Run by Guru Nanak Sewa Samiti, Wirur

GURU NANAK COLLEGE OF SCIENCE

BALLARPUR DIST. CHANDRAPUR- 442 701

NAAC Accredited with Grade B

Affiliated to Gondwana University, Gadchiroli

Website: www.gncollege.co.in Email: principalgncb@gmail.com/principalgncb@yahoo.co.in Ph.No. (07172) 240124

Program Outcomes, Programme Specific Outcome and Course Outcomes

Guru Nanak College of Science offers Bachelor of Science (B.Sc.) and Master of Science (M.Sc.) in Chemistry subjects. The B.Sc. offers courses that integrate the material students learn in disciplinary courses such as Microbiology, Biotechnology, Chemistry, Zoology, Botany, Physics, and Mathematics and computer science through practical experiences within academic program. The integration occurs through a College - College Alumni- University partnership where academic professional are actively involved in students' education through guest lectures and mentoring experiences and by providing internship opportunities.

Program Outcomes (PO): Faculty of Science and Technology

Bachelor of Science (3 year - semester pattern)

- Demonstrate general knowledge of basic biological, physical, chemical and mathematical principles.
- Develops the scientific temper, gains fundamentals of science and understands the inter-dependability of various sciences to apply the knowledge on the day to day physical world.
- Practice professional ethics in conduct of science.
- Develop problem solving and analytical skills.
- Able to operate and interpret the data from instrumentation.
- Able to use library sources for the academic upbringing of the selected science subjects.
- Demonstrate an ability to understand career opportunities in science and technology industries.
- Student develops a potential to deal with elementary scientific problems with skill and becomes a part of the scientific drive for the betterment of humanity.

DEPARTMENT OF ENGLISH

Programme Specific Outcome:

- Educate students in both the artistry and utility of the English language through the study of literature and other contemporary forms of culture.
- Provide students with the critical faculties necessary in an academic environment, on the job, and in an increasingly complex, interdependent world.
- Assist students in the development of intellectual flexibility, creativity, and cultural literacy so that they may engage in life-long learning
- Students should be able to understand the process of communicating and interpreting human experiences using historical contexts and disciplinary methodologies, through literary representation.
- Students should be able to apply analytical and theoretical approaches to the reading and study of various genres of literary and cultural texts.
- Developing intellectual, personal and professional abilities through effective communicative skills; ensuring high standard of behavioral attitude through literary subjects and shaping the students socially responsible citizens.
- To enhance employability of the students by developing their linguistic competence and communicative skills.
- Upon completion of the course the students should know the plays of master-dramatists, and the capacity to understand and analyse various plays styles.

B.Sc. - I (Compulsory English) Course Outcomes –

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

- Acquaint themselves about the rich and best literary traditions in English and expand their range of experience and in the process they will learn to be more empathetic toward the plight of others.
- Think about the relation between language and literature.

- Write clearly, effectively and creatively and adjust writing style appropriately to the content, context and nature of the subject.
- Know about various innovative ways of using English language in verbal and non- verbal communication.
- Effective communication in English with others.
- To expose to the best examples of prose and poetry in English so that they realize the beauty and communicative power of English.
- To develop the ability to appreciate ideas and think critically.
- To acquaint with the minor forms of literature in English and help them to appreciate the creative use of language in literature.
- To develop interest in reading literary pieces.
- To become competent users of English in real life situations
- To acquire conversational skills in daily life.
- Students awareness about crucial issues like human values, human rights, ecological and environmental issues, caste and gender based discrimination will be developed.
- The students could improve vocabulary.

DEPARTMENT OF MARATHI

Programme Specific Outcome:

- Develop competency in Literary Forms (Marathi poetry, autobiography, novel, short story, drama & performing prose).
- Develop Reading, Writing & Communication Skills in Marathi.
- Get Information about the history of Saint Literature.
- Get Information about the history of MODERN Marathi Literature.
- Apply the study of Marathi Linguistics & Grammar in their practical life.
- Study News Writing for Media. Nurture themselves in soft skills and develop research aptitude.
- Find jobs for their livelihood be motivated for their further education.
- The development of the basic language skill- listening, speaking, reading and writing communication skills.
- Develop Social and moral values and responsibility.
- Develop communication skill.
- Comprehension of the writers and poets.
- Develop an interest for the Marathi Language.
- Improve Language Skill, Speaking Skill, Listening Skill, Reading Skill and Writing Skill.
- Develop Philosophical and Social thoughts by studying prose and poetry.
- Develop Attitude of Literary Forms. (Marathi Poetry, Drama, Novel, Story & Travelogue).
- Develop Reading, Writing & Communication Skills of Students.
- Information about Literary Theory.
- Develop Attitude of Marathi Linguistics & Grammar.
- Gain Knowledge, skill and positive attitude towards Marathi Literature.
- Develop critical and analytical thinking & social interaction and cultural understanding.

- Understand how society has changed and developed from past to present.
- Improve their creative writing abilities towards writing in Marathi to enable them to contribute towards Marathi literature.
- The relation between language and literature.
- Introduction and practice of subjects covered in the study of literature.
- The ancient and medieval versions of Marathi and the types of literature involved.
- Study of principal types of the novel and the drama.

B.Sc. – Sem. - I (Compulsory Marathi)

Course Outcomes

After completion of B. Sc. SEM I with Marathi students will be able to:

- Gain knowledge of about different writers, poet and novels, social workers, get introduction of different types of people while reading text. Writer by Gadgebaba, Dr. B. R. Ambedkar, Jyant Narlikar, Kachru Girhe and Uttam Kamble. Poet by Saint Dyaneshawar, Keshawsut, B. S. Mardhekar, Kusumagaj and Ushakiran Atram.
- Learn to analyse, interpret and write advertisement and reports.
- Develop writing and communicative skills.
- To acquire conversational skill in daily life.
- To understand the basic concept of literary genre, poem, prose and stories.
- To sharpen their critical, creative and analytical skills and enhance their proficiency in Marathi Language.

B.Sc. – Sem. - II (Compulsory Marathi)

Course Outcomes

After completion of B. Sc. SEM II with Marathi students will be able to:

- Gain knowledge of about different writers V. D. Sawarkar, Rastant Tukdoji Maharaj , P. L. Deshapende , Vasant Warhadpande and Baba Bhand. Poet by Saint Tukaram , Sane Guruji , Keshavkumar , Shanta Shelake , Dyanesh Wakudkar.
- Develop skill of Grammar and Letter writing. Learn tradition and culture of Indian villages.
- Aware the Problems of Society.
- To sharpen their critical, creative and analytical skills and enhance their proficiency in Marathi Language.

DEPARTMENT OF HINDI

B.Sc. – Sem. – I Compulsory Hindi

Course Outcomes

Students after completion of B.Sc. Semester – I – Hindi (compulsory) will be able to

CO1: Gain knowledge, skills and positive attitude towards Hindi Language.

CO2: Understand the difference between drama and one act play and also to learn social, moral and cultural values from the characters of the text.

CO3: Analyze, interpret and write letters of different types and translation of the words and introduction to Computer.

CO4: Know about writers and poets like Kabirdas, Sumitranandan Pant, Harivanshrai Bacchan, Namdhari Singh Dinkar, Mahadevi Varma.

B.Sc. – Sem. – II Compulsory Hindi

Course Outcomes

Students after completion of B.Sc. I Semester II – Hindi (compulsory) will be able to-

CO1: Gain knowledge, skills and positive attitude towards Hindi Language.

CO2: Understand the differences between drama and one act play and also to learn social, moral, and cultural values from the characters of the text.

