Programme: M. Sc. Physics

SEMESTER - I			
Core - I	**CLASSICAL MECHANICS**		
Code : 21PPHC11	**Hrs/Week: 6**	**Hrs/Semester: 90**	**Credits:5**

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	Recall basic concepts related to continuous mechanical system.	1	Re
CO 2	Classify the motion of bodies under the influence of the system of force.	5	Ev
CO 3	Understand the method of separation of variables	2	Un
CO 4	Estimate the motion of rigid bodies, molecules, planets, satellites and ships by studying Euler's angles.	3	Ev
CO 5	Interpret extremely accurate results when studying large objects and speeds approaching the speed of light.	3	Ap
CO 6	Explain the difference between Lagrangian and Hamiltonian formulation.	1	Un
CO 7	Imagine the planar and spatial motion of rigid body.	1	Cr
CO 8	Solve the problems using their knowledge and skills in classical mechanics.	2	Cr

SEMESTER - I			
CORE - II	**MATHEMATICAL PHYSICS – I**		
Code : 21PPHC12	**Hrs/Week: 6**	**Hrs/Semester: 90**	**Credits:5**

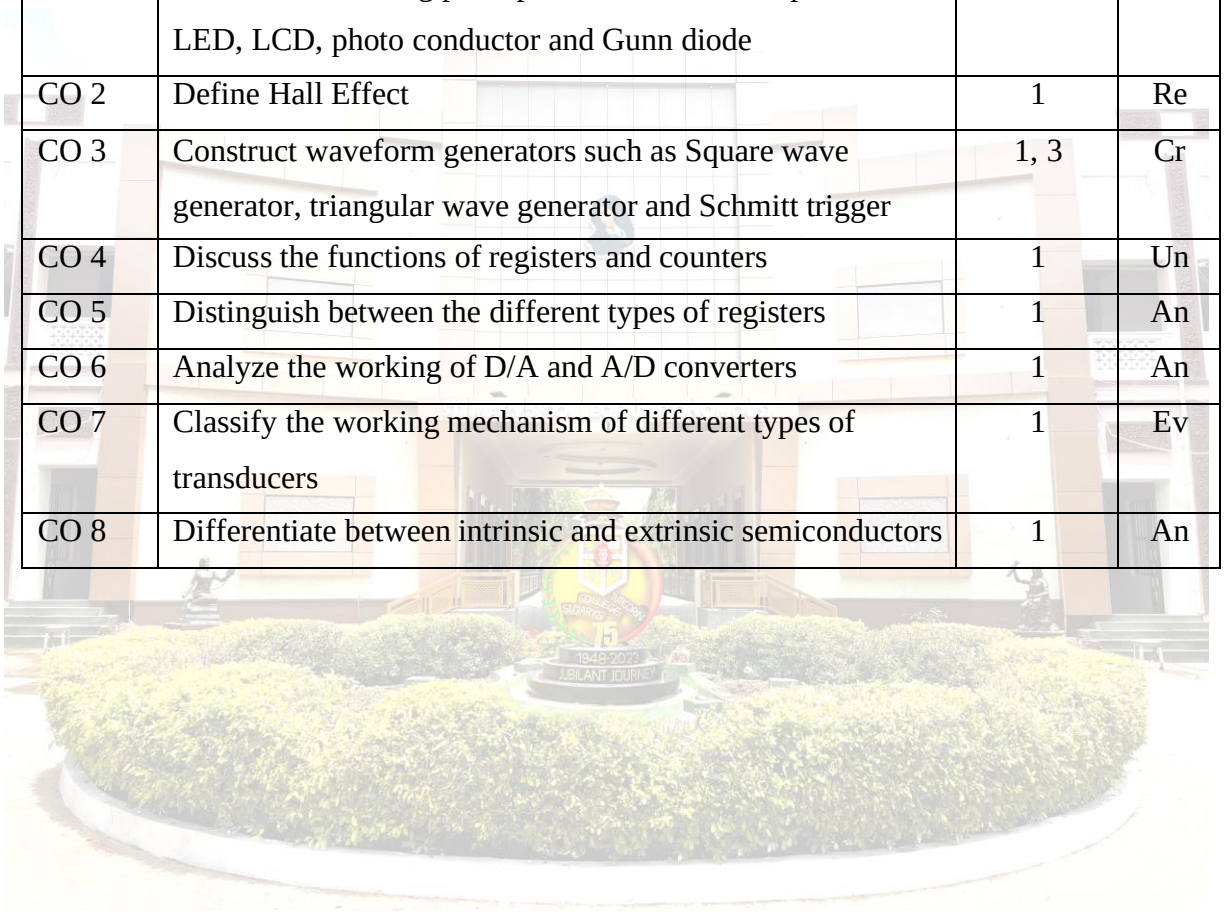
Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	Evaluate the area of irregular shape by Green's theorem.	2	Ev
CO 2	Recall the basic and the special types of matrices.	1	Re
CO 3	Understand the concepts of feedback control systems with finite dimensional vector spaces.	7	Un
CO 4	Apply special functions for Wireless communication and alternating current transmission.	2	Ap
CO 5	Understand the geometrical interpretation of complex numbers.	1	Un
CO 6	Explain the characteristic equation of a matrix using Cayley Hamilton Theorem.	3	Ev
CO 7	Understand the advanced concepts in evaluating double integral and area enclosed by plane curves	2	Un
CO 8	Apply group theory to various disciplines of Physics.	3	Ap

