br>**CO4:** Apply the knowledge in further studies and research in Botany |
| **11.** | **BOT-III.E-3** | Enzymes and metabolic pathways | **CO1:** To identify the role of enzymes in various biological processes<br>**CO2:** To classify the different enzymes based on its structure<br>**CO3:** To restate the various mechanisms of enzyme action |
| **12.** | **BOT-III.E-4** | Herbal Cosmetology | - |
| **13.** | **BOT-IV.E-5** | Plant Breeding and Biostatistics | **CO1:** To recognise various techniques in plant breeding<br>**CO2:** To differentiate between modes of plant breeding<br>**CO3:** To employ manual emasculation procedure.<br>**CO4:** To calculate mean, median, mode, standard deviation, std. error for provided material. |
| **14.** | **BOT-IV.E-6** | Systematics of Flowering plants and<br><br>Phylogeny | **CO1:** Name, arrange, describe and compare the taxa<br>**CO2:** Outline keys for identification of flowering plants<br><br>**CO3:** Interpret phylogenetic trees, cladograms, etc. |
| **15.** | **BOT-IV.E-7** | Plant pathology | **CO1:** Identify various diseases and causal agents of economically important plants<br>**CO2:** Find effective control measures |
| **16.** | **BOT- IV.E-8** | Horticulture, Floriculture & Landscaping | **CO1:** Explain the basics of Horticulture, floriculture and landscaping<br>**CO2:** Outline the requirements for building up nurseries, garden, etc.<br>**CO3:** Inculcate the technique of vegetative propagation of plants.<br>**CO4:** Identify and relate the scope of these fields in building up career |
| **17.** | **BOT-V.E-9** | Bioinformatics | **CO1:** Explain basics of bioinformatics, biological databases<br>**CO2:** Compare and contrast protein information resources and genome information resources<br>**CO3:** Relate the theoretical knowledge with practical sessions. Enable data handling and analysis.<br>**CO4:** Compare the homology between different biological species. |

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| **18.** | **BOT-V.E-10** | Seed Technology | - |
| **19.** | **BOT-V.E-11** | Plant Drug Technology and Pharmacognosy | **CO1:** Explain, discuss and classify medicinal plants, plant drug and technology<br>**CO2:** Explain and illustrate, biosynthetic pathways, bioassays and working of instruments<br>**CO3:** Discuss and compare methods of extraction and analysis of phytochemicals. |
| **20.** | **BOT-V.E-12** | Organic Farming | **CO1:** Create awareness of the social, economic and environmental context for current and future organic agriculture production and management<br>**CO2:** Assess the importance of organic foods in todays World.<br>**CO3:** Apply the knowledge in becoming an entrepreneur in Organic Farming. |
| **21.** | **BOT-VI.E-13** | Plant tissue culture | **CO1:** Explain and discuss the general theoretical backgrounds and practical techniques<br>**CO2:** Describe, define, explain/ discuss, compare, concept of differentiation and culture types<br>**CO3:** Define, describe, explain/ discuss, techniques in PTC in media preparation, sterilisation, callus culture and organogenesis<br>**CO4:** Describe, explain, discuss applications in forestry, agriculture etc |
| **22.** | **BOT-VI.E-14** | Algal Biotechnology | - |
| **23.** | **BOT-VI.E-15** | Economic Botany | **CO1:** To identify economically important plants /plant parts<br>**CO2:** To identify valuable plant products of potential market and economic value.<br>**CO3:** To evaluate, describe and create awareness of the uses of natural plant products as alternative to synthetic and chemical products |
| **24.** | **BOT-VI.E-16** | Applied Mycology | **CO1:** To explain techniques involved in sampling, culturing and maintaining fungal cultures.<br>**CO2**: To discuss industrial and agricultural applications of fungi. |

# B.SC. in BIOCHEMISTRY

**PROGRAMME OUTCOMES**

| Programme Outcomes (PO) | Short Title of the POs | Description of the Programme Outcomes<br><br>Graduates will be able to : |
|---|---|---|
| **PO-1** | Problem Analysis and Solutions | Think critically, identify, analyze problems/ situations and further attempt to design/ develop solutions that meet the specified goals. |
| **PO-2** | Use of Technology | Apply appropriate IT tools efficiently in their daily activities of communication and academics. |
| **PO-3** | Environment and Sustainability | Analyze and attempt solutions to environmental issues and commit themselves to sustainable development in the local/ national and global context. |
| **PO-4** | Ethics | Recognize and understand professional ethics /human values and be responsible for the same. |
| **PO-5** | Individual and Team work | Function effectively at various levels, capacities and situations. |
| **PO-6** | Communication | Communicate proficiently (oral and written) as a responsible member of society. |
| **PO-7** | Research Aptitude | Understand general research methods and be able to analyse, interpret and derive rational conclusions. |
| **PO-8** | Life Skills | Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of domain specific change. |
| **PROGRAMME SPECIFIC OUTCOMES (PSO)** | | |
| **PSO-1** | Fundamental Knowledge of Biochemistry | Possess a fundamental knowledge of the different aspects of Biochemistry, with the means and ability to specialize in a specific field. |
| **PSO-2** | Development of practical skills | Be equipped with practical skills and the ability to apply their theoretical concepts to design, perform experiments, analyze and interpret data and thus develop proficiency in laboratory management. |
| **PSO-3** | Critical thinking and analytical skills | Be able to demonstrate proficiency in quantitative reasoning (critical thinking) and analytical skills. |
| **PSO-4** | Analysis and Problem Solving | Be able to use these skills to analyze and solve industry-related problems, thus preparing them for a successful career in industry and research institutes. |
| **PSO-5** | Understanding the need for sustainable solutions | Be able to understand the impact of Biochemistry in the development of sustainable solutions for the environment and societal context. |
| **PSO-6** | Developing an inclination towards research | Develop an inclination towards research through the compulsory internship in industry/research/academic institutes which promote and inculcate professional ethics and code of practice among students, enabling them to work in a team with a multidisciplinary approach. |

**COURSE OUTCOMES**

| S. No. | Course Code | Course Title | Course Outcomes |
|---|---|---|---|
| 1 | BCH-I.C-1 | Molecules of Life | On the successful completion of the course, the students will be able to:<br><br>**CO1:** Gain an understanding of the various theories of the origin of life<br><br>**CO2:** Comprehend the importance of water in the sustenance of life.<br><br>**CO3:** Compare and contrast the various different biomolecules (carbohydrates, proteins, lipids, nucleic acids, vitamins), their categories as well as functions.<br><br>**CO4:** Understand and apply general laboratory safety measures as well as calculate for preparation of various chemicals for experiments.<br><br>**CO5:** Prepare different solutions such as buffers, reagents and stock solutions for experiments independently. |
| 2 | BCH-I.C-2 | Cell Biology | On the successful completion of the course, the students will be able to:<br><br>**CO1:** Demonstrate an understanding of cell communication<br><br>**CO2:** Correlate the function of each cell organelle with proper coordination.<br><br>**CO3:** Identify and analyze different biological cells using a compound microscope<br><br>**CO4:** Prepare various plant and animal specimen for the observation of cell structures. |
| 3 | BCH-II.C-3 | Protein Chemistry | On the successful completion of the course, the students will be able to:<br><br>**CO1:** Comprehend the various levels of protein structure<br><br>**CO2:** Explain the mechanism and significance of membrane proteins.<br><br>**CO3:** Correlate the techniques used in studying protein structure |

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| | | | **CO4:** Review enzymes and their classification system.<br><br>**CO5:** Assess and compare the various methods employed in protein estimation/concentration and measuring the protein content. |
| 4 | BCH-II.C-4 | Biophysics | On the successful completion of the course, the students will be able to:<br><br>**CO1:** Explain the basic concepts of the origin and evolution of life<br><br>**CO2:** Understand how cellular reactions take place in accordance with thermodynamic principles<br><br>**CO3:** Describe the mechanism of derivation of energy through bioenergetic reactions in living cells<br><br>**CO4:** Elucidate energy transductions in organisms.<br><br>**CO5:** Understand the concepts of buffer capacity and osmolarity.<br><br>**CO6:** Demonstrate a practical understanding of spectrophotometry. |

# B.SC. IN BIOTECHNOLOGY

**PROGRAMME OUTCOMES**

| Programme Outcomes (PO) | Short Title of the POs | Description of the Programme Outcomes<br><br>Graduates will be able to : |
|---|---|---|
| **PO-1** | Problem Analysis and Solutions | Think critically, identify, analyze problems/ situations and further attempt to design/ develop solutions that meet the specified goals. |
| **PO-2** | Use of Technology | Apply appropriate IT tools efficiently in their daily activities of communication and academics. |
| **PO-3** | Environment and Sustainability | Analyze and attempt solutions to environmental issues and commit themselves to sustainable development in the local/ national and global context. |
| **PO-4** | Ethics | Recognize and understand professional ethics /human values and be responsible for the same. |
| **PO-5** | Individual and Team work | Function effectively at various levels, capacities and situations. |
| **PO-6** | Communication | Communicate proficiently (oral and written) as a responsible member of society. |
| **PO-7** | Research Aptitude | Understand general research methods and be able to analyse, interpret and derive rational conclusions. |
| **PO-8** | Life Skills | Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of domain specific change. |
| **PROGRAMME SPECIFIC OUTCOMES (PSO)** | | |
| **PSO-1** | Fundamental Knowledge of Biotechnology | Possess a fundamental knowledge of the different aspects of Biotechnology, with the means and ability to specialize in a particular field. |
| **PSO-2** | Development of practical skills | Be equipped with practical skills and the ability to apply their theoretical concepts to design, perform experiments, analyze and interpret data and thus develop proficiency in laboratory management. |
| **PSO-3** | Critical thinking and analytical skills | Be able to demonstrate proficiency in quantitative reasoning (critical thinking) and analytical skills. |
| **PSO-4** | Analysis and Problem Solving | Be able to use these skills to analyze and solve industry related problems, thus preparing them for a successful career in industry and research institutes. |
| **PSO-5** | Understanding the need for sustainable solutions | Be able to understand the need and impact of biotechnological solutions on environment and societal context, keeping in view the need for sustainable solutions. |
| **PSO-6** | Developing an inclination towards research | Develop an inclination towards research through the compulsory internship in industry/research/academic institutes which promote and inculcate professional ethics and code of practice among students, enabling them to work in a team with a multidisciplinary approach. |

**COURSE OUTCOMES**

| S.N. | Course Code | Course Title | **Course Outcomes:** On the successful completion of the course, the students will be able to: |
|---|---|---|---|
| 1 | BIO-I.C-1 | Biomolecules | **CO1:** Discuss the structure of atoms, biomolecules and chemical bonds.<br>**CO2:** Understand concepts of enzyme kinetics, bio polymers and metabolic reactions in a living system.<br>**CO3:** Understand and apply general laboratory safety measures as well as calculate for preparation of various chemicals for experiments.<br>**CO4:** Prepare different solutions such as buffers, reagents and stock solutions for experiments independently.<br>**CO5:** Operate various lab instruments such as weighing balance, water bath and spectrophotometer. |
| 2 | BIO-I.C-2 | Cell Biology | **CO1:** Correlate the function of each cell organelle with proper coordination.<br>**CO2:** Demonstrate an understanding of cell communication..<br>**CO3:** Prepare various plant and animal specimen for observation of cell structures<br>**CO4:** Identify and analyze different biological cells using a compound microscope. |
| 3 | BIO-II.C-3 | Fundamental Genetics | **CO1:** Outline the basic principles of Mendelian genetics and compare and analyze different inheritance patterns as well as solve problems based on genetic principles.<br>**CO2:** Compare and contrast different mutations, their effects on cells and the application of the same to research.<br>**CO3:** Differentiate between the structure and working of a compound and dissection microscope.<br>**CO4**: Construct and interpret a karyotype prepared from a spread of metaphase chromosomes. |
| 4 | BIO-II.C-4 | Basic Microbiology | **CO1:** Understand the scope and importance of Microbiology, classification schemes, cultivation, preservation and maintenance of the microbial cultures.<br>**CO2:** Discriminate between various groups of microorganisms and also comprehend the beneficial and harmful effects of each group of microorganisms.<br>**CO3:** Compare, analyze and apply concepts of the principle and working of various types of microscopes.<br>**CO4:** Adhere to strict laboratory safety measures to be followed in a microbiology laboratory.<br>**CO5:** Master skills in aseptic techniques as well comprehend the importance of cleaning and decontamination. |

# B.SC IN CHEMISTRY

**PROGRAMME OUTCOMES**

| Programme Outcomes (PO) | Short Title of the POs | Description of the Programme Outcomes<br><br>Graduates will be able to : |
|---|---|---|
| PO-1 | Problem Analysis and Solutions | Think critically, identify, analyze problems/ situations and further attempt to design/ develop solutions that meet the specified goals. |
| PO-2 | Use of Technology | Apply appropriate IT tools efficiently in their daily activities of communication and academics. |
| PO-3 | Environment and Sustainability | Analyze and attempt solutions to environmental issues and commit themselves to sustainable development in the local/ national and global context. |
| PO-4 | Ethics | Recognize and understand professional ethics /human values and be responsible for the same. |
| PO-5 | Individual and Team work | Function effectively at various levels, capacities and situations. |
| PO-6 | Communication | Communicate proficiently (oral and written) as a responsible member of society. |
| PO-7 | Research Aptitude | Understand general research methods and be able to analyse, interpret and derive rational conclusions. |
| PO-8 | Life Skills | Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of domain specific change. |

**PROGRAMME SPECIFIC OUTCOMES (PSO)**

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| **PSO-1** | Acquire the skills in preparation of chemical solutions, inorganic complexes, planning the procedures and performing experiments in the laboratory. |
| **PSO-2** | Handle scientific instruments like spectrophotometer, pH meter, Conductometer, Potentiometer, etc. |
| **PSO-3** | Develop basic theoretical principles of chemistry and writing skills applicable for higher studies and research |
| **PSO-4** | Operate efficiently within a group during their project and assignments and hence develop important skills such as communication, negotiation, influence, advising and interpreting |
| **PSO-5** | Appreciate the central role of chemistry in our society by understanding the safe handling of chemicals, environmental issues and key issues faced in energy, health and medicine. |
| **PSO-6** | Elucidate various spectra, X Ray Diffractograms, TG-DTA curves and identify surface morphology by SEM/TEM images. |

**Course Outcomes**

| | Course Code | Course Title | Course Outcomes: On successful completion of the course, the student will be able to: |
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| 1. | CHE-I.C-1 | General Physical and Inorganic Chemistry | **CO1 :** Demonstrate and evaluate the rate and order of a reaction.<br>**CO2 :** Utilize mathematical concepts to solve chemical problems.<br>**CO3 :** Develop expertise in the preparation of chemical solutions based on normality, molarity and molality.<br>**CO4 :** Interpret the PV isotherms of gases and identify the critical temperature.<br>**CO5 :** Delineate atomic structure, periodic table and covalent bonding.<br>**CO6 :** Sketch hybridization and molecular orbital diagrams. |
| 2. | CHE-I.C-2 | General Organic and Inorganic Chemistry | **CO1 :** Name the organic compounds using IUPAC nomenclature.<br>**CO2 :** Identify and classify the different organic reactions.<br>**CO3 :** Apply the theoretical knowledge to synthesize alkanes and alkenes.<br>**CO4 :** Write 3D structures of organic molecules using 2D surface.<br>**CO5 :** Identify the given unknown organic compound by carrying out various chemical tests. |
| 3. | CHE-II.C-3 | Concepts in Physical and Analytical Chemistry | **CO1:** Describe the basic concepts of thermodynamics and its applications.<br>**CO2 :** Interpret the pressure temperature diagrams in unary and binary systems.<br>**CO3 :** Explain the concept of surface tension and viscosity in liquids.<br>**CO4 :** Explain role of analytical chemistry in sciences, calculations based on chemical stoichiometry.<br>**CO5 :** Sketch titration curves and solve numericals.<br>**CO6 :** Explain theory on precipitation and complex formation titrations. |
| 4. | CHE-II.C-4 | Concepts in Organic and Inorganic chemistry | **CO1 :** Categorize the compounds as aromatic, non-aromatic and anti-aromatic.<br>**CO2 :** Apply the theoretical knowledge to write the synthesis of alkynes, alkyl halides, aromatic compounds.<br>**CO3 :** Discuss and describe the steps involved in the mechanism of nitration, sulphonation, halogenation and Friedel Crafts reactions of aromatic compounds.<br>**CO4 :** Explain and outline the different properties of |