CO3: Analyze, interpret and write letters of different types and translation of the words and introduction to Computer.

CO4: Know about writers and poets like – Rahim, Maithilisharan Gupt, Gopaldas Saxena "Neeraj", Surdas, Udayshankar Bhatt.

DEPARTMENT OF MICROBIOLOGY

COURSE: B.Sc. (Three years; Six Semesters)

Program specific outcomes (PSOs):

S. No .	Program Specific Outcomes
PSO1	To acquire, articulate, retain and apply specialized language and knowledge relevant to microbiology.
PSO2	To demonstrate competency in laboratory safety and in routine and specialized microbiological laboratory skills applicable to microbiological research or clinical methods, including accurately reporting observations and analysis
PSO3	To communicate scientific concepts, experimental results and analytical arguments clearly and concisely, both verbally and in writing
PSO4	To demonstrate various technique in the Microbiology discipline through involvement in research or internship activities.
PSO5	To gain the knowledge for various specialized discipline of Microbiology like: Molecular biology of micro-organisms, Metabolic studies of micro-organisms, Industrial application of micro-organisms, Clinical/pathogenic microbiology, Microbial biochemistry and metabolism, Infection and Immunity, Spectroscopy and enzymology and Applied Microbiology etc.

Course Outcome (All Semester of B.Sc. Microbiology):

After successful completion of the course, the student is expected to learn the following outtcomes-

S. No .	Course Outcomes
CO1	In semester-I students will understand the detailed knowledge on the basic concept of microbiology, history of microbiology & contribution of various scientists, the scope and future of Microbiology in various fields, various classes of bacteria & also about bacterial identification, detailed study on prokaryotic & eukaryotic microbes, nutritional requirements of microorganisms & also about different types of culture media, structure & classification of viruses and methods of cultivation of viruses.
CO2	Semester- II students will know about the principles & applications of various microscopes; learn about various staining techniques used in Microbiology,physical & chemical methods used for microbial sterilization.
CO3	In Semester- III students learn the facts of microbial metabolism and energy metabolism, growth measurement of bacteria and enzyme kinetics & enzyme inhibition.

CO4	Semester- IV deals with Principles of Food microbiology & diseases, Soil microbiology & biogeochemical cycles, Microbial Association, Nitrogen Fixation and environmental biotechnology etc. These topics are essential to understand the environmental microbiology aspects.
CO5	In semester –V students will get the knowledge of Normal flora & Host-Parasite Relationship, Dynamics of Disease Transmission and Control, Microbial Mechanism of Pathogenicity infection control and study of human diseases, principles of spectroscopy and chromatography, blotting techniques, radioactivity & centrifugation techniques.
CO6	In semester – VI students will learn the basic knowledge of r- DNA technology & genetic engineering technology. Structure and functions of Immune system, resistance, antigen antibody interaction, Hypersensitivity & autoimmunity etc.

DEPARTMENT OF BIOTECHNOLOGY

Course: B.Sc. (Three years; Six Semesters)

Program Specific Outcomes (PSOs):

S. No.	Program Specific Outcomes
PSO1	To help students to understand the various aspects of Biology and related technology and to apply and evolve new aspects to benefit mankind.
PSO2	To develop practical skills for application.
PSO3	Students are given freedom to handle various instruments so that they develop confidence in using them.
PSO4	The syllabus itself aims at creating scientific temperament amongst students.
PSO5	To communicate scientific concepts, experimental results and analytical arguments clearly and concisely, both verbally and in writing.

Course outcome (All Semester of B.Sc. Biotechnology):

After successful completion of the course, the student is expected to learn the following outcomes-

S. No .	Course Outcomes
CO1	In Semester-I, students learn the basics of Microbiology, Introduction to cell, Cell organells, Cytoskelton, cell locomotion and cell division, History , development and microscopy, Bacterial morphology &Organells, Microbial Diversity & Microbial staining techniques and Microbial growth, Nutrition & Control.
CO2	In Semester-II, Students learn about Fundamental of Biochemistry, Nucleic Acids, Chromosomes, Concept of Genes & Nucleosomes, Carbohydrates, lipids & vitamins and Amino Acids and Proteins. Mendel's laws of inheritance, Crossing over & linkage, Chromosomal aberration & population genetics and Genetic disorder helpful to understand the genetic life.
CO3	In Semester-III they learn Carbohydrate, lipid & nitrogenous compound Metabolism and Bioenergetics, Enzymology, & Catalysis, Replication & Transcription, Genetic code and transcription, which is very essential for Biotechnology students. This enhances Student's ability to comprehend and master the skills in genetics.
CO4	Semester-IV is dedicated to Immunology, Biostatistics and Biophysical techniques. This syllabus helps in understanding deeper aspects of Cell

	Biology as immune cells and molecules and various techniques related to it. Biostatistics is very important for research data interpretation. So the basics of statistics as applied to Life Sciences are taught.
CO5	Semester-V deals with Genetic engeneeringPlant tissue culture and rDNA technology which is core Biotechnology and the knowledge gained in the previous semesters helps the students to comprehend these subjects with ease.
CO6	Semester-VI comprises Applications of Biotechnology like Industrial, Food, Environmental Biotechnology, Animal and Plant Biotechnology. These subjects emphasise the application of Biotechnology in various fields. Learning the techniques in the field of application of Biology in various walks will equip the students with skills needed to pursue their higher studies with more clarity and understanding.

DEPARTMENT OF BIOCHEMISTRY

Course: B.Sc. (Three years; Six Semesters)

Program Specific Outcomes (PSOs):

S. No	Program Specific Outcomes
PSO1	Leads to an under graduate degree -B.Sc. a three year degree course with Biochemistry as one of the three major subject.
PSO2	To equip the students for health/clinical courses like degree/diploma in pathology, nutrition studies like dietetics.
PSO3	To gain basic knowledge for being fully equipped for first aid procedures and thus can be of help to society.
PSO4	To increases health awareness in an individual and to spread the same among the masses.
PSO5	To inculcating hygienic practices in self and to teach others.
PSO6	To become qualified for pursuing post-graduation in various subjects of Life Sciences.
PSO7	To become qualified to pursue Hospital management courses, Laboratory management courses and management courses in Biotechnology.

Course Outcome (All Semester of B.Sc. Biochemistry):

After successful completion of the course, the student is expected to learn the following outcomes-

S. No .	Course Outcomes
CO1	In Semester-I, students learn the basics in the constitution and working of human body, cells and digestion etc, staining growth, study of bacteria and Viral diseases caused to human being. This basic knowledge is essential for Biochemistry students.
CO2	In Semester-II, Students learn about Fundamental of Carbohydrate, lipid & nitrogenous compound, amino acids structures. Liver, Kidney and its functions, Immunology and its techniques. Which is very essential for Biotechnology students? This enhances Student's ability to comprehend and master the skills in genetics.
CO3	In Semester-III they learn the Biological macromolecules Amino acids, Peptides and proteins, Proteins and Nucleic acids etc essential to understand the biological life. Biophysical techniques is also required for analytical research.
CO4	Semester-IV is dedicated to acquire an in depth knowledge about enzymes

	which act as biocatalyst especially their construction of structure, the mechanism of reactions they catalyze and the way to isolate and purify them and Biophysical technique is important for analytical research.
CO5	Semester-V deals with the study of Lipid & Carbohydrate metabolism and Lipid biosynthesis. Molecular biology, which is core Biochemistry and the knowledge gained in the previous semesters helps the students to comprehend these subjects with ease.
CO6	Semester-VI comprises the deep knowledge of Bioenergetics & metabolism of Amino acids and Nucleotides. Protein synthesis and use of r-DNA technology tools emphasize the application of Biochemistry in various fields.

