Program outcomes, program specific outcomes and course outcomes

1. Department of Mathematics

Graduation:

Algebra

The concepts and results of Algebra are fundamental to the study of Mathematics and represent a human achievement of great beauty and power.

Real Analysis

Real Analysis is a major course in Mathematics, traditionally viewed as the difficult subject. Beauty and creativity involved in this important area of mathematics is highly appreciable.

Differential Equations

After completing the course, students will be able to formulate and solve differential equations arising from changes in physical world.

Mechanics

The objective of the course is to understand how one can use theory of calculus of determine centre of gravity, velocity and acceleration of a particle along a cause etc.

Linear Programming

After studying course, students will be able to formulate a given simplified description of a suitable real world problem as a linear programming model in general, standard canonical forms.

Differential and Integral Calculus

Upon completion of this course, students will be able to interpret a function from an algebraic, numerical, graphical and verbal perspective and extract information relevant to the phenomenon modeled by the function, students also will able to study, how to differentiate and integrate standard functions.

Post Graduation:

Algebra I

Algebra is a core topic for all discipline that uses higher mathematics and logics. It will help student is becoming sophisticated mathematicians.

Real Analysis

A great deal of the course is intended to immerse the student into the world of formal**/**abstract mathematics in which formal proofs and definitions are used in abundance.

Differential Equation

The course may be considered to occupy is central position from which different lines of development extend in many directions. The theory of differential equation is an important branch of mathematics and essential for understanding many physical and natural phenomena.

Metric Spaces

Metric spaces are vital prerequisite for later mathematics courses including Analysis, Topology, Measure Theory, Complex Analysis etc.

Topology

Topology is a modern branch of geometry. The course is designed to develop an understanding of topological ideas and techniques and their role in analysis.

Measure and Integration I

On successful completion of this course, students will understand: How Lebesgue measure on $\mathbb{R}$ is constructed, the general concept of measure and how measures may be used to construct integrals.

Discrete Mathematics

The primary goal of this course is to provide an introduction to discrete structure for information technology. After studying this course, students will be able to relate computing theory with applications, apply the concepts of Boolean algebra in various areas of Computer Science.

Operation Research I

The problem in Optimization is the most common applications of mathematics. The main aim of this course is to present different methods of solving Optimization problem in the area of linear programming, game theory, assignment and transportation problem.

Operation Research II

After completing this course, students will understand how the problems of Economics, Business Management, and other industrial problems may be solved with the help of Inventory Control and Queuing theory.

Measure and Integration II

Investigations in probability theory, partial differential equations, hydromechanics and quantum mechanics often pose problems which require integration over sets. This course gives sufficient

answers to such type of problems.

Abstract Algebra II

The main aim to study this course is it to understand a close relationship between the roots of a polynomial and its Galois group.

Numerical Analysis

This course aims to provide students with the techniques for finding approximate numerical solution to the mathematical problems for which exact or analytical solutions are unavailable or inappropriate.

Complex Analysis

This course aims to provide an understanding of the basic facts of complex analysis, in particular the nice properties enjoyed by the derivatives and integrals of function of a complex variable; and to show complex analysis can be used to evaluate real integrals.

Mechanics

Mechanics is the oldest branch of Physics deplanes and is well important in the discipline of Mathematics. It is, in fact a course in Classical Mechanics. Students can understand the applications of fundamental conservation principles to analyze mechanical system.

Algebraic Coding Theory

The objective of the course is to teach the students how to produce algebraic codes based on the methods of groups and finite fields and to make the students familiar with some of the most widely used codes and their applications.

Number Theory

The aim of the course is to give an introduction to elementary number theory, to show how certain number theoretical theorems can be applied to solve simple Diophantine equations.

Fluid Dynamics

Fluids have the ability to transport matters and its properties as well as transmit force; therefore Fluid Dynamics is an important subject that is particularly open to cross fertilization with other Sciences and disciplines of Engineering.

Fuzzy Set Theory

Upon successful completion of this course, students should be able to understand basic knowledge of Fuzzy sets, fuzzy relations, elements of fuzzy arithmetic and fuzzy logic.

Fundamental Analysis

Many of the topics studied in this course have applications on Approximation theory, Operator's theory and other areas of mathematics. At the end of the course, the students will be aware to interplay of algebra and topology.

Differential Geometry

Differential Geometry is a mathematical discipline that uses the method of Differential and integral calculus, as well as linear and multi linear algebra, to study problems in Geometry. The theory of plane and space curves and of the surface in the three-dimensional Euclidean space formed the basis for its initial development in the 18^{th} and 19^{th} century.

2. DEPARTMENT OF PHYSICS

Program Outcomes (POs): The Physics department offers two programs:

1. Physics for B.Sc. students of PCM.
2. M.Sc. Physics.

Both these programs are primarily geared towards cultivating the idea – "***Physics is the study of nature and its laws (till the most fundamental level)***", amongst the students. The Program Specific Outcomes (PSOs) and the Course Outcomes (COs) of the individual programs/courses/papers are more or less spun around this theme and are listed below.

Program Specific Outcomes (PSOs): For the Under-Graduate Physics program (B.Sc. Physics for PCM).

PSO1: Understanding the fundamental concepts of Physics and its basic laws.

PSO2: Acquire the necessary mathematical-tools and concepts required for understanding the underlying physics.

PSO3: Acquire theoretical and experimental knowledge/skill related to the physical phenomenon, as well as the ability to connect both (theory & practical).

PS04: Acquire problem solving skills and ability to apply them to real world physical phenomenon.

PS05: Motivation to pursue higher studies (Postgraduate, Research etc.) in Physics.

Course Outcomes (COs): For the Under-Graduate Physics program (B.Sc. Physics for PCM).

Mechanics	Understanding - Frame(s) of Reference, Newton's Laws (along with application for point particles as well as system of particle), (conservative) force and potential energy, Work-Energy Theorem, Rocket motion. Understanding quantities and ideas related to rotational motion- Angular Velocity, Angular

	momentum, Torque, Moment of Inertia (calculations and related theorems), Conservation of Angular Momentum. Understanding Newton's law of gravitation, Gravitational Field, Potential & Potential Energy, Central force, Kepler's Laws of Planetary motion, Satellite and Planetary orbits and motions. Understanding material properties such as elasticity, stress, strain, various elastic constants and their relationships, Experimental methods to determine the various elastic properties. Understanding fluids at rest (surface tension, excess pressure) as well as in motion (viscosity, flow through capillary tube, Bernoulli's theorem, Poiseuille's formula), Experimental methods to determine surface tension and viscosity.
Electricity and Magnetism	Understanding vector analysis (applying concepts for problem solving), the nabla operator (Gradient, Divergence & Curl), Differentiation and Integration of Vectors (fields), Integral Theorems (Gauss, Stokes, Green and corollaries). Understand the basic concepts of Electrostatics-Field, Flux, Gauss's Theorem with applications, Potential and relation with Field, Potential Energy. Also concept of conductors, dielectrics and capacitance, The Electric-Vector. Understand the basic concepts of Magnetostatics- Biot-Savart's Law and applicatons, The Lorentz Force law, Div and Curl of magnetic field and the magnetic vector potential, Ampere's circuital law, Magnetism in matter (Magnetization, Permeability, Susceptibility) and Types of Magnetic materials (Dia, Para & Ferro). Understanding inductance (self and mutual and induction), Faraday's Law, Lenz' Law & energy conservation, AC circuits- RC, LC and LCR, Resonance. Realizing that EM is contained in the 4 Maxwell's Equations, Understanding equation of continuity, displacement current, Maxwell's correction to Ampere's circuital law. Gain knowledge on EM waves, propagation and their properties using Maxwell's equations, Polarization of EM Waves.
Waves, Oscillations & Acoustics	Understanding Simple Harmonic Motion, the Harmonic Oscillator Equation and solutions, Linearity and Superposition principle, Superposition of Harmonic Oscillations- Collinear (Interference & Beats) and Perpendicular (Lissajous Figures). Understanding waves and wave motion, Waves on a string (travelling and standing), Normal-modes, Group and Phase velocities. Understanding the Fourier Theorem and its applications. Understanding Damped Harmonic Oscillations, Over/Under/Critical damping, Relaxation time, LCR circuit. Understanding Forced Harmonic Oscillations, Transient and Steady state behavior, Resonance and Sharpness, Bandwidth, Quality Factor. Understanding intensity and loudness of sound waves, Decibels, Ultrasonic waves (generation, detection and uses), Building acoustics, Reverberation time and Sabine's formula, (Acoustic) design of buildings.
Practical (B.Sc. 2nd Year)	The various practicals included in the Physics syllabus of B.Sc. 1 are aimed at understanding (and measuring) the phenomenon/ quantities studied in the theory papers (e.g. ideas about Moment of Inertia, Elastic constants, Simple & Compound pendulums, Current, Voltage, Resistances, Solenoid, LCR circuit, SHM, Normal modes of a string etc.). The student should use and develop "hand-skills", observation-skills, mathematical tools (analytical, numerical, graphical etc.) to connect theory with experiments.
Thermal Physcis& Statistical Mechanics	Understanding the basic thermodynamic concepts- State variable, Equilibrium, Heat, Work, Zeroth and First Laws and the concepts of Temperature and Internal Energy, Applications of First Law to various processes (Adiabatc, Isothermal etc.), Mayer's relation. Understanding the need of second law of thermodynamics, Reversible & Irreversible processes, Heat Engine and Refrigerator, Second Law of Thermodynamics (in term of Engines and

