MASTER OF SCIENCE

COURSE OUTCOMES

M.Sc. PREVIOUS (CHEMISTRY)

Paper 1: INORGANIC CHEMISTRY

CO1.	Understand multiplication tables, irreducible representations, orthogonality theorem.
CO2	Students can analyse kinetics and mechanism of substitution reactions in octahedral Co (III) and square planar Pt (II) complexes.
CO3	Able to analyse valence bond treatment of planar, tetrahedral and square planar hybrid orbitals.
CO4.	Able to understand preparation, properties, structure and applications of alkyl and aryls of Lithium, Beryllium, Magnesium, Aluminum, Mercury and Tin.
CO5	Student will learn Walsh diagram, dπ– pπ bonds, Bents rule, Study free ions in tetrahedral, octahedral and square planar crystal fields, Orgel diagrams, Tanabe Sugano diagrams.

Paper 2: ORGANIC CHEMISTRY

CO1.	Understand concept of aromaticity, ant aromaticity, nonaromaticity and homoaromaticity with examples.
CO2	Able to learn interconversion of Fischer, Newman and Saw-Horse projections, configurational projections, R/S and E/Z.
CO3	Student will learn stereochemistry of N, S and P containing organic compounds & understand elements of symmetry and chirality.
CO4.	They can understand basic principles of organic reaction mechanism and its determination.
CO5	Students can analyse aromatic nucleophilic and electrophilic substitution reactions with mechanism.

Paper 3: PHYSICAL CHEMISTRY

CO1.	Able to learn Hackle molecular orbital theory and its applications.
CO2	They will understand importance of symmetry in quantum mechanics.
CO3	Students can analyse electro kinetic phenomena such as electrophoresis and electro osmosis.
CO4.	Able to evaluate corrosion of metals and its mechanism.
CO5	Able to differentiate between different theories of kinetics & solve questions basis on rates of different reactions.

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Paper 4: SPECTROSCOPY AND SUSTAINABLE CHEMISTRY

CO1.	Students able to study in details important concepts of UV-Visible spectroscopy and its role in structure elucidation of organic compounds.
CO2	Students can understand important concepts of Infrared spectroscopy and its role in structure elucidation of organic compounds.
CO3	They can evaluate Raman spectroscopy.
CO4.	Students can analyze diffraction methods (X-ray Electron diffraction Neutron diffraction) for structure determination.
CO5	They can analyze selection rules and intensities of transition in the spectra of transition metal complexes.

Paper 5: GREEN AND SUSTAINABLE CHEMISTRY

CO1.	Able to convey the use of green synthetic methods in organic synthesis..
CO2	Able to learn the use of ultra sound and microwaves in organic synthesis.
CO3	Able to understand the concept polymer supports and phase transfer catalysts in organic synthesis..
CO4.	Students will understand the use of crown ethers and ionic liquids in organic synthesis. Examine the applications and environmental hazards of nanomaterials memorize the twelve basic principles of green chemistry
CO5	They can remember the mechanisms involved in multi component reactions memorize the twelve basic principles of green chemistry.

Paper 6: ANALYTICAL TECHNIQUES

CO1.	Student can estimate the types of errors in chemical analysis.
CO2	Student can apply appropriate techniques for the qualitative and quantitative analysis of chemicals in laboratories and in industries..
CO3	Able to prepare standard solutions. Understand the fundamentals of analytical chemistry and steps of a characteristic analysis.
CO4.	Able to conduct acid base titrations, complex metric titrations and redox titrations .
CO5	They can evaluate the analytical data in terms of statistics.

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M.Sc. FINAL (CHEMISTRY)

Paper 1: Application of Spectroscopy, Photochemistry & Solid State Chemistry

CO1.	Understand the important concepts of UV-Visible spectroscopy and its role in structure elucidation of organic compounds.
CO2	Able to defines thermal properties of phonons, heat capacity of phonons, density of states and density of states models of Debye and Einstein. Can explain free electron gas model and band models.
CO3	Able to explain crystal systems, crystal planes and directions, Miller indices, diffraction of waves by crystals and Bragg's law.
CO4.	Students can understand photo physical kinetics of unimolecular and bimolecular processes and Stern-Volmer & fundamentals of photochemistry and laws governing it such as Beer Lambert law.
CO5	They can describe and distinguish between radiative and non- radiative transitions with the help of Jablonski diagram.

Paper 2: Bio inorganic Chemistry, Bio Organic Chemistry, Bio Physical Chemistry

CO1.	Students can explain metal ion binding to biomolecules and their functions.
CO2	Able to define importance of inorganic elements in vital systems .Determines and calculates association/dissociation constants and kinetic constants with the use of known physicochemical methods.
CO3	Able to understand chemistry of cofactors and their biological function, mechanism, biosynthesis of nucleotides, folic acids; replication, transcription, protein biosynthesis.
CO4.	They can understand basic knowledge about biomolecules and their importance, application as well as mechanistic approach in relation to the conventional pathways.
CO5	They will know principles of biophysical chemistry and their application in thermodynamic characterization and analysis of macromolecules.

Paper 3: Environmental Chemistry

CO1.	Students will retain information about the composition of air and the concepts of greenhouse effect and global warming.
CO2	Students will know the different sources of water pollutants and to understand the Effects of water pollution.
CO3	They can recognize the types and consequences of soil and radioactive pollutants. Discuss local and global environmental issues based on the knowledge gained throughout the course.
CO4.	They will scrutinize the causes and harmful effects of thermal and soil pollution.
CO5	Students can apply basic chemical concepts to analyse chemical processes involved in different environmental problem (air , water & soil).