SEMESTER - I			
CORE - III ELECTRONICS AND EXPERIMENTAL METHODS			
Code : 21PPHC13	**Hrs/Week: 6**	**Hrs/Semester: 90**	**Credits: 5**

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	Discuss the working principle of Tunnel Diode, photodiode, LED, LCD, photo conductor and Gunn diode	1	Un
CO 2	Define Hall Effect	1	Re
CO 3	Construct waveform generators such as Square wave generator, triangular wave generator and Schmitt trigger	1, 3	Cr
CO 4	Discuss the functions of registers and counters	1	Un
CO 5	Distinguish between the different types of registers	1	An
CO 6	Analyze the working of D/A and A/D converters	1	An
CO 7	Classify the working mechanism of different types of transducers	1	Ev
CO 8	Differentiate between intrinsic and extrinsic semiconductors	1	An



SEMESTER - I			
ELECTIVE – I	**A. CRYSTAL GROWTH & THIN FILMS**		
Code : 21PPHE11	**Hrs/Week: 6**	**Hrs/Semester:90**	**Credits: 4**

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO 1	generate an understanding of self-assembly during the process of growth	1	Un
CO 2	apply the processskills of scientific inquiry during experimentation	4	Ap
CO 3	Classify the arrangement of SEM, TEM	4	Ev
CO 4	apply the techniques of SEM and TEM to their own research projects	5	Ap
CO 5	distinguish the differences and similarities between different deposition techniques.	1	An
CO 6	categorize selection of deposition techniques for various applications	1	An
CO 7	use more techniques for the preparation of crystals and thin films	4	Ap
CO 8	recognize appropriate material for the fabrication of a device	4	Re

SEMESTER - II			
CORE IV	**MATHEMATICAL PHYSICS II**		
Code : 21PPHC21	**Hrs/Week: 6**	**Hrs/Semester: 90**	**Credits: 5**

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	Analyse the experimental data with the aid of Fourier transform	4	An
CO 2	Blend the concepts of tensor calculus in moment of inertia	1	Cr
CO 3	Recall the basic notations of generating functions and special functions	1	Re
CO 4	Apply computational techniques to solve a wide range of numerical problems arising in physics	2	Ap
CO 5	Explain the concepts of Laplace Integral	1	Un
CO 6	Solve mathematical problems arising in physics by a variety of mathematical techniques.	2	Cr
CO 7	Employ the knowledge of critical thinking and problem solving	5	Ap
CO 8	Employ correct method to solve a particular problem	2	Ap