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| | | | transition elements.<br>**CO5 :** Compare 4d and 5d analogues.<br>**CO6 :** Describe crystalline solids in terms of their structure, ionic radii and coordination.<br>**CO7 :** Interpret crystal structures.<br>**CO8 :** Describe lattice energy, Born-Haber's cycle, Fajan's rule and defects in solids.<br>**CO9 :** Explain trends in periodic properties of d-block elements with respect to their ionic radii, oxidation state, spectral properties, magnetic properties.<br>**CO10 :** Describe crystalline solids in terms of their structure, ionic radii and coordination there by able to interpret crystal structure. |
| 5. | CHE-III.C-5 | Comprehensive Chemistry-I (Physical & Inorganic Chemistry) | **CO1 :** Understand Second and Third law of Thermodynamics<br>**CO2 :**Calculate equilibrium constant and formulate conditions for maximum yield in industrial processes<br>**CO3 :** Explain theory of strong and weak electrolytes.<br>**CO4 :** Explain trends in periodic properties of f-block elements with respect to its size of atoms or ions, reactivity, oxidation state, complex formation, colour, magnetic properties.<br>**CO5 :** Name coordination compounds and to able to draw the structure based on its name.<br>**CO6 :** Describe the shape and structures of coordination complexes based on different coordination numbers.<br>**CO7 :** Explain merits and demerits of different theories of acids and bases and to explain the properties of a solvent that determines their utility. |
| 6. | CHE-IV.C-6 | Comprehensive Chemistry-II (Organic & Analytical Chemistry) | **CO1 :** Identify and classify diverse organic compounds containing C, H and O elements.<br>**CO2 :** Predict the chemical reactivities of several organic compounds containing CHO elements.<br>**CO3 :** Outline the preparations of several compounds belonging to different classes of organic compounds having CHO elements.<br>**CO4 :** Apply the important reactions involved in each class of organic compounds with CHO elements.<br>**CO5 :** Design scheme for an analytical process.<br>**CO6 :** Use proper techniques of sampling of solids, liquids & gases.<br>**CO7 :** Apply statistical treatment to analytical data. |
| 7. | CHE-V.C-7 | Advanced Chemistry-I: Physical and Inorganic | **CO1:** Understand the interactions of electromagnetic radiation and matter in IR and Raman spectroscopy and |

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| | | Chemistry | their applications.<br>**CO2 :** Explain applications and harmful effects of nuclear radioisotopes.<br>**CO3 :** Demonstrate a sound knowledge of the photochemistry principles and their application.<br>**CO4 :** Employ the theories that govern metal ligand bonding.<br>**CO5 :** Interpret the types of crystal field splitting and calculate the crystal field stabilization energy.<br>**CO6 :** Discuss the types of d-d transitions and its theory. |
| 8. | CHE-VI.C-8 | Advanced Chemistry-II: Organic and Analytical chemistry | **CO1 :** Assess conditions for obtaining maximum efficiency of extraction.<br>**CO2 :** Classify chromatographic methods.<br>**CO3 :** Apply chromatographic method for separation, qualitative and quantitative estimation.<br>**CO4 :** Predict the stereochemistry of products for various reactions using the mechanisms involved in the course.<br>**CO5 :** Explain the reactivity of organic compounds containing nitro, amino and cyano functional groups.<br>**CO6 :** Name and classify the carbohydrates and analyze its chemical reactivities.<br>**CO7 :** Name and classify the organosulfur and organophosphorous compounds and analyze its chemical reactivities.<br>**CO8 :** Apply the important reactions involved for the synthesis of other similar compounds. |
| 9. | CHE-III.E-1 | Name Reactions and Synthetic Methodologies | **CO1 :** Describe condensation reactions involving nucleophilic addition to carbonyl compounds.<br>**CO2 :** Define and describe various name reactions and rearrangements along with their mechanisms.<br>**CO3 :** Predict the product for various reactions involving these name reactions/rearrangements.<br>**CO4 :** Apply these mechanisms towards the formation of complex molecules.<br>**CO5 :** Discuss and describe the steps involved in the mechanism of Friedel-Crafts reactions, Reimer-Tiemann reaction, Vilsmeier-Haack reaction, Gattermann-Koch reaction and Kolbe-Schmidt reaction.<br>**CO6 :** List the different oxidising and reducing agents.<br>**CO7 :** Apply the theoretical knowledge to identify the reagents used to bring about a particular chemical reaction. |
| 10. | CHE-III.E-3 | Surface Chemistry and Catalysis | **CO1 :** Understand the behavior of solid surfaces.<br>**CO2 :** Differentiate between surface energy and surface |

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| | | | tension in case of solids.<br>**CO3 :** Classify and interpret various types of adsorption isotherms.<br>**CO4 :** Estimate surface area of a solid.<br>**CO5 :** Predict the mechanistic behavior of catalytic reactions.<br>**CO6 :** Evaluate conditions under which a catalysed reaction changes rate dependence. |
| 11. | CHE-III.E-4 | Bioinorganic Chemistry | **CO1 :** Elucidate the role of metal ions that are involved in different processes like oxygen transport, electron-transfer reactions etc. in biological systems.<br>**CO2 :** Apply the concepts of coordination chemistry to metallobiomolecules which are based on iron and copper ions.<br>**CO3 :** Evaluate the role of metal centres in the metalloenzymes that are involved in the catalysis of various biological reactions and thus predict the reaction mechanisms.<br>**CO4 :** Develop skills to prepare model systems which mimic the role of metal ions in biological systems.<br>**CO5 :** Discuss the importance of essential and trace elements in biological processes and evaluate their role in biology.<br>**CO6 :** Explain the biologically important compounds like proteins, carbohydrates etc. and to interpret their biological importance.<br>**CO7 :** Compare different mechanisms of ion transport across cell membrane and classify different biomolecules which help in the transport of ions and to illustrate PS-I and PS-II approach of photosynthesis.<br>**CO8 :** Analyze how metals are used as diagnostic agents and application of Au, Cu, Zn, Pt-complexes as anti-cancer drug and in medicine. |
| 12. | CHE-IV.E-5 | Pharmaceutical Chemistry | **CO1 :** Understand the significance of chemistry in Pharmaceutical chemistry.<br>**CO2 :** Develop an understanding of the physico-chemical properties of drugs.<br>**CO3 :** Explain molecular mechanism of drug action and metabolism.<br>**CO4 :** Draw comparison between medicinal chemistry and pharmaceutical chemistry.<br>**CO5 :** Synthesize some of the important drugs reported in literature.<br>**CO6 :** Identify and define the drug classes and some |

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| | | | pharmacological properties. |
| 13. | CHE-IV.E-6 | Polymer and Colloid Science | **CO1 :** Distinguish between different types of solutions in terms of solute dimensions.<br>**CO2 :** Evaluate properties of colloids.<br>**CO3 :**.Explain properties of gels and emulsions.<br>**CO4 :** Calculate molecular weight of a polymer.<br>**CO5 :** Design synthesis of a polymer.<br>**CO6 :** Measure molecular weight of a polymer.<br>**CO7 :** Understand solid state properties of polymers. |
| 14. | CHE-IV.E-7 | Spectroscopic Techniques | **CO1 :** Outline and interpret the deviation from Beer-Lambert's Law and to identify the validity and limitations.<br>**CO2:** Interpret the spectroscopic methods for qualitative and quantitative analysis; discuss the principle instrumentation; compare the Colorimeter and Spectrophotometer and employ UV-Visible Spectrophotometer.<br>**CO3:** Outline the principle on which inductively coupled plasma spectroscopy works and illustrate the instrumentation involved in the technique.<br>**CO4:** Employ inductively coupled plasma spectroscopy technique and identify its limitations. |
| 15. | CHE-V.E-9 | Heterocyclic Chemistry | **CO1 :** Identify, name and classify the various heterocyclic compounds.<br>**CO2 :** Describe the structure, different reactions and preparations of selected nitrogen and oxygen containing aliphatic heterocycles.<br>**CO3 :** Describe the structure, diverse reactions and syntheses of pyrrole, furan, thiophene and pyridine heterocycles.<br>**CO4 :** Describe the structure, diverse reactions and synthetic routes with mechanisms of numerous condensed heterocycles.<br>**CO5 :** Predict the reactivities of complex heterocyclic compounds containing the structural motif of these simple heterocycles.<br>**CO6 :** Apply the synthetic methodologies for the synthesis of complex heterocycles. |
| 16. | CHE-V.E-10 | Nanomaterials and Solid State Chemistry | **CO1 :** Recall the history, occurrence and technological development of nanomaterials and classify them.<br>**CO2 :** Compare different synthesis techniques of nanoparticles like biological, chemical and physical and design various nanomaterials.<br>**CO3 :** Evaluate XRD data, and calculate its parameters; |

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| | | | carry out analysis of TG-DTA curves; assess morphology and particle size from SEM/TEM images.<br>**CO4 :** Express the physical and chemical properties of solids like magnetic, electrical and dielectric and interpret the applications of materials in various field like catalysis, ferrofluids, etc. |
| 17. | CHE-V.E-11 | Organometallic Chemistry | **CO1 :** Illustrate metal-ligand interaction in formation of different metal carbonyls based on valence bond theory.<br>**CO2 :** Explain and rationalize the synthesis, structure, bonding, properties of organometallic compounds of main group elements.<br>**CO3 :** Apply the EAN concept and Wade's rules to any organometallic system and predict its stability, structure and bonding.<br>**CO4 :** Understand the chemical behavior and predict the reaction mechanism of organometallic compounds.<br>**CO5 :** Illustrate the catalytic cycles using an organometallic compound as a catalyst for industrial synthesis of some organic compounds.<br>**CO6 :** Interpret IR spectra of metal carbonyls and predict their structure. |
| 18. | CHE-VI.E-13 | Spectroscopic Methods in Organic Chemistry | **CO1 :** Describe the principles of IR, UV and Mass spectroscopy.<br>**CO2 :** Calculate UV maxima of any given organic compound using Woodward-Fieser rules.<br>**CO3 :** Predict the presence of various functional groups in a given organic compound using IR spectroscopy.<br>**CO4 :** Interpret the mass spectra of various organic compounds.<br>**CO5 :** predict the structures of organic compounds based on the given $^{1}$H NMR and $^{13}$CMR data.<br>**CO6 :** interpret the $^{1}$H NMR and $^{13}$CMR spectra of organic compounds. |
| 19. | CHE-VI.E-14 | Environmental Chemistry | **CO1 :** Delineate how pollutants are transported and accumulated in the environment.<br>**CO2 :** Recognize different types of toxic substances and analyze toxicology.<br>**CO3 :** Describe water purification and waste treatment processes.<br>**CO4 :** Apply knowledge of chemical and biochemical principles of fundamental environmental processes in air, water, and soil.<br>**CO5 :** Apply basic chemical concepts to analyze chemical processes involved in different environmental |

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| | | | problems.<br>**CO6 :** Develop skills in procedures and few instrumental methods applied in analysis of soil and water pollution. |
| 20. | CHE-VI.E-15 | Selected Topics in Inorganic Chemistry | **CO1 :** Differentiate between thermodynamic stability and kinetic stability and apply it to transition metal complexes.<br>**CO2 :** Apply the concepts to determine the reaction mechanism of transition metal complexes.<br>**CO3 :** Determine the factors that govern the stability and lability of transition metal complexes.<br>**CO4 :** Illustrate the chemistry and function of some of the technologically useful materials like liquid crystals, superconductors and fullerides.<br>**CO5 :** Understand the properties and classify the polymers<br>**CO6 :** Explain the preparation, structure and bonding and applications of polymers comprising of B, P, Si and S.<br>**CO7 :** Analyze the magnetic properties of the transition metal complexes as well as interpret the effect of temperature on magnetic properties.<br>**CO8 :** Determine the magnetic susceptibility by using Guoy's balance.<br>**CO9 :** Identify and apply the symmetry elements in molecules and to evaluate the Point groups in molecules with appropriate examples. |

# B.SC. IN GEOLOGY

## PROGRAMME OUTCOMES

| Programme Outcomes (PO) | Short Title of the POs | Description of the Programme Outcomes<br><br>Graduates will be able to : |
|---|---|---|
| PO-1 | Problem Analysis and Solutions | Think critically, identify, analyze problems/ situations and further attempt to design/ develop solutions that meet the specified goals. |
| PO-2 | Use of Technology | Apply appropriate IT tools efficiently in their daily life-professional and personal. |
| PO-3 | Environment and Sustainability | Be aware of environmental issues and commit towards sustainable development at local/ national and global context. |
| PO-4 | Ethics | Recognize and understand professional ethics /human values and be responsible. |
| PO-5 | Individual and Team work | Function effectively at various levels, capacities and situations. |
| PO-6 | Communication | Communicate proficiently (oral and written) as a responsible member of society. |
| PO-7 | Research Aptitude | Understand general research methods and be able to analyse, interpret and derive rational conclusions. |
| PO-8 | Life Skills | Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of domain specific change. |

**PROGRAMME SPECIFIC OUTCOMES (PSO)**

After successful completion of a Bachelor's degree in Geology, the students will be able to :

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| PSO-1 | Explain the theoretical concepts involved in courses like Mineralogy, Petrology and Structural Geology. |
| PSO-2 | Apply theoretical concepts involved in mineral forming to confidently identify them in hand as well as in thin sections. |
| PSO-3 | Analyse the theoretical concepts and apply them in interpreting the various petrographic features in rocks exhibited in hand specimens and in thin sections. |
| PSO-4 | Create, analyse and interpret structural geological maps. |
| PSO-5 | Make accurate field observations during field excursions and relate their understanding of various structural and petrological features learnt in classroom for correct interpretation. |
| PSO-6 | Communicate confidently and write geological reports. |
| PSO-7 | Demonstrate content knowledge appropriate to professional career goals |

**COURSE OUTCOMES**: Upon completion of the course, the student will be able to :

| Course Code | Course Title | Course Outcomes |
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| GEL-I.C.1 | Fundamentals of Mineralogy | **CO1** Understand what is a mineral and its formation.<br>**CO2** Explain mineralogical properties like polymorphism, isomorphism, Pseudomorphism.<br>**CO3** Describe the physical properties of minerals.<br>**CO4** Relate crystal chemistry and chemical bonding to the formation of minerals like crystal structure, chemistry, chemical composition.<br>**CO5** Compare and contrast the elemental and major oxide composition of the crust with the entire earth.<br>**CO6** Link how the internal atomic structure of minerals affects the external development of a crystal in terms of crystal symmetry, crystal system and crystal forms.<br>**CO7** Identify rock- forming minerals in hand specimen using their physical properties.<br>**CO8** Classify minerals into crystal systems based on crystal symmetry. |
| GEL-II.C-2A | Earth's Dynamics and Tectonics | **CO1** Understand the origin and nature of the earth and its layered structure.<br>**CO2** Gain insights into the spheres of the earth and their inter-relationship, the earth's Gravity, and magnetic field.<br>**CO3** Relate the concept of Isostacy with plate tectonics<br>**CO4** Differentiate between the different types of forces acting in the lithosphere and link the different types of responses of brittle and ductile substances to stress.<br>**CO5** Understand the exogenous and endogenous geological hazards.<br>**CO6** Read and interpret geological maps and draw geological cross– sections.<br>**CO7** Recognize different types of folds, faults and joints. |
| GEL-I.C-3A | Elementary Petrology | **CO1** Understand the processes involved in the formation of rocks, their textures and structures.<br>**CO2** **C**lassify rocks into their various types – Igneous, Sedimentary or Metamorphic.<br>**CO3** Understand the importance of rocks.<br>**CO4** Differentiate between the different rock types based on their textures, structures and mineralogy<br>**CO5** Identify the different textures and structures of rocks.<br>**CO6** Describe the mineralogy and properties of, and identify common rock types. |

