DEPARTMENT OF PHYSICS

PROGRAM SPECIFIC OUTCOMES

PSO-1 : Students will demonstrate knowledge of classical mechanics, electromagnetism, quantum mechanics, and thermal physics, and be able to apply this knowledge to analyze a variety of physical phenomena.

PSO-2 : Students will develop the proficiency in the acquisition of data using a variety of laboratory instruments and in the analysis and interpretation of such data. Hence the students will be to execute experimental and project work independently.

PSO-3 : Students will be capable of oral and written scientific communication and will prove that they can think critically and work independently.

PSO-4: Students will be able to understand the issues of environmental contexts and sustainable development.

PSO-5 : Students will realize and develop an understanding of the impact of physics and science on society.

COURSE OUTCOMES

SEMESTER I - PH1CRT01 : METHODOLOGY AND PERSPECTIVES OF PHYSICS

This paper helps in the following ways

1. Acquire an overview on the inspiring history in the development of physics.

2. Develop a knowledge on different number systems and their change process and to identify the application of binary numbers in computers.

3. Learn the significance of vectors in physics.

4. Get familiar with different coordinate systems and their applications in various kinds of problems in physics.

5. Achieve knowledge on the importance of care to be taken while doing experiment.

6. Create skills to estimate errors in experimental measurements

SEMESTER II - PH2CRT02 : MECHANICS AND PROPERTIES OF MATTER

1. Understand the general nature of waves and its characteristics.

2. Define simple harmonic motion and deduce total energy of SHM.

3. Analyse the theory of various oscillations and resonance.

4. State and prove parallel and perpendicular axes theorems.

5. Derive expressions for moment of inertia of regular bodies using parallel/perpendicular axes theorem.

SEMESTER III - PH5CRT03 : OPTICS, LASER AND FIBER OPTICS

1. Understand the basic theories of the phenomena like interference, diffraction and polarization and their applications.

2. Understand the basic working principle of Laser and different types of lasers.

3. Familiarize applications of lasers in different fields.

4. Understand the propagation of light through optical fiber.

5. Acquire knowledge different kinds of optical fibres and its applications.

SEMESTER IV - PH5CRT04 - SEMICONDUCTOR PHYSICS

1. Understand various types of semiconducting diodes, properties and characteristics.

2. Analyse various configurations and feedback circuits of bipolar junction transistor

3. Apply the concepts of transistor amplifier.

4. Compare amplifiers & oscillators.

5. Explain Field Effect Transistor (FET) and OP-amp.

6. Analyze different types of modulation.

SEMESTER V - PH5CRT05: ELECTRICITY AND ELECTRODYNAMICS

1. Lay a sound theoretical foundation in electricity and electrodynamics.

2. Understand the concepts of Polarization, bound charges and boundary conditions.

3. Express the relevance of different magnetization and the boundary condition of magnetic field.

4. Illustrate Faraday's law of induction, Maxwell's equations in different media and displacement current.

5. Discuss energy, momentum and propagation of electromagnetic waves in different media.

6. Solve network theorems.

PH5CRT06: CLASSICAL AND QUANTUM MECHANICS

1. Understand the basic concepts of constraints and the formulation of Lagrangian and Hamiltonian

2. Understand the basic mathematical formulation of quantum mechanics.

3. Understand wave properties of particles, De Broglie waves and its implications on the uncertainty principle.

4 Understand the concepts of Wave Mechanics, Eigen values, Eigen functions and basic postulates of quantum mechanics.

5 Analyse Schrodinger's equation for a particle in a box.

PH5CRT07 : DIGITAL ELECTRONICS AND PROGRAMMING

1. Explain the basic logic operations of NOT, AND, OR, NAND, NOR, and XOR gates.

2. Simplify circuits and Boolean expressions using the Boolean laws and Karnaugh maps.

3. Design basic combinational and sequential logic circuits.

4. Understand the basics of object oriented C++ programming.

5. Acquire the skills to write the programs using the basic concepts of C++.

PH5CRT08 : ENVIRONMENTAL PHYSICS AND HUMAN RIGHTS

1. Get basic knowledge about water resources and proper water management.

2. Understand pollution factors, remedies and environmental protection laws

3. Understand renewable, non-renewable and natural resources.

4. Recognize the need to protect various energy sources and understand advantages of renewable energy sources and steps to harness them.