SEMESTER - II			
CORE V	**ELECTROMAGNETIC THEORY**		
Code : 21PPHC22	**Hrs/Week: 6**	**Hrs/Semester: 90**	**Credits: 5**

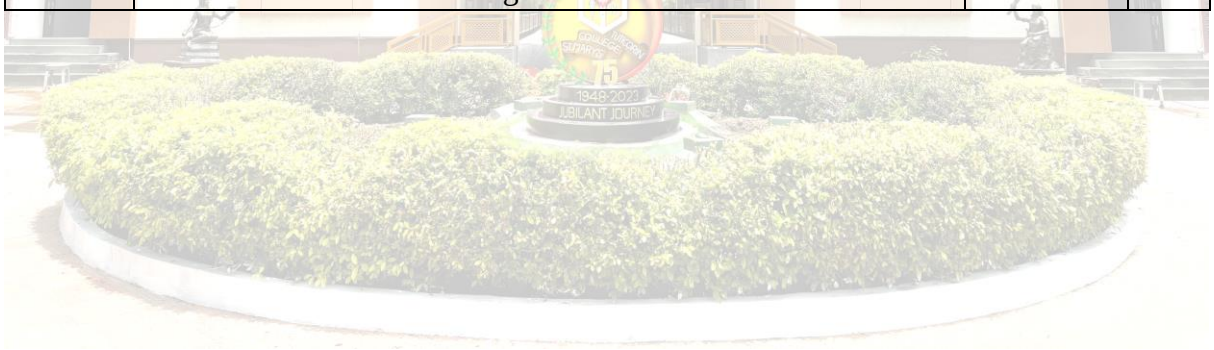
Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	Recall the fundamental concepts of electromagnetic theory	1	Re
CO 2	Compare electrostatics with magnetostatics	1	Un
CO 3	Construct Maxwell's equations and identify each mathematical operator and physical quantity in the equations	3	Ap
CO 4	Formulate potential problems within electrostatics, magnetostatics	2	Cr
CO5	Analyze different waves and conduct a mock trial on electromagnetic radiation	5	An
CO 6	Summarize the types of wave guides	1	Un
CO7	Distinguish transmission lines and waveguides and analyze propagation of signal in different modes	1	An
CO8	Obtain solutions for the problems in electromagnetic theory	2	Cr

SEMESTER - II			
CORE VI THERMODYNAMICS AND STATISTICAL MECHANICS			
Code : 21PPHC23	**Hrs/Week: 6**	**Hrs/Semester: 90**	**Credits:5**

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	Understand working knowledge of the zeroth, first, second and third law of thermodynamics	1	Un
CO 2	Apply statistics in different systems containing atoms and molecules	2	Ap
CO 3	Inspect the partition function for the microcanonical, canonical, grand canonical ensemble	1	An
CO 4	Recall the loss of thermodynamics and equipartition theorem from the statistical description using microstates	1	Re
CO 5	Assess about phase transitions and black body radiation	5	Ev
CO 6	Apply energy changes in chemical reaction using the first law of thermodynamics	2	Ap
CO 7	Estimate the Statistical properties of Random Walks and fluctuations in ensembles	1	Cr
CO 8	Determine the physical properties of the system using various correlation functions in Ising Model	6	Ev



SEMESTER - II			
ELECTIVE - II A. BIO-MEDICAL INSTRUMENTATION			
Code :21PPHE21	**Hrs/Week: 6**	**Hrs/Semester:90**	**Credits: 4**

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	Define resting and action potentials	1	Re
CO 2	Classify the uses of electrode paste	1	Ap
CO 3	Discuss the principle of operation of different types of transducers	1	Un
CO 4	Interpret the output of bio potential recorders such as ECG, EEG and EMG	1	Ev
CO 5	Investigate internal and external pacemakers	1	An
CO 6	Illustrate the working of different kinds of radiation monitoring instruments	1	Ap
CO 7	Recognise the importance of computers in medicine	1	Un
CO 8	Evaluate the need for various imaging techniques such as Computer Tomography, Thermography and MRI	1	Ev