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| GEL-II.C-4 | Principles of Stratigraphy and Paleontology | **CO1** Understand principles of Stratigraphy and concept of Facies.<br>**CO2** Differentiate between absolute and relative age of the earth.<br>**CO3** Explain measurements of geologic time.<br>**CO4** Describe how rocks are correlated.<br>**CO5** Describe types of fossils, conditions and modes for fossilisation, how fossils can be used to locate economic deposits.<br>**CO6** Describe and explain morphology of the hard parts of different phylum's and geological time range.<br>**CO7** Understand map reading and handle clinometer compass.<br>**CO8** Solve problems on bearings.<br>**CO9** Describe and identify fossils/casts/shells w.r.t their morphology and geological age.<br>**CO10** Apply classroom teaching to field observations and preparing a geological report |
| GEL-III.C-5A | Advanced Mineralogy and Geochemistry | **CO1** Understand the concept of Gibbs Phase Rule.<br>**CO2** Correlate structure, chemical composition with physical and optical properties of minerals of major silicate group of minerals.<br>**CO3** Interpret stability relations of minerals using Phase diagrams.<br>**CO4** Understand how minerals originate and associate with each other in a rock<br>**CO5** Understand the geochemical composition of the Earth.<br>**CO6** Describe how compatible elements are involved in the various geochemical processes.<br>**CO7** Explain how incompatible elements are involved in the various geochemical processes.<br>**CO8** Evaluate and interpret how geochemistry can be used to interpret tectonic setting.<br>**CO9** Solve applied quantitative problems.<br>**CO10** Plot major oxides in tectonic discriminant diagrams. |
| GEL-III.E-1 | Physical Geology | **CO1** Identify the dominant medium of erosion, transportation and deposition in a given area and explain the mechanisms for those processes.<br>**CO2** Identify various dessert landforms and explain the processes involved in their formation.<br>**CO3** Identify various fluvial landforms and explain the processes involved in their formation.<br>**CO4** Identify various Karst topography and features and explain the processes involved in their formation. |

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| GEL-III.E-1 (contd.) | Physical Geology (contd.) | **CO5** Identify various glacial and coastal landforms and explain the processes involved in their formation.<br>**CO6** Assign stream order as per Strahler's Method, Analyze various attributes of basin morphometry and drainage.<br>**CO7** Prepare and analyze long and cross sections of river profiles from SOI Toposheet.<br>**CO8** Deduct the processes involved in shaping the geomorphology of a local area by an integrated approach of applying theoretical knowledge and field based observations. |
| GEL-III.E-2 | Groundwater and Hydrogeology | **CO1** Understand the concept of Groundwater, its sub- surface distribution and sources.<br>**CO2** Explain the rock properties of porosity and permeability affecting the movement of groundwater.<br>**CO3** Differentiate between the various types of aquifers.<br>**CO4** Carry out groundwater exploration by resistivity method.<br>**CO5** Draw flow-nets from groundwater levels.<br>**CO6** Determine water quality based on various parameters.<br>**CO7** Understand the effects of over withdrawal of groundwater and water logging, and suggest mitigation measures. |
| GEL-III.E-3A | Ore Genesis | **CO1** Differentiate between rock-forming minerals and ore minerals.<br>**CO2** Understand the basis of classifying ore minerals.<br>**CO3** Understand the origin and stages of ore formation.<br>**CO4** Classify the various ore minerals under categories such as magmatic, hydrothermal, volcanogenic etc.<br>**CO5** Explain the processes involved in the formation of ore deposits.<br>**CO6** Understand the genesis and occurrence of various ore deposits in India.<br>**CO7** Evaluate ore minerals in hand specimen using their physical properties. |
| GEL-III.E-4 | Marine Geology | **CO1** Understand ocean bathymetry and learn to identify features of the ocean floor such as mid ocean ridges, seamounts, guyots, hydrothermal vents, pillow basalts, trenches.<br>**CO2** Relate the ocean features to its tectonic origin.<br>**CO3** Understand the various processes which generate ocean currents. |

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| GEL-III.E-4 (contd.) | Marine Geology (contd.) | **CO4** Classify marine sediments into four broad categories based on their origin i.e lithogenous , hydrogeneous, biogenous, cosmogenous.<br>**CO5** Identify the characteristics of important marine resources for the future such as polymetallic nodules and gas hydrates.<br>**CO6** Recognise how near shore geological processes shape coastlines over time. |
| GEL-IV.C-6 | Structural Geology | **CO1** Gather knowledge about the geometry of various structures acquired by rocks at primary and secondary stages.<br>**CO2** Understand the concepts of stress and strain.<br>**CO3** Understand the application of stress and strain in rock deformation.<br>**CO4** Identify rock structures and deformities like joints, folds and faults.<br>**CO5** Understand a structural separation in geological context based on unconformities.<br>**CO6** Identify secondary structures developing in rocks.<br>**CO7** Interpret geological maps<br>**CO8** Solve structural problems based on provided data. |
| GEL-IV.E-5A | Engineering Geology | **CO1** Understand issues related to geological basement and structure of a region.<br>**CO2** Identify the characteristics of basement rock formations and problems associated with them.<br>**CO3** Describe and interpret geological structures in geological maps and drawing cross sections.<br>**CO4** Assess the area appropriately suggested for a geotechnical project and apply the geological knowledge for a safe and secure construction and operation of a geotechnical project.<br>**CO5** Suggest remedial measures to encounter the problems detected.<br>**CO6** Interpret core logs and suggest suitable remedial measures.<br>**CO7** Collect data interpret and analyse it to solve problems associated with the engineering project as well as the environment.<br>**CO8** Explore and suggest novel ideas using geological background for the geotechnical project.<br>**CO9** Suggest Site feasibility based on geological maps.<br>**CO10** Carry out physical and mineralogical descriptions of cores.<br>**CO11** Draw relationship of core log to RQD values<br>**CO12** Compute reservoir area, catchment area, reservoir capacity.<br>**CO13** Solve numerical problems on ultimate strength of rocks. |

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| GEL-IV.E-6A | Optical Mineralogy | **CO1** Understand basic concepts in optical mineralogy wrt relief, pleochroism, character between crossed polars, extinction and their types, interference colours, zoning and twinning.<br>**CO2** Correlate elementary principles of optics to crystal optics.<br>**CO3** Distinguish Uniaxial and Biaxial Indicatrix<br>**CO4** Understand the concept of formation of Interference colours and determine their orders as per Newton's Scale.<br>**CO5** Handle Petrological Microscopes.<br>**CO6** Identify major rock-forming minerals in microsections.<br>**CO7** Detect Optic Sign for Uniaxial and Biaxial Minerals using Interference Figures.<br>**CO8** Determine Anorthite content of Plagioclase.<br>**CO9** Calculate Optic Axial Angle. |
| GEL-IV.E-7 | **Natural Hazards and Management** | **CO1** Understand the causes, effects and mitigation measures for natural hazards such as droughts, floods, cyclones, volcanic eruptions, tsunami, landslides & subsidence, salinity hazards, coastal erosion.<br>**CO2** Appreciate the CRZ act and its impact on disaster mitigation.<br>**CO3** Understand the framework and roles of various bodies under the National disaster management plan of India.<br>**CO4** Prepare a simple disaster management plan for a building/unit. |
| GEL-IV.E-8 | Geotectonics | **CO1** Gain an insight into the study of the earth's interior using seismic data.<br>**CO2** Understand the various layers of the earth's interior and the mechanism of plate tectonics.<br>**CO3** Explain the origin and nature of the earth's magnetic field and palaeomagnetism.<br>**CO4** Understand the theory of Continental Drift along with supporting evidences.<br>**CO5** Explain mountain building (orogenesis) and its relation with plate tectonics.<br>**CO6** Identify and plot various tectonic features on the earth's surface. |
| GEL-V. C-7A | Sedimentary Petrology | **CO1** Understand the processes leading to the formation of sedimentary rocks.<br>**CO2** Identify and explain the various textures and structures of sedimentary rocks.<br>**CO3** Relate different sedimentary facies with the environment of deposition. |

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| | | **CO4** Describe and identify the textures, structures and mineral composition and origin of various clastic and non-clastic sedimentary rocks. |
| GEL-V.E-9B | Precambrian Stratigraphy of India | **CO1** Understand evolution and stabilisation of the Archean cratons in India with special emphasis on Dharwar craton.<br>**CO2** Understand the tectonics behind Mobile Belts of India<br>**CO3** Differentiate between western Dharwar Craton and Eastern Dharwar Craton.<br>**CO4** Interpret geological and geochemical differences of the basement rocks for Sargur (Gorur Gneiss) and Dharwarian (Peninsular Gneissic Complex)<br>**CO5** Relate the lithostratigraphy of Sargur and Dharwar Schist Belt and correlate it with the Goa Group of rocks.<br>**CO6** Understand the Purana basins in India with emphasis on Cuddapah Vindhyans and Kaladgis.<br>**CO7** Identify specimens representing rock Formations in Goa<br>**CO8** Assigning stratigraphy Formations based on fossils.<br>**CO9** Solve problems in stratigraphic correlation |
| GEL-V.E-10 | Petroleum Geology | **CO1** Describe the Physical & chemical properties of Hydrocarbons.<br>**CO2** Compare various exploration techniques involved in hydrocarbon detection.<br>**CO3** Understand the process of drilling & completion of a Petroleum well.<br>**CO4** Prepare isopach maps.<br>**CO5** Delineate and describe the petroliferous domains in India.<br>**CO6** Analyse well logs. |
| GEL-V. E-11A | Metamorphic Petrology | **CO6** Correlate deformation with grade of metamorphism.<br>**CO7** Evaluate how the different factors like temperature, pressure, protolith, chemically active fluids and time control metamorphism.<br>**CO8** Interpret tectonic setting of Metamorphic Belts based on field characters and kinematic stress indicators.<br>**CO9** Interpret the metamorphic processes combining the evidences derived from hand specimens, microsections and protolith.<br>**CO10** Differentiate between Barrovian and Buchan Zones<br>**CO11** Apply the facies concept to progressive contact and regional including burial metamorphism.<br>**CO12** Identify textures of metamorphic rocks in hand specimens.<br>**CO13** Identify textures, structures, mineralogy of metamorphic rocks in thin sections |

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| GEL-V.E-12 | Remote Sensing and Digital Image Processing | **CO1** Explain remote sensing principles, purposes, advantages and limitations.<br>**CO2** Define and describe electromagnetic spectrum and interactions with various types of media.<br>**CO3** Describe characteristics of remote sensing imagery.<br>**CO4** Describe sensors and image acquisition methods.<br>**CO5** Search and download satellite imagery from online portals such as Bhuvan, USGS Earth explorer.<br>**CO6** Understand the application of digital imagery for interpretation of lithology, Structure and geomorphology.<br>**CO7** Prepare various maps using Quantum GIS and Google Earth. |
| GEL-VI.C-8A | Igneous Petrology | **CO1** Understand conceptual techniques wrt nucleation and growth of minerals thereby understanding the formation of a rock.<br>**CO2** Identify igneous rocks in hand specimen.<br>**CO3** Identify igneous rocks in thin sections<br>**CO4** Classify igneous rocks<br>**CO5** Evaluate a rock wrt its environment of formation (PT) conditions thereby assign a name.<br>**CO6** Identify key textural and microstructures and their application related to geological processes.<br>**CO7** Interpret ternary phase diagrams.<br>**CO8** Classify rocks based on their chemical analysis. |
| GEL-VI.E-13B | Phanerozoic Stratigraphy of India | **CO1** Understand the Gondwana sedimentation and its economic significance.<br>**CO2** Understand the geology and geotectonics of Triassic of Spiti.<br>**CO3** Understand the geology and geotectonics of Jurassic of Kutch.<br>**CO4** Understand the geology and geotectonics of Cretaceous of Trichinopoly.<br>**CO5** Understand Deccan Flood Volcanism.<br>**CO6** Analyse and interpret the Gondwana breakup.<br>**CO7** Understand the geology and geotectonics of Tertiaries of Assam and its economic significance<br>**CO8** Understand the upheaval and evolution of Himalayas.<br>**CO9** Relate boundary problems associated with Precambrian-Cambrian, Permian-Triassic, Cretaceous-Tertiary and Pleistocene-Holocene boundaries in India and their relation to mass extinctions.<br>**CO10** Prepare lithostratigraphic maps. |

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| GEL-VI.E-14A | Rock Structures and Deformation Microstructures | **CO1** Understand the process and mechanisms of rock structures and rock deformation microstructures.<br>**CO2** Interpret the significance of microstructures in Igneous, Sedimentary and Metamorphic rocks.<br>**CO3** Apply the significance of features like foliation and lineation in field as well as in microsections in understanding microstructures and rock deformation.<br>**CO4** Interpret Shear Sense Indicators in Mylonites.<br>**CO5** Enhance application skills in relating deformation history to tectonism.<br>**CO6** Interpret deformation features in field and in microsections.<br>**CO7** Identify and Interpret the significance of rock structures in thin sections.<br>**CO8** Identify and Interpret the significance of rock deformation microstructures in thin sections. |
| GEL-VI.E-15A | Surveying, Mapping and Field Geology | **CO1** Carry out dumpy level survey.<br>**CO2** Carry out plane table survey.<br>**CO3** Understand SOI Toposheet catalogue.<br>**CO4** Learn to plan for a geology field trip.<br>**CO5** Record detailed field observations systematically in their field diary and subsequently prepare a geologic field report of the same. |
| GEL-VI.E-16A | Principles of Geophysical Exploration and Mining | **CO1** Gain knowledge of key concepts of mining processes right from exploration to exploitation<br>**CO2** Understand the difference between the nature of, and factors leading to the choice between, Open-cast and Underground mining methods.<br>**CO3** Explain the different techniques of ore beneficiation.<br>**CO4** Get acquainted with government agencies and regulations that control the mining and mineral conservation processes.<br>**CO5** Explain the principles behind, and methods of Geophysical, Geochemical and Geobotanical exploration.<br>**CO6** Draw cross - and longitudinal sections using bore-hole Data.<br>**CO7** Estimate ore reserves using different methods.<br>**CO8** Get a first-hand experience in core-logging |

# B.SC. IN PHYSICS

**PROGRAMME OUTCOMES**

| Programme Outcomes (PO) | Short Title of the POs | Description of the Programme Outcomes<br><br>Graduates will be able to : |
|---|---|---|
| PO-1 | Problem Analysis and Solutions | Think critically, identify, analyze problems/ situations and further attempt to design/ develop solutions that meet the specified goals. |
| PO-2 | Use of Technology | Apply appropriate IT tools efficiently in their daily activities of communication and academics. |
| PO-3 | Environment and Sustainability | Analyze and attempt solutions to environmental issues and commit themselves to sustainable development in the local/ national and global context. |
| PO-4 | Ethics | Recognize and understand professional ethics /human values and be responsible for the same. |
| PO-5 | Individual and Team work | Function effectively at various levels, capacities and situations. |
| PO-6 | Communication | Communicate proficiently (oral and written) as a responsible member of society. |
| PO-7 | Research Aptitude | Understand general research methods and be able to analyse, interpret and derive rational conclusions. |
| PO-8 | Life Skills | Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of domain specific change. |

**PROGRAMME SPECIFIC OUTCOMES (PSOs)**

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| PSO-1 | Strengthen the understanding of basic concepts of Physics and impart required mathematical skills. |
| PSO-2 | Provide a strong base in Experimental Physics to pursue higher studies/research in Experimental Physics. |
| PSO-3 | Provide a sound foundation in Theoretical Physics to pursue higher studies/research in Theoretical Physics |
| PSO-4 | Developing analytical thinking and logical reasoning. |
| PSO-5 | Enhancing problem solving skills. |
| PSO-6 | Promote self-learning, self-confidence, communication skills and team work. |
| PSO-7 | Enhancing employability through skill enhancement courses. |

**COURSE OUTCOMES**

| S. No. | Course Code | Course Title | Course Outcomes<br>At the end of this course students will be able to: |
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| 1 | **PHY-I.C-1** | **Introduction to Mathematical Physics** | **CO1:** Have a good understanding of vector analysis and its application in physics.<br>**CO2:** Have a good grasp on various tests used to test the convergence and divergence of different kinds of series and learn how to expand a function in power series.<br>**CO3:** Understand the basics of complex numbers.<br>**CO4:** Have an understanding of matrix operations and properties of matrices.<br>**CO5:** Learn basics of partial differentiation and its application in physics.<br>**CO6:** Be able to solve ordinary first and second order differential equations important in the physical sciences,<br>**CO7:** familiarize with spherical and cylindrical coordinate systems.<br>**CO8:** Use mathematical techniques to solve several problems in physics and enhance problem solving skills. |
| 2 | **PHY-I.C-2** | **Mechanics I** | **CO1:** develop qualitative and quantitative understanding of Newtonian mechanics in one and two dimensions and solve the Newton equations for simple configurations.<br>**CO2:** understand the Law of Conservation of Linear Momentum and Angular Momentum and apply these laws to understand elastic and inelastic collision, motion of a rocket and Kepler's law.<br>**CO3:** demonstrate the knowledge of work and energy in kinetics<br>**CO4:** understand the Principle of Conservation of Mechanical Energy (for conservative forces) and apply this law to problems of objects moving under the influence of conservative forces.<br>**CO5:** develop ideas of Newtons Law of gravity, gravitational field and potential energy by solving various problems. |
| 3 | **PHY-II.C-3** | **Heat and** | **CO1:** Understand different types of temperature scales |