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Paper 4: Organic Synthesis-I

CO1.	Students will learn basic principles of organic reaction mechanism and its determination.
CO2	Students will understand aromatic nucleophilic and electrophilic substitution reactions with mechanism.
CO3	Able to understand mechanism and stereochemistry of elimination reactions.
CO4.	They can analyze oxidation & reduction reactions and their mechanism. Students will be able to understand the role of reagents and catalysts in organic synthesis
CO5	Students will be able to analyze the difference in the basic types of synthetic approaches

Organic Specialization

Paper 5: Organic Synthesis-II

CO1.	Able to plan the various C-N and C-C bond reactions and predict the products.
CO2	Able to solve chemo selective oxidation by using different oxidizing agents.
CO3	They can understand reduction various functionalities by using different reducing agents.
CO4.	Students will know various synthetic methodologies to synthesis of various organic molecules.
CO5	Able to analyze enantioselective and diastereoselective synthesis. Oxidizing and Reducing agents and their applications in organic synthesis.

Organic Specialization

Paper 7: Chemistry of Natural Products

CO1.	Understand different pathways of biogenesis of natural products.
CO2	Students will know structure elucidation of terpenoids (camphor, abiotic acid, squalene).
CO3	They will know structure elucidation of alkaloids (nicotine, quinine, morphine and reserpine). Learn the different types of alkaloids, glycosides & terpenes etc. and their chemistry and medicinal importance
CO4.	Able to learn advanced methods of structural elucidation of compounds of natural origin.
CO5	Able to understand isolation, purification and characterization of simple chemical constituents from the natural source.

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Inorganic Specialization
Paper 4: Organotransition Metal Chemistry

CO1.	Students can be explain and rationalize the synthesis, structure, bonding, properties and reactivity of main group, transition metal, lanthanoid, and actinoid organyls.
CO2	Students will get a good overview of the fundamental principles of organotransition-metal chemistry and know how chemical properties are affected by metals and ligands.
CO3	They will be able to use knowledge about structure and bonding issues to understand the stability and reactivity of simple organometallic complexes.
CO4.	Able to work as a professional level in a chemical synthesis laboratory demonstrating effective laboratory safety and etiquette, especially in the areas of chromatographic techniques and spectroscopic characterization.
CO5	They will understand fundamental reaction types and mechanisms and how to combine these to understand efficient catalytic processes.

Inorganic Specialization
Paper 5: Bioinorganic & Supramolecular Chemistry

CO1.	To enhance the abilities of learners to develop the concept of management accounting and its significance in the business.
CO2	It enhances the abilities of learners to analyze the financial statements. Learn to analyse the linkage between auditing, accounting and financial statement analysis.
CO3	To enable the learners to understand, develop and apply the techniques of management accounting in the financial decision making in the business corporates.
CO4.	To make the students develop competence with their usage in managerial decision making and control.
CO5	Enables to express themselves and their ideas better than today in terms of technical points in accounting and auditing

Inorganic Specialization
Paper 6: Photo inorganic Chemistry

CO1.	The student can formulate the macroscopic and quantum laws of the absorption of light by molecules and solids.
CO2	The student will be able to describe the various deactivation processes of molecular excited states.
CO3	The students will be able to characterize the kinetics of deactivation processes and their role in the photochemical reactivity.
CO4.	The student will be able to express the principles of photo polymerization and polymer photo degradation and stabilization.
CO5	The student will be able to represent the mechanisms of natural photochemical processes & able to quote the various types of photochemical reactions.

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Inorganic Specialization
Paper 7: Polymers

CO1.	Remember the preparation and properties of some important polymers.
CO2	Empathize the process of fabrication.
CO3	Realize the applications of fiber and elastomer technology in the field of Industries.
CO4.	Able to explore the chemistry of elastomers. To study the methods of measuring the molecular weight, polymerization kinetics and copolymerization and polymer processing technologies..
CO5	To understand about radical and ionic polymerization and techniques of polymer analysis.

Physical Specialization
Paper 4: Analytical Chemistry

CO1.	Develops analytical skills and problem solving skills requiring application of Chemical principles.
CO2	Apply appropriate techniques for the qualitative and quantitative analysis Of chemicals in laboratories and in industries.
CO3	Understand the fundamentals of analytical chemistry and steps of a characteristic analysis.
CO4.	Able to apply conduct acid base titrations, complex metric titrations and redox titrations like permanganometry, dichrometry and iodometric-iodimetric Titrations.
CO5	Able to evaluate the analytical data in terms of statistics. Compare qualitative and quantitative analysis methods.

Physical Specialization
Paper 5: Physical Organic Chemistry

CO1.	Students will be able to clearly communicate the results of scientific work in oral, written and electronic formats to both scientists and the public at large.
CO2	Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.
CO3	Students will be able to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments.
CO4.	Students will have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in analytical, Inorganic, Organic and physical chemistry. Majors to be certified by the american chemical society will have extensive laboratory work and knowledge of biological chemistry.
CO5	Students will be able to explore new areas of research in both chemistry and allied fields of science and technology. Students will be able to function as a member of an interdisciplinary problem solving team

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Physical Specialization
Paper 6: Chemical Dynamics

CO1.	Able to compare and contrast the chemical behavior and reactions of common substances.
CO2	Students can collect quantitative data and organize it into meaningful charts and graphs.
CO3	Able to discuss industrial processes for manufacture of major inorganic chemicals.
CO4.	Analyze experimental data and draw appropriate conclusions from data and chemistry theories.
CO5	Distinguish between a first-order reaction and a second-order reaction. Discuss the effect of a catalyst on a chemical reaction.

Physical Specialization
Paper 7: Electrochemistry

CO1.	Evaluate fundamentals of electrochemistry.
CO2	Discuss electrode potentials and cell thermodynamics.
CO3	Recognize the electrochemical processes.
CO4.	Evaluate electrodes and cells.
CO5	Express the electrodes materials. Explain the type of electrodes and electrode materials.

