M.Sc. Physics

The M.Sc. Physics program has 20 courses offered in Physics during 4 semesters. Five Courses are offered in each of the four semesters. The course outcomes of the different courses are stated here.

PROGRAMME OUTCOMES (PO) OF MSc PHYSICS

PO No.	Upon completion of postgraduate programme, the students will be able to:
PO-1	Create, apply and disseminate knowledge leading to innovation
PO-2	Think critically, explore possibilities and exploit opportunities positively
PO-3	Work in teams, facilitating effective interaction in work places.
PO-4	Lead a sustainable life
PO-5	Embrace lifelong learning

PROGRAM SPECIFIC OUTCOMES (PSO) OF MSc PHYSICS

PSO No.	Upon completion of M.Sc Physics program, the students will be able to:
PSO-1	Master analytic and critical thinking skills through acquired knowledge in major branches of physics.
PSO-2	Graduates sustain intellectual curiosity and know how to continue to learn not only areas that are relevant to Physics, but also that are important to society
PSO-3	To equip the students for seeking suitable careers in Physics
PSO-4	Perform basic, applied and collaborative research.
PSO-5	Enhance pedagogical and scientific writing skills through modern methods.
PSO-6	Enhance National and International competency.
PSO-7	Kindle entrepreneurial skills and lifelong learning.
PSO-8	Become socially and environmentally responsible citizens.

Course Outcomes (CO)

Course Outcome No.	Outcome
Semester.1 : PH010101 MATHEMATICAL METHODS IN PHYSICS – I	
CO 1	To learn about Gradient, Divergence and Curl in orthogonal curvilinear and their typical applications in physics.
CO 2	To learn about special type of matrices that are relevant in physics and then learn about tensors.
CO 3	To study different ways of solving second order differential equations and familiarized with singular points and Frobenius method.
Semester.1: PH010102 CLASSICAL MECHANICS	
CO 4	To understand the Lagrangian and Hamiltonian approaches in classical mechanics.
CO 5	The classical background of Quantum mechanics and get familiarized with Poisson brackets and Hamilton -Jacobi equation
CO 6	To comprehend basic ideas about nonlinear equations and chaos.
Semester.1: PH010103 ELECTRODYNAMICS	
CO 8	To have a clear understanding of Maxwell's equations and electromagnetic boundary conditions.
CO 9	Have grasped the idea of electromagnetic wave propagation through wave guides and transmission lines
CO 10	Extend their understanding of special theory of relativity by including the relativistic electrodynamics.
Semester.1 : PH010104 ELECTRONICS	
CO 11	To learn about basic operational amplifier circuits.
CO 12	To study application of OPAMP as amplifiers
CO 13	To learn about different Communication Systems
Semester 2: PH010201 MATHEMATICAL METHODS IN PHYSICS – II	
CO 14	Learn the fundamentals and applications of Fourier series, Fourier and Laplace transforms, their inverse transforms etc.
CO 15	To have gained ability to apply group theory to physics problems, which is a pre-requisite for deeper understanding of crystallography, particle physics, quantum mechanics and energy bands in solids.
Semester 2: PH010202 QUANTUM MECHANICS – I	
CO 16	Students are expected to be well-versed in Linear vector spaces, Hilbert space, concepts of basis and operators and bra and ket notation.
CO 17	To learn theory of angular momentum and spin matrices, orbital angular momentum and Clebsh Gordan Coefficient.
CO 18	To understand Space-time symmetries and conservation laws, theory of identical particles.
Semester 2: PH010203 THERMODYNAMICS AND STATISTICAL MECHANICS	
CO 19	To apply the principles of statistical mechanics to selected problems.
CO 20	To Grasp the basis of ensemble approach in statistical mechanics to a range of situations..

CO 21	To learn the fundamental differences between classical and quantum statistics and learn about quantum statistical distribution laws.
Semester 2: PH010204 CONDENSED MATTER PHYSICS	
CO 22	To have a basic knowledge of crystal systems and spatial symmetries
CO 23	To know Bloch's theorem and what energy bands are and know the fundamental principles of semiconductors
CO 24	To know the fundamentals of dielectric and ferroelectric properties of materials
Semester 3: PH010301 QUANTUM MECHANICS – II	
CO 25	This course will enable the student to have basic knowledge about advanced techniques like approximation methods for time-independent problems like the WKB approximation.
CO 26	To learn Perturbation theory and Interaction of an atom with the electromagnetic field.
CO 27	Understand the variational equation and its application to ground state of the hydrogen and Helium atom.
CO 28	Perturbation theory and Interaction of an atom with the electromagnetic field.
CO 29	To study relativistic Quantum Mechanics using Dirac equation, Dirac matrices etc.
Semester 3: PH010302 COMPUTATIONAL PHYSICS	
CO 30	The students should be able to gets a wide knowledge of numerical methods in computational Physics that can be used to solve many problems which does not have an analytic solution.
Semester 3: PH010303 ATOMIC AND MOLECULAR PHYSICS	
CO 31	Know about different atom model and will be able to differentiate different atomic systems, different coupling schemes and their interactions with magnetic and electric fields.
CO 32	Have gained ability to apply the techniques of microwave and infrared spectroscopy to elucidate the structure of molecules
CO 33	Be able to apply the principle of Raman spectroscopy and its applications in the different field of science & Technology.
CO 34	To become familiar with different resonance spectroscopic techniques and its applications
Semester 3: PH810301 SOLID STATE PHYSICS FOR MATERIALS (Elective Course 1)	
CO 35	In this paper students study about various crystal imperfections atomic diffusion and different kind of crystal bindings
CO 36	To understand different type of excitations in solid such as plasmons, polaritons and magnons and their importance
Semester 4: PH010401 NUCLEAR AND PARTICLE PHYSICS	
CO 37	After successful completion of the course, the student is expected to have a basic knowledge of nuclear size, shape, bindingenergy.etc and also the characteristics of nuclear force in detail.
CO 38	Be able to gain knowledge about various nuclear models and potentials associated.

CO 39	Acquire knowledge about nuclear decay processes and their outcomes. Have a wide understanding regarding beta and gamma decay.
Semester 4: PH810402 SCIENCE OF ADVANCED MATERIALS (Elective Course 2)	
CO 48	Acquire knowledge about different materials such as Ceramics, polymers and composites and study their properties
CO 49	To have knowledge about photonic materials such as LEDs, solar cell and photonic crystals and their working principles
CO 50	Have information about materials used to fabricate various semiconductor devices.
Semester 4: PH810403 NANOSTRUCTURES AND MATERIALS CHARACTERIZATION (Elective Course 3)	
CO 51	This course will enable the student to have basic knowledge about preparation of quantum nanostructures
CO 52	To learn about Microelectromechanical Systems and Nanoelectrochemical systems.
CO 53	To Study carbon nanotubes and their applications.
Practical papers (PH1P01, PH1P02, PH1P03 and PH1P04)	
CO 54	PH1P01: These practical papers make the student familiar with General physics experiments like Cornu's method, Quincke's method, Photoelectric effect etc.
CO 55	PH1P02: On completion of this paper students will be expertise in handling specific electronic equipments like CRO, function generators etc.
CO 56	PH1P03: Here practicals in computational physics are performed using C++ language which will give a new experience to the students in the field of computer simulations.
CO 57	PH1P04: In their material science lab, students will learn to analyze XRD spectrum, U-V spectrum etc.