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| | | **Thermodynamics** | and relationship between different scales of temperature.<br>**CO2:** Able to relate the effects of changes in temperature, pressure and volume on physical systems at macroscopic scale by analyzing collective motion of their particles.<br>**CO3:** Able to comprehend the first law of thermodynamics to represent the relationship between heat and mechanical work.<br>**CO4:** Able to comprehend the second law of thermodynamics to depict the manner in which thermodynamic changes take place.<br>**CO5:** Explain the usefulness of these concepts for wide range of applications that include heat engines, refrigerators and air conditioners.<br>**CO6:** Calculate change in entropy in matter during change in phase. |
| 4 | **PHY-II.C-4** | **Electricity and Magnetism** | **CO1 :** Comprehend basic concepts like: laws of electrostatics and magneto statics and also related applications.<br>**CO2 :** Understand the interrelated concepts of Electricity and Magnetism.<br>**CO3 :** Understand the working of transient circuits and alternating current circuits.<br>**CO4 :** Correlate the theoretical basis of various concepts of electricity and magnetism while performing experiments. |
| 5 | **PHY-II.C-5** | **Electromagnetic Theory – I** | **CO1:** Apply vector calculus to understand concepts in electrostatics.<br>**CO2:** Comprehend the interaction between charges in vacuum as well as in medium.<br>**CO3:** Calculate the electric field and electrical potential for discrete charges and continuous distribution of charge.<br>**CO4:** Applysuitabletechniques to solve various electrostatic problems.<br>**CO5:** Understand how ferroelectric materials can be used as memory devices. |
| 6 | **PHY-E1** | **Optics** | **CO1 :** Understand the image formation for various optical systems.<br>**CO2 :** Differentiate between optical phenomena like Interference, Diffraction and Polarization. |

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| | | | **CO3 :** Correlate the theoretical basis of various concepts of Geometrical Optics and Physical Optics while performing experiments<br>**CO4 :** Develop understanding towards the different phenomena exhibited by light. |
| 7 | **PHY-E2** | **Modern Physics** | **CO1 :** have an understanding of constituents of an atom and atomic structure.<br>**CO2 :** discuss and interpret experiments that reveal the wave properties of matter.<br>**CO3 :** discuss and interpret experiments that reveal the particle properties of waves and wavelike properties of particle.<br>**CO4:** apply uncertainty principle to solve physics problems<br>**CO5:** understand the working of mass spectrographs and accelerators<br>**CO6:** understand the basic operating principle of the laser and the optical fiber. |
| 8 | **PHY-E3** | **Oscillations, Waves and Sound** | **CO1 :** Set up an equation of motion for simple harmonic motion and obtain its solution.<br>**CO2 :** Explain how superposition of waves leads to different Lissajous figures.<br>**CO3 :** Set and solve the equation of motion for damped and driven damped harmonic oscillators and analyse the nature of oscillations.<br>**CO4:** Understand the dependence of velocity of sound waves on various factors like temperature, pressure, density, humidity.<br>**CO5:** Solve problems for different cases of Doppler effect. |
| 9 | **PHY-E17** | **Introduction to Astronomy and Astrophysics** | **CO1 :** Understand the various Extra-galactic objects.<br>**CO2 :** Understand the construction, working and mounting of modern telescopes.<br>**CO3 :** Understand co-ordinate system of Celestial Objects.<br>**CO4 :** Understand types of stars and their life cycle. |
| 10 | **PHY-II.C-6** | **Quantum Mechanics** | **CO1 :** understand central concepts and principles in quantum mechanics, such as the Schrödinger equation, the wave function and its statistical interpretation, the uncertainty principle, stationary and non-stationary states, time evolution of solutions.<br>**CO2 :** solve the Schrödinger equation to obtain wave functions for some important types of potential in one |

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| | | | and three dimension and give concise physical interpretations and reasoning underlying the mathematical results<br>**CO3 :** grasp the concepts of angular momentum and spin.<br>**CO4 :** have an insight into fundamental issues in quantum mechanics like the EPR paradox, Bells theorem and Schrödinger's cat<br>**CO5:** develop an understanding of why both analytic and numerical solutions are important in quantum mechanics and have acquired experience in using both types of methods on quantum mechanical problems<br>**CO6:** use numerical tools and software to solve the Schrodinger equation for more complicated cases. |
| 11 | **PHY-E5** | **Electronics-I** | **CO1 :** Understand the fundamentals of semiconductor behavior and the operation of basic semiconductor devices.<br>**CO2 :** Understand basic circuit laws; semiconductor based analog circuits from a fundamental point of view.<br>**CO3 :** Use this knowledge to describe bipolar transistors and its applications.<br>**CO4 :** Understand and apply the concept of feedback to study operational amplifier and sinusoidal oscillators. |
| 12 | **PHY-E6** | **Solid State Devices** | **CO1 :** Comprehend the p-n junction theory and analyse the effect of heat and light on the performance of the semiconductor devices.<br>**CO2:** Understand different types of special diodes and their uses in various electronics applications.<br>**CO3 :** Understand different types of optoelectronic devices and their uses in various electronics applications.<br>**CO4:** Design, construct and study the performance of circuits based on breakdown devices.<br>**CO5 :** Corelate the theory to understand the working of these devices. |
| 13 | **PHY-E4** | **Properties of Matter and Acoustics** | **CO1 :** Gain an introductory knowledge of dynamics of rigid bodies, and its applications to basic physical problems.<br>**CO2 :** Familiarize with of acoustics of rooms and musical scales.<br>**CO3 :** Comprehend the phenomenon of elasticity, |

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| | | | surface tension, viscosity and their application. |
| 14 | **PHY-E7** | **Computational Physics** | **CO1 :** Understand various numerical methods<br>**CO2 :** Use FORTRAN language for numerical calculations.<br>**CO3 :** Understand various concepts of Physics using numerical methods using FORTRAN as a programming language.<br>**CO4 :** Solve problems in Physics by numerical methods using FORTRAN as a programming language. |
| 15 | **PHY-II.C-7** | **Electromagnetic Theory – II** | **CO1 :** Calculate magnetic field induction using Biot-Savart's law and Ampere's law.<br>**CO2 :** Interpret bound currents and calculate magnetic fields in matter.<br>**CO3 :** Comprehend microscopic theory magnetism.<br>**CO4 :** Establish the link between electrostatics and magnetostatics using Maxwell's equations.<br>**CO5:** Develop the wave equation for propagation of electromagnetic waves through material media and vacuum at different angles of incidence. |
| 16 | **PHY-E9** | **Solid State Physics** | **CO1 :** Understand firmly the basics of Solid State Physics.<br>**CO2 :** Understand the link between the structural aspects and the various physical properties of crystalline solids.<br>**CO3 :** Gain a comprehensive broad knowledge in topic such as: Bonding in Solids, Crystal Physics, Electrical properties of solids, Origin of energy band structure in solids and Magnetic properties of materials. |
| 17 | **PHY-E10** | **Thermodynamics and Statistical Mechanics** | **CO1 :** Understand basics of kinetic theory of gases and thermodynamic potentials.<br>**CO2 :** Understand Maxwell-Boltzmann, Fermi-Dirac, and Bose-Einstein statistics and its application to the classical gas, electrons in a metal and blackbody radiation<br>**CO3 :** Understand the specific heat of solids by invoking statistical mechanics. |
| 18 | **PHY-E11** | **Electronics-II** | **CO1** : Analyse AC circuits and apply the techniques in designing circuits.<br>**CO2:** Generate different kinds of waves using OP-Amp<br>**CO3:** Understand the basic concepts of 555 timer. |

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| | | | **CO4:** Develop the ideas of monolithic linear regulators and understand different types of voltage regulators in LM series<br>**CO5:** Apply binary operations to different digital circuits<br>**CO6:** Understand the clocked digital electronics and its applications in different types of counters |
| 19 | **PHY-E12** | **Mathematical Physics** | **CO1 :** Comprehend the functions of complex variables.<br>**CO2 :** Apply mathematical techniques such as: calculus of residues to evaluate definite integrals.<br>**CO3:** Apply solutions of Legendre, Bessel and Hermite equations, Fourier transforms of different functions in solving various Physics problems.<br>**CO3 :** Able to solve higher order problems in Physics**.** |
| 20 | **PHY-II.C-8** | **Atomic and Molecular Physics** | **CO1 :** solve the case of the hydrogen atom using the three dimension time-independent Schroedinger equation, identify atomic effect such as space quantization and interpret the wave functions and probability densities.<br>**CO2 :** become familiar with the orbital, spin and total angular momentum of many electron atoms.<br>**CO3 :** explain the observed dependence of atomic spectral lines on externally applied magnetic fields.<br>**CO4:** grasp the physics of diatomic molecules, their electronic states, vibrations and rotations and their spectra.<br>**CO5:** comprehend classical and quantum theory of Raman effect.<br>**CO6:** develop analytical and computing skills through problem solving, and computer based exercises, which involve quantum mechanical systems such as the Harmonic oscillator, Hydrogen atom and Morse potential. |
| 21 | **PHY-E13** | **Mechanics – II** | **CO1 :** Separate two body problem into two equivalent single body problems<br>**CO2 :** Establish equation of orbit for the motion under inverse square law force and study different types of orbits.<br>**CO3 :** Establish the relation between time derivative of a vector in a fixed frame of reference with respect to moving frame of reference.<br>**CO4:** Comprehend the occurrence of some pseudo |

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| | | | forces due to relative motion between frames of references such as Coriolis's force, centrifugal force<br>**CO5:** Understand the motion of rigid bodies by solving Euler's equations of motion.<br>**CO6:** Understand the advantages of Lagrangian formulation over Newtonian formulation.<br>**CO7:** Solve various mechanical problems using Lagrangian equation of motion |
| 22 | **PHY-E14** | **Nuclear and Elementary Particle Physics** | **CO1 :** Understand the fundamental principles governing the basic properties of nuclei, nuclear structure and particle physics.<br>**CO2 :** Able to solve elementary problems, relating theoretical predictions and measurement results, in nuclear and particle physics. |
| 23 | **PHY-E15** | **Introduction to Special Theory of Relativity** | **CO1 :** Understand the limitations of Newtonian relativity at speeds close to the speed of light.<br>**CO2 :** Learn the postulates of special theory of relativity and understand the connection between space and time.<br>**CO3 :** Comprehend the concepts of relativistic velocity, relativistic mass and equivalence of energy and mass.<br>**CO4 :** Learn about the doppler effect in relativity. |
| 24 | **PHY-E16** | **Introduction to Materials Science** | **CO1 :** Understand the fundamentals of materials science.<br>**CO2 :** Understand the properties and applications of materials.<br>**CO3 :** Investigate the relationship that exists between the structures and properties of materials. |
| 25 | **PHY-E8** | **Instrumentation** | **CO1 :** Understand basic concepts related to the various types of measuring instruments and measuring techniques.<br>**CO2 :** Comprehend basic principles involved in measuring instruments like Ammeter, Voltmeter, Ohmmeter and Multimeters.<br>**CO3 :** Understand working and use of CROs and Signal Generators<br>**CO4 :** Understand working and usage of the various types of transducers. |

# B.SC. in ZOOLOGY

**PROGRAMME OUTCOMES**

| Programme Outcomes (PO) | Short Title of the POs | Description of the Programme Outcomes<br>Graduates will be able to : |
|---|---|---|
| PO-1 | Problem Analysis and Solutions | Think critically, identify, analyze problems/ situations and further attempt to design/ develop solutions that meet the specified goals. |
| PO-2 | Use of Technology | Apply appropriate IT tools efficiently in their daily life- professional and personal. |
| PO-3 | Environment and Sustainability | Be aware of environmental issues and commit towards sustainable development at local/ national and global context. |
| PO-4 | Ethics | Recognize and understand professional ethics /human values and be responsible. |
| PO-5 | Individual and Team work | Function effectively at various levels, capacities and situations. |
| PO-6 | Communication | Communicate proficiently (oral and written) as a responsible member of society. |
| PO-7 | Research Aptitude | Understand general research methods and be able to analyse, interpret and derive rational conclusions. |
| PO-8 | Life Skills | Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of domain specific change. |
| **PROGRAMME SPECIFIC OUTCOMES (PSO)**<br>Graduate of programme of BSc Zoology should have developed high level of proficiency in: | | |
| PSO1 | Sound subject knowledge | Have strong foundation of fundamentals and modern concepts of Zoology. |
| PSO2 | Good practical procedure skills | Formulate plan of procedure and execute research plan and collect, collate, analyse and interpret data. |
| PSO3 | Bio- Entrepreneur | Being able to make a business plan to pursue career in Fishery / Wildlife / paramedical or research sector or start business enterprise related to aspects of zoology. |
| PSO4 | Critical thinking and Problem solving skills | Assess, analyse and argue critically, real life problems or issues in areas/fields of zoology and apply proper logical strategies to find a solution. |
| PSO5 | Leadership quality | Demonstrate leadership quality and be able to function well as an individual or in a team. |

**COURSE OUTCOMES (COs)**

| SEM. | COURSE CODE | COURSE TITLE | **COURSE OUTCOME:** Upon successful completion of the course, students will be able to: |
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| **I** | **ZOO-I.C-1** | Animal Diversity : Non Chordates | CO1: Be familiar with identification of the non-chordates from chordates.<br>CO2: Identify the invertebrates and classify them upto the class level.<br>CO3: Understand the basis of life processes in the non-chordates.<br>CO4: Able to appreciate the process of evolution and understand how it progressed from simple, unicellular cells to complex, multicellular organisms. |
| **I** | **ZOO-I.C-2** | Cell and Molecular Biology | CO1: Have an understanding of cell, it's organelles and their function.<br>CO2: Demonstrate deeper understanding of what 'life is and how it functions at cellular level.<br>CO3: Contrast cellular membrane structure and function, fine structure and function of cell organelles.<br>CO4: Perform a variety of molecular and cellular biology techniques. |
| **II** | **ZOO-II.C-3** | Diversity and Biological Systems of Chordates | CO1: Be familiar with identification of the non-chordates from chordates with justification.<br>CO2: Identify the different chordates upto the order.<br>CO3: Understand the functioning and mechanism of the various biological systems in the chordates.<br>CO4: Able to appreciate the process of evolution of chordates from nonchordates and understand how it progressed from simple vertebrates to highly complex vertebrates. |
| **II** | **ZOO-II.C-4** | Fundamentals of Animal and Human Genetics | CO1: Describe the basic structure of genes and chromosomes.<br>CO2: Relate an organism's genotype and phenotype and explain the role of genes in inheritance.<br>CO3: Associate knowledge of genetic principles to the phenomena which occur in humans with reference to genetic inheritance.<br>CO4: Construct and analyze pedigrees to determine mode of inheritance of disorders and traits. |
| **III** | **ZOO-III.C-5** | Human Physiology | CO1: Describe and explain the normal function of the cells, tissues, organs, and organ systems of the human body.<br>CO2: Develop understanding of the functional relationships of anatomical structures to one another.<br>CO3: Know the disorders associated with the different systems.<br>CO4: Understand and associate malfunctions in the body to various organs and organ systems. |
| **IV** | **ZOO-IV.C-6** | Biochemistry and | CO1: Understand better the chemical basis in life. |

