J.J. College of Arts & Science (Autonomous), Pudukkottai

Department of Physics

Course Outcomes

M.Sc. Physics – PSPH

Course Name - Mathematical Physics	Course Code - P1R1PHCC1
Upon Completion of the course students would be able to	
CO 1	Use Green's theorem and Stoke's theorem to compute integrals.
CO 2	Diagonalize square matrices.
CO 3	Acquired skill to solve physics problems using complex analysis.
CO 4	Use special functions to evaluate different integrals.
CO 5	Understand and use the Great Orthogonality theorem
Course Name - Classical Dynamics And Relativity	Course Code - P1R1PHCC2
Upon Completion of the course students would be able to	
CO 1	Acquired knowledge about conservation laws and constraints.
CO 2	Apply Lagrangian formulation to solve problems in mechanics.
CO 3	Acquired knowledge about central force problem.
CO 4	Understand Kepler problem.
CO 5	Acquired knowledge about Hamilton's formulation.
CO 6	Apply Hamilton's formulation to solve problems in mechanics.
Course Name – Analog and Digital Electronics	Course Code – P1R1PHCC3
Upon Completion of the course students would be able to	
CO 1	The current voltage characteristics of semiconductor devices.
CO 2	Analyze dc circuits and relate ac models of semiconductor devices with their physical Operation.
CO 3	Design and analyze of electronic circuits.
CO 4	Analyze important types of integrated circuits.
CO 5	Analyze, design and implement sequential logic circuits

Course Name - Numerical Methods And Computational Physics		Course Code – P1R1PHEC1
Upon Completion of the course students would be able to		
CO 1	Use numerical methods to model physical systems on different length and time scales.	
CO 2	Critically select different numerical methods to solve different types of physical and technical problems.	
CO 3	Describe different methods to compute the electron structure of solid materials.	
CO 4	Enable students to both broaden and deepen our understanding of physics by vastly increasing the range of mathematical calculations.	
CO 5	Acquired the knowledge of differential equation.	
Course Name - Major Practical – I (General & Electronics)		Course Code : P1R1PHCC4P
On completion of the course, the students will be able to		
CO 1	Measure of the stiffness of a solid material which is a mechanical property of linear elastic solid materials.	
CO 2	Understand ions are accelerated in the desired direction using charged plates with the opposite electrical potential.	
CO 3	Understand the electromagnetic radiation emitted by a black body at constant temperature.	
CO 4	Determine the charge to mass value of the electron (electric and magnetic field)	
CO 5	Understand that the passive component is basically a resistor whose resistance value decreases when the intensity of light decreases.	
Course Name - Electromagnetic Theory		Course Code – P2R1PHCC5
Upon Completion of the course students would be able to		
CO 1	Demonstrate a mastery of Coulomb's law for the electric field, and apply it to systems of point charges as well as line, surface, and volume distributions of charges.	
CO 2	Exploit alternative coordinate systems (Cartesian and spherical coordinates) to problems.	
CO 3	Reformulate the laws of electrostatics in the form of Laplace's or Poisson's equations for the potential, and solve boundary-value problems	
CO 4	Demonstrate an understanding of the relation between electric field and potential, exploit the potential to solve a variety of problems, and relate it to the potential energy of a charge distribution.	

CO 5	**Examine the phenomena of wave propagation in different media.**
Course Name – Quantum Mechanics	**Course Code – P2R1PHCC6**
Upon Completion of the course students would be able to	
CO 1	**Understand the concepts and principles of Quantum Mechanics: the Schrodinger equation, the wave function and its physical interpretation, stationary and non-stationary, time evolution and expectation values.**
CO 2	**Apply principle of quantum mechanics to calculate observables on known wave functions.**
CO 3	**Grasp the concept of spin and angular momentum as well as their quantization and addition rules.**
CO 4	**Explain physical properties of elementary particles (nucleons, atoms, molecules and solids (bond structure) based on quantum mechanics.**
CO 5	**To analysis the concept of Klein-Gordon equation**

Course Name - Statistical Mechanics	**Course Code – P2R1PHCC7**
Upon Completion of the course students would be able to	
CO 1	**Acquire knowledge about different laws of thermodynamics.**
CO 2	**Grasp the basic concept of ensemble approach in statistical mechanics and able to apply the approach to a wide range of situations.**
CO 3	**Learn the fundamental differences between classical and quantum statistics.**
CO 4	**Understand the thermodynamics of ideal Bose systems and Fermi systems in physics.**
CO 5	**Understand the applications of M-B, B-E and F-D distribution from various energy level**
Course Name - Microprocessor And Microcontroller	**Course Code – P2R1PHCC8**
Upon Completion of the course students would be able to	
CO 1	**Write programs to run on 8086 microprocessor based systems.**
CO 2	**Design system using memory chips and peripheral chips for 16 bit 8086 microprocessor.**
CO 3	**Understand and device techniques for faster execution of instructions, improve speed of operations and enhance performance of microprocessors.**
CO 4	**Analyaze assembly language programs;select appropriate assemble into machine cross assembler utility of a microprocessor and microcontroller.**