SEMESTER - II			
ELECTIVE II B. MICROPROCESSOR AND MICROCONTROLLER			
Code :21PPHE22	**Hrs/Week: 6**	**Hrs/Semester: 90**	**Credits: 4**

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	Understand the architectures and instruction sets of microprocessors and microcontrollers	1	Un
CO 2	Verify bus transactions, memory organisation and address decoding, basic I/O interfaces and port addressing	1	Ev
CO 3	Apply and implement learned algorithm design techniques and data structures to solve the problems	2	Ap
CO 4	Understand the interfacing of peripheral devices like I/O ports, keyboards, displays, ADCs, DACs, stepper motor	1	Un
CO 5	Analyze concepts associated with interfacing a microprocessor to memory and to I/O devices	6	An
CO 6	Estimate how to control components of a microprocessor based system through the use of interrupts	4	Cr
CO 7	Recall a microprocessor programming model at a level that enables to write assemble language programs for theprocessor meeting given specifications	6	Re
CO 8	Understand the popular 8051 Microcontroller ,the processor family and Time delay	1	Un

SEMESTER -III			
Core - VII	**QUANTUM MECHANICS – I**		
Code: 21PPHC31	**Hrs/Week: 6**	**Hrs/Semester: 90**	**Credits:5**

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	Recall Schrodinger equation	1	Re
CO 2	Describe Ehrenfest's theorem and its verification	1	Un
CO 3	Discuss Heisenberg Uncertainty principle	1	Un
CO 4	Evaluate the commutation relations between the various quantum mechanical operators	1	Ev
CO 5	List the properties of Ket and Bra vectors	1	Re
CO 6	Discuss the linear harmonic oscillator problem using wave formalism and matrix formulation	2	Un
CO 7	Interpret equations of motion in the Schrodinger picture, Heisenberg picture and Interaction picture	1, 2	Ap
CO 8	Combine spin and angular momenta	1	Ap

SEMESTER -III			
CORE - VIII ATOMIC AND MOLECULAR SPECTROSCOPY			
Code:21PPHC32	**Hrs/Week: 6**	**Hrs/Semester: 90**	**Credits:5**

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	Explain the structure of atoms and the origin of the observed spectra	1	Un
CO 2	Examine rotational spectra, get information about molecular dimension and atomic masses	4	An
CO 3	Examine rotational Raman spectra and understand the techniques in instrumentation	3	An
CO 4	Apply knowledge of Mossbaur spectroscopy in solid state physics and nanotechnology	4	Ap
CO 5	Assess how nuclear spins are affected by magnetic field and able to explain what happens when radio frequency radiationis observed	1	Ev
CO 6	Recall the basic hydrogen spectra	1	Re
CO 7	Explain the key properties of many electron atoms and the importance of the Pauli's exclusion principle	1	Ev
CO 8	Solve problems in atomic and molecular physics	2	Ap

SEMESTER –III			
CORE - IX	**SOLID STATE PHYSICS- I**		
Code: 21PPHC33	**Hrs/Week: 6**	**Hrs/Semester: 90**	**Credits: 5**

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	Recall about the crystal structure and degree of ordering to atom binding and packing	1	Re
CO 2	Compare the Energy Bands and the number of orbital	5	Un
CO 3	Explain the physics of different types of bonds in crystalline structure	1	Un
CO 4	Solve band structure calculations for simple systems	6	Cr
CO 5	Apply the role of effective electron mass in electron dynamics	1	Ap
CO 6	Estimate the thermal ionization of donors and acceptors	4	Ev
CO 7	Describe diffraction using the reciprocal lattice	1	Re
CO 8	Deduce Bloch's theorem from the Schrödinger equation for electrons in a periodic potential	6	An

SEMESTER - III			
ELECTIVE -III A. NANO SCIENCE AND TECHNOLOGY			
Code:21PPHE31	**Hrs/Week: 6**	**Hrs/Semester:90**	**Credits: 4**