| SEM. | COURSE CODE | COURSE TITLE | **COURSE OUTCOME:** Upon successful completion of the course, students will be able to: |
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| | | Metabolic Regulation | CO2: Know the basic principles that govern the functioning of living systems<br>CO3: Be familiar with enzymes and their activities<br>CO4: Appreciate better the interactions between the biological molecules. |
| **V** | **ZOO-V.C-7** | Developmental Biology | CO1: Understand the basic plan of animal development.<br>CO2: Know the processes which occur during the course of development in invertebrates and vertebrates.<br>CO3: Have the basic knowledge of developmental biology.<br>CO4: Know the concepts associated with development of embryo. |
| **VI** | **ZOO-VI.C-8** | Wildlife Biology | CO1: Apply the techniques used in assessment and monitoring of wildlife.<br>CO2: Understand the basics of wildlife status, conservation, assessment and management.<br>CO3: Know about the diversity, extent, range of wildlife population dynamics.<br>CO4: Know the rules, regulations and factors governing wildlife. |
| **III** | **ZOO-III.E-1** | Vertebrate Endocrinology | CO1: Be familiar with all the endocrine organs of human body.<br>CO2: Associate hormones to body growth, metabolism, reproduction and development.<br>CO3: To understand the underlying principles and disorders associated with hormone functions<br>CO4: Learn techniques of histology and tissue identification. |
| **III** | **ZOO-III.E-2** | Basic microbiology and Fundamentals of Animal Biotechnology | CO1: Gain working knowledge of basic bacterial laboratory techniques and use of microorganism in biotechnology.<br>CO2: Perform techniques of bacterial isolation and identification.<br>CO3: Have knowledge about various molecular techniques of gene manipulation.<br>CO4: Should be able to Perform techniques of isolate DNA, bring about transformation and identification of recombinants. |
| III | **ZOO-III.E-3** | Environmental Toxicology | CO1: Distinguish, classify and characterize a variety of environmental pollutants based on their biological and physical properties.<br>CO2: Identify the main sources and types of environmental pollutants and assess their potential environmental fate.<br>CO3: Understand mechanisms of detoxification of various varieties of toxicants.<br>CO4: Know the procedures/protocols used to assess |

| SEM. | COURSE CODE | COURSE TITLE | **COURSE OUTCOME:** Upon successful completion of the course, students will be able to: |
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| | | | physicochemical parameters and environmental contaminants. |
| III | **ZOO-III.E-4 / *ZOO-III-SEC-1** | Waste management techniques | CO1: Understand concept of types of waste,its transport and disposal.<br>CO2: Perform composting techniques / procedures.<br>CO3: Identify means of reducing waste production.<br>CO4: Plan and conduct research in areas of waste management |
| IV | **ZOO-IV.E-5** | Animal cell culture and Applications | CO1: Operate, calibrate, and maintain standard equipment found in an animal cell culture laboratory;<br>CO2: Prepare and sterilize media and solutions used in cell culture.<br>CO3: Understand concepts and applications of mammalian cell culture.<br>CO4: Perform primary cell culture of suspension and adherent cells. |
| IV | **ZOO-IV.E-6** | Aquaculture and Fisheries | CO1: Understand conservation and sustainability of aquaculture resources.<br>CO2: Acquainted with various techniques of aquaculture.<br>CO3: Know strategies of improving the social and economic benefits derived from aquaculture and fisheries.<br>CO4: Initiate business enterprise in area of aquaculture. |
| IV | **ZOO-IV.E-7** | Immunology | CO1: Understand the components of the immune system and their function.<br>CO2: Explain the mechanisms of immune response.<br>CO3: Know about the techniques used in detecting immunological diagnosis.<br>CO4: Perform immunoassays for disease detection. |
| IV | **ZOO-IV.E-8** | Parasitology | CO1: Know about the parasites and their lifecycles.<br>CO2: Get acquainted with dimensions of public health viz . a viz. parasitic diversity, epidemiology and community prophylaxis.<br>CO3: Be familiar with the parasite host interactions.<br>CO4: Gain knowledge on diagnosis of parasite infections and preventive measures. |
| V | **ZOO-V.E-9** | Molecular Genetics and Forensic Science | CO1: Understand and explain the process of replication, transcription and translation<br>CO2: Differentiate between the gene expression in prokaryotes and eukaryotes<br>CO3: Understand the Branches of forensic science<br>CO4: know the application of molecular tools in genetic diagnosis |
| V | **ZOO-V.E-10** | Economic Zoology | CO1: Understand how zoological species contribute to economic sources. |

| SEM. | COURSE CODE | COURSE TITLE | COURSE OUTCOME: Upon successful completion of the course, students will be able to: |
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| | | | CO2: Gain working knowledge of techniques of rearing organisms.<br>CO3: Get acquainted with maintenance of the species<br>CO4: Understand the underlying principles of harvesting products from species. |
| V | **ZOO-V.E-11** | Basic and Applied Entomology | CO1: Be familiar with the identification of bio economical species.<br>CO2: Identify entrepreneurial opportunities in entomology.<br>CO3: Important insects and their products.<br>CO4: Insect pests of public health and veterinary importance and their management. |
| V | **ZOO-V.E-12** | Fish Preservation and Processing | CO1: gain understanding of the economic benefits of fishes.<br>CO2: They will also be able to understand the nutritional values of the fishes<br>CO3: Perform some protocols of Fish processing and preservation.<br>CO4: Aquaint oneself with the processes at fish processing industry |
| VI | **ZOO-VI.E-13/ *ZOO-VI-GE-1** | Health and Nutrition | CO1: Know about nutrients and their function<br>CO2: Read and interprete food labels.<br>CO3: Correlate role of lifestyle and food habits in causing diseases.<br>CO4: Prepare Diet Plans for different age group individuals. |
| VI | **ZOO-VI.E-14** | Ecology and Ethology | CO1: gain better understanding of concepts of ecology.<br>CO2: Acquainted with the basics of animal behaviours<br>CO3: Know strategies of biodiversity conservation,<br>CO4: Understand mechanisms of sustainable development. |
| VI | **ZOO-VI.E-15** | Laboratory Techniques in Pathology | CO1: Perform basic techniques of cell/tissue processing<br>CO2: Be Familiar with procedures of tests done for disease detection<br>CO3: Process various body fluids and tissues for disease detection..<br>CO4: Understand the clinical implication of the pathological tests. |
| VI | **ZOO-VI.E-16 / *ZOO-VI-SE-2** | Bio Entrepreneurship | CO1: understand concept of business Proposals<br>CO2: familiar with the methodologies and regulations required to start an enterprise<br>CO3: Identify opportunities available in life science for start-ups.<br>CO4: Generate Ideas and initiate a Business Plan. |

# B.A. in PSYCHOLOGY

**PROGRAMME OUTCOMES**

| Programme Outcomes (PO) | Short Title of the POs | Description of the Programme Outcomes<br><br>Graduates will be able to : |
|---|---|---|
| PO-1 | Problem Analysis and Solutions | Think critically, identify, analyze problems/ situations and further attempt to design/ develop solutions that meet the specified goals. |
| PO-2 | Use of Technology | Apply appropriate IT tools efficiently in their daily life-professional and personal. |
| PO-3 | Environment and Sustainability | Be aware of environmental issues and commit towards sustainable development atlocal/ national and global context. |
| PO-4 | Ethics | Recognize and understand professional ethics /human values and be responsible. |
| PO-5 | Individual and Team work | Function effectively at various levels, capacities and situations. |
| PO-6 | Communication | Communicate proficiently (oral and written) as a responsible member of society. |
| PO-7 | Research Aptitude | Understand general research methods and be able to analyse, interpret and derive rational conclusions. |
| PO-8 | Life Skills | Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of domain specific change. |
| **PROGRAMME SPECIFIC OUTCOMES (PSO) of Department of Psychology**<br>After successful completion of a Bachelor's degree in Psychology, the students will: | | |
| PSO-1 | Testing | Assist in reliability and validity processes of test construction. |
| PSO-2 | Experimentation | Conceptualize and design an experiment in psychology. |
| PSO-3 | Application of knowledge | Generate culturally appropriate solutions to psychosocial problems encountered in real world settings |
| PSO-4 | Cognitive Skills | Demonstrate reasonable scepticism and intellectual curiosity by asking questions about causes of behaviour |
| PSO - 5 | Self-improvement | Demonstrate the application of psychological principles to promote self-improvement |

**Course Outcomes**

| Sr. No | Course Code | Course Title | Course Outcomes |
|---|---|---|---|
| 1. | PSY-I.C-1 (Non-experimental) | **BASIC COURSE IN PSYCHOLOGY** | CO1. Distinguish between various schools of psychology.<br><br>CO2.Describe the functioning of the nervous system.<br><br>CO3. Use various techniques to improve memory.<br><br>CO4. Analyze the influence of motives on behavior.<br><br>CO5.Apply learning theories to modify behavior. |
| 2. | PSY-I.C-2 (Experimental – Theory) | **EMOTIONAL DEVELOPMENT** | CO 1.Differentiate between moods and emotions.<br><br>CO 2.Describe the process involved in the experience of emotions<br><br>CO 3.Categorize people according to their temperamental<br><br>CO 4.Extrapolate how attachment between a parent and child can influence future relationships of the child<br><br>CO 5.Describe the importance of emotional intelligence. |
| 3. | PSY-II.C-3 (Non-experimental) | **Personality Theories** | CO 1.To explain personality development through various theoretical perspectives.<br><br>CO 2.To highlight the importance of personality development.<br><br>CO 3.To Distinguish between various personality theories.<br>CO 4To identify one's own personality traits.<br><br>CO 5.To critically<br>evaluate different personality theories. |
| 4. | PSY-II.C-4 (Experimental: Theory) | **BASICS OF COUNSELLING** | CO1. List out personal Characteristics of Effective Counsellors<br><br>CO2.Describe the stages involved in |

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| | | | Counselling process<br><br>CO3. Highlight important elements of establishing an alliance between Counsellor and Counselee<br><br>CO4. Identify transference and countertransference in a therapeutic alliance<br><br>CO5. Compare person centered and cognitive behaviour approaches of Counselling<br><br>CO6. Identify various areas of counselling |
| 5. | PSY-V.C-7 (Experimental-Theory) | **EXPERIMENTAL PSYCHOLOGY** | CO1.Identify the variables of an experiment<br><br>CO2. Design an experiment having one or two variables<br><br>CO3.Weigh methods of subject selection from subject populations<br><br>CO4. Examine the criteria for selecting stimuli from stimulus population.<br><br>CO5 Select the statistical test to be used for the given experimental research<br><br>CO6. Analyse and minimize/avoid pitfalls in experiments |
| 6. | PSY-III.E-2 (Non-experimental) | **CHILD PSYCHOLOGY** | CO1.Describe prenatal development<br><br>CO2. List out the precautions during pregnancy<br><br>CO3. Highlight the important aspects of cognitive development in children<br><br>CO4. Identify effective strategies to boost self-esteem in children<br><br>CO5. Describe effective parenting styles<br><br>CO6. Analyze the effect of different family dynamics on development of children. |
| 7. | PSY-III.E-4(Non-experimental) | SPORTS PSYCHOLOGY | CO1. Apply the principles of psychology in sports. |

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| | | | CO2. Defend the use of healthy aggression in sporting scenarios.<br><br>CO3. Differentiate between intrinsic and extrinsic motivation in sports.<br><br>CO4. Identify the source of motivation for a sportsperson.<br><br>CO5. Explain the importance of goal-setting in sports.<br><br>CO6. Manage conflicts among teams. |
| 8. | PSY-III.E-3 (Non-experimental) | **INTERPERSONAL RELATIONSHIPS** | CO1. Apply different theoretical perspectives to understand interpersonal relationships<br><br>CO2. Identify factors determining relationship formation.<br><br>CO3. Examine the effects of relationship on various aspects of life.<br><br>CO4. Identify ways to prevent dissolutions of relationships.<br><br>CO5. Suggest ways to dissolve relationships in a healthy manner.<br><br>CO6. Examine variations in relationships. |
| 9. | PSY-III.E-17 (Non-experimental) | **BIOLOGICAL BASIS OF BEHAVIOUR** | CO1. Describe how genes influence behaviour and cause individual differences.<br><br>CO2. Explain the impact of endocrine system on behaviour.<br><br>CO3. Explain functioning of the nervous system.<br><br>CO4. Relate the link between perception and sensation across different sensory systems.<br><br>CO5. Examine different states/levels of consciousness. |
| 10. | PSY-VI.C-8 (Experimental) | **PSYCHOLOGICAL TESTING** | CO1. Describe the characteristics, and user guidelines of a psychological test.<br><br>CO2. Explain the importance and types of norms in testing.<br><br>CO3. Describe the essential components (reliability and validity) of a psychological test. |

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| | | | CO4. Enumerate estimates of reliability.<br><br>CO5. Enlist types of validity in testing.<br><br>CO6. Critically evaluate the scientific soundness of a psychological test. |
| 11. | PSY-IV.E-7 (Non-experimental) | **Psychology of Adolescence** | CO1. Compare various theoretical perspectives of adolescence<br><br>CO2. Describe the psychological dimensions of puberty<br><br>CO3. Critically evaluate the role of society/culture in identity development in adolescents<br><br>CO4. Prepare a plan for health awareness among adolescence<br><br>CO5. Conceptualize ways to deal with various socio-emotional and other issues faced by adolescents. |
| 12. | PSY-IV.E-6 (Non-experimental) | **CRIMINAL PSYCHOLOGY** | CO1. Explain the different approaches to criminal behaviour.<br>CO2. Describe the type of violence in schools, community, and in families.<br><br>CO3. Enumerate the characteristics of sexual offenders.<br><br>CO4. Propose techniques to prevent crime in various settings.<br><br>CO5. Evaluate the use of punishment as a deterrent to criminal activity.<br><br>CO6. Propose techniques to rehabilitate criminals. |
| 13. | PSY-IV.E-5 (Non-Experimental) | **PSYCHOLOGY OF ADJUSTMENT** | CO1. Identify the elements of a fully functioning person.<br><br>CO2. Describe how individuals in a family adjust to changes & respond to challenges. |

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| | | | CO3. Analyze the sources of marital conflict and use appropriate resolving techniques.<br><br>CO4. Examine the relationship between work and psychological adjustment.<br><br>CO5. Analyze how different areas of adjustment are interrelated |
| 14. | PSY-V.E-9 (Non-experimental) | **COGNITIVE PSYCHOLOGY** | CO1. Explain the various paradigms of cognitive psychology.<br><br>CO2. Distinguish between bottom-up and top-down processes in perception.<br><br>CO3. Demonstrate how we acquire, store, transform and use knowledge.<br><br>CO4. Apply the concepts of perception, attention and concept formation in daily activities.<br><br>CO5. To map the link between various cognitive processes. |
| 15. | PSY-III.C-5 (Experimental - theory) | **PSYCHOPATHOLOGY I** | CO1. To impart knowledge and understanding of the basic concepts in Abnormal<br><br>CO2. Psychology and the theories about Abnormality<br><br>CO3. To know the historical development of the study of abnormal behaviour, criteria and perspectives in abnormal behaviour and common classification systems,<br><br>CO4. To create awareness about Mental Health problems in society<br><br>CO5. To create a foundation for higher education and for a career in Clinical Psychology. |
| 16. | PSY-V.E-12 | **PSYCHOLOGY OF ADULTHOOD** | CO1. Analyze the progression of physical development from young to middle adulthood.<br><br>CO2. Describe the process of moral development in young adulthood.<br><br>CO3 Relate various theories of personality development to young adulthood. |

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| | | | CO4 Describe the various types of psychosocial issues that arise in marital and non-marital relationships.<br><br>CO5. Relate the decline in cognitive abilities to changes in daily functioning during middle adulthood.<br><br>CO6. Analyze the impact of evolving relationships on psychosocial adjustment in middle adulthood. |
| 17. | PSY-IV.E-8 (Non-experimental) | **POSITIVE PSYCHOLOGY** | CO1. Describe the methods used to study well-being<br><br>CO2. Compare Hedonic and Eudaimonic Views of Happiness<br><br>CO3. Identify sources of resilience for children, adolescence and adults available in the society<br><br>CO4. Identify determinants of happiness in the Indian culture<br><br>CO5. Evaluate the role of money in the context of positive psychology |
| 18. | PSY-V.E-11 | **ENVIRONMENTAL PSYCHOLOGY** | CO1. Describe the human - environmental relationship<br><br>CO2. Compare and contrast the theories of environment behaviour relationship.<br><br>CO3.Analyse the environmental influences on human behaviour.<br><br>CO4. Defend the role of an environmental psychologist in bringing about a positive change in the environment<br><br>CO5.Propose pro-environmental behaviours in the Indian setting. |
| 19. | PSY-VI.E-15 | **NEUROPSYCHOLOGY I** | CO1. To explain the process of neural conduction and synaptic transmission<br><br>CO2. To Describe the development of the nervous system.<br><br>CO3. To describe the organization, structure, |