	Refrigerators), Concept of Entropy, The Carnot's cycle, Second law in terms of entropy change, Third law of thermodynamics (the Nernst theorem). Understanding the four thermodynamic potentials, The Maxwell's relations and applications (response functions, Joule-Thompson cooling, Calusius-Clapeyron equation etc.) Understanding the Kinetic Theory of Gases (towards a microscopic description), Maxwell's velocity distribution law, transport phenomenon, the classical equipartition theorem and its use to determine specific heats of mono-atomic and diatomic gases. Understanding Blackbody radiation (the first step towards quantum mechanics), Spectral emissive power, Energy Density of Cavity Radiation, The Rayleigh-Jeans Law, Planck's law and deducing Wien's displacement law, Wien's distribution laws (1^{st} and 2^{nd}), Stefan-Boltzmann law and Rayleigh-Jeans from it.
Optics	Understanding Geometrical Optics- Fermat's principle of extremum path and applications, Cardinal points, Combination of Lenses, Lagrange equation of magnification. Understanding optical instruments- Eye pieces (Ramsden's, Huygen's and Gaussian), Aberrations (and types) and their corrections. Understanding the Interference of Light- The superposition principle, Coherence and conditions for interference, Double slit interference, Division of amplitude and division of wavefront, Fresnel's Biprism, Phase change upon reflection, Thin-film interference (Haidenger and Fizeau fringes), Newton's rings (theory and experimental setup), The Michelson Interferometer and its (experimental) use, Fabry-Perot interferometer. Understanding diffraction of light- Fresnel diffraction, Half-period zones and zone-plate, Diffraction pattern of edge, slit and wire, Fraunhofer diffraction (single, double and multiple slits), The diffraction grating as a measurement tool. Understanding polarization of light- Transverse EM Wave, Plane polarized light (production and analysis), Malus Law, Brewster's Law, The Nicol Prism, Circularly and Elliptically polarized light, Optical rotation, The polarimeter (experimental setup also).
Solid State Physics	Understanding Crystal Structure, Lattice, Basis, Bravais Lattice, Unit Cell, The seven crystal systems and the fourteen Bravasis lattices; SC, BCC, FCC, HCP and diamond structures, NaCl, CeCl and Zinc Blende structures. Understanding reciprocal lattice, Brillouin Zone, Reciprocal lattices of SC, BCC and FCC lattices, Miller indices, X-ray diffraction, Bragg's Law, Methods of X-ray diffraction (Laue, Powder, Rotating Crystal). Understanding lattice vibrations and phonons (sound quanta), Monoatomic and Diatomic chains, Acoustical and Optical branches, Specific heats of solids (Dulong-Petit, Einstein and Debye theories), the T^3 law. Understanding the free electron theory of metals (the electron gas), Lorentz-Drude Theory, Properties of metals (Thermal and Electrical conductivities, Electronic specific heat, Thermionic emission), Widemann-Franz relation, Sommerfeld theory. Understanding the basics of band theory- the Kronig-Penny model, Band gaps, Conductors, Semiconductors and Insulators, Intrinsic and Extrinsic Semiconductors (P & N type), Conductivity, Hall effect and Hall coefficient.
Practical (B.Sc. 1^{st} Year)	The various practicals included in the Physics syllabus of B.Sc. 2 are aimed at understanding (and measuring) the phenomenon/ quantities studied in the theory papers (e.g. ideas about thermal conductivity, blackbody radiation, calorimetry, statistical probabilities, dispersion, interference, gratings, lens combinations, polarization etc). The student should use and develop "hand-skills", observation-skills, mathematical tools (analytical, numerical, graphical etc.) to connect theory with experiments.
Quantum Mechanics	Understanding the origins of quantum theory- Blackbody radiation and early radiation laws, Planck's (revolutionary) idea (the quantum hypothesis & birth of quantum mechanics), Photoelectric and Compton effects. Understanding the wave nature (and hence dual nature) of matter, De Broglie's idea of matter waves and their wavelength, Davisson-Germer Experiment, Wave-particle duality, The

	uncertainty principle (position-momentum and Energy-time), Interference experiments with particles. Understanding the Schrodinger's equation (quantum mechanical equation of motion), Time dependent and time-independent versions, Framework of QM (postulates, wavefunction-properties and physical significance), Probability and Conservation, Operators, Eigenfunctions and Eigenvalues, Expectation values, The free particle wavefunction. Learning to solve the Schrodinger's equation, Stationary states, Boundary conditions lead to quantization, Potential Step & Barrier and transmission, Potential well (infinite and finite depths), The one dimensional harmonic oscillator in QM, Zero point energy. Learning to solve the Schrodinger's equation in three dimensions (for spherically symmetric systems), The Schrodinger's equation for the Hydrogen atom and solving it using separation of variables, Angular momentum eigenfunctions (spherical harmonics), Solving the radial equation using Frobenius's method, Emergence of the various quantum numbers (n, l and m).
Modern Physics	Understanding the various atomic models- Thomson, Rutherford and Bohr, the Bohr model and the hydrogen spectra, Other quantum ideas/experiments- Bohr-Sommerfeld model and quantization condition, the Stern-Gerlach experiment and electron spin, Electron magnetic moment, Bohr magneton, Larmor's precession, The vector atom model, Space quantization. Understanding optical spectra (on the basis of the vector atom model), LS and JJ couplings, Selection and Intensity Rules, The fine structure of sodium D lines, Magnetic interactions and Zeeman effect, X-ray spectra and Moseley's Law. Understanding basics of radiation, Absorption and Emission (spontaneous and stimulated), The Einstein's A and B coefficients, Metastable states (long living), Population inversion, Pumping, Lasing action and Laser/Maser. Understanding the atomic nucleus, Constituents of the nucleus, properties, Nature of nuclear force, Binding Energy and BE curve, Stable nuclei, The semi-empirical mass formula, Models of the nucleus (Liquid drop and Shell model). Understanding radioactivity, Decay of nuclei, Radioactive decay law, Mean and half life, alpha, beta and gamma decays and their features, Pauli's neutrino prediction, Ideas of fission and fusion of nuclei, Mass deficit and energy generation, Controlled nuclear fission and the nuclear reactor, Energy production in stars, Particle detectors.
Basic Electronics	Understanding elementary semiconductors and devices (intrinsic, extrinsic- P & N), the PN diode and its characteristics in forward and reverse bias, Zener diode, Optoelectric devices- LEDs, Photodiode and Solar cell. Understanding diode circuits- The rectifier- Half-wave, Full-wave (Centre tapped and Bridge versions), Ripple factor and Efficiency, Filters (C, L, Pi etc.), Clipping and Clamping circuits using diodes, Voltage multipliers, Zener diode and voltage regulation. Understanding transistors and amplifiers- Bipolar Junction transistors (NPN, PNP), Characteristics (input and output) in various configurations (CE, CB & CC), Current gains alpha and beta and their relation, Load line analysis, Q-point, Active, Cutoff and Saturation regions, Transistor biasings; Transistor Amplifiers- Voltage, Current and Power, Class A, B and C amplifiers; The Field Effect Transistor (FET) and the Uni-Junction Transistor (UJT) Understanding Oscillator circuits- Feedback (negative and positive), Birkhausen's criterion, RC (Wein bridge and Phase-Shift) & LC (Collector tuned and Colpitt) oscillators and frequency of oscillation, Crystal oscillators, The Multivibrator and various operation modes (Monostable, Astable and Bistable). Understanding Digital Electronics and Circuits- Number systems (Binary etc.) and conversions, Basic Logic Gates (AND, OR & NOT) and realizations using diodes and transistors, Universal Gates (NAND & NOR), Other gates, Boolean Algebra- De Morgan's Theorem, Simplifying logic circuits, Minterm, Maxterm, SOP and POS, Karnaugh Map, Binary arithmetic (addition, subtraction) using circuits- Half/Full adders, Word (4-bit) binary adder-subtractor.
Practical (B.Sc. 3rd Year)	The various practicals included in the Physics syllabus of B.Sc. 3 are aimed at understanding (and measuring) the phenomenon/ quantities studied in the theory papers (e.g. ideas about Energy

