MSc (Physics)

Course Outcomes

Semester-1	
Course Code	**Course Outcomes**
PH2101	**CO1**- Learn complex analytical method to solve tedious integrals. **CO2-** Learn Fourier and Laplace techniques to solve differential equations. **CO3-** Able to deal with spatial function came across different physics problems in classical and quantum systems. **CO4-** Develop basic understanding of tensors. **CO5-**Learn Green's function method to solve non homogeneous differential equations.
PH2102	**CO1**- Develop the basic knowledge about the network theorems and analysis. **CO2**- Understanding of I-V characteristics of active electronic components and their respective applications in circuits. **CO3**- Develop the basic knowledge about the digital electronics.
PH2103	**CO1**- To develop skill to solve the mechanical problems by using Lagrangian, Hamiltonian methods. **CO2**- Apply the concept of canonical transformations and Poisson's brackets in solving problems of physics. **CO3**- Solve the dynamical systems by applying the Hamilton-Jacobi techniques.

	CO4- Solve Lagrange's equation of motion for small oscillations.
	CO5- Enhance the understanding of the student about classical approach to deal with mechanical systems.
PH2104	**CO1**- Develop the Concepts like matter waves, uncertainty principle, operator algebra, wave function.
	CO2- Write down and solve the time independent Schrodinger equations for simple quantum systems like free particle motion, bound states, tunneling problem, hydrogen atom, linear harmonic oscillator.
	CO3-Extract information about a quantum state from knowledge of its wave function.
	CO4- Achieve an ability to use the Bra-Ket notations and the matrix formalism of quantum mechanics.
	CO5- Helps the students to understand atomic physics, spectroscopy, particle physics, nuclear physics, solid state physics, and quantum statistics.
PH2161	**CO1**- Learn to validate the laws of general physics in a real experimental situation and correlate the laws of physics for explaining facts and figures.
	CO2- This will inculcate the scientific thinking skills and develop the curiosity of knowing "why things happen the way it happens".
	CO3- Learn to observe objects/experiments spread over different disciplines of physics for patterns and record both qualitative and quantitative information and construct reasonable conclusions.
	CO4- Acquire skill for development of any devices, appliances, instruments for different purposes.

PH2162	**CO1**- Acquire and interpret experimental data to examine the physical laws.
	PSO2, PSO3)
	CO2- Apply the scientific method to experiments in the laboratory.
	CO3- Develop procedures and observational skills as data is taken and gain a fundamental understanding of simple and complex apparatus used in the experiment.
	CO4- Apply analytical techniques, statistical analysis, graphical analysis, spread sheet data/recording to the experiments.
	CO5- Verify the theoretical ideas and concepts covered in lecture by completing a host of experiments.
	CO6- Communicate physical concepts and findings with professionalism, both orally and in writing.
Semester-2	
PH2201	**CO1**- Enhance the knowledge of Electric and magnetic forces.
	CO2- Enhance the knowledge of unification of electric and magnetic forces.
	CO3- Deal with propagation of electromagnetic wave in free space, Dialectic, &metal and reflection/transmission at the interface of these materials.
	CO4- Study transmission lines and modes propagation through the transmission lines.
	CO5- Understand the theory of radiation by point charge/dipoles.
PH2202	**CO1**- Develop the basic knowledge about electronic conduction in metals.

	CO2- Develop the basic knowledge about the crystal structure of materials.
	CO3- Understanding of physical properties of materials, e.g. thermal, dielectric and magnetic.
	CO4- Develop the basic knowledge of superconductivity and nano materials.
PH2203	**CO1**- Learn the essentials of C programming.
	CO2- Will help student to analyze and plot experimental graphs for the modern experiments where data acquisition is interfaced via computer.
	CO3- Will help in learning computation and do simulation and numerical programming labs.
	CO4- Knowledge of C programming will make them competent for developing software for various purposes.
PH2204	**CO1**- Develop the basic knowledge about different approximation methods.
	CO2- Carry out mathematical calculation on complex quantum systems by variational method.
	CO3- Develop the knowledge to understand Stark effect, Zeeman effect.Develop the basic knowledge on time – dependent perturbation theory, Fermi golden rule to understand atomic transitions.
	CO4- Helps the students to understand atomic physics, spectroscopy, particle physics, nuclear physics, solid state physics, quantum statistics.
PH2261	**CO1**- Design and study of the different applications of diodes and transistor.