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COURSE OUTCOMES
M.Sc. PREVIOUS (MATHEMATICS)
Paper 1: Advanced Abstract Algebra

CO1.	Familiarize extension fields, algebraic extensions.
CO2	Understand geometric constructions finite fields.
CO3	Acquire knowledge about Gaussian integers and multiplicative norms.
CO4.	The focus of the course will be the study of certain structures called groups, rings, fields and some related structures.
CO5	Understand Galois theory and its applications. Helps to gain skill in problem solving and critical thinking.

Paper 2: Real Analysis and Topology

CO1.	Understanding and familiarize, functions of bounded variation, total variation, additive property of total variation and their properties.
CO2	Familiarizing rectifiable path and arc length, additive and continuity properties of arc length, equivalence of paths and change of parameter.
CO3	Attainment of a deeper and wider knowledge of sequence and series of functions and uniform convergence.
CO4.	Discuss several constructions of topological spaces and Analyse various properties of topological spaces. Apply properties of continuous functions on topological spaces. Examine connected, compact, and normal topological spaces and their properties and Demonstrate various theorems on Normal Topological spaces.
CO5	Understand the concept Lebesgue outer measure, measurable sets, regularity, measurable functions, Borel and Lebesgue measurability.

Paper 3: Differential equations and special functions

CO1.	Explore the methods of solutions of boundary value problems. Investigate systems of ordinary differential equations. Model with first-order differential equations (DE) and identify initial value problem.
CO2	Obtain solutions for ordinary differential equations whose non homogeneous terms Include discontinuous functions or distributions.
CO3	Give an account of the foundations of calculus of variations and its applications in Mathematics and Physics. Describe the brachistochrone problem mathematically and solve it. Solve isoperimetric problems of standard type.
CO4	Classify and explain the solution of Hyper geometrical differential equation. Understand purpose and application of 2F1(a,b;c,d) and Legendre's duplication formula.
CO5	Understand nature and properties of various type special function like Bessel function ,Hermite polynomials and Laguerre polynomials.

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Paper 4: Differential geometry and tensor analysis

CO1.	Explain the basic concepts about space curves, its arc length, tangents and normal.
CO2	Compute evolutes and involutes of various space curves.
CO3	Construct tangent plane, normal plane and osculating plane for space curves. Analyze the orthogonal trajectories and geodesics.
CO4.	Basic concept of Tensor analysis, Contravariant and Covariant tensors, relative tensor , metric tensor, permutation tensor.
CO5	Christoffel symbol and their properties. Einstein space,flate space, isotropic point.Reimann- Christoffel tensor and its properties.

Paper 5: Mechanics

CO1.	Students will be able to articulate and describe relative motion, Inertial and non-inertial reference frames. Students will be able to define the motion of mechanical systems and their degrees of freedom.
CO2	Able to understand an account of the foundations of calculus of variations and of its applications in mathematics and physics.
CO3	Formulate maximum principles for various equations and derive consequences.
CO4.	Use the theory, methods and techniques of the course to solve problems. Study of the interaction of forces between solids in mechanical systems.
CO5	Able to understand analytical mechanics as a systematic tool for problem solving.

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M.Sc. FINAL (MATHEMATICS)

Paper 1: Functional Analysis

CO1.	Learn the concept of normed linear spaces, Banach spaces and various properties operators defined on them.
CO2	Discuss about the completion of normed linear spaces.
CO3	Get an idea about different types of convergence of sequences in normed spaces and their relations.
CO4.	Demonstrate the consequences of Hahn-Banach theorem. Critique the closed graph theorem and stability result for operator.
CO5	Understand that there is a surjective isometry between a Hilbert space and its dual.

Paper 2: Viscous Fluid Dynamics

CO1.	Understand about vortex motion and its permanence, rectilinear vertices, vortex images and specific types of rows of vortices
CO2	Model mathematically the compressible fluid flow and describe various aspects of gas flow
CO3	Acquire knowledge of viscosity, stresses and rates of strain and relation between them for newtonian fluids, energy dissipation due to viscosity, and laminar and turbulent flows.
CO4.	Derive the equations of motion for a viscous fluid flow and use them for study of flow of newtonian fluids in pipes and ducts for laminar flow fields, and their applications in mechanical engineering
CO5	Get familiar with dimensional analysis and similitude, understand the common dimensional numbers of fluid dynamics along with their physical and mathematical significance, concept of boundary layer flow.

Paper 3: Integral transformation and integral equations

CO1.	Recognize the different methods of finding Laplace transforms and Fourier transforms of different functions.
CO2	Recognize the contribution and impacts of functional analysis in applied science.
CO3	Apply the knowledge of Linear Transform, Fourier Transform and Finite Fourier transforms in finding the solutions of differential equations, initial value problems and boundary value problems.
CO4.	Apply the various concepts of integral equations in various problems
CO5	Able to select and combine the necessary laplace transform techniques to solve second-order ordinary differential equations. Discuss the solutions of various integral equations.

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Paper 4: Relativity and cosmology

CO1.	Analyzing how to solve a problem by applying simple fundamental laws to more complicated situations.
CO2	Develop tools to enable the quantitative calculation of general relativistic effects.
CO3	Synthesize knowledge of Newtonian gravity and special relativity from the syllabus.
CO4.	Demonstrate understanding of the physics of space-time and its interaction with matter and light in the general theory of relativity, and contrast the theory with earlier descriptions of gravity.
CO5	Apply physics knowledge and mathematical skills to solve problems, including applying the field equations with different metrics. Analyse gravitational phenomena in nature including black holes, wormholes, warp drives and the cosmological history of the Universe..

Paper 5: Advanced numerical analysis

CO1.	Adequate exposure to learn alternative methods and analyze mathematical problems to determine the suitable numerical techniques.
CO2	Use the concepts of interpolation, eigen value problem techniques for mathematical problems arising in various fields
CO3	Able to find roots of equations using iterative methods.
CO4.	Apply Gauss elimination method, Doolittle's decomposition method to solve problems.
CO5	Solve initial value and boundary value problems which have great significance in engineering practice using ordinary and partial differential equations.