	quanta, quantization, diodes, LEDs, rectifiers, power supplies, transistors, amplifiers, oscillators, logic gates, Boolean algebra, logic circuits etc). The student should use and develop "hand-skills", observation-skills, mathematical tools (analytical, numerical, graphical etc.) to connect theory with experiments.

Program Specific Outcomes (PSOs): For M.Sc. Physics.

PSO1: Strengthening and further understanding of the fundamental concepts of Physics and its basic laws (as acquired during the Under-graduate studies) by augmenting mathematical rigor (at the Physicists level) along with Physical interpretations (and clear physical picture(s)) of any theory/process/situation.

PSO2: Acquire the necessary mathematical-tools (analytic, approximate, numerical, graphical etc.) and concepts required for understanding the underlying physics and use them to solve complex and advanced problems (including those with real world applications).

PS03: Gain substantial knowledge in the various (core) branches of Physics- viz. Classical Mechanics, Electrodynamics, Mathematical Methods, Quantum Mechanics, Statistical Mechanics, Condensed Matter Physics, Astrophysics, Electronics, Nuclear Physics, Particle Physics etc.

PSO4: Acquire theoretical and experimental knowledge/skill related to the physical phenomenon, as well as the ability to connect both (theory & practical). Also gradually develop the scientific method by designing and conducting experiments.

PS05: To get an exposure to research and research methodology during the dissertation work (theoretical and/or experimental) to be performed during the last semester.

PS06: Motivation to pursue a research/academic career in Physics. Aim towards writing and qualifying in various competitive exams- (e.g. CSIR-UGC-NET, GATE, JEST, BARC, DRDO, Entrance exams of premier research institutes (National & International)).

PS07: Gain knowledge of the subject along with general competence and analytical skill for employment in other sectors viz. industry, R&D, consultancy, public administration etc.

Course Outcomes (COs): For M.Sc. Physics.

Classical Mechanics	Understanding the various alternative formulations of Classical Mechanics (e.g. Newtonian, Action Principle(s), Lagrangian and Hamiltonian formulations). Realizing the need (Advantages/Disadvantages) of the various formulations and the unified appearance of the various conservation laws. Paving the way for transition towards Quantum Mechanics (as well as proper understanding/formulation of Statistical Mechanics) via the appropriate formulation of Classical Mechanics. Applying the ideas to problem solving- Rigid body dynamics, Small Oscillations etc.
Mathematical Physics	Acquiring the mathematical tools needed during Physics study at the M.Sc. level (and elsewhere also). Realizing the "unreasonable effectiveness" of Mathematics in the Physical Sciences (in general). Working with mathematical rigor (at the Physicists level of rigor) and developing the ability/habit of tackling complex problems. Applying the tools acquired here to the other courses (e.g. CM, ED, QM, SM etc.)
Astrophysics	Gain a basic understanding of applying Physics at the grandest scales i.e. in Astrophysics/Cosmology.

	Understanding observational methods/tools and related theoretical concepts to infer properties of bodies/system located far away in the Universe. Understanding stellar processes and features (Energy generation, Magnitudes, H-R diagram, Evolution, Brightness, Luminosity, Spectra etc.) A mathematical understanding of the processes occurring within a star in the form of some fundamental physics equations (Mass distribution, Hydrostatic Equilibrium, State equations, R-V theorem etc.)
Electrodynamics	Realizing the unification of Electricity and Magnetism as a single physical concept- Electromagnetism (or Electrodynamics) and that Maxwell's equations express this fact. Understanding various electromagnetic phenomenon (EM Wave in vacuum, conductors, non-conductors, plasma, bounded media, wave guides). Understanding the potential formulation of ED (and its advantages). Understanding generation and nature of radiation (fields) from moving (accelerated) charges. Formulating ED (and writing and performing calculations) within the relativistic framework i.e. four-vector & Tensor notations. Understanding the role of this relativistic formulation and ability to apply it elsewhere.
Practical	The various practicals included in the Physics syllabus of M.Sc. 1st Semester are aimed at understanding (and measuring) the phenomenon/ quantities studied in the theory papers of various other semesters (e.g. LCR, UJT, Transistors, Diodes, DIAC, TRIAC, FET, Amplifiers, Oscillators etc.). The student should use and develop "hand-skills", observation-skills, mathematical tools (analytical, numerical, graphical etc.) to gradually connect theory with experiments.
Atomic & Molecular Physics	Understanding that optical properties of materials and realizing the fact that it are just an application of Quantum Mechanics to atomic/molecular systems. Understanding the atomic and molecular spectra along with their finer features (Fine structure, Vibrational-Rotational spectra). Understanding the effect of electric and magnetic fields on the various spectra via interactions (or charge and/or spin). Understanding the various theories/formulations/models to understand spectra (Vector atom model, LS, JJ coupling schemes, Raman spectroscopy, Heitler-London and Born-Oppenhiemer treatments etc.) Understanding the quantum theory of radiation (Einstein's coefficients) and basic working principle of Lasers.
Solid State Physics	Understanding of the basic (theoretical) ideas involved in the study of Condensed Matter Physics. Understanding the origin of elasticity (and elastic constants) from the properties of the underlying crystal structure. Understanding the interaction of crystals with radiation (X-rays) and the related theoretical framework as well as experimental setup(s) (Diffraction experiments). Understanding the quantum treatment of elastic/sound waves (i.e. the idea of phonons and phonon gas etc.) Understanding the thermal properties of solids on the basis of the phonon picture.
Statistical Mechanics	Understanding the (average) microscopic description vs. the macroscopic description (as done in Thermodynamics) for a system with large no. of degrees of freedom. Understanding (and calculating within the framework) the various statistical ensembles and the corresponding (thermodynamic) formulations. Application of the statistical ideas to derive/understand the behavior of gases (ideal as well as real). Understanding the basics of Quantum SM (FD & BE stat) and some simple applications. Understanding blackbody radiation as a gas of photons (i.e statistical treatment- BE statistics).
Quantum	Understanding that our world in inherently quantum and so the proper framework to