DEPARTMENT OF COMPUTER SCIENCE

Course: B.Sc. (Three years; Six Semesters)

Program Specific Outcomes (PSOs):

S. No	Program Specific Outcomes
PSO1	Demonstrate understanding of the principles and working of the hardware and software aspects of computer systems.
PSO2	To enhance skills and adapt new computing technologies for attaining professional excellence and carrying research.
PSO3	Design, implements, test, and evaluate a computer system, component, or algorithm to meet desired needs and to solve a computational problem.
PSO4	To pursue further studies to get specialization in Computer Science and Applications (MCA), Mathematics, business administration.
PSO5	To pursue the career in corporate sector can opt for MBA.
PSO6	To Work in the IT sector as programmer, system engineer, software tester, junior programmer, web developer, system administrator, software developer.
PSO7	To work in public sector undertakings and Government organisations etc.

Course outcome (All Semester of B.Sc. Computer Science):

After successful completion of the course, the student is expected to learn the following outcomes-

S. No .	Course Outcomes
CO1	**In Semester-I** **Paper-I** Understand What is Computer and Basic concepts of computer. Understand the History of Computers. Aware about various types of Computers, types of input and output devices. Preparation of Algorithm and Flowchart of Program. Learn computer networks, its types and basics of Internet. Understand computer viruses and its types. **Paper-II** Develop their programming skills. Be familiar with programming environment with C Program structure. Declaration of variables and constants. Understand operators, expressions and preprocessors. Understand arrays , it's declaration and uses.
CO2	**In Semester-II** **Paper-I** Aware about different CPU scheduling algorithms.Know about

	functions and services of operating system. Get familiar with different memory management techniques. Understand different disk and drum scheduling algorithms as well as dead lock Concepts. Get introductory knowledge about android operating system. **Paper-II**Design programs using Functions, Pointers, Structures and Unions inC language. Write a program using File Handling. Writing programs for drawing different graphical shapes
CO3	**In Semester-III** **Paper-I** Know about E-R Model by overview of database design.. Get aware of Describing & storing data. Get familiar with Conversion of ER to Relational model. Know about functional dependency and Data Normalization. Understand Database Implementations. Make use of Concurrency control, Backup & recovery for large or huge of databases. Get aware about handling huge databases. **Paper-II** Be familiar with Object Oriented Programming Environment. Differentiate between Structures oriented programming and object oriented. Programming. Understand different object modeling techniques and analysis like Generalization. Aggregation and Metadata. Write Reusable. Extensible and Robust programs in C++.
CO4	**Semester-IV** **Paper-I** Analyze the time and space requirement of any algorithm. Know what is data structure and basic algorithmic notations. Understand different linear data structures for conversion ofmathematical expressions and polynomial representations. Know the file structures. **Paper-II** Get aware about .Net platform. Understand looping structure, control flow statements and exceptionhandling in VB.NET. Understand object oriented programming in VB.NET. Program using ADO.NET
CO5	**Semester-V** **Paper-I** Use page layout, styles and text balance, site map, Master pages andcontent Pages, Navigation controls: Tree view, site map path(bread crumb), Menu navigation. • Understand how to design website with different website development models. • Know the different page types on websites and it's navigations. **Paper-II** Understand features and data types in SQL server. Create and manipulate databases for various applications. Use procedures and trigger for performing complex operation on databases. Handle errors using exception handling concepts. Get aware of Describing & storing data. Understand Database Implementations.
CO6	**Semester-VI** **Paper-I** Explore polymorphism using Function and Operator Over loading, overriding. Get knowledge JDK Environment. Understand the different aspects of hierarchy of classes and their extensibility. Understand the concepts of streams and files. Write programs for handling runtime errors using

	exception. **Paper-II** To acquire Object Oriented Skills in Python. To acquire programming skills in core Python. To develop the skill of designing Graphical user Interfaces in Python. To develop the ability to write database applications in Python.

DEPARTMENT OF CHEMISTRY (UG & PG)

Programme Specific Outcomes (PSOs):

Students will demonstrate an understanding of major concepts in all disciplines of chemistry.

Students will employ critical thinking and the scientific method to design, carry out, record and analyze the results of chemical experiments and get an awareness of the impact of chemistry on the environment, society, and other cultures outside the scientific community. To enable students to develop an understanding of the principals of chemical safety and to enable them to apply these concepts when working in a laboratory.

The principle, design, observations, procedures and calculations of the experiment results should demonstrate an understanding of practical's and its applications in different chemical industries and R&D laboratories.

Course Outcomes (PSOs):

I. Inorganic Chemistry

• To enables students to learn the atomic structure, concept of covalent bond, periodic table and its properties, S-block and P-block elements and chemistry of hydrides, oxides and oxoacids.

• To enables students to know about VSEPR and MO theories, Chemistry of elements of first, second, third transition series, Errors in Chemical Analysis, non-aqueous solutions, Chemistry of lanthanides and actinides.

• The students will understand some fundamental aspects of coordination compounds and isomerism, concept of oxidation and reduction, Calorimetry and Spectrophotometry, separation techniques, introductions of some inorganic polymers.

• To have the idea about Metal ligand bonding in Transition Metal Complexes, Electronic spectra of Transition Metal Complexes, Magnetic Properties of Transition Metal Complexes, Thermodynamic and Kinetic aspect of metal complexes, Organometallic Chemistry, Metal carbonyls, Bioinorganic Chemistry, concept of Hard and Soft Acids and Bases.

II. Organic Chemistry

• To predict the outcome, chemical reactions, preparations & mechanism of organic reactions, stereochemistry of organic compounds, geometrical and conformational isomerism, and basics concept of alkanes, alkenes, dienes, alkynes and aromaticity.

• To impart the students concepts of the fundamentals of orientations in organic molecules, properties and mechanism involved in alkyl halides, polyhalogen compounds, aryl halides, alcohols, phenols, aldehydes, ketones, carboxylic acids and its derivatives.

• To understand the basic concepts and mechanisms organic compounds of nitrogen, heterocyclic compounds, elemental analysis, organometallic compounds, UV-visible and infrared spectroscopy and its application.

• To learn the concept of NMR Spectroscopy and its applications, Organic synthesis via enolates, carbohydrates, amino acids, peptides, proteins, nucleic acides, synthetic drugs, dyes and detergents.

III. Physical Chemistry

• To acquaint knowledge on basics of thermodynamics, gaseous states, liquid state, properties of liquids, surface chemistry and catalysis.

• Students to learn and understand about second law of thermodynamics, free energy functions, chemical equilibrium, phase rule, chemistry of liquid-liquid mixtures, nuclear chemistry, molecular structure, chemical kinetics and theories of chemical kinetics.

• To provide an insight into the properties of solid state, electrochemistry, rotational and vibrational spectroscopy, basics of quantum chemistry.

• To get an overview about the concept of electrochemistry, quantum mechanics and MOT, photochemistry, Raman spectroscopy, Colligative properties and Macromolecules.