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M.Sc. PREVIOUS (PHYSICS)

Paper 1: Classical mechanics and mathematical methods in physics

CO1.	Students learn Lagrangian and Hamiltonian and hence Lagrange and Hamilton's equation of motion and their application in different cases.
CO2	Students learn small oscillations and its applications to different cases and hence determination of normal modes and normal frequencies.
CO3	Students learn special theory of relativity, four vector, relativistic kinematics and their applications.
CO4.	Students study fluid dynamics, equation of continuity and Poiseuille's for streamline flow of a liquid through a capillary tube and its applications.
CO5	Solve problems in orthogonality of vectors and Eigen values and Eigen vectors.

Paper 2: Classical Electrodynamics

CO1.	Students will have achieved the ability to use Maxwell equations in analyzing the electromagnetic field due to time varying charge and current distribution.
CO2	Students will have achieved the ability to describe the nature of electromagnetic wave and its propagation through different media and interfaces.
CO3	Students will have achieved the ability to explain charged particle dynamics and radiation from localized time varying electromagnetic sources.
CO4.	Students study the reflection and refraction of light when fall on the interface of different dielectric medium
CO5	Students study about the propagation of light through conducting media and plasma.

Paper 3: Quantum mechanics, atomic and molecular physics

CO1.	To understand to solve the one dimensional Schrodinger wave equation .
CO2	To verify the first order and second order perturbations theory.
CO3	Able to analyze quantum state of electrons in atoms. Students learn about rotational and vibrational energy levels of diatomic molecules and Raman spectroscopy.
CO4.	Able to understand the microwave and infrared spectroscopy
CO5	Understand the basic concept of NMR and ESR spectrometers.

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Paper 4: Electronics, numerical methods and computer Programming

CO1.	Due to circuit analysis of IC and OPAMP, it will help in performing the mathematical Operation.
CO2	Understand the basic electronics of logic circuits, counters, registers and be able to use Integrated circuit packages. Analyse the method for writing the C – programme for its algebraic equation
CO3	Study the importance of Euler's method and Runge – kutta second and third Order and first order differential equation.
CO4.	Perform the theory and derivations for numerical differentiations and Integral.
CO5	Be capable of specifying the simplified syntax of programming languages (C/C++).

M.Sc. FINAL (PHYSICS)

Paper 1: Advanced Quantum Mechanics and Introductory quantum field

CO1.	Apply Feynman rules to calculate probabilities for basic electromagnetic processes with particles (decay and scattering).
CO2	Understand the basics of quantum electrodynamics and introduction to QCD.
CO3	Discuss the difficulties with the theory of quantum measurement and local realism.
CO4.	Model physical systems using common approximation techniques for making dynamical calculations.
CO5	Apply renormalization and regularization with quantum field theory. Get knowledge about gauge theories as well as quantum electrodynamics and quantum chromodynamics.

Paper 2: Nuclear Physics

CO1.	To study the various types of accelerator and nuclear fission and fusion..
CO2	Study the various types of nuclear reactors. Explain the experimental evidence for quarks, gluons, quark confinement, asymptotic Freedom, sea quarks, the running coupling constant and color charge
CO3	To study the various types of accelerator and nuclear fission and fusion.
CO4.	Determine nuclear properties such as binding energy, spin and parity in the Framework of the liquid drop model and the shell model of the nucleus.
CO5	Use the liquid drop model and the law of radioactive decay to describe alpha-decay, Beta-decay, fission and fusion, predict decay reactions and calculate the energy Release in nuclear decays.

Paper 3: Statistical and solid state physics

CO1.	Study the basic ideas of Bose-Einstein and Fermi –Dirac distribution.
CO2	Apply the machinery of statistical mechanics to the calculation of macroscopic Properties Resulting from microscopic models of magnetic and crystalline systems.
CO3	Define and discuss the concepts and roles of entropy and free energy from the view Point of statistical mechanics.
CO4.	Find out the relationship between crystals detector, structure analysis by Various methods. Understand the energy levels and define electrical conductivity – Hall Effect and free electron model and band gap energy
CO5	Analyse the relationship between dielectric and Ferro electric proportion of Crystal .

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Paper 4: Microwave Electronics

CO1.	Integrating a wide range of microwave components into one design oriented frame work.
CO2	Characterize microwave devices in terms of the directionality of communication.
CO3	Use a microwave test bench in analyzing various types of microwave measurements.
CO4.	Measure the various parameters in microwave engineering. Design & analyze the micro wave integrated circuits.
CO5	An in-depth knowledge of applying the concepts on real time applications.

M.Sc. PREVIOUS (ZOOLOGY)

Paper 1: Biosystematics and Taxonomy

CO1.	Learn the concept and principles of taxonomy, biosystematics and process of biological evolution.
CO2	Understand the insect classification, apterygote orders.
CO3	Understand the exopterygote orders and the endopterygote orders.
CO4.	Understand the ecology and behavior of Aquatic insects.
CO5	Understand the ecology of Gall forming and Leaf mining insects, co evolution and social organization in insects.

Paper 2: STRUCTURE AND FUNCTION OF INVERTEBRATES

CO1.	Classify and characterize phylum-Protozoa and phylum-Porifera.
CO2	Classify and characterize phylum-Coelenterate and phylum-Platyhelminthes.
CO3	Introduction to Coelomates and Annelida.
CO4.	Introduction to Arthropod, Mollusca and Echinodermata.
CO5	Course will provide knowledge regarding the various invertebrates species.