Mechanics	understand it is Quantum Mechanics. "Establishing"/Understanding the basic framework of QM (Schrodinger's equation, wavefunction and probabilistic interpretation, uncertainty relations etc.). Learning to solve the Schrodinger's (time-independent) equation (various one and three dimensional problems). Understanding the various formulations of QM and their equivalence- Schrodinger, Heisnberg (Matrix) and Dirac formulations. Understanding symmetry in QM- Space and Time translation symmetries as well as Rotational symmetry (Angular momentum, Spin, Addition etc.) Understanding the various approximation methods to solve the Schrodinger's equation (Perturbation, Variational method, WKB approximation) and application to different (stationary) state problems. Applying approximation methods to time dependent problems and treatment of radiation (emission and absorption) via such methods (Time dependent perturbation theory, Fermi's Golden Rule, the Semiclassical theory of radiation etc.).
Practical	The various practicals included in the Physics syllabus of M.Sc. 2nd Semester are aimed at understanding (and measuring) the phenomenon/ quantities studied in the theory papers of various other semesters (e.g. Multivibrators, Interferometers, Fresnel's Law, Magnetic susceptibility, Radiation laws etc.). The student should use and develop "hand-skills", observation-skills, mathematical tools (analytical, numerical, graphical etc.) to gradually connect theory with experiments.
Advanced Quantum Mechanics	Understanding, applying and formulating QM at an even deeper level than done earlier (in the QM Course). Applying quantum ideas to understand the scattering of particles. Employing various (approximate) methods- Partial Wave Analysis and the Born approximation. Understanding notion of identical and indistinguishable. Realizing origin of the Pauli's exclusion principle and related notions (Spin-Statistics connection, Permutation symmetry etc.) Formulation (along with the need) of the relativistic version of (NR) quantum mechanics. Working out in detail the two basic relativistic wave equations (Klein-Gordon and Dirac equations) and the various associated phenomenon/notions (Plane wave solutions, Negative Energies and Probabilities, Spin of electron and its magnetic moment, The Hole Concept, Particles and Antiparticles etc.) Understanding the need of relativistic quantum fields (towards Quantum Field Theory), Field formulations for the various wave equations via 2nd quantization.
Nuclear Physics	Understanding the atomic nucleus and its various properties along with the experimental tools and techniques of nuclear investigations. Understanding basic properties of the nucleus and the various nuclear models. Understanding the nature of the nuclear force along with experimental setup(s) to study them. Understanding radioactive decay and its various feature. Understanding nuclear reactions by applying (mainly) quantum ideas to them.
Particle Physics	Get a basic understanding of the fundamental constituents of our Universe (the "elementary" particles and the four fundamental interactions). Understanding the gauge principle and role of symmetry (along with ideas of unification). Understanding the common (mathematical) origin of (the various) conservation laws as a manifestation of (some) symmetry. A very basic understanding of the unification of the fundamental interactions- Electroweak and Grand Unifications. Understanding (hadronic) matter as composed of quarks and the "construction" schemes (i.e. various direct-product representation of SU(3)). An overview of the various properties of quarks (and also of the composite mesons and baryons).
Electronics- A	Acquire a basic understanding of electronic principles (analog and digital). Understanding of various oscillator circuits (including multivibrators).

	Understanding of logic gates (basic, universal and combinational) and the various technologies (RTL, TTL, CMOS, 7400 family etc.) used to implement them. Ability to "construct", simplify and implement various logic functions/circuits (Adder/Subtractors, Comparators, MUX and dMUX, Coders, Encoders, Decoders). Understanding memory elements (Flipflops- RS, JK, D, Master-Slave, Clocked vs. Unclocked etc.; Registers and Counters) as Sequential circuits. Understanding the various "memory devices" and IC-technologies.
Practical	The various practicals included in the Physics syllabus of M.Sc. 3rd Semester are aimed at understanding (and measuring) the phenomenon/ quantities studied in the theory papers of this semester (mainly Electronics e.g. IC-study (555, 723), Logic circuits (basic- AND/OR/NOT/NAND/XOR etc. to advanced- Adders/MUX/dMUX etc. and memory elements- RS, JK etc.), Microprocessor, SCR, DIAC, TRIAC, GM-counter etc.). The student should use and develop "hand-skills", observation-skills, mathematical tools (analytical, numerical, graphical etc.) to gradually connect theory with experiments.
Computational Physics	Acquiring the basic ability to solve physical problems (i.e. equations- algebraic, differential, matrix etc.) using numerical techniques. Learning the techniques/methods of numerical analysis (Interpolation methods, Differential equation solving, Matrix inversion, Integration, Roots of equations etc.) Learning computer programming (FORTRAN) and implementing numerical recipes/algorithms on the computer (usually using iterative methods) to solve problems (including physical problems- Kepler's problem).
Environmental Physics	Learning to understand over surroundings (atmosphere, radiation and environment in general) using the principles of physics. Understanding the atmosphere (its structure, thermodynamics, transport phenomenon, hydrostatic equilibrium, and green house effect). Understanding solar radiation receive on earth (Radiation laws, Matter-Light Interaction, Scattering, Ozone depletion etc.). Understanding water and air pollution (Fluid dynamics, Diffusion, Noise Pollution etc.). Understanding the world energy needs and ways to generate energy for our use (Renewable vs. Non-renewable, Environmental changes and climate due to anthropogenic activities).
Laser & Fiber Optics	Understanding the basic principles of a Laser (semi classical/quantum theory of radiation, Einstein's coefficients, Pumping, Population Inversion, Coherence- spatial and temporal). Knowledge of the various kind of lasers (3 and 4 level systems, He-Ne, Argon, Gas, Solid-state, Semiconductor, Ruby, Nd-YAG etc.) and their features. Getting a basic idea of non-linear optics (harmonic generations, phase matching, self-focusing etc.). Understanding use(s) of laser as an investigating tool (to investigate material properties)- Laser spectroscopy.
Electronics- B (Elective)	Understanding the basic electronic involved in communication electronics. Understanding modulation and demodulation (AM, FM, SSB, Phase- Various circuits to generate and detect). Understanding radio communication (ground and sky propagations, role of ionosphere, Appleton-Hartley theory, Radar and its workings). Understanding Transmission Line (basically EM Waves in conductors). Developing ability to solve related problems (Line parameters, TL-equations, Impedances, SWR, Reflection coefficient etc.). Understanding the various kind of antenna to broadcast and receive radio signals.
Practical/ Dissertation/ Project	The student has to complete a dissertation/project (theoretical and/or experimental) and submit a written report during this last semester. This gives the students some exposure to research and research methodology. Moreover the written report enables the students to write scientific communication. All this is aimed at nurturing them into (possible) future researchers who are capable of- (a) thinking and analyzing critically and clearly (b) adopting the scientific method and (c) working independently.

3. Department of Chemistry

Graduation-

Program outcome:- The U.G programunder SDSUV provide the understanding of fundamental chemistry from core to their basic application in daily life. At the end of this program student have acquired the knowledge of chemistry of system, surrounding and their positive and negative impact in our daily life and environment.

Course outcome:-

Inorganic chemistry:- This course includes the fundamental study of atomic structure, periodic properties, Nature of chemical bonding, related theories and chemistry of all the elements of periodic table.

Organic chemistry:-This course gives the understanding of structure, bonding, mechanism and stereochemistry of organic compounds and the study of different functional groups in organic molecules. Also it involves the study of bimolecular like carbohydrates, amino acids proteins, vitamins which constitutes of body and monitor the functioning of life.

Physical Chemistry:-This course links physical state with the chemical changes occurs in our surroundings and nature. The chemistry of different statesi.eSolid, liquid and gaseous state and colloidal state and branch of science that deals with the quantitative relationship between heat and other forms of energy called thermodynamics and the chemistry related to electrolytes called electrochemistry.

Post-Graduation:-

Program outcome:-The P.G program give the understanding of detail, advanced and fine knowledge of chemistry. This program explores and covers the remaining concept of U.G program and links the text book chemistry to the daily life activities and their application. Importantly this program includes the course that deals with the study of interaction of light with matter called spectroscopy which help in the real analysis.

Course outcome:-

Inorganic Chemistry:-This Course encompass the theories and bonding concepts in coordination compound and acids-bases in detail. The interesting chemistry of organometallic compounds.

Organic Chemistry:-This advance organic chemistry course includes the mechanism, energy consideration, stereochemistry and different types of organic reactions in detail.

Physical Chemistry:-This course includes the thermodynamic and kinetic behavior of reaction and various theories for reaction kinetics.

Spectroscopy:-This course deals with the study of interaction of light with matter. The light of different energy cause different type of changes like electronic, vibration, rotational, nuclear etc. in molecule by interaction with different frequency light. Organic spectroscopy includes NMR, ESR, Mossbauer, IR, UV-visible spectroscopy.

Group Theory and Instrumentation techniques:- Group Theory is the mathematical application to determine the symmetry of molecule and molecular operation and to obtain knowledge of its physical properties and binding nature. Instrumentation techniques involve the understanding about the instruments and techniques used in analysis.

Reagents in organic synthesis and Organometallics :- The important transformation like oxidation-reduction, substitution, addition, elimination in organic reaction have been performed using specific reagents and conditions, this course covers all the important reagents for such transformations.