PG DEPARTMENT OF CHEMISTRY

Programme Specific Outcomes (PSOs) –

- Know different approaches for Organic Synthesis and study there reaction mechanisms.
- Motivate towards critical thinking and analysis to solve complex chemical problems, e.g., analysis of data, synthetic logic, spectroscopy, structure and modelling, problem solving.
- Promotes towards use modern techniques, decent equipment's and Chemistry software's.
- Demonstrate good laboratory practices and safety to impart the basic analytical and research oriented skills.
- Understand the fundamentals principle, instrumentation and application of various spectroscopic techniques like NMR, IR, and U.V- Visible spectroscopy.
- Learn potential uses of analytical, industrial, medicinal and green chemistry for sustainable development of human welfare.
- Achieve all essential knowledge of organic, inorganic physical, analytical chemistry.
- Aware about various separation techniques like Chromatography Ion exchange, Solvent extraction.
- Understand the concept of synthesis and significance of medicine, polymer and fabrics in everyday life.
- Perform experiments in the area of organic synthesis, qualitative and quantitative analysis, estimation, inorganic semi micro analysis, and conductometric potentiometric methods.

GURU NANAK COLLEGE OF SCIENCE
BALLARPUR DIST. CHANDRAPUR- 442 701
NAAC Accredited with Grade B
Affiliated to Gondwana University, Gadchiroli
Website: www.gncollege.co.in Email: principalgncb@gmail.com/principalgncb@yahoo.co.in Ph.No. (07172) 240124

Course Outcome (CO) of MSc Semester: -II

Paper-I Inorganic Chemistry (COs)

- To know Stereochemistry and Bonding in Main Group Compound by VSRPR theory.
- To understand Metal-Ligand Bonding via Crystal Field Theory.
- Learn to determine Stepwise and overall formation constants using spectrophotometric and Potentiometric method.
- To study Classification, nomenclature, structure, bonding of borane hydride cluster.
- Understand the concept of Metal-Metal bonds

Paper-II Organic Chemistry (COs)

- To knowNature and Bonding in Organic Molecule.
- Learn novel organic synthesis approaches of enamines and imines.
- Understand concept of Stereochemistry in 5 -8 membered rings.
- To explore the concept of Reactive Intermediates: carbocation, carbanion,free radical, carbenes, nitrenes.
- To make understood about organic Reaction mechanism, there Structure and Reactivity.
- To study in detail about aliphatic, aromatic nucleophilic and electrophilic substitution.

Paper-III Physical Chemistry (COs)

- To know Nature and Bonding in Organic Molecule.
- To understand postulates of quantum mechanics and derivation of Schrodinger wave equation.
- Learn about Classical thermodynamics Maxwell's relations and entropy Partial

molar quantities.

- To understand the construction of phase diagram in one, two, and three component systems.
- To study chemical kinetics considering various theories related to rates of reaction.
- To know Photochemical and enzyme catalysis reaction and there application.

Paper-IV Analytical Chemistry (Cos)

- To know application of analytical chemistry in qualitative and quantitative analysis of data.
- To understandvarious separation techniquelike Chromatography Ion exchange, Solvent extraction.
- To make them aware about Classical methods of analysis via volumetric and gravimetric analysis.
- To learn the principle, instrumentation of Spectrophotometryand Colorimetry.

Course outcomes of MSc Semester: -II

Paper-I Inorganic Chemistry (Cos)

- To Study Electronic spectra of Transition Metal complexes.
- To understand the concept of Magnetic Properties of Transition Metal complexes.
- Learn Reaction mechanism of Transition Metal Complexes.
- To know Structure and bonding, vibrational spectra of metal carbonyls and Metal nitrosyls.
- To explore EAN rule, synthesis and structures Wilkinson'scatalyst and Vaska's compound.

Paper-II Organic Chemistry (COs)

- To know the addition to carbon-carbon and carbon- hetero atom multiple bond reaction and mechanism.
- Understand the mechanism of molecular rearrangement through organic name reaction.
- Learn the concept of synthesis reactivity and mechanism of free radical reaction.
- To Aware the knowledge of Basic principles of green chemistry for sustainable development.

Paper-III Physical Chemistry (COs)

- To know application of quantum mechanics.
- To learn all concept of thermodynamics like Statistical and Irreversible Thermodynamics.
- To understand Solid State chemistry and its Reactions.
- To explore knowledge of nuclear chemistry and its models.

Paper-IV Analytical Chemistry (Cos)

- To learn fundamental of sampling and quantification.
- To know application and advantages of gas and Liquid chromatography.
- To understand modern technique like Fluorometry, phosphorimetry and Flame photometry.
- To introduce about Principle of polarography. Its Instrumentation and advantages.

Course outcomes of MSc Semester: -III

(ORGANIC CHEMISTRY SPECIALIZATION)

Paper-I Spectroscopy (Cos)

- To understand modern technique like Fluorometry, phosphorimetry and Flame photometry.
- To understand Symmetry properties of molecules and application.
- To know working and uses of modern technique like Mass and Mossbauer spectroscopy.
- To study fundamentals of microwave and Infrared spectroscopy.
- Understand the principle of ESR and Raman for molecular structure determination.

Paper-II Organic Chemistry (Special-I) (Cos)

- To understand synthesis and mechanism of photochemical reaction.
- To know concept of Pericyclic Reactions by FMO and Woodward-Hoffman approach.
- To learn oxidation and reduction reagent there stereochemistry in organic synthesis.
- To make them aware about Chemistry of P, S, Si, B, and Ti compounds.

Paper-III Organic Chemistry (Special-II) (Cos)

- To understand occurrence, isolation Structure determination of natural products, alkaloids plant pigments.
- To get detail knowledge of naturally occurring sugars carbohydrate.
- Learn concepts of Amino acids, protein and peptides.
- To know structure of and importance of Porphyrin, steroids.

Paper-IV Polymer Chemistry (Elective) (Cos)

- To study nomenclature and classification of polymers

- Understand how to determine of Molecular mass of polymers.
- Know Morphology and order in crystalline polymers.
- To awake about types of Commercial polymers and uses

Course outcomes of MSc Semester: -IV

Paper-I Spectroscopy (Cos)

- Understand the fundamental of Ultraviolet and visible Photoelectron spectroscopy.
- To learn how to perform analysis Nuclear magnetic Resonance data.
- To make known about types of NMR and its various applications in medical field.
- Understand the modern X ray, Electron, Neutron Diffraction.

Paper-II Organic Chemistry (Special-I) (Cos)

- To study mechanism organic name reaction involving Carbanion intermediate.
- To know Preparation and applications of organometallic reagents.
- Understand the concept of Advanced Stereochemistry in organic synthesis.
- Learn the protection and deprotection of functional groups.
- To make them know design and synthesis based on retrosynthetic analysis. Mechanism of Enzyme Action

Paper-III Organic Chemistry (Special-II) (Cos)

- Understand mechanism of reaction in which enzyme acts as biological catalyst.
- To know synthesis of heterocycle and chemical properties.
- Learn biological functions of Nucleic Acids, lipids, vitamins.
- To know Introduction, classification and methods of dying.
- To make them know History, medical terms in pharmaceutical chemistry and classification of drugs.

Paper-IV Polymer Chemistry (Elective) (Cos)

- To know Introduction, classification and methods of dying.
- To make them know History, medical terms in pharmaceutical chemistry and classification of drugs.

- Understand concept of Characterization of polymers by thermo mechanical and X-ray diffraction technique.
- To make them distinguish between Biomedical Inorganic, coordination polymers.

DEPARTMENT OF PHYSICS

Program Specific Outcome (PSO)

Develop scientific attitude and temperament and give emphasis on the development of experimental skills, data analysis, calculation, measurements and also on the limitations and precautions about the experimental method data and results obtained.