5. Identify different means of harnessing solar energy and its advantages.

6. Understand the International, National and State perspectives of Human Rights and means to prevent the violation of rights.

SEMESTER VI

PH6CRT09 : THERMAL AND STATISTICAL PHYSICS

1. To understand the concept of heat, zeroth and first law of thermodynamics.

2. Explain Lees Disc experiment and can calculate the thermal conductivity by experimentally.

3. Describe the working of ideal and real heat engines.

4. Focus on the thermo dynamical functions and their relations

5. To understand and analyse some of the basic concepts of statistical physics.

6. Derive Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac distribution laws and compare the laws.

PH6CRT10 : RELATIVITY AND SPECTROSCOPY

1. Understand the significance of Michelson Morley experiment.

2. Explain special theory of relativity.

3. Derive Lorentz transformation equations.

4. Illustrate twin paradox.

5. Explain relativistic time dilation and length contraction.

6. Derive Einstein's mass energy relation $E=mc^2$.

PH6CRT11 : NUCLEAR, PARTICLE AND ASTROPHYSICS

1. Understand the basic occupants of nuclear physics and particle physics.

2. Differentiate the different types of nuclear reactions.

3. Elucidate the origin and effects of cosmic rays.

4. Acquire knowledge on elementary particles will help students to understand the fundamental constituents of matter and lay foundation for the understanding of unsolved questions about dark matter, antimatter and other research oriented topics.

5. Develops a research curiosity in nuclear & Astrophysics.

PH6CRT12 : SOLID STATE PHYSICS

1. Understand the basics of crystallography, Electrical properties of metals.

2. Understand Band Theory of solids, demarcation among the types of materials, Semiconductor Physics and Superconductivity.

3. Distinguish various chemical bonding in common crystal structures.

4. Solve problems and analyze experimental results.

CHOICE BASED COURSE

PH6CBT02 : MATERIAL SCIENCE

1. Understand the structure, properties and classification of materials.

2. Understand about the imperfections in solids.

3. Distinguish between different optical properties of materials-absorption Photoconductivity and Photoluminescence.

4. Develop ideas about various display devices.

5. Get awareness of nanotechnology - synthesis and characterisations like Powder XRD, SEM, etc of semiconducting nano particles.

OPEN COURSE

PH5OPT02 : PHYSICS IN DAILY LIFE

1. Understand the concept of errors, fundamental and derived quantities.

2. Understand the role of light and em waves in daily life.

3. Understand the concepts and laws of linear and rotational motion.

4. Understand the different methods of power generation and evaluate the merits and demerits.

5. Realize the general features of waves.

6. Understand the fundamentals of celestial bodies andthe importance of satellites.

COMPLEMENTARY PHYSICS FOR MATHEMATICS

PH1CMT01 : PROPERTIES OF MATTER & ERROR ANALYSIS

1. Understand the concepts of elasticity and its relevance.
2. Understand and evaluate the practical significance of the fluid dynamics.
3. Explain different types of errors in measurements.
4. Estimate and report errors in physical measurements.
5. Create skills to estimate errors in experimental measurements

PH2CMT01 : MECHANICS AND ASTROPHYSICS

1. Recall the laws of gravitation.
2. Apply parallel and perpendicular axes theorem.
3. Describe the life cycle of stars and stellar evolution
4. Understand stellar classification, properties and its various stages.