CO 5	**Evaluate assembly language programs and download the machine code that will provide solutions real-world control progrmmes.**
Course Name – Crystal Growth And Thin Films	**Course Code – P2R1PHEC2**
Upon Completion of the course students would be able to	
CO 1	**Learn about the crystal growth mechanisms and techniques.**
CO 2	**Learn about various thin films deposition and characterization techniques.**
CO 3	**Much of our research is dependent on growing high quality crystal and thin films.**
CO 4	**To improve the properties and performance of thin films and crystals.**
CO 5	**To achieve improvements in the growth process.**
CO 6	**Perceive the higher quality of crystal and thin films**
Course Name - Major Practical – II	**Course Code : P2R1PHCC9P**
At end of the course students will be able to:	
CO 1	**Understand and classify the instruction set of 8086 microprocessor and distinguish the use of different instructions and apply it in assembly language programming.**
CO 2	**Understand the architecture and operation of Programmable Interface Devices.**
CO 3	**To Understand the Binary to BCD conversion using assembly language programming and perform it using microprocessor trainer kit.**
CO 4	**Realize the C programming & Interfacing Advanced Microprocessor.**
CO 5	**To know the various applications of 8086 microprocessor to perform the general architecture of a microcomputer system and architecture & organization 8086.**

Course Name - Condensed Matter Of Physics		Course Code – P3R1PHCC10
Upon Completion of the course students would be able to		
CO 1	Understand the basic ideas of crystals, its periodic structure and defects.	
CO 2	Empathize the properties that result from the distribution of electrons in metals, semiconductors and insulators.	
CO 3	Able to comprehend the dielectric and magnetic properties of solids.	
CO 4	Identify with the concepts of defects and dislocations in crystals and its consequences.	
CO 5	Acquire the knowledge about the theories underlying the superconducting properties of materials.	
Course Name - Atomic And Molecular Spectroscopy		Course Code – P3R1PHCC11
Upon Completion of the course students would be able to		
CO 1	List different types of atomic spectra and related instrumentation.	
CO 2	Describe theories explaining the structure of atoms and the origin of the observed spectra.	
CO 3	Identify atomic effect such as space quantization and Raman effect.	
CO 4	Describe the molecular bonding and molecular energies.	
CO 5	Perceive the resonance spectra from various energy level	
Course Name - Nanoscience And Nanotechnology		Course Code – P3R1PHEC3
Upon Completion of the course students would be able to		
CO 1	Explain the fundamental principles of nanotechnology and their application to biomedical engineering.	
CO 2	Apply engineering and physics concepts to the nano-scale and non-continuum domain.	
CO 3	Identify and compare state-of-the-art nanofabrication methods and perform a critical analysis of the research literature.	
CO 4	Evaluate current constraints, such as regulatory, ethical, political, social and economical, encountered when solving problems in living systems.	
CO 5	Potentially be able to join a research group in nanoscience and nanotechnology	

Course Name - Advanced Physics		Course Code - P3R1PHEC4
Upon Completion of the course students would be able to		
CO 1	Understand and be able to explain the principles and operation of a laser.	
CO 2	Understand and be able to apply the principles of optical modulation and detection as well as evaluate its performance.	
CO 3	Understand nonlinear optics and photonics phenomena and how they impact modern advanced technological systems.	
CO 4	Acquired the knowledge of OFC	
CO 5	Generate succinct laboratory reports based on experimental observations and theoretical analysis.	
Course Name - Major Practical – III		Course Code : P3R1PHCC12P
On completion of the course, the students will be able to		
CO 1	Study the temperature dependence of resistance of a semiconductor.	
CO 2	Determine the magnetic susceptibility of paramagnetic substance in the form of a liquid, solid and rod.	
CO 3	Understand the Dielectric properties of Liquid Amides from a polarizable force field.	
CO 4	Determine the thermal conductivity of a good conductor.	
CO 5	Determine the thickness of thin films using optical instruments.	
Course Name - Nuclear And Particle Physics		Course Code - P4R1PHCC14
Upon Completion of the course students would be able to		
CO 1	List different types of atomic spectra and related instrumentation.	
CO 2	Describe theories explaining the structure of atoms and the origin of the observed spectra.	
CO 3	Identify atomic effect such as space quantization and Raman effect.	
CO 4	Describe the molecular bonding and molecular energies.	
CO 5	Work in the laboratory, analysis of experimental data, theoretical calculations, computational simulations, or a combination of those tasks.	

CO 6	**Collaborate with others in an international team, take responsibility for own project, and present scientific results both in writing and orally**
Course Name - Major Practical – IV	**Course Code : P4R1PHCC13P**
After successful completion of the course student will be able to:	
CO 1	**Understand the differences between theoretical, practical & simulated results in integrated circuits.**
CO 2	**Develop a digital logic and apply it to solve real life problems.**
CO 3	**Know the design aspects of microprocessor and to write assembly language programs of microprocessor for various applications.**
CO 4	**Understand DC analysis and AC models of semiconductor devices.**
CO 5	**Analyze logic processes and implement logical operations using combinational logic circuits.**