Organic Photochemistry:- Various reactions takes place by the effect of temperature change called thermal reaction. The reactions which takes place by the effect of light of different frequency and wavelength is called photochemical reaction and mechanism of such reactions studied under photochemistry.

Chemistry of Natural Products:- This course includes the study of natural products like alkaloids, terpenoids, steroids, vitamins and their extraction, purification, chemical effects and applications.

Organic Synthesis:- The synthesis of organic molecules involve various approached and mechanism, new molecules synthesized by mimicking the existing route amd concept. Retrosynthetic or disconnection approach also used to design various drug molecule and biologically active molecule.

Heterocyclic Chemistry:-Heterocyclic molecules are of great importance in medicinal or drug chemistry. This course covers the preparation, properties, reactivity and application of different type of heterocycles

Environmental Chemistry:-This course give idea about environmental terminologies, natural cycles like hydrological, oxygen and nitrogen cycles and composition of atmosphere. Knowledge about air-water pollution, their cause, effects and outcome. The purification process, the analytical methods involves for measuring the air-water quality parameters and standard.

Program Specific Outcomes:-

Chemistry is a broad area, its important branch of science as everything we do is chemistry! All matter is made up of chemical, even our body is made of chemicals and chemical reaction occur when we eat, breath etc, so it's the study of everything. From starting (like extraction of elements, compounds) to their final state (like polymers, cosmetics, drugs and medicineetc) ready for application involve various chemical processes and purification techniques which were studied under the Program. The advantage of leaning chemistry and acquiring knowledge about the process and techniques involves have great career opportunities in academic as well as industries. As this subject covers broad area, one can pursue a job as a pharmacologist, biochemist, lab technicians, analytical chemist, environmentalist, synthetic chemist, Material scientist, geochemist, chemical engineer in industry.

4. Department of ZOOLOGY

Syllabus/Program Outcomes:-

1. Acquired the knowledge with facts and figures related to various papers in zoology such as Animal Diversity, Taxonomy, Evolution, Genetics, Biochemistry, Endocrinology, Toxicology and Ecology and animal behavior.
2. Understood the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevance in the day to day life.
3. Acquired the skills in handling scientific instruments, planning and performing in laboratory equipments.
4. The skill of observation and drawing logical inference from the scientific experiments.
5. Analyze the given scientific data critically and systematically and the ability to draw the objective conclusions.
6. Been able to think creatively (divergent and convergent) to propose novel ideas in explaining facts and figures or providing new solution to the problems.
7. Realize how developments in any science subject help in the development of other science subject and via versa and how interdisciplinary approach helps in providing better solution and new ideas for the sustainable development.
8. Develop various communication skills such as reading, listening, speaking, etc.
9. Realize that pursuit of knowledge is a lifelong activity and in combination with untiring efforts and positive attitude and other necessary qualities leads towards a successful life.

SEC (UG level) Public Health and Hygiene- Outcomes

Students understood the importance of hand washing, sanitation and hygiene, safe drinking water; household cleaning and food safety constitute the main focus for hygiene interventions in the college, home and community level.

Outcome of Special Papers (PG level)

1. Fishery Science: Students describe the knowledge necessary for professional or academic work in the field of aquaculture and fisheries.
2. Evaluate the importance of diversity as well as the role of social factors (e.g. culture, economics, policy) on aquaculture and fisheries from local to global scales.
3. Demonstrate the basic technical skill necessary for work in aquaculture and fisheries (e.g. data collection and analysis, scientific methods etc.)
4. Create local and global solution to complex challenges in aquaculture and fisheries.

Students become familiar with Earth system and the manner in which they have been modified by human activity over time, especially with regards to coastal ecosystems. Recognize and appreciate the diversity of human culture and their relationship to local and global ecosystems. Develop a personal environmental ethic.

Outcomes of Immunology (PG level)

1. Trace the history and development of immunology.
2. Understood the organization of immune system.
3. Learn how cell culture is used for research in cancer.
4. Understand the vaccines and their importance.
5. Learn how cancer defeats the immune system.

Outcomes of Immunology (PG level)

1. Learn how microorganisms are used as model system to study basic biology, genetics, metabolism and ecology.
2. Learn laboratory skills i.e. preparation of and viewing samples for microscopy, culture techniques, viewing samples in microscopy to identify microorganisms etc.
   Overall students develops hypothesis generation and testing, including the development of theoretical and practical skills in the design and execution of experiments.

5. DEPARTMENT OF BOTANY

Course Outcomes UG level

B. Sc. I Sem.

Microbiology

1- Students understood the importance of microbes & their role in nature as biodegradation, nitrogen fixing, & medicine.

2- Demonstrate theory and practical skills in microscopy & their handling techniques and staining produce.

3- Known various culture media & their applications.

4- Understand the nature of viruses & how viruses can be used as tools to study biological process, as cloning vector & for gene transfer.

Fungi, Elementary Plant Pathology & Lichens

1- To know about what is fungi & why these achlonophythus organisms included in plant kingdom.

2- understand the diversity of fungi.

3- know the economic importance of fungi as especially food, medicine

4- able to identify the symptoms of plant diseases which caused by fungi B.Sc. IIndSemPaper Ist-

Algae & Bryophyta

on completion of this course, students are able to

1- understand the diversity of algae and know the systematic morphology and structure of algae.
2- understand the thallus and gametophytic plant body.
3- origin of life from sea to land (from aquatic to terrestrial) as amphibian plants
4- understand the occurrence, thallus structure and reproduction in bryophyte
Paper II

Pteridophyta, Gymnosperm and ElemantaryPalaeobotany

on completion of this course, students are able to
1- understand the diversity of plant evalutionary trend from bryphyta to ptericlophyta
2- known about the ferm and taxonomic position of ferm
3- impotance of gymnosperm
4- to understand the stellar system and its evolution.
5- able to know process of fossilization

Semester III

Paper- taxonomy of angiosperm

1- understand the diversity of plant from primitive to advanced level.
2- know the concept of methodology in taxonomy
3- hand on exposure to experimental work on plant identification and especially local plants
4- able to know that flora and how to make a herbarium sheet
5- economic importance of plants in our daily life as food, fodder and shelter.

Paper II Anatomy and Embryology

Able to know that section cuttings of plant root stem and flowers composition of tissue development of micro and megasporogenesis.

Semester IV

Paper – I cytology and genetics

1- Understand the cell science
2- Understand cell wall, plasma membrane, cell organelles and cell division.
3- able to prepare the semi-permanent slide of different stages of mitosis.
4- Acquired the knowledge biochemical nature of nucleic acids, their role in living systems, experimental evidences to prove DNA as genetic material.
5- Students are able to analyze the scientific data of Mendel's law through biostatistics method.

Paper- II Plant Ecology

1- Understand the relationship between environment & life.
2- Know about biotic & biotic factor & their role in ecosystems.
3- Learn the scope & importance of ecology in modern era
4- Able to preformatted the different ecological field experiment
5- Importance of ecotourism & ecosystem services.

Paper- III Molecular Biology & Biotechnology

1- Students are able to know about the genomic organization or living organisms, study of DNA, genes & chromosome etc
2- Understand the fundamental of biotechnology
3- Know about basics protocols for tissue culture techniques
4- Able to perform the fundamentals of recombinant DNA Technology.
5- Understand the process of synthesis of proteins & role of genetic code in polypeptide

Paper IV- Plant Breeding & Biostatistics

1- Students are able to know about the new discipline to botany plant berrding
2- To introduce the student with branch of branch of plant breeding for the survival of human being from starvation
3- Understand the modern strategies applied in genetic & plant breeding to sequence & analyse in local crops.
4- Able to performed the experiment emasculation, mass selection, pure line selection & colonel selection.
5- Understand the role of plants in human welfare.
6- Used to solve Genetical problems through central tendency & chi square test etc.

Semester VI

Paper- I Plant Physiology, Elementary Morphogenesis & Biochemistry:

On completion of the course, students are able to:
1- Role of diffusion, osmosis & water potential in relation to physiology of plants & in other organisms.
2- Learn & understand about mineral nutrition in plants.
3- Know about photosynthesis & respiration process in support with different experiment and prove it.
4- Nitrogen metabolism & its importance
5- skilled in use of grow regulators in agriculture field.
6- Understand the proportion of monosaccharide.
7- Significance of carbohydrate, proteins & fats in organisms (plants).