To apply graduate-level knowledge and solve problems in the areas of electrodynamics, quantum mechanics, classical mechanics, statistical mechanics, mathematical physics and Nanoscience and nanotechnology, Electricity and magnetism, Atomic physics, Nuclear – Physics. Understand theories of physics and its relevance in present day Technology. Study the strength of equation, format graphs, and mathematical tools to solve the problems. Make models and circuits through the study of digital electronics.

Course outcomes (CO)

On the completion of the course the students are able to:

- Explain the concept of Gravitation, Astrophysics, and planetary motion, rotational motion of rigid body and moment of inertia and concept of linear, angular momentum and Newton's laws of Motion (Mechanics).
- Understand the concept of properties of matter viz. Elasticity, viscosity, surface tension, thermodynamics and Kinetic theory.
- Interpret and illustrate concepts of sound waves, acoustics and ultrasonic and oscillations (Free, damped and forced oscillation).
- Honed the skilled to understand Electrostatic properties, Magnetostatics, magnetism, Electromagnetic nature.
- Develop the understanding of the optical phenomenon such as interference, diffraction, polarization, reflection, refraction, transmission etc.
- Acclimatize with the concept of solid state Physics, relativity, Nuclear Physics, Bio-Physics, X-ray, Laser, Raman spectroscopy, Electron spin resonance, Nuclear magnetic Resonance, Atomic and molecular physics.
- Learn the basics of solid state electronics eg. BJT, FET, JFET, MOSFET, also communication and digital electronics, fibre optical communication.
- Gain the knowledge of quantum mechanical concepts applicable in understanding behaviour of nanomaterials and applications in nanotechnology.

DEPARTMENT OF MATHEMATICS

Course: B.Sc. (Three years; Six Semesters)

Program Specific Outcomes (PSOs):

S. No Program Specific Outcomes	Program Specific Outcomes
PSO1	Build logic to deal with problems in mathematics.
PSO2	Critically interpret numerical data, graphical data and develop models.
PSO3	Apply mathematical knowledge to a career and research related to mathematical sciences.
PSO4	Apply critical thinking skills to solve problems which can be modeled mathematically.
PSO5	Construct mathematical arguments, proofs and develop mathematical as well as analytical thinking.
PSO6	Make students understand the basic structure of mathematics i.e. sets, relation and functions and relation among them.
PSO7	Develop the ability to understand concepts in mathematics on their own

Course outcome (All Semester of B.Sc. Mathematics):

After successful completion of the course, the student is expected to learn the following outcomes-

S. No .	Course Outcomes
CO1	**In Semester-I** **Paper-I** Revise concepts of limit, continuity and differentiability. • Learn Mean Value Theorems and their applications. • Learn the concepts of Beta and Gamma function and their properties. • Learn the advanced technique to solve double integral. **Paper-II** Find limit, continuity of two variable functions. • Understand partial differentiation and various method to find them. • Learn about homogeneous functions, Taylor's series of two variable functions. • Find minima and maxima using Lagrange's multiplier method. • Learn tracing of curves, find

	tangent and normal of curve. • Deal with complex functions, finding roots of complex numbers. • Learn circular and hyperbolic functions. • Learn De'moivre's theorem and its applications.
CO2	**In Semester-II** **Paper-I** Deal with first order differential equation. • Find integrating factor. • Deal with linear equations, Bernoulli's equation and first order higher degree equations solvable for x,y,p. • Find orthogonal trajectory. • Solve simultaneous differential equations. • Solve linear equation with constant coefficients by finding complementary function and particular integral. • Deal with Cauchy- Euler's equation. • Find wronskian and its properties. • Solve differential equation using method of variation of parameter. • Form difference equation. • Solve linear difference equation. • Deal with Homogeneous linear equation with constant coefficient and nonhomogeneous linear equations. **Paper-II** Understand linear partial differential equation of first order and formation of partial differential equation by eliminating the arbitrary constants and arbitrary functions. • Solve total differential equation, Lagrange's linear partial differential equation. • Solve partial differential equation using Charpit's method. • Solve homogeneous partial differential equation with constant coefficient by finding complementary function and particular integral. • Find solution of non homogeneous linear partial differential equation. • Classify second order partial differential equation.
CO3	**In Semester-III** **Paper-I** Understand the concepts of real sequence, their convergence and divergence and Cauchy convergence criterion for sequence. • Understand the concepts of infinite real series their convergence and divergence. • Find convergence of series by using various tests such as comparison test, P-series test, ratio test, Leibnitz's test. • Understand the basic of metric, neighborhood, closed set, open sets. • Learn about metric spaces, Cauchy sequence and complete metric space. • Understand concepts of Reimann integral and properties of integrable functions. **Paper-II** Gain basic knowledge of sets, subsets, classes of sets and countability of sets. • Learn basic concepts of relation and types of relations. • Learn basic concepts of Fuzzy sets, examples of Fuzzy sets and operations on Fuzzy sets. • Understand the alpha cuts and convex Fuzzy sets. • Gain knowledge about Laplace transform, its properties. • Learn inverse Laplace transform and its applications on differential equations and partial differential equations.
CO4	**Semester-IV** **Paper-I** Understand the basic of groups, their various types, its properties. • Learn basic of Normal subgroups, cosets, their properties. • Find homomorphism and isomorphism of groups, kernel of homomorphism. •

	Learn fundamental theorems of isomorphism. • Gain basic knowledge of Ring theory, Field, subring and their properties. • Learn about integral domain and characterization of ring. **Paper-II** Find greatest common divisor of more than two integers by using Euclidean algorithm and least common multiple. • Solve linear diphantine equation. • Gain knowledge about fundamental theorems of arithmetic and unique factorization theorem. • Learn about congruence and properties of congruence. • Learn about Chinese reminder theorem and Goldbach conjuncture. • Gain knowledge about arithmetic function, Euler's theorem, Mobius function, the and functions.
CO5	**Semester-V** **Paper-I** Understand the basic concepts of vector spaces, subspaces and their properties. •Learn about linearly dependence and independence and their basic properties. • Learn about basis and dimension of vector spaces. • Learn about linear transformation, algebra linear transformation and rank nullity theorem. • Gain knowledge about Dual space, Bi dual space, adjoint of linear transformation and eigenvalue and eigenvectors of linear transformation. • Learn basic concepts of Inner product space, Cauchy Schwartz inequality. • Deal with orthogonal vectors, orthogonal sets and Gram Schmidt orthogonalization process. **Paper-II** Gain basic knowledge of matrices, types of matrices. • Operate elementary operations on matrices. • Reduce matrices to normal form. • Find inverse of matrices, and row rank, column rank and rank of matrices. • Solve homogeneous and non homogeneous system of linear equations by matrix inversion method, crammer's rule, Gauss Jordan elimination method. • Find eigenvalues and eigenvectors of matrices. • Gain basic knowledge about polynomial equations in one variable. • Locate roots of polynomial by using Descarte's rule sign. • Understand relation between roots and coefficients of polynomial. • Find transformation of equations if there is change in sign of roots, if root is multiplied by given number. • Learn Cordon's method, Ferrari's method and Descarte's method.
CO6	**Semester-VI** **Paper-I** Solve nonlinear equations $f(x)=0$ by using various methods such as 1) Bisection method 2) Regula falsi method 3) Secant method 4) Newton-Raphson method • Solve linear algebraic equation $A(x)=b$ by using various methods such as 1) Gauss elimination method 2) Partial pivoting 3) Gauss-Jordan elimination 4) LU decomposition method 5) Gauss- Jacobi method of iteration 6) Gauss- Seidel method of iteration. • Gain knowledge about Finite difference operator, Central difference operator. • Learn about Newton-Gregory forward and backward difference interpolation formula, Lagrange's interpolation formula, Newton's divided difference interpolation formula for unequal interval. • Learn about various method for numerical differentiation such as 1) Newton's special and general formula 2) Newton's divided

	difference formula • Find minima and maxima of a tabulated function. • Learn about various methods to find integration numerically such as 1) Trapezoidal rule 2) Simpson's one-third rule 3) Simpson's three-eight rule 4) s rule • Find degree of precision and truncation error of above quadrature rule. **Paper-II** Learn about analytic function, Cauchy- Riemann equation and harmonic Boole function. • Find Mobius transformation and cross ratio of complex numbers. • Find complex integration. • Use Cauchy's integral theorem and Cauchy integral formula. • Find singularities and residue of complex functions. • Find vector differentiation and vector integration. • Find Gradient, Divergent and curl of vector functions. • Use of Green, Gauss and stokes theorems.