Paper 3: MOLECULAR BIOLOGY AND BIOTECHNOLOGY

CO1.	Understanding of cloning of mammals, Large scale culture and production from recombinant microorganisms.
CO2	Gains skills in medical, environmental biotechnology, bio pesticides, biotechnology of aquaculture and use of animals as bioreactors.
CO3	This insight allows students to take into consideration about ethical issues involved In production transgenic animals and BT products.
CO4.	Learning application of molecules in modifying organisms and cells & understand of in vitro culturing of organisms and production of transgenic animals
CO5	Able to learn basic molecular biological techniques to manipulate DNA, RNA and proteins.

Paper 4: GENERAL PHYSIOLOGY

CO1.	Compare the functioning of organ systems across the animal world.
CO2	Explain the physiological functions of various organ systems of the mammalian physiology.
CO3	Comprehend the study of endocrine system their role in maintaining homeostasis of the human body.
CO4.	Explain the patho-physiology of common diseases related to organ systems of the body.
CO5	Discuss about clinically important diagnostic instruments, their working principle and applications.

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Paper 5: BIOCHEMISTRY

CO1.	Able to understand concept about structure and function about biological macromolecules essential to life.
CO2	To make understanding about different monomeric units their source, structure, function in different biological systems.
CO3	Concept of biosynthesis, bioenergetics, metabolism and biotransformation of individual biomolecules. Understanding the role of biomolecules in the functioning of cell as a whole and interlinking of various pathways related to biosynthesis, bioenergetics, metabolism and biotransformation.
CO4.	Understanding the corelationship that exists between structure and function of individual biomolecules.
CO5	Understanding the bioenergetics and metabolism of different biomolecules.

Paper 6: BIOSTATISTICS AND POPULATION GENETICS

CO1.	Students gains knowledge about statistical Methods like measures of central Tendencies, Probability
CO2	Students gain knowledge about various tools And techniques used in biological systems And gives them insight about their use in Research.
CO3	Biostatistics teaches them to use the best data Analysis methods in their research projects.
CO4.	Students gains knowledge about statistical Methods like measures of central tendencies, Probability.
CO5	Learns the problem-solving methods.

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M.Sc. FINAL (ZOOLOGY)

Paper 1: Biology of Chordates

CO1.	Concept and definition of the Chordate group.
CO2	Evolution and functional relationships of particular Organ/structure/feature.
CO3	Interlinking different strata of organizations of the Chordate Tissue/Organ systems.
CO4.	To analysis the diversity of functions and their relations with The environment.
CO5	Understanding the structure-function relationship in the Vertebrate systems.

Paper 2: Environmental Biology and Ethology

CO1.	Understand the concepts of ethology.
CO2	Elucidate the evolutionary aspects and adaptiveness of behaviour.
CO3	Illustrate the hormonal regulation of behaviour.
CO4.	Describe the characteristics of population; growth and regulation of human Population.
CO5	Compare the major terrestrial biomes and biogeographical zones of India.

Paper 3 Genes and differentiation

CO1	Understanding genetics and relate modern DNA technology for disease diagnostics and therapy.
CO2	Learn about DNA, RNA and their replication, mutations, DNA repair mechanism.
CO3	Learn the molecular aspects of Genetics disorders and mutations.
CO4.	Appreciate the concepts of gene and relationship between genotype and phenotype.
CO5	Helps in Highlighting the scope and significance of genetics by imbibing the principles of hereditary genetic transmission and interactions of gene with environment.

PAPER IV -- Tools and Techniques

CO 1	Various techniques used in biological sciences
CO 2	Types of Microscope and their use.As Microscopes are the eye into the living cell.
CO 3	Principles and use of analytical instruments: centrifugae, spectrophotometer, pH meter.
CO 4	Chromatography and its types, Electrophoresis,
CO 5	The course imparts education in various techniques used in biological sciences.

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PAPER V - Environmental Biology

CO 1	The course acts as an eye opener and let students use the interdisciplinary approaches such as ecology, economics, ethics and policy to devise solutions to environmental problems.
CO 2	The subject makes students proficient in ecological field methods such as wildlife survey, biodiversity assessment, mathematical modeling and monitoring of ecological systems.
CO 3	The subject enable the learners to understand how humans interact with the environment, and to find ways to deal with environmental problems and live more sustainably.
CO 4	The course makes the environmental science students to study and take home the message of , how the environment interacts biologically, chemically and physically.
CO 5	The course enables the students to strike balance between the natural environment, built environment, and the sets of relationships between them.

PAPER VI - Environmental Toxicology

CO 1	Understand toxicology and associated terms related with environmental Toxicology.
CO 2	The course enables the students to be familiar with toxicity episode phases and basic understanding of risk assessment.
CO 3	Couse enables them to appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving.
CO 4	The course enables the learner to understand environmental toxicology students to study toxic pollutants and their effects on the physical and biological environment, such as identifying and investigating potential sources of pollutants in the environment and minimizing their toxic effects on humans and other organisms.
CO 5	Course imparts knowledge on toxic pollutants in the environment include different organic and inorganic chemical compounds, such as pesticides, industrial waste and heavy metals.

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M.Sc. PREVIOUS(EVS)

Paper I: Ecology

CO1.	Develop an appreciation of the modern scope of scientific inquiry in the field of Ecology
CO2	Become familiar with the variety of ways that organisms interact with both the physical and the biological environment.
CO3	Develop an understanding of the differences in the structure and function of different types of ecosystems.
CO4	Learn techniques of data analysis as well as methods of presenting scientific information in figures and tables
CO5	Develop an appreciation of the natural world through direct experience with local ecosystems.

Paper II: Ecosystem

CO1.	Understand ecosystem structure and functions
CO2	Understand the ecosystem disruption.
CO3	To understand local ecological issues.
CO4	To understand basic methods of experimental design and analysis.
CO5	Learn techniques for gathering data in the field.