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	Recall a thorough knowledge of basic underline disciplines of nanoscience and nanotechnology	4	Re
CO 2	Explain the preparation, characterization and properties of nanomaterials	6	Un
CO 3	Analyze the types and properties of carbon nanotubes	1	An
CO 4	Assimilate existing and new concepts, methodology and researches and apply them in their academic research environment	7	Ev
CO 5	Aware of challenges, risks and promises of nano technological development	6	An
CO 6	Synthesise the nanomaterials by physical, chemical and biological methods and evaluate their properties.	6	Ev
CO 7	Characterise the synthesized nanomaterials by various techniques.	5	Ev
CO 8	Apply the nanomaterials in energy storage, food and in day-to-day life.	8	Ap

SEMESTER - III			
ELECTIVE -III	**B. ENERGY SOURCES**		
Code: 21PPHE32	**Hrs/Week: 6**	**Hrs/Semester:90**	**Credits: 4**

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	outline the technologies that are used to harness the power of solar energy	1	An
CO 2	discuss the positive and negative aspects of solar energy in relation to natural and human aspects of the environment	5	Un
CO 3	Summarize the structure of biomass.	8	Ev
CO 4	Assess economic factors affecting geothermal energy production	5	Ev
CO 5	Analyse and critically evaluate emerging geothermal technologies.	8	An
CO 6	Compare chemical energy to mechanical energy.	1	An
CO 7	Write the uses of Hydrogen energy	5	Cr
CO 8	List the main characteristics (advantages/disadvantages) for fuel cells.	8	Ap

SEMESTER – IV			
CORE X	**QUANTUM MECHANICS – II**		
Code: 21PPHC41	**Hrs/Week: 6**	**Hrs/Semester: 90**	**Credits: 5**

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	Describe time independent perturbation theory and its application to the first order Stark effect in Hydrogen atom	1	Re
CO 2	Discuss time dependent perturbation theory and transition probability	1	Un
CO 3	Derive Fermi- Golden rule	2	An
CO 4	Write the Relativistic theory in quantum mechanics	1	Cr
CO 5	Describe scattering by a square well potential using Born approximation and Partial wave analysis	1	Un
CO 6	Employ WKB approximation in quantum problems	1	Ap
CO 7	Explain Dirac's equation for a free particle	1	Ev
CO 8	Apply approximation methods to solve problems	1	Ap

SEMESTER - IV			
CORE XI	**SOLID STATE PHYSICS- II**		
Code:21PPHC42	**Hrs/Week: 6**	**Hrs/Semester: 90**	**Credits: 5**

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	Understand the properties of solids	1	Un
CO 2	Demonstrate the types of Polarizability	2	Ap
CO 3	Compare the magnetic properties of solid materials	1	An
CO 4	Reason the working of magnetic mirror and SQUID	1	An
CO5	Identify theproperties of insulators and ferro electricity.	1	An
CO 6	Develop the research work in the field of material science and nanotechnology	1	Cr
CO7	Solve the problems related basic crystallography.	1	Cr
CO8	Discuss the quantum theory of magnetic materials	1	Ap

SEMESTER - IV			
CORE XII	**NUCLEAR AND PARTICLE PHYSICS**		
Code:21PPHC43	**Hrs/Week: 6**	**Hrs/Semester: 90**	**Credits:5**

Course Outcomes:

CO No.	Upon completion of this course, students will be able to	PSOs addressed	CL
CO 1	List the basic atomic properties of nuclei	1	Re
CO 2	Classify the different types of nuclear reactions	5	Un
CO 3	Examine the different types of nuclear models and their properties	6	An
CO 4	Categorize the nuclear forces and the theories related to it	1	An
CO 5	Classify the types of elementary particles	1	Ev
CO 6	Distinguish the fission and fusion	1	An
CO 7	Relate the deuteron properties and reactions	2	Ap
CO 8	Examine the origin of various terms in nuclear physics	1	An

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