DEPARTMENT OF ZOOLOGY

Programme Specific Outcome- UG

- Apply the knowledge of various branches of Zoology for graduate course and higher studies.
- Develop positive attitude towards the subject for sustainable development.
- Understand the connection of life and rich diversity of organism and their ecological and evolutionary significance.
- Acquire basic skill and study of nature, techniques experimental skill and scientific investigation.
- Identify and list out common animals explain physiological changes in animal bodies.
- Explain genetic abnormalities animal benefits to human also diseases caused by animals to humans. Use of Bioinformatics, Biostatistics as a tool for all activities related to Zoology.
- Promotes responsibility, entrepreneurship skill research and career opportunities.

Course Outcomes

BSc semester-I Paper-I

Life and Diversity of animals (Protozoa to Annelida)

- Familiar with invertebrate world that surrounds us.
- Able to identify invertebrates and classify them up to the class level.
- Understand the basis of life processes in the non-chordates.
- Lower invertebrates introduction digestive nervous reproductive system.
- Classify and characterize phylum-protozoa, reproduction in Paramecium.
- Classify and characterize phylum- porifera, morphological characters of Sycon.
- Classify and characterize phylum- coelenterata, morphological characters of Obelia. CO-8 Classify and characterize phylum-platyhelminths, reproduction in Taeniasolium.

- Classify and characterize phylum-aschelminths, reproduction in Ascaris.
- Classify and characterize phylum-Annelida, digestive reproduction in Hirudineria.

B.Sc. Semester-I Paper-II Cell Biology

- To know the fundamental principles and unifying facts of cell biology.
- To study the cell theory, prokaryotic and eukaryotic cells, animal and plants cell.
- To know the osmosis, diffusion, active and passive transport with help of examples.
- To study different models- Sandwich and fluid mosaic model.
- To study the cell organelles (Golgi complex, Ribosomes, lysosomes, Endoplasmicreticulum, Mitochondriaetc.
- To know the structure and function of nucleus, nucleolus and chromosomes.

B.Sc. semester-II Paper-I Life and Diversity of animals (Arthropoda to Hemichordata)

- Familiar with invertebrate world that surrounds us.
- Able to identify invertebrates and classify them up to the class level.
- Understand the basis of life processes in the non-chordates.
- Lower invertebrates introduction digestive nervous reproductive system.
- Classify and characterize phylum-Arthropoda, reproduction in Periplaneta.
- Classify and characterize phylum- Mollusca, morphological characters of Pila.
- Classify and characterize phylum- Echinodermata, morphological characters of Asterias.
- Classify and characterize phylum-Hemichordata, reproduction in Balanoglossus.

B.Sc. Semester-II Paper-II Genetics and Evolution

- To know the Mendelian genetics, laws of genetics, interaction of genes.

- To study linkage, crossingover, syndrome and mutation.
- To know the major history of life.
- To study the direct evidences of evolution (type of fossil, evolution of horse)
- To study the evolutionary changes, species concept, modes of speciation.
- To know more about macroevolution and extinction.

B.Sc. semester-III Paper-I Animals Diversity of chordate and comparative anatomy

- Familiar with vertebrate world that surrounds us.
- Able to identify vertebrates and classify them up to the class level.
- Understand the basis of life processes in the chordates.
- Higher vertebrates introduction digestive nervous reproductive system and comparative anatomy.
- Classify and characterize up to order -Urochordata, general characters Ascidian tadpole larva retrogressive metamorphosis.
- Classify and characterize up to order - Cephalochordata, morphological characters digestive system of Amphioxus.
- Classify and characterize up to order - Cyclostomata, morphological characters of Pteromyzon and Myxine.
- Classify and characterize up to order -pisces, general characters, osmoregulation.
- Classify and characterize up to order –amphibia, general characters, parental care.
- Classify and characterize up to order –Reptilia, general characters, snake venom poisonous and non poisonous snakes.
- Classify and characterize up to order –aves, general characters, flight adaptation migration. Classify and characterize up to order –mammals, general characters, prototheria, metatheria, eutheria.

B.Sc. Semester-III Paper II Physiology and Biochemistry _Part-I

- To know the fundamental principles and unifying facts of human physiology.
- To study the breathing mechanism, Hemoglobin (Hb %) as a respiratory pigments, function of respiratory organs and others respiratory organs.
- To study source and type of vitamins, deficiency and diseases.
- To know the digestive mechanism, digestion of carbohydrates, protein sandfats.
- To study all digestive glands and its function (Structure and function of Salivary, Gastric, Intestinal, liver, Pancreas).
- To study of enzyme, nomenclature of enzyme, Induce–fit model and key-lock models, properties of enzyme and factors affecting enzyme activity.
- To study the mechanism of breathing, respiratory pigments, transports of O2 and CO2.
- To study the respiratory disorders and effects of smoking.

BSc semester-IV Paper- I Developmental Biology

- To Study of types of eggs.
- To know fertilization mechanism and significance.
- To study types of cleavage.
- To study types of blastulation.
- To study morphogenetic movements in the early development of frog.
- To know development of chick.
- To study extra embryonic membrane.
- To know gametogenesis.
- To study implantation types.
- To know placentation types and functions.
- To know gene activation and apoptosis.
- To study stem cells

- To know IVF
- To study semen bank and AI and contraceptive

B.Sc. Semester-IV Paper-II Physiology and Biochemistry Part_II

- To study the structure and function of nephron, mechanism of urine formation.
- To know the elementary ideas of dialysis and counter current mechanism.
- To study the structure and functions of endocrine glands (Pituitary, Thyroid, Adrenal)
- To know the male and female sex hormones.
- To study there productive cycle (menstrual & estrous cycle)
- To study the structure and function of neuron, E.M. structure of neuron
- To know the sliding filaments theory of muscle
- To study the properties of muscles (Twitch, tetanus, tonus, summation, muscle fatigue)
- To study the circulatory system in details.
- To know the blood groups and its genetics.
- To know the Blood pressure, 13 clotting factors, cardiac cycle, ECG and function of blood and its composition etc.

BSc semester-V Paper- I Applied Zoology

- To study types of fisheries in brief.
- To know pre and post stocking management.
- To study mono and poly culture.
- To study fish diseases.
- To study life cycle of Ancylostoma and Wuchereria.
- To study biology control and damage insect pest.
- To study mosquito disease and Pediculushumanus.
- To study fowl on the basis of their use.
- To know about principles of poultry breeding and diseases.

- To study introduction of dairy farm and management.
- To know preservation semen and AI in cattle‟s and diseases.
- To study of management of modern dairy farm.