Paper III: Environmental Pollution and Health

CO1.	To provide general understanding of quality of air, water and land and their pollutions.
CO2	To provide the knowledge of impact of air and other pollutions on locals and global effects of air pollution on human, materials, properties and vegetation
CO3	To study the fate and transport of air pollutants and its measurement techniques.
CO4	To discuss the various types of air pollution control equipment and their design principles and limitation.
CO5	To make people aware, and spread awareness in the industries that cause various pollution like water, air, soil, and noise and affect the environment and obviously health.

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Paper IV: Environmental Education and Policy

CO1.	To increase public awareness about environmental issues
CO2	To explore possible solutions, and to lay the foundations
CO3	To provide active participation of individuals in the protection of environment
CO4	To give the knowledge of Local, national and international legislative controls to protect and manage the environment;
CO5	To familiarize the concept and scope of environmental law

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M.Sc. FINAL(EVS)

Paper I: Waste Treatment and Management

CO1.	To Minimize the Production of Waste.
CO2	To Reduce Pollution Effects.
CO3	To Protect Groundwater Sources.
CO4	To Ensure Sustainability.
CO5	To characterize the waste and apply the knowledge of laws for municipal solid waste management, for handling of biomedical wastes and for handling of plastic wastes.

Paper II: Natural Resources and Biodiversity Conservation

CO1.	To explore possible solutions, and to lay the foundations
CO2	To increase public awareness about environmental issues and To provide resources for future generations
CO3	To provide active participation of individuals in the protection of environment
CO4	To protect and preserve the flora and fauna to main the balance in the ecosystem.
CO5	To maintain ecological diversity

Paper III: Environmental impact assessment and sustainable development

CO1.	To identify, predict, and evaluate economic, environmental, and social impacts of development activities.
CO2	To Providing information on the environmental consequences for decision making.
CO3	To study the importance of EIA..
CO4	To know the role of public in EIA studies
CO5	To Understand phenomena of impacts in the environment.

Paper IV: Environmental Pollution Management and control Technology

CO1.	To assess pollution sources.
CO2	To study exposure pathways and fate .
CO3	To provide active participation of individuals in the protection of environment
CO4	To evaluate consequences of human exposure to pollution and its impacts to environmental quality.
CO5	To take necessary steps to remediate reduce/eliminate pollution of the environment,

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Paper V: Environmental Science, Ecological Principles, wildlife and conservation Biology

CO1.	To assess pollution sources.
CO2	To study exposure pathways and fate .
CO3	To provide active participation of individuals in the protection of environment
CO4	To evaluate consequences of human exposure to pollution and its impacts to environmental quality.
CO5	To take necessary steps to remediate reduce/eliminate pollution of the environment.

M.Sc. PREVIOUS(BOTANY)

Paper 1: Cell and Molecular Biology of Plants

CO1.	To enable the students to remember principles and concepts of Cell and Molecular Biology of Plants
CO2	To enable the students to apply the basic concepts of Cell & Molecular Biology, and allied aspects of Cell & Molecular Biology of Plants
CO3	Students are enabled with the understanding in the practical applications of Cell & Molecular Biology of Plants
CO4.	The student will get thorough knowledge on the Cell & Molecular Biology of Plants practice prevailing in Cell & Molecular Biology and other allied aspects.
CO5	To find out the technical expertise in maintaining the books of Cell & Molecular Biology of Plants

Paper 2: Cytology, Genetics & Cytogenetics

CO1.	To enable the students to remember principles and concepts of Cytology, Genetics & Cytogenetics
CO2	To enable the students to apply the basic concepts of Cytology, Genetics & Cytogenetics, and allied aspects of Cytology, Genetics & Cytogenetics
CO3	Students are enabled with the understanding in the practical applications of Cytology, Genetics & Cytogenetics
CO4.	The student will get thorough knowledge on the Cytology, Genetics & Cytogenetics practice prevailing in Cytology, Genetics & Cytogenetics and other allied aspects.
CO5	To find out the technical expertise in maintaining the books of Cytology, Genetics & Cytogenetics

Paper 3: Biology & Diversity of Lower Plants: Cryptogams

CO1.	To enable the students to remember principles and concepts of Biology & Diversity of Lower Plants: Cryptogams
CO2	To enable the students to apply the basic concepts of Biology & Diversity of Lower Plants: Cryptogams , and allied aspects of Biology & Diversity of Lower Plants: Cryptogams
CO3	Students are enabled with the understanding in the practical applications of Biology & Diversity of Lower Plants: Cryptogams
CO4.	The student will get thorough knowledge on the Biology & Diversity of Lower Plants: Cryptogams practice prevailing in Biology & Diversity of Lower Plants: Cryptogams and other allied aspects.
CO5	To find out the technical expertise in maintaining the books of Biology & Diversity of Lower Plants: Cryptogams

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Paper 4: Taxonomy & Diversity of Seed Plants

CO1.	To enable the students to remember principles and concepts of Taxonomy & Diversity of Seed Plants
CO2	To enable the students to apply the basic concepts of Taxonomy & Diversity of Seed Plants, and allied aspects of Taxonomy & Diversity of Seed Plants
CO3	Students are enabled with the understanding in the practical applications of Taxonomy & Diversity of Seed Plants
CO4.	The student will get thorough knowledge on the Taxonomy & Diversity of Seed Plants practice prevailing in Taxonomy & Diversity of Seed Plants and other allied aspects.
CO5	To find out the technical expertise in maintaining the books of Taxonomy & Diversity of Seed Plants

Paper 5: Plant Physiology & Metabolism

CO1.	To enable the students to remember principles and concepts of Plant Physiology & Metabolism
CO2	To enable the students to apply the basic concepts of Plant Physiology & Metabolism, and allied aspects of Plant Physiology & Metabolism
CO3	Students are enabled with the understanding in the practical applications of Plant Physiology & Metabolism
CO4.	The student will get thorough knowledge on the Plant Physiology & Metabolism practice prevailing in Plant Physiology & Metabolism and other allied aspects.
CO5	To find out the technical expertise in maintaining the books of Plant Physiology & Metabolism