Paper II Economic Botany & Biodiversity

1- Understand the role of plants in human welfare.
2- Gain knowledge about various parts used for food, medicine etc.
3- Able to know & they can discuss about biodiversity & its role in earth.
4- Significance of plant diversity & Hot spots.
5- Conservation of biodiversity in our locality.
Outcomes of special paper in PG level

Paper III Plant health Managements

1- Students are able to diagnose the plant dineases through the general symptoms.
2- Understand the scope & importance of plant pathology.
3- Now they able to prepared the permanent & semi-permanent slides of pathogen
4- Know about the different pest types of pest applied in agriculture fields.
5- Can be identify the local disease which caused the severe damage to our crops as cereals, horticultural crops. vegetables, spices & medicinal plants.
6- Gain knowledge on Host parasite interaction process Diversity and cultivation of mashroom.

Outcome

1- Understand the diversity of mushroom.
2- Know about nutritional & medicinal value of edible mushrooms & poisonous mushrooms.

3- Able to know cultivation techniques of button mushroom …….. mushroom.
4- skill the student to earn the income through mushroom cultivation.
5- Gain the knowledge to overcome the problem of pollution caused by the different crop residues, because the fungi have the ability to recycle these waste & convert them into edible protein.
6- Know about the present status of mushroom industry in India.

Ethno botany Outcome

1- Students are able the relevance of ethno botany in the present context & which are growing in local area.

2- Know about the major & minor ethnic groups or Tribls of India & their life styles.
3- Learn about identification of wild edibles plants
4- Understand the role of ethno medicinal plants in local health care system.
5- Get awareness on the conservation practices of medicinal plants

6. DEPARTMENT OF COMMERCE

B.COM. 1st YEAR (Sri Dev Suman Uttarakhand University)

Group I	**Management Group**	
	Paper I –Principles of Management	The student will be able to understand Principles & functions of Management, Process of decision making, and Modern trends in management process.
	Paper II– Business Environment	This paper helps the students to understand the environment of enterprises, factors affecting business and fund raising in business.
Group II	**Accounting Group**	
	Paper I –Financial Accounting	Student will get conceptual knowledge of financial accounting and applying both Theoretical and practical knowledge to their future careers in business.
	Paper II -Business Statistics	Student will develop the ability to analyze and interpret data to provide meaningful information to assist in making management decision.
Group III	**Business Economics & Legal Aspects of Business**	
	Paper I –Business Economics	The students acquire the knowledge of Demand and supply, Price fixing, market competitors, and management business economically.
	Paper II – Business Laws	Students will be able to understand the important business legislation that dictate how to form and run business along with relevant case law

B.COM IVTH SEMESTER

(Sri Dev Suman Uttarakhand University)

COURSE	OUTCOME
Human Resource Management	The student will be able to understand nature of human resources and its significance to the organization.
Fundamental of Insurance	Student will get to knowledge about various types of insurance, its principles and usefulness in business
Indian Financial System	Through this paper the students learn about various financial institutions, investment institution, capital market, money market and their working.
Entrepreneurship	The purpose of this paper is to orient the students towards entrepreneurship as a career option, develop entrepreneurship skill. Students will be able to apply these skills in the context of both new ventures as well as in established companies.
Cost Accounting-II	The student will be able to understand various aspects of cost ascertainment and its determinants and advise the management to maximize its profits and used to streamline manufacturing operations.
Corporate Accounting-II	The Student will get knowledge on the accounting practice prevailing in holding account, amalgamation and other Allied aspects.

B.COM VITH SEMESTER
(H.N.B. Garhwal University)

COURSE	OUTCOME
Banking & Insurance	Student will get the knowledge about banking and various types of insurance its principles and usefulness in business.
Management Accounting	The student acquires the knowledge in the Management Accounting Techniques in business decision making.
Indian Economy	Student will be able to understand issues relating to the growth and development of the Indian Economy and application of Economic Theory in the context of India.
Seminar and Comprehensive Viva-Voce	Student will be enhancing their presentation and communication skill also they learn to develop their personality, so that they can face the challenges of competitive world.

7. हिन्दी विभाग

स्नातक स्तर:-

बी० ए० हिन्दी विषय के अंतर्गत तीन वर्षीय पाठ्यक्रम में कुल 6 प्रश्नपत्र सम्मिलित हैं-

स्नातक प्रथम वर्ष प्रथम प्रश्नपत्र – "हिन्दी भाषा एवं साहित्य"

स्नातक प्रथम वर्ष का विद्यार्थी चाहे इंटरमीडिएट स्तर पर विज्ञान वर्ग का हो, या कला वर्ग का या फिर वाणिज्य वर्ग का हो, भाषा की व्याकरणिक एवं साहित्यिक समझ उसे विषय विशेष को समझने में सहायता प्रदान करती है। हिन्दी भाषी क्षेत्र के लगभग 70 % विभिन्न विषयों के विद्यार्थी भाषा का माध्यम हिन्दी चयनित करते हैं। अतएव यह प्रश्नपत्र हिन्दी भाषा को व्याकरणिक स्तर तक समझने में सहायक है। साथ ही विभिन्न प्रतियोगी परीक्षाओं में सफल होने के लिए भी इसका अनिवार्य रूप से गहन अध्ययन किया जाना चाहिए। साथ ही इस प्रश्नपत्र में साहित्य के स्वरुप एवं विविध विधाओं तथा उनके तत्वों की सम्पूर्ण जानकारी विद्यार्थियों के लिए अत्यंत उपयोगी है।

<u>स्नातक प्रथम वर्ष द्वितीय प्रश्नपत्र</u> – "काव्यांग एवं हिन्दी कविता"

काव्य के विभिन्न अंगों – रस , छन्द , अलंकार , शब्दशक्ति को गहनता से समझकर ही साहित्य का वास्तविक रसास्वादन संभव है। व्याकरणिक स्तर पर विभिन्न प्रतियोगी परीक्षाओं में इससे सम्बंधित प्रश्न आवश्यक रूप से पूछे जाते हैं। साथ ही इस प्रश्नपत्र के द्वारा हिन्दी साहित्य के प्रारम्भिक युगों की कविताओं के स्वरुप से परिचित होकर विद्यार्थी में काव्य- सृजन की क्षमता का भी विकास होता है।

<u>स्नातक द्वितीय वर्ष प्रथम प्रश्नपत्र</u> – "गद्य एवं नाट्य साहित्य"

उपन्यास , कहानियों , निबंध , नाटक , एकांकी , रेखाचित्र , यात्रा-संस्मरण की पाठ्यवस्तु का अध्ययन करके विद्यार्थी में विविध प्रकार की गद्य विधाओं के शिल्प और संवेदना को समझने के पश्चात् गद्य साहित्य-सृजन करने की क्षमता का विकास होता है। साथ ही इन प्रतिष्ठित लेखकों के उपन्यास , कहानी , निबंध , नाटक , एकांकी , रेखाचित्र , यात्रा-संस्मरणों को पढ़कर समाज के विभिन्न पक्षों – राष्ट्रभक्ति , स्त्री विमर्श , दलित विमर्श , भूख , गरीबी , लाचारी , ग्रामीण परिवेश , नगरीय परिवेश , राजनैतिक विचार आदि का समावेश विद्यार्थी को जीवन जीने की एक नवीन दृष्टि प्रदान करता है।

<u>स्नातक द्वितीय वर्ष द्वितीय प्रश्नपत्र</u> – "आधुनिक हिन्दी कविता"

काव्य विकास-क्रम में आधुनिक हिन्दी कविता के स्वरुप एवं उसके विकास के चरणों से विद्यार्थी परिचित होते हैं, जिससे वे आधुनिक स्तर पर काव्य-सृजन की क्षमता को वृद्धिगत कर सकें।

<u>स्नातक तृतीय वर्ष प्रथम प्रश्नपत्र</u> – "प्रयोजनमूलक हिन्दी"