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| | | | and function of the human central nervous system.<br><br>CO4. To explain the effects of sleep deprivation and sleepdisorders<br><br>CO5. To explain the role of biopsychology in psychiatric disorders. |
| 20. | PSY-IV.C-6 (Experimental-Theory) | **PSYCHOPATHOLOGY II** | CO1 Identify mental disorders based on the symptoms.<br><br>CO2. Differentiate between personality disorders and schizophrenia.<br><br>CO3. Distinguish between sexual deviance and sexual disorders.<br><br>CO4. Identify appropriate treatment intervention for mental disorders.<br><br>CO5. Critically evaluate the portrayal of mental disorders in mainstream media. |
| 21. | PSY-VI.E-13 (Non-experimental) | **GERONTOLOGY** | CO1. Explain the concept of ageing from different cultural perspectives<br><br>CO2. Describe the concept of ageing from different theoretical perspectives<br><br>CO3. Analyze the need for old age homes<br><br>CO4. Describe challenges faced by elderly today<br><br>CO5. Prepare a proposal for empowering the aged people |
| 22. | PSY-VI.E-14 | **ORGANIZATIONAL BEHAVIOR** | CO1. Underline the relevance of studying organisational behaviour<br><br>CO2. Evaluate the various theories of motivation at workplace.<br><br>CO3. Analyse team situations and adopt appropriate leadership behaviour for them.<br><br>CO4. Identify the nature and sources of conflict.<br><br>CO5. Implement effective conflict management strategies in real world settings |
| 23. | PSY-V. E-16 | **CROSS-CULTURAL** | CO1. Explain the relevance of cross-cultural |

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| | | **PSYCHOLOGY** | psychology.<br><br>CO2. Evaluate ethnocentrism in applicability of research findings to Indian populations.<br><br>CO3. Analyse the impact of globalization on cultural transmission.<br><br>CO4. Defend personal opinions on individualistic/collectivistic ways of living.<br><br>CO5. Draw parallels in personality development, emotional expression and language development across cultures.<br><br>CO6. Explain how cultures can define psychopathologies.<br><br>CO7. Underline the importance of culture in fostering healthy behaviours. |
| 24. | PSY-VI.E-18 | **NEUROPSYCHOLOGY II** | CO1.To describe Neuroplastic property of the brain in the face of brain damage.<br><br>CO2. To apply the phenomena of split brain to the study of personality.<br><br>CO3. To examine the role of the nervous system in the development of learning disorders.<br><br>CO4. To describe the functioning of the nervous system in drug addicts<br><br>CO5. To explain the brain reward circuit and its role in addiction<br><br>CO6. To explain various research methods used to study structure and functions of the brain. |
| 25. | PSY-INT-1 (Non-experimental) | **BUSINESS PSYCHOLOGY** | CO1. Apply theories of motivation to the workplace.<br><br>CO2. Explain how communication at work can be improved.<br><br>CO3. Describe the processes of negotiation and decision making.<br><br>CO4. Explain how job satisfaction can be enhanced. |

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| | | | CO5. Differentiate between leadership and management.<br><br>CO6. Enumerate human resources practices that can increase work productivity.<br><br>CO7. Identify stressors and propose stress management techniques at work. |
| 26. | PSY-INT-2(Non-experimental) | SPORTS PSYCHOLOGY | CO1. Apply the principles of psychology in sports.<br><br>CO2. Defend the use of healthy aggression in sporting scenarios.<br><br>CO3. Differentiate between intrinsic and extrinsic motivation in sports.<br><br>CO4. Identify the source of motivation for a sportsperson.<br><br>CO5. Explain the importance of goal-setting in sports.<br><br>CO6. Manage conflicts among teams. |
| 27. | PSY-V.E-11 | **ENVIRONMENTAL PSYCHOLOGY** | CO1. Describe the human - environmental relationship<br><br>CO2. Compare and contrast the theories of environment behaviour relationship.<br>CO3. Analyse the environmental influences on human behaviour.<br><br>CO4. Defend the role of an environmental psychologist in bringing about a positive change in the environment<br><br>CO5. Propose pro-environmental behaviours in the Indian setting. |

# BSC in SOCIOLOGY

## PROGRAMME OUTCOMES

| Programme Outcomes (PO) | Short Title of the POs | Description of the Programme Outcomes<br><br>Graduates will be able to : |
|---|---|---|
| PO-1 | Problem Analysis and Solutions | Think critically, identify, analyze problems/ situations and further attempt to design/ develop solutions that meet the specified goals. |
| PO-2 | Use of Technology | Apply appropriate IT tools efficiently in their daily activities of communication and academics. |
| PO-3 | Environment and Sustainability | Analyze and attempt solutions to environmental issues and commit themselves to sustainable development in the local/ national and global context. |
| PO-4 | Ethics | Recognize and understand professional ethics /human values and be responsible for the same. |
| PO-5 | Individual and Team work | Function effectively at various levels, capacities and situations. |
| PO-6 | Communication | Communicate proficiently (oral and written) as a responsible member of society. |
| PO-7 | Research Aptitude | Understand general research methods and be able to analyse, interpret and derive rational conclusions. |
| PO-8 | Life Skills | Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of domain specific change. |
| **PROGRAMME SPECIFIC OUTCOMES (PSO)**<br>After successful completion of a Bachelor's degree in Sociology, the students will: | | |
| PSO-1 | Sociological Perspective | Employ a Sociological Perspective in the critical Analyses of Varied aspects: Society, Change, Progress and Development learned the works of Western and Indian pioneers. |
| PSO-2 | Cultural Understanding and appreciation | Understand, Appraise and Demonstrate the evolution of Goan and Indian Culture and appreciate the same. |
| PSO-3 | Use of Digital Technology | Demonstrate the use of digital technology in narrating any sociological phenomena using sociological perspective |
| PSO-4 | Research Aptitude | Apply the methods of Qualitative Research in planning, designing and execution of a Research Project |
| PSO-5 | Social Work | Design and establish areas of Social Work i.e. NGO'S, Women Empowerment, Social issues and Social Welfare (Rural and Urban) |
| PSO-6 | Educational Practice | Critically evaluate the issues arising in the contemporary system of education in India and demonstrate varied teaching-learning pedagogies to deal with the classroom thereby creating a foundation in Teaching as a profession |

# MASTER OF ARTS IN GEOGRAPHY

**Programme Outcome (PO)**

| Programme Outcomes (PO) | Short Title of the POs | Description of the Programme Outcomes<br><br>Graduates will be able to : |
|---|---|---|
| PO-1 | Problem Analysis and Solutions | Think critically, identify, analyze problems/ situations and further attempt to design/ develop solutions that meet the specified goals. |
| PO-2 | Use of Technology | Apply appropriate IT tools efficiently in their daily activities of communication and academics. |
| PO-3 | Environment and Sustainability | Analyze and attempt solutions to environmental issues and commit themselves to sustainable development in the local/ national and global context. |
| PO-4 | Ethics | Recognize and understand professional ethics /human values and be responsible for the same. |
| PO-5 | Individual and Team work | Function effectively at various levels, capacities and situations. |
| PO-6 | Communication | Communicate proficiently (oral and written) as a responsible member of society. |
| PO-7 | Research Aptitude | Understand general research methods and be able to analyse, interpret and derive rational conclusions. |
| PO-8 | Life Skills | Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of domain specific change. |

**Program specific outcomes (PSO)**

| Program outcome(PO) | Short Title of PSOs | Description of the program outcomes |
|---|---|---|
| PSO 1 | Map Skills | Students will be able to read, interpret and generate maps and other cartographic representations from temporal and spatial perspectives. |
| PSO2 | Fundamentals of Geography | Students will be able to understand fundamentals of geography (physical, human and regional) in general and apply in specialized domains of geography. |
| PSO3 | Research Skills | Students will be able to present completed research including review of literature, methodology and discussion and utilize cartographic tools and other visual formats both orally and in written formats. |
| PSO4 | Practical Skills | Students will be able to understand various theoretical and methodological approaches, including quantitative as well as qualitative data in physical and human geography through practical, fieldworks and presentations. |

**Course Outcome (CO)**

| S.N. | Course Code | Course Title | Course Outcomes |
|---|---|---|---|
| 1 | PG.GEG.C1 | Advanced Geomorphology | CO1: Understand the dynamics of the physical geography including the origin of the Earth and its evolution through geologic time and related topographic ad structural evolution.<br>CO2: Understand and explain how the endogenous and exogenous processes shape landforms and distinguish the mechanisms that control these processes.<br>CO3: Analyze the relationship between folding, faulting, volcanic activity and plate tectonics.<br>CO4: Outline the early development of geomorphology and the people involved with its development.<br>CO5: Understand how different scales of time and space affect geomorphological processes.<br>CO6: Differentiate between the general degradational processes of rock weathering and their effects on landforms.<br>CO7: Describe the morphology and evolution of landscapes and related processes in areas influenced by fluvial, glacial, periglacial, aeolian, karst, and coastal systems.<br>CO8: Understand landform development by various theories.<br>Analyze geomorphological issues at global, regional and local scale and application of geomorphology to solve realistic problems |
| 2 | PG.GEG.C2 | Advanced Climatology | CO1: Develop basic knowledge of atmospheric weather and climate and the structure of the atmosphere.<br>CO2: Understand and explain how temperature, pressure, humidity and wind motion vary in time and space and their effect on weather.<br>CO3: Knowledge about meteorological observations and measurements.<br>CO4: Describe climatic diversity over the Earth and knowledge of the climatic zones.<br>CO5: Describe the global circulation of the atmosphere, frontal systems and atmospheric motions.<br>CO6: Ability to perform climatological analysis on the basis of meteorological data. |
| 3 | PG.GEG.C3 | Practical in Geomorphology and Climatology | CO1: Understand Geomorphic data and its importance<br>CO2: Create different types of thematic maps and interpreting the results.<br>CO3: Apply different statistical methods used in geomorphological data.<br>CO4: Understand and apply geomorphic signs and symbols and to understand geomorphic pattern on field.<br>CO5: Use geomorphologic data to communicate effectively by creating graphs and charts.<br>CO6: Understand the importance of climatic data in day to |

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| | | | day life.<br>CO7: Apply statistical data in a given climatic datasets.<br>CO8: Understand and analyze the relationship between different climatic data like rainfall & temperature, height & temperature, Normal lapse rate & Dry adiabatic rate.<br>CO9: Create results and graphs; and build up their interdependence.<br>CO10: Use climatic data to communicate effectively by creating graphs and charts. |
| 4 | PG.GEG.E1 | Introduction to Tourism | CO1: At the end of this course students are expected to have a holistic understanding of fundamental concepts of tourism and tourist resources in India and thereby be able to analyze the interrelationships among them.<br>CO2: Students will be able to demonstrate an awareness and sensitivity to retail and tourism management operations in an international marketplace.<br>CO3: Demonstrate the ability to critically evaluate and compare diverse perspectives in the retailing and tourism management industry. |
| 5 | PG.GEG.E2 | Rural Studies | CO1: Apply their knowledge and understanding, and problem-solving abilities, to independently identify rural development issues from a geographical perspective.<br>CO2: Demonstrate an ability to critically and systematically integrate knowledge, to analyze and assess complex phenomena and issues in the fields of rural development.<br>CO3: Identify and analyze specific urban and rural development needs; and demonstrate an ability to clearly present and discuss conclusions, and the arguments, orally and in writing. |
| 6 | PG.GEG.E3 | Geography of Environment | CO1: Understand human-environment interactions and environmental problems – their causes, effects and remedies.<br>CO2: Evaluate the impacts of human activities on natural environments with special reference to India.<br>CO3: Understand environmental hazards and management.<br>CO4: Show awareness and responsibility towards the environment. |
| 7 | PG.GEG.E4 | Advanced Regional Geography | CO1: Students will be able to comprehend the global trends and their relation to the physical and socio-economic issues. |
| 8 | PG.GEG.C4 | Geography of Population | CO1: Understand the nature, scope and approaches of population geography<br>CO2: Understand concepts like fertility, mortality, migration, gender and urbanization<br>CO3: Apply population theories and models in the present day context<br>CO4: Conduct mini research on population using |

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| | | | approaches in population geography |
| 9 | PG.GEG.C5 | Advanced Economic Geography | CO1: On completion of this course, student will gain insights of the various concepts in economic geography and its approaches. Students will able to link economic development with the geo-spatial data. |
| 10 | PG.GEG.C6 | Practicals in Population and Economic Geography | CO1: The knowledge drawn from this course will acquaint students in analyzing and interpreting statistical data from Census documents, reports, etc and aid in drawing effecting conclusions. |
| 11 | PG.GEG.C7 | Basics of Geographical Thought | CO1: At the end of this course, student will gain sense of chronological organization and areal variation in human activities. The students will be able to evaluate theoretical concepts from geography and elsewhere; and be able to demonstrate an understanding of the dynamic and contested nature of the discipline and its contemporary issues. |
| 12 | PG.GEG.C8 | Basics of Research Methodology | CO1: Understand the importance of review of literature in research<br>CO2: Develop skills of writing review of literature<br>CO3: Understand and use different referencing skills<br>CO4: Create hypothesis/formulate<br>CO5: Critically assess literature review/research paper |
| 13 | PG.GEG.E5 | Advanced Regional Geography of India | CO1: On completion of this course, the students will understand the issues related of disparities in various regions of India. Students will gain a firm knowledge base of various regions in India and its resource distributions, particularly from the perspective of physical, environmental and human perspective. |
| 14 | PG.GEG.E6 | Urban Development and Processes | CO1: On successful completion of the course, it is intended that each student will have achieved an understanding of:<br>i) Application of theoretical knowledge to practical case studies or selected urban set ups.<br>ii) Will be able to undertake mini research on selected urban issues.<br>CO2: Explain and evaluate historical and contemporary global urbanization processes;<br>CO3: Understand the social, economic, demographic dimensions metropolitan areas and impacts country side (city region). |
| 15 | PG.GEG.E7 | Islands of Indian Ocean | CO1: Students will be able to understand the significance of geo-political location of islands.<br>CO2: Students will be able to understand and analyze the role of history in growth and development of oceanic islands.<br>CO3: Students will be able to critically identify, enquire and reflect on the threats, environmental as well as human, to the Indian Ocean Islands. |
| 16 | PG.GEG.E8 | Techniques of Academic Report | CO1: The students will understand the various components of academic writing and field report. |

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| | | Writing | CO2: The students will be able to formulate effective statement of argument and validate the same<br>CO3: The students will be able to use and apply referencing style as per the requirement of the course. |
| 17 | PG.GEG.E9 | Geography of Tourism | CO1: At the end of this course students are expected to have a holistic understanding of fundamental concepts of tourism and tourist resources in India and thereby be able to analyze the interrelationships among them.<br>CO2: Understand and describe spatial patterns of international and domestic tourism.<br>CO3: Understand and describe spatial patterns of international and domestic tourism.<br>CO4: Identify tourism actors and career opportunities in tourism. |

# B.VOC SOFTWARE DEVELOPMENT

**PROGRAMME OUTCOMES**

| Programme Outcomes (PO) | Short Title of the POs | Description of the Programme Outcomes Graduates will be able to : |
|---|---|---|
| **PO-1** | Problem Analysis and Solutions | Think critically, identify, analyze problems/ situations and further attempt to design/ develop solutions that meet the specified goals. |
| **PO-2** | Use of Technology | Apply appropriate IT tools efficiently in their daily life-professional and personal. |
| **PO-3** | Environment and Sustainability | Be aware of environmental issues and commit towards sustainable development at local/ national and global context. |
| **PO-4** | Ethics | Recognize and understand professional ethics /human values and be responsible. |
| **PO-5** | Individual and Team work | Function effectively at various levels, capacities and situations. |
| **PO-6** | Communication | Communicate proficiently (oral and written) as a responsible member of society. |
| **PO-7** | Research Aptitude | Understand general research methods and be able to analyse, interpret and derive rational conclusions. |
| **PO-8** | Life Skills | Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of domain specific change. |

**PROGRAMME SPECIFIC OUTCOMES (PSO)**

After successful completion of a Bachelor's degree in Vocation Software Development, the students will:

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| **PSO-1** | Conduct Investigations of Complex Problems | Able to apply theoritical and practical knowledge to solve real world problems. |
| **PSO-2** | Sef Directed | Work ready at each exit point of the program. |
| **PSO-3** | Project Management | Able to work in teams and acquire an edge of having real world experience by virtue of internship which being mandatory part of the programme. |
| **PSO-4** | Problem Analysis | Able to imbibe the skill of writing optimal software programs. |

**Course Outcomes(Skill Component)**

| Sr.No | Course Code | Course Title | Course Outcome |
|---|---|---|---|
| 1 | CSD-SK1 | Computer Organization and Operating System | **CO1:** Understand the Von Neumann architecture.<br>**CO2:** To have a thorough understanding of the basic structure and operation of a digital computer.<br>**CO3:** Understand the function of an operating system. |
| 2 | CSD-SK2 | Web Designing | **CO1:** Apply markup language for presenting of information in web pages.<br>**CO2:** Able to design responsive websites<br>**CO3:** Implement different frameworks used for web designing |
| 3 | CSD-SK3 | Introduction to Programming | **CO1:** Explain computer programming concepts<br>**CO2:** Able to design algorithmic solution to a problem<br>**CO3:** Covert algorithms to python programs<br>**CO4:** Design program with interactive input and output |
| 4 | CSD-SK4 | Database Management Systems | **CO1:** Able to model an application's data requirements using conceptual modeling tools like ER diagrams.<br>**CO2:** Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.<br>**CO3:** Use a database management system to create, populate, maintain, and query a database. |
| 5 | CSD-SK5 | Network Administration | **CO1:** Apply basic networking concepts to setup, maintain and troubleshoot web servers.<br>**CO2:** Understand user management and roles in database<br>**CO3 :** Demonstrate expertise in configuring host and network level technical security controls to include host firewalls, user access controls, host logging, network filtering, intrusion detection and prevention and encryption |
| 6 | CSD-SK6 | Multimedia | **CO1:** Develop specific skills in designing Graphical Images, Audio and Video Capture and Editing using Software tools<br>**CO2:** Understand the industrial standard of video, audio and image formats.<br>**CO3:** Understand were and when to use image manipulation software tools. |

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| 7 | CSD-SK7 | Object Oriented Paradigm | **CO1 :** Apply fundamental object- oriented concepts in problem solving.<br>**CO2:** Analyze problem scenario and identify classes/objects, their properties/functionalities and associations.<br>**CO3 :** Analyze the problem scenario and model the system using UML diagrams.<br>**CO4 :** Implement the object oriented model in any object oriented language. |
| 8 | CSD-SK8 | Computer Network | **CO1:** Gain Knowledge of the Reference models<br>**CO2:** Understand basic concepts of data transmission medium, Compare various routing,<br>**CO3:** Able to design the basic Computer network and maintain the networks<br>**CO4:** Develop client server program for different applications |
| 9 | CSD-SK9 | Server Side Programming | **CO1:** Able to write basic server-side scripts<br>**CO2:** Demonstrate the techniques and features of server side programming and<br>database techniques to construct a web application.<br>**CO3:** Recognize security issues in web development and suggest and implement best practice solution. |
| 10 | CSD-SK10 | Web Development Framework | **CO1:** Understand the enabling technologies for building Internet an Web database applications.<br>**CO2:** Understand the different components for developing client/server applications.<br>**CO3:** Apply the techniques and features of the client/server development languages to construct database application based on the Internet.<br>**CO4:** Develop the web database applications through programming exercises. |
| 11 | CSD-SK11 | Agile Software Engineering | **CO1:** Plan and deliver an effective software engineering process, based knowledge of widely used development lifecycle models.<br>**CO2:** Develop Team working skills including general organization, planning and time management, and inter-group negotiation.<br>**CO3:** Develop pair programming, u testing, and refactoring skills.<br>**CO4:** Apply agile practices such as test-driven development, standup meetings, and pair programming to their software engineering practices |

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| 12 | CSD-SK12 | Mobile Application Development | **CO1:** Apply Java programming concepts to Android application development.<br>**CO2:** Design and develop user Interfaces for the Android platform.<br>**CO3:** Ability to apply general programming knowledge in the field of developing mobile applications |
| 13 | CSD-SK13 | Data Structure | **CO1:** Develop knowledge of basic data structures for storage and retrieval of ordered or unordered data. Data structures include arrays,<br>linked lists, binary trees, heaps, and hash tables.<br>**CO2:** knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, searching and sorting of each data structure.<br>**CO3:** Analysing and compare algorithms for efficiency using Big-O notation.<br>**CO4:** Implementing projects requiring the implementation of the above data structures. |
| 14 | CSD-SK14 | Software Testing | **CO1:** Understand Software Testing process of an applications.<br>**CO2:** Apply modern Software Testing process in relation to Software Development and Project<br>Management.<br>**CO3:** Create Test Strategies and plans, design test cases, prioritize and execute them.<br>**CO4:** Have an ability to identify and understand various Software Testing problems and solve them. |
| 15 | CSD-SK15 | Design and Analysis of Algorithms | **CO1:** To explain basic concepts related to the design and analysis of algorithms.<br>**CO2:** To describe classical algorithms and their complexity<br>**CO3:** To design and analyse selected algorithms. |
| 16 | CSD-SK16 | Cloud Computing | **CO1:** Explain the core concepts of the cloud computing paradigm.<br>**CO2:** Characterize the different cloud services ie. Infrastructure, Platform and Software as a Service<br>(IaaS, PaaS, SaaS). |

**Course Outcomes(General Component)**

| S. N | Course Code | Course Title | Course Outcomes |
|---|---|---|---|
| 1 | CSD-GE3 | Cyber Security | **CO1:** Understand the working of a computer network.<br>**CO2:** Be aware of the various measures that need to be taken in order to protect data.<br>**CO3:** Able to understand various forms of crimes in cyber world. |

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| | | | **CO4:** Gain knowledge about various rights given to the individual to protect their intellectual property. |
| 2 | CSD-GE4 | Office Automation Tools | **CO1:** Examine spreadsheet concepts and explore the Microsoft Office Excel environment.<br>**CO2:** Learn to use functions and formulas.<br>**CO3:** Work with pivot tables and charts. |
| 2 | CSD-GE5 | Mathematical Foundation of Computer Science I | **CO1:** Apply counting principles to determine Probabilities.<br>**CO2:** Demonstrate an understanding of relations and functions and determine their properties.<br>**CO3:** Evaluate Boolean functions and simplify Expressions using the properties of Boolean algebra.<br>**CO4:** Write an argument using logical notation and determine if the argument is valid or not. |
| 3 | CSD-GE9 | Business Communication | **CO1:** Using persuasive and professional language in speech and writing<br>**CO2:**Conducting effective business research and communicating the process and findings in a range of business documents and oral presentations<br>**CO3:** Planning and managing a business project and communications strategy<br>**CO4:**Demonstrating advanced interpersonal communication, business etiquette and relationship building skills |
| 4 | CSD-GE13 | Personality Enhancement | **CO1:** To improve soft skills, communicate effectively & grow as a professional.<br>**CO2:** Develop your overall personality and gain confidence in your daily encounters and present yourself assertively. |
| 5 | CSD-GE14 | Digital Marketing | **CO1:** Optimize the website for various search engines.<br>**CO2:** Market the company/product using Search Engine and Social Media.<br>**CO3:** Analyze the Web for improving the marketing strategy. |
| 6 | CSD-GE15 | Organizational Behavior | **CO1:** Organizational Behavior Fundamental Concepts.<br>**CO2:** Learn how to deal with work stress in an organization.<br>**CO3:** Learning how to lead a team. |
| 7 | CSD-GE17 | E-Commerce | **CO1 :** Understand various E-Commerce Strategies.<br>**CO2 :** Understand the Working of an E-Commerce Website.<br>**CO3 :** Evaluate the various Payment Mechanisms.<br>**CO4 :** Develop an E-Commerce Website. |

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| 8 | CSD-GE19 | Human Computer Interface | **CO1 :** Understand the intricacies of human interaction with a computer System.<br>**CO2 :** Understand the principles of good screen design and layouts.<br>**CO3 :** Understand the different navigation schemes on windows based interface; learn the different types of selection devices and components of a window based interface.<br>**CO4 :** Analyze Requirements of system.<br>**CO5 :** Classify human users based on their abilities, personalities.<br>**CO6:** Designing prototypes. Evaluate the design of user interfaces. Compare the interfaces different products. |

# B.Voc. in 3D Media & Virtual Reality - VFX

**PROGRAMME OUTCOMES**

| Programme Outcomes (PO) | Short Title of the POs | Description of the Programme Outcomes<br><br>Graduates will be able to : |
|---|---|---|
| PO-1 | Problem Analysis and Solutions | Think critically, identify, analyze problems/ situations and further attempt to design/ develop solutions that meet the specified goals. |
| PO-2 | Use of Technology | Apply appropriate IT tools efficiently in their daily activities of communication and academics. |
| PO-3 | Environment and Sustainability | Analyze and attempt solutions to environmental issues and commit themselves to sustainable development in the local/ national and global context. |
| PO-4 | Ethics | Recognize and understand professional ethics /human values and be responsible for the same. |
| PO-5 | Individual and Team work | Function effectively at various levels, capacities and situations. |
| PO-6 | Communication | Communicate proficiently (oral and written) as a responsible member of society. |
| PO-7 | Research Aptitude | Understand general research methods and be able to analyse, interpret and derive rational conclusions. |
| PO-8 | Life Skills | Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of domain specific change. |
| **PROGRAMME SPECIFIC OUTCOMES (PSO)**<br>After successful completion of a Bachelor's degree in 3D Media & Virtual Reality - VFX, the studentswill: | | |
| PSO-1 | Real World Experience | Gain real world project experience throughout their learning cycle, that helps them to better understand the roles and processes in wide range of computer-generated design and animation careers |
| PSO-2 | Critical thinking and visualization | Use critical thinking skills and problem-solving strategies in all dimensions of development and production. |
| PSO-3 | Following the industry process | Develop an understanding of the industry as a whole by executing all components of development, pre-production, production and post-production planning in at least two disciplinary areas. |
| PSO-4 | Employable Skills | Prepare for employment by developing a plan based upon critical self-reflection and employer/placement feedback. |

**Course Outcomes: Semester - I**

| S. No. | Course Code | Course Title | Course Outcomes |
|---|---|---|---|
| 1. | VFX – G1 | Language Paper | CO-1 To speak fluently, confidently and use correct English.<br>CO-2 To draft letters– formal & informal letters, representations, notices, agendas and minutes of meetings.<br>CO-3 To communicate effectively through written communication. |
| 2. | VFX – G2 | Introduction to Creative Writing | CO1: Students will learn to think and write creatively<br>CO2: Improve vocabulary and sentence structures<br>CO3: Learn to critique the writings of their peers<br>CO4: Demonstrate an understanding of literary conventions like plot, character, theme, etc.<br>CO5: Develop a basic understanding of various prose fiction genres. |
| 3. | VFX – G3 | History of Indian Art | CO1: Familiarize themselves with works of Indian artists.<br>CO2: Have and appreciation of the various factors that have contributed to the art movements throughout history |
| 4. | VFX – SK1 | Drawing and Painting | CO1: Identify the various techniques used and elements required in drawing.<br>CO2: Compose layouts as per their own creative visualizations.<br>CO3: Explore the possibilities of various media, and the diverse conceptual modes available to a painter.<br>CO4: Understand basic principles of design and colour, concepts, media and formats, and the ability to apply them to a specific aesthetic intent. |
| 5. | VFX – SK2 | 3D Animation - I | CO1: Explore the basic tools and interfaces used to model a 3D animation character.<br>CO2: Positioning 3D objects.<br>CO3: Create 3D object using splines tools and splines modifier.<br>CO4: Manipulate and segregate 3D objects. |

**Course Outcomes: Semester – II**

| S. No. | Course Code | Course Title | Course Outcomes |
|---|---|---|---|
| 1. | VFX – G4 | Academic Writing | CO1: Gain a complete understanding of each stage of writing process.<br>CO2: Attain practical experience of writing essay outlines, editing drafts, and producing a completed essay for each of the three essay types.<br>CO3: Learn to use sources and incorporate them effectively into an essay, adding valuable evidence and authority to an essay.<br>CO4: Develop a strong academic vocabulary using transitional words and comparison and contrast phrases. |
| 2. | VFX – G5 | Introduction to Digital Mass Media | CO1: Comprehend the field of digital media.<br>CO2: Understand a few theoretical perspectives behind digital media and the various jargons.<br>CO3: Be comfortable around the various equipment and software required for various media. |
| 3. | VFX – G6 | History of Western Art | CO1: Have an appreciation for the various art movements that happened through Europe<br>CO2: Identify artists with their works. |
| 4. | VFX – SK4A | Vector Graphics | CO1: Identify the capabilities and functions of drawing, transformation and shape tools in a vector graphics software.<br>CO2: Sketch virtual art using computer graphics software program.<br>CO3: Apply skills in the combination of bitmapped and vector elements to create design work<br>CO4: Create vector images using a graphic design software. |
| 5. | VFX – SK5 | 3D Animation - II | CO1: Identify the various modelling techniques.<br>CO2: Associate how the different modelling techniques are used to model a 3D character.<br>CO3: Model advanced 3D characters. |

**Course Outcomes: Semester III**

| S. No. | Course Code | Course Title | Course Outcomes |
|---|---|---|---|
| 1. | VFX – G7 | Environmental Studies - I | CO1: Understand the complex linkages of environment with different disciplines.<br>CO2: Apply the knowledge acquired in this course for environmental management. |
| 2. | VFX – G8 | Art Appreciation | CO1: Interpret works of art based on a system of analysis<br>CO2: Explain the processes involved in the artistic production, themes, and the political, social, cultural and aesthetic issues that artists examine in their work<br>CO3: Explain the role and effect of visual arts in societies, history, and other world cultures. |
| 3. | VFX – G9 | Business Communication | CO1: To apply creative thinking abilities necessary for effective communication in the modern workplace situation<br>CO2: To demonstrate clarity, precision, conciseness and coherence in use of language<br>CO3: To learn how to make one's writing better, faster and more successful<br>CO4: To produce successful documents in any given situation in different formats, while considering the writer's objectives, the reader's needs, the reader-writer relationship and the context.<br>CO5: To increase personal confidence in delivering speeches to small & large audiences<br>CO6: To understand and gain non-verbal skills essential to effective oral communication.<br>CO7: Make proper presentations that disseminate information, conduct negotiation and use persuasion. |
| 4. | VFX – G10 | Cyber Security | CO1: Understand the working of a computer network.<br>CO2: Be aware of the various measures that need to be taken in order to protect data.<br>CO3: Able to understand various forms of crimes in cyber world.<br>CO4: Gain knowledge about various rights given to the individual to protect their intellectual property. |
| 5. | VFX – SK7 | Visual Effects - I | CO1: Develop and understanding of the visual effects software interface and tools.<br>CO2: Design visual effects sequences using storyboarding and pre-visualization that meet production requirements<br>CO3: Integrate live action sequences with virtual |

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| | | | environments seamlessly using masking techniques |
| 6. | VFX – SK8 | Video Editing | CO1: Acquire basic skill set to build presentable sequences with video clips provided and export to compressed video files for upload to various media<br>CO2: Understand fundamental concepts of creating and editing videos for different media<br>CO3: Be familiarized with the user interface and work efficiently with video editing software |
| 7. | VFX – SK9 | Colour Grading | CO1: Gain a broad understanding of colour theory and apply techniques to grading of motion pictures<br>CO2: Confidently use node based workflow of the colour grading software<br>CO3: Perform primary and secondary grading to a round trip project. |

**Course Outcomes: Semester IV**

| S. No. | Course Code | Course Title | Course Outcomes |
|---|---|---|---|
| 1. | VFX – G11 | Environmental Studies – II | CO1: Understand the complex linkages of environment with different disciplines.<br>CO2: Apply the knowledge acquired in this course for environmental management. |
| 2. | VFX – G12 | Film Appreciation | CO1: Recognize types of films, their impact on society, and their roles in our lives<br>CO2: Recall concepts such as sound, lighting techniques, script, editing, etc. and how they impact a film<br>CO3: List the roles of directors, critics in the film industry<br>CO4: Identify the works of prominent film directors of different genres and various editing styles. |
| 3. | VFX – G13 | Print Advertisement | CO1: Learn the different phases involved in a print campaign<br>CO2: Identify and foresee the various existing and upcoming avenues available in the field of print advertising<br>CO3: Learn how to effectively use this information to create and sustain a brand image. |
| 4. | VFX – G14 | Personality Enhancement | CO1: To learn to present themselves well and positively influence other people's perceptions |