B.Sc. Semester-V Paper-II Aquatic Biology

- To know the fundamental principles and unifying facts of aquatic biology.
- To study the ecosystems (Freshwater, marine water)
- To know the differences between lentic and lotic ecosystem
- To study different physicochemical and biological parameters of water & soil
- To know the fresh water and saline water fishery in India.

B.Sc. semester-VI Paper-I Microtechnique Bioinformatics and Biostatistics.

- To study visualization of cell by light microscope.
- To study concept of resolving power of different microscopes.
- To know the different fixation and staining technique for EM, freez-etch method.
- To study image processing method in microscopy.
- To study structure and function of microtome.
- To study fixation dehydration clearing embedding.
- To know about section cutting and problem encounter in section cutting.
- To study double staining with Hematoxylin. Eosin.
- To know about Bioinformatics tools.
- To study biological database.
- To study structure of nucleotide database.
- To know about Application of bioinformatics.
- To study of tabulation presentation of data sampling error.
- To study measures of central tendency dispersal probability distribution regression and correlation t- test analysis of variance.

B.Sc. Semester-VI Paper-II Reproductive Biology

- To know the fundamental principles and unifying facts of reproductive biology.
- To know the structure and functions of main reproductive organs of human being.
- To study the current state of knowledge about the functional organization of the human body.
- To study the physiology of reproduction
- To know the role of male reproductive system and female reproductive system.
- To know the general functions of reproductive organs of male and female.
- To study the physiology of coitus, spermatogenesis and oogenesis.
- To know the assisted reproductive technology including ZIFT, GIFT, IVF, AI, etc.
- To study the contraceptive measures.
- To study the physiology of pregnancy.
- To study the pregnancy test by using kit.
- To know the causes of infertility in male and female.
- To study the histology of reproductive organs of human being and other mammals too.

DEPARTMENT OF BOTANY

Programme Specific Outcome- UG

- Know about the importance of plants, their diversity and its conservation.
- Know the cryptogams and phenerogams.
- Know the Characteristic features, Systematics, Morphology, Structure and lifecycle of Viruses, Bacteria, Cyanobacteria, Mycoplasma, Algae, Fungi, Lichen, Bryophytes, Pteridophytes.
- Know the Diversity, Systematics and biology of seed plants (Angiosperms and Gymnosperms).
- Know the structures, types and function of gene, genome, cell, tissue, organ system containing development, reproduction, ecological and physiological adaptions.
- Understand the basic concepts of plant Physiology, Biochemistry, Anatomy, Morphology, Taxonomy, Ecology, Cytology, Genetics, Plant pathology, Mycology, Ethenobotany.

Course Outcomes

BSc semester-I Paper- I Micro-organisms, Algae, Fungi and Plant Pathology

- Understand the general characteristic of life.
- Understand the depth about Viruses Bacteria & Mycoplasma.
- Understand the depth of Cyanobacteria (Nostoc).
- Learn about general characteristics, classification, economic importance of Algae & Fungi.
- Understand the life history of Algae (Voucheria, Chara, Bactrachopermum, Ectocarpus, Oedogenium) and Fungi (Mucor, Albugo, Cercospora, Puccinia,

Penicillium).

- Understand the classification of plant diseases, pathogen, symptoms, causes and control measures of Tobacco mosaic disease, Red rot of Sugarcane, Brown spot of Rice, Bacterial Blight of Cotton & loose smut of Wheat.

B.Sc. semester-I Paper- II Plant Diversity (Bryophyta, Pteridophyta, Gymnosperms and Palaeobotany)

- Understand the morphological diversity and Economic importance of Bryophyta.
- Know about Classification system, the interesting characters and Economic importance of Pteridophyta and Gymnosperms.
- The students will be able to understand the structure & reproduction of certain selected Bryophyta, Pteridophyta, Gymnosperms.
- The students will be able to understand the process of Fossilization.
- Learn some fossil Rhynia, Glossopteris, Cycadeoidea.

BSc semester-II Paper- I Angiosperm (Morphology and Anatomy)

- Understand the morphological characteristic of Angiosperm.
- Know about modification of stem, leaves, root in Angiosperm.
- Know about phyllotaxy, branching, pattern and venation in Angiosperm.
- Understand about morphology of flower, its types, floral whorls (calyx, corolla, androecium & gynoecium) useful for practical purpose also.
- Understand about Inflorescence, its types, placentation, Aestivation, types of fruits, floral formula and floral diagram.
- Learn about classification of permanent tissue (parenchyma, collenchyma, Sclerenchyma, xylem, phloem).
- Learn about Newman theory and Tunica carpus theory.
- Learn about vascular cambium, Periderm & Vascular Bundles.

- Know about Anatomy of root, stem and leaf of Maize and Sunflower.
- To know more about anatomy of stem and Anamolous secondary growth in Moringa, Dracena, Bignonea, Boerhhavia and Beet root.

BSc semester-II Paper- II Taxonomy and Diversity of Angiosperms

- The students will be able to understand the classification system of Angiosperm.
- The students will be able to understand the plant diversity available in the region and its economic value.
- Know about basic principles of plant taxonomy.
- Know the Botanical names and families of most of the plants available in the region.
- The students will be able to understand the herbarium techniques.

BSc semester-III Paper- I Reproductive Biology of Angiosperms, Plant Growth and Development

- The students will be able to understand the mechanism of pollination and basic structure of the embryo.
- The students will be able to understand the plant growth and development.
- Know about plant movement.
- The students will be able to understand concept of photoperiodism.

BSc semester-III Paper- II Plant Biochemistry & Physiology

- Students understand the mechanism of Osmosis, Plasmolysis, Diffusion, Ascent of Sap, Transpiration & Mineral nutrition.
- Understand the mechanism of Biological N2 fixation.
- Know about the properties of enzymes, classification and theories (Lock and Key theory & Induced fit theory).

- Know about mechanism of photosynthesis and respiration.
- Know about classification, properties, role of carbohydrates.
- Know about Aldoses and Ketoses.
- Students understand the properties and role of lipids, uses of fatty acids, oils, waxes, and sterols.
- Know about structure of Amino acids and Proteins.

BSc semester-IV Paper- I Cell Biology, Genetics and Biotechnology

- Students learn about structure of typical plant cell and cell organelles (Mitochondria, Chloroplast, Endoplasmic reticulum, Vacuoles, Ribosome"s, Lysosomes and Golgi bodies).
- Students understand the various steps of cell division (Mitosis and Meiosis).
- Understand Learn more about Mendelism. (Law of dominance, Law□tissue culture technique. of segregation and law of Independent Assortment).
- Know about complementary and supplementary factors.
- Learn about plastid and Mitochondrial DNA.
- Learn about mechanism of Linkages and crossing over.
- Know more about polyploidy mutation, chromosomal abberation.
- Learn mechanism of protein synthesis.
- Learn more about Agrobacterium plasmid, T4 bacteriophage, jumping genes, lac operar model.

BSc semester-IV Paper- II Plant Ecology

- Understand about the climatic factors, Edaphic factors, Biotic Factors,
- Understand the concept of Food chain and food web.
- Understand the Ecosystem, and Environmental Pollution.
- Understand plant community dynamics, ecological adoptation in plant and phytogeographical regions of India and local region.