इसका दूसरा नाम कामकाज़ी हिन्दी भी है। विभिन्न सरकारी कार्यालयों में अनिवार्य रूप से इसका प्रयोग होता है। संक्षेपण , प्रारूपण , टिप्पण , पल्लवन , अनुवाद , पत्रकारिता , पारिभाषिक शब्दावली , जनसंचार माध्यमों आदि का अध्ययन इसके अंतर्गत किया जाता है। विभिन्न सरकारी कार्यालयों के विभागों एवं अनुभागों में इससे सम्बन्धित कार्य प्रतिदिन होते हैं। यह रोजगारपरक हिन्दी भी कहलाती है।

<u>स्नातक तृतीय वर्ष द्वितीय प्रश्नपत्र</u> – "जनपदीय भाषा साहित्य"

गढ़वाली एवं कुमाऊँनी साहित्य के उद्भव एवं विकास का अध्ययन करके विद्यार्थी क्षेत्रीय भाषा को गहनता से समझता है। हिन्दी भाषा के साथ ही साथ अपनी क्षेत्रीय भाषा के साहित्य एवं व्याकरण का ज्ञान होना भी साहित्य के विद्यार्थी के लिए अत्यंत आवश्यक है। लोकगीत , लोककथाएं , लोकगाथाएं हमें उत्तराखंड की सामाजिक , राजनैतिक , धार्मिक एवं आर्थिक परिस्थितियों से परिचित कराकर पहाड़ के जनजीवन एवं मानवीय मूल संवेदनाओं को समझने में सहायक होती हैं।

<u>स्नातकोत्तर स्तर:</u>-

एम० ए० हिन्दी विषय के अंतर्गत द्वि-वर्षीय पाठ्यक्रम में कुल 18 प्रश्नपत्र सम्मिलित हैं। सभी प्रश्नपत्र विभिन्न राज्यस्तरीय एवं राष्ट्रीय स्तरीय प्रतियोगी परीक्षाओं में सफल होने में सहायक हैं।

प्रथम सेमेस्टर

प्रथम प्रश्नपत्र- हिन्दी साहित्य का इतिहास (आरम्भ से रीतिकाल तक)

हिन्दी साहित्य के इतिहास के प्राम्भिक युगों को उनके प्रवृत्तिगत एवं तत्कालीन परिस्थितियों के आधार पर विस्तृत अध्ययन करके विद्यार्थी का साहित्यिक ज्ञान समृद्ध होता है।

द्वितीय प्रश्नपत्र- आदिकालीन एवं निर्गुण काव्य

आदिकालीन एवं भक्तिकालीन कवियों के काव्य का अध्ययन करके विद्यार्थियों की काव्य-सृजन क्षमता विकसित होती है।

तृतीय प्रश्नपत्र- मध्यकालीन सगुण एवं रीतिकालीन काव्य

भक्तिकालीन एवं रीतिकालीन कवियों के काव्य का अध्ययन करके विद्यार्थियों की काव्य-सृजन क्षमता में वृद्धि होती है।

चतुर्थ प्रश्नपत्र- हिन्दी साहित्य का इतिहास (भारतेन्दु युग से अब तक)

स्नातकोत्तर स्तर पर युगीन परिस्थितियों एवं प्रवृत्तियों के आधार हिन्दी साहित्य के इतिहास का विस्तृत अध्ययन करके विद्यार्थी का साहित्यिक ज्ञान समृद्ध होता है।

द्वितीय सेमेस्टर

पंचम प्रश्नपत्र- भारतीय काव्यशास्त्र और हिन्दी आलोचना

विभिन्न काव्यशास्त्रीय सिद्धांतों- रस सिद्धांत , अलंकार सिद्धांत , वक्रोक्ति सिद्धांत , ध्वनि सिद्धांत , औचित्य सिद्धांत का अध्ययन करते हुए काव्य को विभिन्न आलोचनात्मक प्रवृत्तियों की कसौटी पर परखने में विद्यार्थी को सहायता मिलती है।

षष्ठम प्रश्नपत्र- आधुनिक गद्य (निबन्ध, नाटक एवं अन्य गद्य विधाएं)

विविध विधाओं के साहित्य का अध्ययन विद्यार्थियों में लेखन की अपार संभावनाएं उत्पन्न एवं विकसित करता है।

सप्तम प्रश्नपत्र- उपन्यास एवं कथा साहित्य

उपन्यास एवं कहानियाँ हमारे आम जन-जीवन से जुड़ी हुई घटनाओं पर आधारित होती हैं, जो हमें सामाजिक , धार्मिक , राजनैतिक एवं सांस्कृतिक जीवन-मूल्यों को समझने में सहायता प्रदान करती है।

अष्टम प्रश्नपत्र- पाश्चात्य काव्यशास्त्र

विभिन्न पाश्चात्य कवियों- प्लेटो , अरस्तू , लौंजाइनस , वड्र्सवर्थ , कॉलरिज , इलियट , रिचड्र्स आदि के सिद्धांतों का अध्ययन विद्यार्थी को पाश्चात्य लेखन शैली से परिचित करता है तथा पाश्चात्य आलोचनात्मक प्रवृत्तियों के आधार पर काव्य की समीक्षा करने में सहायता प्रदान करता है।

नवम प्रश्नपत्र- आधुनिक काव्य (भारतेन्दु युग से उत्तर छायावाद तक)

विभिन्न आधुनिक कवियों ने तत्कालीन परिवेश के आधार पर काव्य में विभिन्न तत्वों को समाहित किया, जिसका अध्ययन करके विद्यार्थी में नवीन एवं मौलिक काव्य-सृजन की क्षमता में वृद्धि होती है।

तृतीय सेमेस्टर

दशम प्रश्नपत्र- भाषा विज्ञान एवं हिन्दी भाषा

विद्यार्थियों को भाषा का व्याकरणिक ज्ञान- स्वन , वाक्य , रूपिम , अर्थ विज्ञान की विस्तृत जानकारी प्राप्त होती है ।

एकादश प्रश्नपत्र- आधुनिक काव्य (छायावादोत्तर हिन्दी कविता)

आधुनिक कवियों के काव्य में वर्तमान परिस्थितियों की झलक विद्यार्थी को वर्तमान यथार्थ से परिचित कराती है। कविता केवल काल्पनिक लोक ही नहीं , अपितु यथार्थ वस्तु जगत से भी बोध कराती है।

द्वादश प्रश्नपत्र- जयशंकर प्रसाद

छायावाद के चार स्तम्भों में से एक जयशंकर प्रसाद के सम्पूर्ण साहित्य का विस्तृत अध्ययन करके विद्यार्थी विशिष्ट साहित्यिक प्रतिभा को विकसित कर सकता है। प्रेम और सौन्दर्य के कवि जयशंकर प्रसाद के साहित्य में मानवीय संवेदना, प्रकृति-चित्रण , रहस्यवादी अनुभूति , कल्पना प्रवणता , भारतीय जीवन दर्शन की अभिव्यक्ति आदि विशेषताएं सर्वत्र दृष्टिगोचर होती हैं।

त्रयोदश प्रश्नपत्र- सूरदास

सूरदास के सम्पूर्ण साहित्य के विस्तृत अध्ययन में वात्सल्य और माधुर्य भावों से युक्त कृष्ण काव्य का चित्रण हृदय में स्वाभाविक आनंद की अभिव्यंजना करता है, साथ ही उनका काव्य एक साथ ही लोक और परलोक को प्रतिबिंबित करता है।

चतुर्थ सेमेस्टर

चतुर्दश प्रश्नपत्र- भाषा विज्ञान और हिन्दी भाषा

भाषा के उद्भव एवं विकास का व्याकरणिक स्तर पर विस्तृत अध्ययन करके विद्यार्थी में विषय विशेष की गहन समझ विकसित होती है।

पंचदश प्रश्नपत्र- प्रयोजनमूलक हिन्दी और मीडिया लेखन

हिन्दी केवल साहित्यिक भाषा न होकर राजभाषा (कामकाज़ी हिन्दी) भी है। विभिन्न प्रशासनिक कार्यों , वित्त , वाणिज्य , बैंकिंग , बीमा , व्यापार , विधि , विज्ञापन , संवाद लेखन , पटकथा लेखन , जनसंचार माध्यम, सरकारी पत्राचार , पारिभाषिक शब्दावली का निर्माण आदि विभिन्न कार्यों में इसका महत्वपूर्ण योगदान है।