Paper 6: Microbiology and Plant Pathology

CO1.	To enable the students to remember principles and concepts of Microbiology and Plant Pathology
CO2	To enable the students to apply the basic concepts of Microbiology and Plant Pathology, and allied aspects of Microbiology and Plant Pathology
CO3	Students are enabled with the understanding in the practical applications of Microbiology and Plant Pathology
CO4.	The student will get thorough knowledge on the Microbiology and Plant Pathology practice prevailing in Microbiology and Plant Pathology and other allied aspects.
CO5	To find out the technical expertise in maintaining the books of Microbiology and Plant Pathology

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M.Sc. FINAL(BOTANY)

Paper 7: Plant Morphology, Development Anatomy & Reproductive Biology

CO1.	To enable the students to remember principles and concepts of Plant Morphology, Development Anatomy & Reproductive Biology
CO2	To enable the students to apply the basic concepts of Plant Morphology, Development Anatomy & Reproductive Biology, and allied aspects of Plant Morphology, Development Anatomy & Reproductive Biology
CO3	Students are enabled with the understanding in the practical applications of Plant Morphology, Development Anatomy & Reproductive Biology
CO4.	The student will get thorough knowledge on the Plant Morphology, Development Anatomy & Reproductive Biology practice prevailing in Plant Morphology, Development Anatomy & Reproductive Biology and other allied aspects.
CO5	To find out the technical expertise in maintaining the books of Plant Morphology, Development Anatomy & Reproductive Biology

Paper 8: Plant Ecology

CO1.	To enable the students to remember principles and concepts of Plant Ecology
CO2	To enable the students to apply the basic concepts of Plant Ecology, and allied aspects of Plant Ecology
CO3	Students are enabled with the understanding in the practical applications of Plant Ecology
CO4.	The student will get thorough knowledge on the Plant Ecology practice prevailing in Plant Ecology and other allied aspects.
CO5	To find out the technical expertise in maintaining the books of Plant Ecology

Paper 9: Plant Resource Utilization & Conservation

CO1.	To enable the students to remember principles and concepts of Plant Resource Utilization & Conservation
CO2	To enable the students to apply the basic concepts of Plant Resource Utilization & Conservation, and allied aspects of Plant Resource Utilization & Conservation
CO3	Students are enabled with the understanding in the practical applications of Plant Resource Utilization & Conservation
CO4.	The student will get thorough knowledge on the Plant Resource Utilization & Conservation practice prevailing in Plant Resource Utilization & Conservation and other allied aspects.
CO5	To find out the technical expertise in maintaining the books of Plant Resource Utilization & Conservation

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Paper 10: Biotechnology & Genetic Engineering of Plants & Microbes

CO1.	To enable the students to remember principles and concepts of Biotechnology & Genetic Engineering of Plants & Microbes
CO2	To enable the students to apply the basic concepts of Biotechnology & Genetic Engineering of Plants & Microbes, and allied aspects of Biotechnology & Genetic Engineering of Plants & Microbes
CO3	Students are enabled with the understanding in the practical applications of Biotechnology & Genetic Engineering of Plants & Microbes
CO4.	The student will get thorough knowledge on the Biotechnology & Genetic Engineering of Plants & Microbes practice prevailing in and other allied aspects.
CO5	To find out the technical expertise in maintaining the books of Biotechnology & Genetic Engineering of Plants & Microbes

Paper 11: Advanced Plant Pathology I

CO1.	To enable the students to remember principles and concepts of Advanced Plant Pathology I
CO2	To enable the students to apply the basic concepts of Advanced Plant Pathology I, and allied aspects of Advanced Plant Pathology I
CO3	Students are enabled with the understanding in the practical applications of Advanced Plant Pathology I
CO4.	The student will get thorough knowledge on the Advanced Plant Pathology I practice prevailing in and other allied aspects.
CO5	To find out the technical expertise in maintaining the books of Advanced Plant Pathology I

Paper 12: Advanced Plant Pathology II

CO1.	To enable the students to remember principles and concepts of Advanced Plant Pathology II
CO2	To enable the students to apply the basic concepts of Advanced Plant Pathology II, and allied aspects of Advanced Plant Pathology II
CO3	Students are enabled with the understanding in the practical applications of Advanced Plant Pathology II
CO4.	The student will get thorough knowledge on the Advanced Plant Pathology II practice prevailing in and other allied aspects.
CO5	To find out the technical expertise in maintaining the books of Advanced Plant Pathology II

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M.Sc. PREVIOUS (GEOLOGY)

Paper I: Mineralogy, crystallography and Geo chemistry.

CO1.	The students will be able to understand the evolution of the early Earth from protoplanetary material and its differentiation to present day state
CO2	Further this will provide the foundation for other branches of earth sciences
CO3	It will also help in gaining insight as to how geochemical processes operate within the earth
CO4	Using advanced techniques, the students will be able to better understand the atomic configuration of various mineral families.
CO5	The physical properties of minerals are also discussed along with their paragenesis.

Paper II: Environmental geology, geomorphology and hydrology.

CO1	To identify and define about soil resources
CO2	To have a practical knowledge in management of soil
CO3	To know different processes that exist in underground soil
CO4	To describe and explain about soil formations
CO5	The students will be able to describe scientific method applied in earth sciences.

Paper III: Structural geology and tectonics.