BSc semester-V Paper- I Economic Botany I

- Students understand the origin, Botanical description, cultivation and uses of cereal crops (Rice, Wheat, Maize, Jawar, Gram, Pigeon Pea, Lentil, Green gram and Black gram).
- Understand the origin, Botanical description, cultivation method and uses of Ground nut, Mustard, Sesame, Soyabean, Coconut, Linseed, Tembhurni, Charoli and Jambhul.
- Know about origin, Botanical description, cultivation method and uses of vegetable plants and fruit plants. (Tomato, Potato, Brinjal, Onion, Chili, Sugarcane, Mango, Papaya).
- Know more about origin, botanical description, Cultivation & uses of (Cotton, Jute, Sunhemp, Sisal hemp, Bamboo, Cowpea, Ferugreek and Lucerne).

BSc semester-V Paper- II Economic Botany

- Students gain knowledge about various plant of economic use and its importance.
- Understand the role of plant in human welfare.
- Students gain knowledge about origin, cultivation method, uses and botanical description of economical important plant (Spices, Beverages, Gum, Dye, Rubber, Timber, Bamboo, Medicines, Essential Oil, Bio-fuels) etc.

BSc semester-VI Paper- I Mycology and Plant Pathology

- Understand brief idea about objectives of mycology and mycological institutes in India.
- Understand the process fparasexuality, Homothallism, Heterothallism.
- Know more about classification of plant diseases, culture media preparation

Koch"s postulates, and importance of pathogencity in 20th century.

- Know more about effect of temperature, soil environment, relative humidity, rainfall, wind, light on plant diseases.
- Learn more about defence mechanism and hyper sensitive reaction in plants.
- Students know the Biological and chemical Students know about plant quarantine. control of plant diseases.

BSc semester-VI Paper- II Mycology and Plant Pathology

- Understand role of fungi in industrial Mycology, scope & their utility.
- Understands the basic information on mushroom.
- Understand the scope and importance of plant pathology.
- Understand the life cycle & Symptoms of causal agent.
- Know the prevention & control measure of plant disease & its effects on economy of crop.

DEPARTMENT OF GEOLOGY

Programme Specific Outcome-UG

- Students will acquire a solid base of knowledge in the science of geology as a whole as well as earth materials, earth history, sedimentation and stratigraphy, deformational processes and structural features, and geomorphic processes and landforms.
- Students will develop proficiency in conveying complex geologic concepts in clear, technically correct writing.
- Students will develop proficiency in oral communication of complex geologic concepts.
- Students will develop the aptitudes and dispositions necessary to help democratize society by obtaining and maintaining employment as a professional geologist.

Course Outcomes

BSc semester-I Paper- I Physical Geology

- Students demonstrate an understanding of the physical and chemical structure of the earth‟s interior.
- Students develop a cursory understanding of the hydrologic system and its sub- components (rivers, lakes, oceans, glaciers, deserts) and associated geologic features.

BSc semester-I Paper-II Mineralogy &Elementary Mineral Optics

- Students develop the basic understanding of mineral formation in nature.
- Students understand the basic mineral properties and develop the identification skill for minerals.
- Students develop the understanding regarding the occurrence of minerals in nature and respective agglomerates as rocks.

- Students develop basic vision regarding light behaviour while studying optical properties of minerals.
- Students also get become accustomed with petrological microscope.

BSc semester-II Paper- I General Geology

- Students recognize the relationship between plate tectonics and production of metamorphic terrains and the creation of metamorphic rocks.
- Students acquire an introductory understanding of geologic time and the importance of both relative and radiometric dating techniques. Students also demonstrate an understanding of the usefulness of fossils in relative dating and regional correlations of sedimentary rock units.
- Students complete the course with a sense of geologic time and the ability to recognize the role of plate tectonics in the development of all Earth's surface features including mountain ranges, ocean basins, etc.

BSc semester-II Paper II Crystallography and Optical Mineralogy

- Students understand the basic crystal structure and develop various concepts of crystals.
- Students develop skills to classify the mineral into various crystal systems.
- Students develop the skill to identify the minerals on the basis of crystal shape.
- Students understand the basic optical behaviour of minerals and develop a skill for their identification on the basis of optical properties.

BSc semester-III Paper- I Igneous Petrology

- Students understand the concept of rock origin.
- Student will develop the skill to classify the rock in basic types.
- Students understand the basics of igneous rocks, their origin, their classification, their occurrence, etc.
- Students develop the skill to identify the specific igneous rock on various criteria.

BSc semester-III Paper- II Palaeontology

- Students will understand methods of fossil preservation and preparation.
- Students will understand issues related to the completeness of the fossil record.
- Students will understand how to test scientific hypotheses in paleontology, including appropriate methods of data acquisition and analysis.
- Students will understand how to best describe populations of fossil organisms and how individuals grow and populations evolve through time
- Students will understand how to recognize and properly describe new species of fossils.
- Students will understand the stratigraphic distribution of fossils, how to estimate true times of origination and extinction, and how to estimate rates of evolution and extinction using fossils.
- Students will learn fundamental principles of paleoecology and better understand the science of evolutionary paleoecology.

BSc semester-IV Paper-I Sedimentary Petrology and Metamorphic Petrology

- Students understand the origin of sedimentary & metamorphic rocks.
- Student develops the understanding of classification and occurrence, etc of sedimentary & metamorphic rocks.
- Students develop the skill to identify the specific sedimentary & metamorphic rocks on megascopic criteria.
- Students learn optical properties of sedimentary & metamorphic rocks and identify them on microscopic criteria.

BSc semester-IV Paper- II Indian Stratigraphy

- Students will understand the historical development of geology as a science.
- Students will understand the fundamental tools for the interpretation of earth history,:
- Students will master information related to important changes in the physical earth.

- Students will master information related to important changes in the biological earth.
- Students will deepen their understanding of "Earth's Dynamic Equilibrium".

BSc semester-V Paper- I Economic Geology

- Understand the nature and importance of the resource industry
- Describe the variety of minerals deposits and how they are found and formed
- Demonstrate knowledge of the variety of or forming processes
- Identify common rock type minerals found in and around ore deposits
- Demonstrate knowledge of variety of ore forming processes
- Differentiate between resources and reserves and how to estimate them.

BSc semester-V Paper-II Elements of Remote Sensing and Geomorphology

- Students understand the basic concept of remote sensing and its application in basic operations in geology.
- Students develop the skill to study and analyse the aerial photographs and satellite imageries.
- Students understand the basic concept of geomorphology and the processes responsible for its formation and development.
- Students develop the skill to identify the various geomorphology features and its relevance intra-disciplinary approach.

BSc semester-VI Paper- I Structural Geology

- Students understand the basic concept of various geological structures and its process of formation.
- Students develop the skill to identify various structures like fault, fold, etc in the field.
- Students understand the relevance of structure in various approaches like economic geology, tectonics etc.
- Students learn to draw the various structural maps and its application.

BSc semester-VI Paper-II Elementary Hydrogeology and Environmental Geology

- Students will recognize and be able to demonstrate understanding of the hydrologic cycle as it pertains to ground water systems.
- Students are able to explain how different subsurface materials influence fluid flow including understanding of aquifers, aquitards, aquicludes, confined aquifers and unconfined aquifers.
- Students demonstrate understanding of surface water and ground water systems using the theories of hydraulically connected systems to predict the influence of pumping wells on availability of water in surface bodies.
- Students will be learn and be able to explain basic concepts and procedures associated oil and gas wells and the expanded use of hydraulic fracturing (fracking).

Environmental Geology

- Students will understand impacts of geologic processes on humans.
- Students will directly perform lab tests.
- Students will know how to calculate and understand meaning behind moment magnitude, factor of safety, recurrence intervals, etc.
- Students will see the impacts of geologic processes on humans.
- Students will investigate problems of resource and waste management with growing populations.
- Students will work with and help others to complete projects in a team environment.