षोडश प्रश्नपत्र- अनुवाद : सिद्धांत और प्रयोग

अनुवाद कार्य के विभिन्न स्तरों का विशद एवं वृहद् अध्ययन करके विद्यार्थी श्रेष्ठ अनुवादक बन सकता है। बहुभाषी देश में अनुवादक की एक महत्वपूर्ण भूमिका होती है। लिप्यन्तरण की कार्यालयी अनुवाद में अपनी ही एक विशेषता है।

सप्तदश प्रश्नपत्र- जनपदीय भाषा साहित्य (गढ़वाली भाषा साहित्य)

क्षेत्र विशेष के साहित्य का ज्ञान साहित्य के विद्यार्थी को अवश्य होना चाहिए। विद्यार्थी में क्षेत्रीय भाषा के प्रति रूचि उत्पन्न होने से वह अपने क्षेत्र विशेष की साहित्यिक एवं सांस्कृतिक विरासत को समृद्धिशाली बनाने में सदैव प्रयासरत रहता है।

अष्टादश प्रश्नपत्र- मौखिकी

यह एक प्रकार की परीक्षा है , जिसमें बाह्य परीक्षक द्वारा विद्यार्थी से सम्पूर्ण पाठ्यक्रम में से प्रश्न पूछे जाते हैं और विद्यार्थी को मौखिक रूप से उन प्रश्नों का उत्तर देना होता है। इससे विद्यार्थी में अभिव्यक्ति की क्षमता का विकास होता है।

8. राजनीति विज्ञान विभाग

स्नातक:

राजनीतिक सिद्धांत: राजनीतिक सिद्धान्त के अन्तर्गत राज्य, सरकार तथा समाज/ मानवीय जीवन का अध्ययन किया जाता है। राज्य की उत्पत्ति से लेकर आधुनिक ग्लोबल गांव का अध्ययन के विषय में जानकारी प्राप्त होती है। इस विषय से छात्रों को राजनीति विज्ञान की मूलभूत विषय की जानकारी मिलती है, जिससे वे राजनीति विज्ञान से पूर्णरूप से परिचित हो सके।

तुलनात्मक शासन एवं राजनीति: इस प्रश्न पत्र के अन्तर्गत विश्व के विभिन्न देशों की शासन प्रणालियों एवं राजनीति का तुलनात्मक अध्ययन किया जाता है, जिससे विभिन्न देशों की शासन प्रणालियों एवं राजनीति के विषय में विस्तार से जानकारी प्राप्त हो सके। इससे छात्र विश्व की शासन प्रणालियों एवं राजनीति से परिचित होते हैं।

प्रतिनिधि राजनीतिक विचारक: इस विषय के अन्तर्गत विभिन्न पाश्चात्य राजनीतिक विचारकों के विचार जो नगर राज्यों से लेकर वर्तमान राज्यों तक है कि विषय में छात्र जानकारी प्राप्त करते हैं।

भारतीय शासन एवं राजनीति: भारतीय शासन एवं राजनीति के अन्तर्गत विशेषरूप से भारतीय संविधान, व्यवस्थापिका, कार्यपालिका, न्यायपालिका, राष्ट्रपति, प्रधानमंत्री, चुनाव आयोग, विभिन्न क्षेत्रीय एवं राष्ट्रीय राजनीतिक दलों एवं दबाव समूहों का अध्ययन किया जाता है।

अन्तर्राष्ट्रीय राजनीति: अन्तर्राष्ट्रीय राजनीति के अन्तर्गत विभिन्न देशों के बीच की राजनीतिक सम्बन्धों राष्ट्रीय शक्ति, सामूहिक सुरक्षा कूटनीति तथा विदेश नीति का अध्ययन किया जाता हैं।

लोक प्रशासन: लोक प्रशासन के अन्तर्गत बजट, लेखा प्रणाली, व्यक्तिगत प्रशासन, संगठन एवं स्टाफ के विषय में जानकारी छात्रों को दी जाती है।

स्नातकोत्तर:

पाश्चात्य राजनीतिक विचारक: प्लेटों, अरस्तु, थामस एक्वीनास आदि पाश्चात्य राजनीतिक विचाराकों के विचारों से छात्र अवगत होते हैं जिससे राजनीति की मूलभूत अवधारणाओं से परिचित हो सकें।

तुलनात्मक राजनीति: विभिन्न देशों की शासन प्रणालियों का अध्ययन इस विषय के अन्तर्गत किया जाता है जिसमें शक्ति पृथक्करण, लोकमत आदि के विषय में छात्र जानकारी प्राप्त करते हैं।

भारतीय राजव्यवस्था: इसके अन्तर्गत भारतीय राजनीतिक व्यवस्था; संविधान, अधिकार, कर्तव्य, संसद, व्यवस्थापिका, कार्यपालिका, न्यायपालिका, संघीय व्यवस्था, चुनाव आयोग, केन्द्र-राज्य सम्बन्ध आदि विषयों का अध्ययन किया जाता है, जिससे छात्र इस विषय से परिचित होकर लाभ ले सकें।

स्थानीय स्वशासन: इस विषय के अन्तर्गत पंचायती राज व्यवस्था, नगरपालिकायें, नगर पंचायतें, महानगर पालिकाओं का अध्ययन किया जाता है जिससे स्थानीय शासन के विषय में छात्रों को जानकारी दी जाती है जिससे वे अपने स्थानीय शासन से परिचित हो सकें।

आधुनिक राजनीति व्यवस्था: इस प्रश्नपत्र के अन्तर्गत अमेरीका, ब्रिटेन, फ्रांस, चीन आदि प्रमुख देशों के संविधान, शासन और राजनीतिक दलों का अध्ययन किया जाता है जिससे छात्र विभिन्न देशों की राजनीति और शासन प्रणाली से परिचित हो सकें।

भारतीय राजनीतिक विचारक: इस प्रश्नपत्र के अन्तर्गत भारतीय राजनीतिक विचारकों के विचारों से छात्रों को परिचित करवाया जाता है जिससे वे अपने देश के विचारकों के योगदान की जानकारी ले सके।

भारतीय विदेश नीति: विश्व के प्रमुख देशों अमेरीका, रूस, चीन तथा पडौसी देश नेपाल, पाकिस्तान, बांग्लादेश, श्रीलंका आदि देशों के साथ भारतीय विदेश नीति किस प्रकार है और इन देशों के साथ समय-समय पर हमारे सम्बन्ध किस प्रकार के रहे हैं। इस विषय की जानकारी छात्रों को दी जाती है।

अन्तर्राष्ट्रीय सम्बन्ध: अन्तर्राष्ट्रीय सम्बन्ध के अन्तर्गत राजनीति, सामाजिक, आर्थिक, सैन्य आदि विषयों को लेकर विभिन्न देशों के सम्बन्धों का अध्ययन किया जाता है जिससे छात्र विभिन्न देशों के बिगड़ते-सुधरते सम्बन्धों के विषय में जानकारी प्राप्त कर सकें।

अन्तर्राष्ट्रीय संगठन: इस प्रश्न पत्र के अन्तर्गत विश्व में विभिन्न संगठन जो कि मानवता के विकास में विभिन्न स्तर पर कार्य कर रहे हैं। इनमें आर्थिक संगठन, सैन्य संगठन, क्षेत्रीय संगठन सम्मलित है इनके विषय में छात्रों को जानकारी दी जाती है।

भारतीय प्रशासन: इसके अन्तर्गत भारतीय प्रशासन जिसमें व्यवस्थापिका, कार्यपालिका, न्यायपालिका के अन्तर्गत आने वाले स्टाफ, बजट, भर्ती प्रक्रिया जैसे महत्वपूर्ण बिन्दुओं के विषय में छात्र जानकारी प्राप्त करते है।

मानवाधिकार: इसके अन्तर्गत मानवाधिकारों के विषय में छात्रों को जानकारी दी जाती है जिससे वह अधिकारों एवं कर्तव्यों के विषय जानकारी प्राप्त कर सकें।

राजनीति विज्ञान विषय; छात्रों को भविष्य की चुनौती के लिए तैयार करता है जिससे छात्र विभिन्न प्रतियोगी परीक्षाओं एवं भविष्य की राजनीति के तैयार हो सकें।