CO1.	The student can interpret and evaluate different structures that exist in the earth.
CO2	Can critically assess and review the energy needed to cause different structures.
CO3	Can describe and explain major and minor structures.
CO4	Can understand to compare and contrast structures related to each other.
CO5	Can evaluate and explain the causes of different structures

Paper IV: Palenteology

CO1	The students can understand the basic characteristics of minerals and occurrence.
CO2	Can display knowledge in practical activities
CO3	Can enumerate and compare between the diversity.
CO4	Can recognize about environmental aspects regarding the occurrence of certain fossils
CO5	Can draft a method for certain investigations.

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Paper V: SEDIMENTOLOGY AND PRINCIPLE OF STRATIGRAPHY

CO1	The main objective is to Recall and Review the Stratigraphy of India.
CO2	To understand and explain different applications of Stratigraphy, like, Lithostratigraphy, Chronostratigraphy, Biostratigraphy, Sequence Stratigraphy, Chemostratigraphy and Magnetostratigraphy.
CO3	To interpret utilizing different applications of sedimentology.
CO4	Recognize the importance of critically assessing different approaches in Stratigraphy
CO5	To conceptualize and conceive the necessity of Stratigraphy

Paper VI: PRECAMBRIAN GEOLOGY AND STRATIGRAPHY OF INDIA

CO1	Students will able to know about the various concepts of paleontology
CO2	Students will understand about the origin and evaluation of life
CO3	Students will able to interpret the succession of vertebrate life through geologic time and broad classification and study of some characteristic Indian vertebrate genera
CO4	Students will able to differentiate the morphology, classification, evolutionary trend, composition and structure of shells of selected groups of organisms
CO5	Students will able to know the concept of the sampling methods and sample processing techniques and the application of micropaleontology in hydrocarbon exploration.

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M.Sc. FINAL (GEOLOGY)

Paper I: Resource Geology

CO1	The student is introduced to the detailed study, identification, recognition, uses and applications of the ore deposits related to PGE, Gold, Iron, Manganese, and Chromium.
CO2	The student is introduced to the detailed study, identification, recognition, uses and applications of the ore deposits related to Vanadium, Molybdenum, Tungsten, Nickel, Cobalt, Titanium.
CO3	The student is introduced to the detailed study, identification, recognition, uses and applications of the ore deposits related to Copper, Lead & Zinc, Tin, Niobium-Tantalum, and Aluminium.
CO4	The student is introduced to the detailed study, identification, recognition, uses and applications of the ore deposits related to Uranium, Thorium, Mercury, Nuclear minerals, and REE.
CO5	The student is introduced to the detailed study, identification, recognition, uses and applications of the mineral deposits related to abrasive, ceramic, glass, paint and pigments, fertilizers, and cement. Outline of building and dimension stones.

Paper II: Igneous Metamorphic petrology

CO1.	The student is introduced to a detailed discussion on magma properties; generation of magma; tectonic environments of melting in the lithosphere; application of phase rule in igneous petrology and petrological significance of important synthetic magma systems; along with a short account of mantle plumes, magma plumbing,and large igneous provinces.
CO2	The student is introduced to a detailed discussion on the classification of igneous rocks; magmatic differentiation; magma mixing and mingling; magma assimilation; detailed petrology and petrogenesis of: basalts; ophiolites; alkaline rocks; and ultramafic rocks.
CO3	The student is introduced to a detailed discussion on Bowen's Reaction Series and its petrological significance; variation diagrams in igneous petrology; use of trace and REE in petrogenesis; detailed petrology and petrogenesis of anorthosites; lamprophyre; granite; pegmatite; carbonatite; kimberlite.
CO4	The student is introduced to a detailed discussion on the classification schemes of metamorphic rocks; crystalloblastic series and interpretation of metamorphic rock textures; metamorphic reactions; regional metamorphic gradients and their types; protoliths that undergo metamorphism; Barrovian and Buchan metamorphic zones; isograds; burial metamorphic zones; metamorphic geothermometers and geobarometers. detailed petrology and petrogenesis of eclogites; migmatites; amphibolite.
CO5	The student is introduced to a detailed discussion on distribution of metamorphic rocks with plate tectonic environments; paired metamorphic belts; phase rule in metamorphic systems; metamorphic facies; ACF, AKF, and AKFM diagrams; petrogenetic grids; P-T-t paths;detailed petrology and petrogenesis of granulites; charnockite; khondalites; gondites.

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M.Sc. FINAL (GEOLOGY)

Paper III: Remote sensing and Exploration Geology

CO1.	The student is able to understand the basic elements of RS. He/she in introduced to different energy sources and their interaction with the atmosphere, spectral signatures, and atmospheric windows.
CO2	The student is introduced to the types and classes of satellite RS and aerial RS.
CO3	The student is introduced to AP interpretation elements and their mosaics. He/she learns and understands the elements of satellite RS.
CO4	The student is introduced to thermal RS and SLAR. A short account of IRS satellites and Indian space missions is introduced.
CO5	A short account of the remote sensing techniques in the study of geomorphic features and geological structures relevant to ground water and mineral exploration is emphasized.

Paper IV: Elements of Engineering Geology, Mining Geology and ORE Dressing

CO1.	The student is able to understand and describe how overburden materials are removed to expose the economic deposit. Sampling of economic minerals for tenor or grade estimation in a working mine is discussed.
CO2	The student is able to understand and describe the role of drilling in day to day mining operations and logging of bore hole samples done in the lease area for later mining. Open cast mining methods and the equipment used in a working mine are explained and assessed.
CO3	The student is able to understand, describe, and assess the mining applied to coal seams, hard rocks, alluvial deposits, hydraulic king, and dredging of economic minerals.
CO4	The student is able to understand, describe, and assess the underground mining methods applied to coal seams and hard rocks.
CO5	The student is able to understand, describe, and assess the subsurface coal mining methods, mine ventilation, groundwater problems, and modes of transportation of broken ore in mines, life cycle of a mine and reclamation of mined or quarried land after mining has effectively ceased.

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