	CO2- Design of different electronic circuits using 555 IC timers.
	CO3- Introduction of OPAMP and digital circuits using boolean algebra.
PH2262	**CO1**- Will gain the working knowledge of the C programming language.
	CO2- They will gain the knowledge of working in Linux OS.
	CO3- They will acquire the skill of solving simple physics/mathematics problem through programming.
	CO4- They will acquire knowledge of programming for writing computational and numerical problems.
	CO5- Will help for developing software for various purposes.
Semester-3	
PH2301	**CO1**- Learn to correlate the macroscopic thermodynamics of a system on basis of microscopic dynamics of particles at the microscope level.
	CO2- Learn that any object in the universe is composed of particles, which obey either Fermi statistics or Bose statistics and which are known as Fermions and Bosons.
	CO3- Learn all the modern theories of phase transition applicable to many systems.
	CO4- Learn to apply the concepts of statistical mechanics for understanding thermodynamics in different fields of science like Astrophysics, Cosmology, Plasma Physics, Biological systems, etc.
PH2302	**CO1**-Develop the basic knowledge of nuclear and particle physics.

	CO2-Solve problems and develop critical thinking and independent learning. **CO3**-Understand the nuclear interaction and mechanism of nuclear reactions and apply it in other fields of Physics viz. Astrophysics, Cosmology, Plasma Physics, etc.
PH2303	**CO1-**Learn techniques to solve problems numerically. **CO2-**Learn what the various sources of error are and how to minimize it. **CO3-**Capable of developing algorithms for solve problems numerically with the help of computer. **CO4-**Capable of developing algorithms to simulate physical processes using computers.
PH2331	**CO1-**Learn Quantum Field Theory to explain some of physical processes where Quantum Mechanics is inadequate. **CO2-**Learn different types of symmetries, both continuous and discrete, associated conservation laws. **CO3-**Apply the concept of symmetries to explain the different physics processes. **CO4-**Learn quark model of hadrons **CO5-**Learn Quantum Field Theory to explain some of physical processes where Quantum Mechanics is inadequate.
PH2332	**CO1-**Develop the basic knowledge about the VLSI based devices fabrication processes. **CO2-**Designing of the analog circuits using OPAMP for various real life applications **CO3-**Develop the basic knowledge about the microprocessor and will be able to

	program it according to the requirements.
PH2333	**CO1-**Realize the 4th state of matter i.e. plasma and its basic behaviour.
	CO2-Develop the understating of charge particle motion in different filed conditions.
	CO3-Understand the plasma behaviour by particle, fluid and kinetic theories.
	CO4-Learn different modes propagation in plasma in different physical conditions.
	CO5-Enhance the knowledge of diffusion of plasma in different magnetic field conditions.
	CO6-Develop basic understanding of stability and instability of a fluid/plasma system.
PH2334	**CO1-**Design, operation, and troubleshooting of the analog circuits using OPAMP for various real life applications.
	CO2-Apply basic concepts of microprocessor to technical problem solving according to the requirements.
Semester-4	
PH2401	**CO1-**Develop the understanding of interaction of the radiation, dose and exposure which are used in medical applications.
	CO2-Develop the ideas to discover the new particles.
	CO3-Develop the idea on digital circuits which is to be used in computers and other electronic system.
PH2402	**CO1-**Develop the understanding of quantum mechanics as well as learn the power of quantum mechanics to explain the origin and nature of the spectra of the hydrogen –like

	atoms and of the alkali atoms.
	CO2-Develop the idea of molecular physics which helps the understanding of the properties of the matter.
	CO3-Understand the basic properties and importance of laser light.
	CO4-Understand the phenomena of non-linear optics.
	CO5-Develop Problem solving skills and relevant mathematical methods to approach, conceptualize, and achieve analytical or numerical solutions to problems related to Atomic and Molecular Physics .
PH2403	**CO1-**Learn to apply the knowledge gained by studying the Numerical Technique (Theory) to solve problems numerically using computer.
	CO2-Capable of simulating physical processes using computers.
PH2431	**CO1-**Learn the weak interaction, electromagnetic interaction and electroweak unification.
	CO2-Learn Guage theory, spontaneous Symmetry breaking, Higgs Mechanism, Standard Model etc. for understanding the advanced and frontier research fields on the topic.
PH2432	**CO1-** Develop the basic knowledge about electronic communication and will be able to compare and contrast different communication schemes.
	CO2-Develop the basic knowledge to analyze the quality of transmitted or received information.
	CO3-Recognize the role of the transmission medium in communication system.

PH2433	**CO1-**Develop the basic knowledge of nonlinear phenomena in plasma.
	CO2-Acquire the knowledge of diagnostic techniques like electric probe, microwave & spectroscopic methods to study plasma parameters.
	CO3-Acquire the knowledge of Plasma production techniques.
	CO4-Understand plasma confinement techniques like Tokamak, Stellarator.
	CO5-Realize Plasma as an alternate source of electrical power generation.
PH2434	**CO1-**Develop the basic knowledge to the design, operate and troubleshooting of communications systems.
	CO2-Analyze the basic elements of communication circuits using computer simulations.
	CO3-Develop the basic knowledge to analyze components associated with digital and analog communication systems.
PH2475	**CO1-**Use of critical thinking to formulate and solve scientific problems.
	CO2-Develop documentation and presentation skills.