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| | | | of them in a business environment.<br>CO2: To project the right self image and behavioral etiquette by being well groomed.<br>CO3: To learn soft skills like good manners, empathy, ability to collaborate and negotiate and develop etiquettes that are needed in a social and business setting.<br>CO4: To build a positive body language to appear more approachable, confident and professional.<br>CO5: To understand and learn techniques required to sustain good mental health for everyday functioning. |
| 5. | VFX – SK10 | Visual Effects-II | CO1: Integrate 2D and/or 3D computer generated imagery and live action elements using compositing techniques.<br>CO2: Analyze images and physical sets to digitally re-create lights, cameras, locations and objects.<br>CO3: Create photo-real images to match live action footage by the application of advanced rendering techniques. |
| 6. | VFX – SK11 | Audio Editing | CO1: Get familiarized with a digital audio interface (DAW) to facilitate efficient editing<br>CO2: Learn to record, edit and superimpose audio files on video presentations and animations.<br>CO3: Demonstrate critical decision making as used in a mixdown session |

# B.VOC. IN MULTIMEDIA – DIGITAL FILMMAKING

## PROGRAMME OUTCOMES

| Programme Outcomes (PO) | Short Title of the POs | Description of the Programme Outcomes<br><br>Graduates will be able to : |
|---|---|---|
| PO-1 | Problem Analysis and Solutions | Think critically, identify, analyze problems/ situations and further attempt to design/ develop solutions that meet the specified goals. |
| PO-2 | Use of Technology | Apply appropriate IT tools efficiently in their daily activities of communication and academics. |
| PO-3 | Environment and Sustainability | Analyze and attempt solutions to environmental issues and commit themselves to sustainable development in the local/ national and global context. |
| PO-4 | Ethics | Recognize and understand professional ethics /human values and be responsible for the same. |
| PO-5 | Individual and Team work | Function effectively at various levels, capacities and situations. |
| PO-6 | Communication | Communicate proficiently (oral and written) as a responsible member of society. |
| PO-7 | Research Aptitude | Understand general research methods and be able to analyse, interpret and derive rational conclusions. |
| PO-8 | Life Skills | Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of domain specific change. |
| **PROGRAMME SPECIFIC OUTCOMES (PSO)**<br>After successful completion of a Bachelor's degree in Multimedia – Digital Filmmaking, the studentswill: | | |
| PSO-1 | Fundamental understanding of core concepts | Show proficiency in at least two disciplinary areas as part of a filmmaking team, including: producing/production, management, screenwriting, directing, camera and lighting, editing, audio, art direction, set design, special effects and television studio production. |
| PSO-2 | Critical thinking and visualization | Develop critical thinking and self-awareness by evaluating a variety of theories and approaches to film analysis. |
| PSO-3 | Following the industry process | Develop an understanding of the industry as a whole by executing all components of development, pre-production, production and post-production planning in at least two disciplinary areas. |
| PSO-4 | Employable Skills | Prepare for employment by developing a plan based upon critical self-reflection and employer/placement feedback. |

**Course Outcomes: Semester - I**

| S. No. | Course Code | Course Title | Course Outcomes |
|---|---|---|---|
| 1. | MDF – G1 | Language Paper | CO1: To speak fluently, confidently and use correct English.<br>CO2: CO-2 To draft letters– formal & informal letters, representations, notices, agendas and minutes of meetings.<br>CO3: CO-3 To communicate effectively through written communication. |
| 2. | MDF – G2 | Introduction to Creative Writing | CO6: Students will learn to think and write creatively<br>CO7: Improve vocabulary and sentence structures<br>CO8: Learn to critique the writings of their peers<br>CO9: Demonstrate an understanding of literary conventions like plot, character, theme, etc.<br>CO10: Develop a basic understanding of various prose fiction genres. |
| 3. | MDF – G3 | History of Indian Art | CO3: Familiarize themselves with works of Indian artists.<br>CO4: Have and appreciation of the various factors that have contributed to the art movements throughout history |
| 4. | MDF – SK1 | Drawing and Painting | CO5: Identify the various techniques used and elements required in drawing.<br>CO6: Compose layouts as per their own creative visualizations.<br>CO7: Explore the possibilities of various media, and the diverse conceptual modes available to a painter.<br>CO8: Understand basic principles of design and colour, concepts, media and formats, and the ability to apply them to a specific aesthetic intent. |
| 5. | MDF – SK2 | 3D Animation - I | CO5: Explore the basic tools and interfaces used to model a 3D animation character.<br>CO6: Positioning 3D objects.<br>CO7: Create 3D object using splines tools and splines modifier.<br>CO8: Manipulate and segregate 3D objects. |
| 6. | MDF – SK3A | Raster Graphics | CO1: Identify the software tools used to create graphics and manipulate images.<br>CO2: Associate the interaction of the tools with the graphics or images to attain the intended result.<br>CO3: Manipulate images to attain the desired result.<br>CO4: Learn to use tools and techniques to be more efficient in your photo-editing skills. |

**Course Outcomes: Semester – II**

| S. No. | Course Code | Course Title | Course Outcomes |
|---|---|---|---|
| 1. | MDF – G4 | Academic Writing | CO5: Gain a complete understanding of each stage of writing process.<br>CO6: Attain practical experience of writing essay outlines, editing drafts, and producing a completed essay for each of the three essay types.<br>CO7: Learn to use sources and incorporate them effectively into an essay, adding valuable evidence and authority to an essay.<br>CO8: Develop a strong academic vocabulary using transitional words and comparison and contrast phrases. |
| 2. | MDF – G5 | Introduction to Digital Mass Media | CO1: Comprehend the field of digital media.<br>CO2: Understand a few theoretical perspectives behind digital media and the various jargons.<br>CO3: Be comfortable around the various equipment and software required for various media. |
| 3. | MDF – G6 | History of Western Art | CO3: Have an appreciation for the various art movements that happened through Europe<br>CO4: Identify artists with their works. |
| 4. | MDF – SK4A | Vector Graphics | CO5: Identify the capabilities and functions of drawing, transformation and shape tools in a vector graphics software.<br>CO6: Sketch virtual art using computer graphics software program.<br>CO7: Apply skills in the combination of bitmapped and vector elements to create design work<br>CO8: Create vector images using a graphic design software. |
| 5. | MDF – SK5 | 3D Animation - II | CO4: Identify the various modelling techniques.<br>CO5: Associate how the different modelling techniques are used to model a 3D character.<br>CO6: Model advanced 3D characters. |

**Course Outcomes: Semester III**

| S. No. | Course Code | Course Title | Course Outcomes |
|---|---|---|---|
| 1. | MDF – G7 | Environmental Studies - I | CO3: Understand the complex linkages of environment with different disciplines.<br>CO1: Apply the knowledge acquired in this course for environmental management. |
| 2. | MDF – G8 | Art Appreciation | CO2: Interpret works of art based on a system of analysis |

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| | | | CO3: Demonstrate an understanding of the terminology and conventions of visual expression.<br>CO4: Explain the processes involved in the artistic production, themes, and the political, social, cultural and aesthetic issues that artists examine in their work<br>CO5: Explain the role and effect of visual arts in societies, history, and other world cultures. |
| 3. | MDF – G9 | Business Communication | CO8: To apply creative thinking abilities necessary for effective communication in the modern workplace situation<br>CO9: To demonstrate clarity, precision, conciseness and coherence in use of language<br>CO10: To learn how to make one's writing better, faster and more successful<br>CO11: To produce successful documents in any given situation in different formats, while considering the writer's objectives, the reader's needs, the reader-writer relationship and the context.<br>CO12: To increase personal confidence in delivering speeches to small & large audiences<br>CO13: To understand and gain non-verbal skills essential to effective oral communication.<br>CO14: Make proper presentations that disseminate information, conduct negotiation and use persuasion. |
| 4. | MDF – SK7 | Digital Photography | CO1: Plan and execute the creation of photographic imagery following an iterative process of research, ideation, visualization, analysis, production and evaluation.<br>CO2: Develop visual communication concepts for specific purposes and audiences.<br>CO3: Incorporate the knowledge of photography theories, principles and historical practices into the conceptualization and development of effective photographs.<br>CO4: Create a business plan to support the development and on-going operation of a photography business. |
| 5. | MDF – SK8 | Digital Cinematography-I | CO1: Understand the basic rules and methods used in film production in various film industries<br>CO2: Analyze story structure and the screenwriting process for use in the critique and creation of film.<br>CO3: Understand and apply cinematography practices to tell a visual story |

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| 6. | MDF – SK9 | Video Editing | CO1: Acquire basic skill set to build presentable sequences with video clips provided and export to compressed video files for upload to various media<br>CO2: Understand fundamental concepts of creating and editing videos for different media<br>CO3: Be familiarized with the user interface and work efficiently with video editing software<br>CO4: Edit and compress video for use in various delivery modes of digital media using standard digital video editing software. |

**Course Outcomes: Semester IV**

| S. No. | Course Code | Course Title | Course Outcomes |
|---|---|---|---|
| 1. | VFX – G11 | Environmental Studies – II | CO3: Understand the complex linkages of environment with different disciplines.<br>CO4: Apply the knowledge acquired in this course for environmental management. |
| 2. | MDF – G12 | Film Appreciation | CO1: Recognize types of films, their impact on society, and their roles in our lives<br>CO2: Recall concepts such as sound, lighting techniques, script, editing, etc. and how they impact a film<br>CO3: List the roles of directors, critics in the film industry<br>CO4: Identify the works of prominent film directors of different genres and various editing styles. |
| 3. | MDF – G13 | Print Advertisement | CO4: Learn the different phases involved in a print campaign<br>CO5: Identify and foresee the various existing and upcoming avenues available in the field of print advertising<br>CO6: Learn how to effectively use this information to create and sustain a brand image. |
| 4. | MDF – G14 | Personality Enhancement | CO6: To learn to present themselves well and positively influence other people's perceptions of them in a business environment.<br>CO7: To project the right self-image and behavioral etiquette by being well groomed.<br>CO8: To learn soft skills like good manners, empathy, ability to collaborate and negotiate and develop etiquettes that are needed in a social and business setting.<br>CO9: To build a positive body language to appear more approachable, confident and |

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| | | | professional.<br>CO10: To understand and learn techniques required to sustain good mental health for everyday functioning. |
| 5. | MDF – SK10 | Digital Cinematography-II | CO4: Understand characteristics of light and use of various lighting techniques to compose a visually appealing shot<br>CO5: Acquire skills needed to successfully transform a storyboard into a shot.<br>CO6: Gain understanding of fundamental aesthetic and conceptual approaches to digital cinematography.<br>CO7: Critically observe, analyse and translate between real world lighting and motion picture lighting. |
| 6. | MDF – SK11 | Audio Editing | CO4: Get familiarized with a digital audio interface (DAW) to facilitate efficient editing<br>CO5: Learn to record, edit and superimpose audio files on video presentations and animations.<br>CO6: Demonstrate critical decision making as used in a mixdown session<br>CO7: Make informed judgements as to the quality of a sound recording through analysis of the audio signal. |

# DIPLOMA IN AVIATION HOSPITALITY & CUSTOMER SERVICE

**Programme Outcomes (PO)**

| Programme Outcomes (PO) | Short Title of the Pos | Description of the Programme Outcomes Diploma Holders will be able to: |
|---|---|---|
| PO-1 | Problem Analysis and Solutions | Think critically, identify, analyze problems/ situations and further attempt to design/ develop solutions that meet the specified goals. |
| PO - 2 | Use of Technology | Think critically, identify, analyze problems/ situations and further attempt to design/ develop solutions that meet the specified goals. |
| PO - 3 | Environment and Sustainability | Apply appropriate IT tools efficiently in their daily activities of communication and academics. |
| PO-4 | Ethics | Recognize and understand professional ethics /human values and be responsible for the same. |
| PO-5 | Individual and Team work | Function effectively at various levels, capacities and situations. |
| PO-6 | Communication | Communicate proficiently (oral and written) as a responsible member of society. |
| PO-7 | Research Aptitude | Understand general research methods and be able to analyse, interpret and derive rational conclusions. |
| PO-8 | Life Skills | Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of domain specific change. |
| **Program Specific Outcomes (PSO)** | | |
| After successful completion of Diploma in Aviation Hospitality & Customer Service the students will: | | |
| PSO - 1 | Real World Experience | Gain real world experience throughout their internship program, that helps them to better understand the roles in the Hospitality & Aviation Industry |
| PSO - 2 | Critical thinking & Conflict Resolution | Use critical thinking skills and problem-solving skills in all dimensions of Customer Service |
| PSO - 3 | Following the industry nuances | Develop an understanding of the industry as a whole by understanding the various departments involved in the industry |
| PSO - 4 | Employable Skills | Prepare for employment by developing a plan based upon critical self-reflection and employer/placement feedback. |

**Course Outcomes**

| Sr. No. | Course Code | Course Title | Course Outcomes |
|---|---|---|---|
| 1 | APS-AHC 1 | Customer Service | CO-1 Identify and deliver Customer service<br>CO-2 Connect and effectively communicate with customers<br>CO-3 Resolve customer problems /complains using policies and operating procedures<br>CO-4 Create customer delight during service delivery |
| 2 | APS-AHC 2 | Hospitality | CO-1 Explain the relevance of lodging and food service operations to the travel and tourism industry.<br>CO-2 Distinguish the functions of the hotels<br>CO-3 Be able to work in the Housekeeping, front office and food and beverage service departments with basic knowledge of the culinary<br>CO-4 Deliver high quality Guest service in front of the house departments |
| 3 | APS-AHC 3 | Aviation | CO-1 Relate to an operational cycle as a trainee cabin crew<br>CO-2 Prioritization of safety, security and first aid<br>CO-3 Classify the support operations and work in sync with other areas within the industry like ground staff and commercial/logistics job roles in the aviation industry.<br>CO-4 Familiarize with professional terminology during operations |
| 4 | APS-AHC 4 | Personality Development | CO-1 Identify the importance of a positive personality<br>CO-2 Change personal grooming and hygiene as per industry standards<br>CO-3 Be able to present oneself with social grace and etiquette<br>CO-4 Demonstrate professional know about during interviews |
| 5 | APS-AHC 5 | Internship | |
| 6 | APS-AHC 6 | Communication Skills | CO-1 Communicate with Guest, Clients, passengers.<br>CO-2 Have a fair understanding of business Communications.<br>CO-3 Compare the difference between personal and business communications<br>CO-4 Be able to communicate with poise, correct grammar and better diction. |

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| 7 | APS-AHC 7 | Conversational French | CO-1 Appreciate French hospitality & service.<br>CO-2 Communicate effectively in a business setting.<br>CO-3 Use Basic gastronomical terminology in French.<br>CO-4 Have a fair understanding of French conversational Grammar |
| 8 | APS-AHC 8 | Travel Geography | CO-1 Read maps, understand time zones in detail<br>CO-2 Appreciate the importance of basic geography in tourism and travel.<br>Understand the potential in various tourism generating regions of the world Demonstrate the knowledge of the cultural zones of continents.<br>CO-3 Describe the physical features and places of tourist importance in India<br>CO-4 Demonstrate professional know about during interviews |
| 9 | APS-AHC 9 | Grooming | CO1 - Ability to make a positive first impression<br>CO2 - Ability to make a lasting impression<br>CO3 - Improvement in overall appearance<br>CO4 - Enhanced overall conduct during formal & informal occasions<br>CO5 - Better ability to communicate behavioral expectations to subordinates |
| 10 | APS-AHC 10 | Community Outreach | CO1 - Work with communities to build change strategies that promote social and economic justice and challenge patterns of oppression and discrimination.<br>CO2 - Create a community engagement plan utilizing principles of community leadership and volunteer management.<br>CO3 - Facilitate conflict resolution and consensus building among groups and individuals through effective mediation strategies and skills. |
| 11 | APS-AHC 11 | Cruise Familiarization | CO-1 Describe the Cruise industry and how these are managed to cater to the global demand trends.<br>CO-2 Compare and contrast the operations and management of land-based property from a floating resort.<br>CO-3 Examine the marketing strategies, organizational structure, recreational activities and facilities/amenities for the different cruise line companies. |