PH3CMT01 : MODERN PHYSICS AND ELECTRONICS

1. Describe different atom models.
2. Calculate various factors related to radioactivity.
3. Explain the inadequacies of classical physics and experimental evidences for quantum theory.
4. Obtain the Schrodinger equation and use it for solving the problem of a particle in a box.
5. Comprehend the theory behind diodes and transistors.
6. Illustrate number systems, Boolean algebra, logic gates and truth table.

PH4CMT01 : OPTICS & ELECTRICITY

1. To study the characteristic properties of light using the phenomenon of interference, diffraction and polarization of light and their applications.
2. Understand the basic working principle of Laser and its applications.
3. Explain the properties of dielectrics.
4. Apply the concepts of alternating current.
5. Develop practical skills based on optical and electrical experiments.

COMPLEMENTARY PHYSICS FOR CHEMISTRY

PH1CMT01 : PROPERTIES OF MATTER & THERMODYNAMICS

1. Understand the theory behind the modulus of elasticity.

2. Analyse the bending moments/torsion while applying force on different objects.

3. Understand and evaluate the practical significance of the fluid dynamics.

4. Explain thermodynamic systems and processes.

PH2CMT01 : MECHANICS AND SUPERCONDUCTIVITY

1. Understand the characteristic features of motion under gravity.

2. Apply parallel and perpendicular axes theorem.

3. Describe the characteristics of waves.

4. Classify materials like insulators, semiconductors.

5. Understand the concept of superconductivity.

PH3CMT01 : MODERN PHYSICS AND MAGNETISM

1. Describe different atom models.

2. Understand various factors related to radioactivity.

3. Explain the inadequacies of classical physics and experimental evidences for quantum theory.

4. Obtain the Schrodinger equation and use it for solving the problem of a particle in a box.

5. Discuss about magnetism, different magnetic materials, its properties and reason for Earth's magnetism.

PH4CMT01 : OPTICS &SOLID-STATE PHYSICS

1. Apply the concepts of interference, diffraction and polarization in different practical cases.

2. Understand the basic working principle of Laser and its applications.

3. Explain the properties of dielectrics.

4 Distinguish different crystal structures with examples.

Importance of Practical

Laboratory offers a extensive space for students to nurture their hidden scientific potential, creative thinking and systematic analyzing skills. Through B Sc. Physics programme, students will realize how theory, experiment and observation mutually correlated and help each other to increase the frontiers of knowledge of the physical universe. By conducting various experiments, students will be able to adopt a number of skills and they will be benefitted in life many ways as follows:

(a) Understand the basic notions of physics thoroughly.

(b) Deliver platform to test out the theoretical knowledge gained in class rooms.

(c) Learn to formulate physical phenomenon mathematically.

(d) Develop inferences from observations.

(e) Get competency to use mathematical methods to solve physics problems.

(f) Improve the observational and technical skills.

(g) Ability to handle various instruments in the laboratory.

(h) Learn to tabulate the data systematically.

Importance of Project

On completion of the course, the students will be able to:

(a) Describe the necessity, need, relevance and importance of the project undertaken.

(b) Outline the work into small tasks like reference work, collection of equipment and materials, the apparatus as per the requirements of the aims and objectives of the project, actual performance of experiment, data collection etc.

(c) Carry out the experiments as per the designed procedure to achieve the goals.

(d) Explain the theory behind the formulae used, collect and Analyze the data and Validate the hypotheses.

(e) Standardize the entire procedure to obtain reliable, repeatable results. Compare and contrast if necessary, with the published data to Justify the results obtained.

(f) Compile the data, Identify the sources of errors and show how to minimize them.

Importance of Industrial visit

(a) Industrial visit bridge the gap between classroom theoretical training and practical learning in a real-life environment.

(b) It provides an opportunity for students to ask questions related to their area of interest.

(c) It gives students a platform to enhance their interpersonal skills.

(d) The students get to see the best practices opted by different companies for similar work.