B.Sc. Physics Model II

Programme Outcomes

At the completion of under graduate programme, the student will be able to imbibe the following programme outcomes.

- Create logical reasoning and critical thinking through the knowledge that they acquired in classrooms, laboratory etc. and apply them in real-life situations.
- Internalize the significance of various academic as well as extracurricular activities that will enable them to become skilled professionals.
- Grow into accountable and empowered individuals who will emerge as scientists, entrepreneurs etc., and be employed in various governmental and non-governmental sectors.
- Attain expertise in communication skills, acquire moral and social values that keep one creative and compassionate human in all walks of life and turn out to be responsible citizens
- Build up self-esteem and ability to engage in independent and life-long learning in the context of an ever-changing world and competence to face challenges.

  Recognize the current local and global issues of environmental contexts and involves in activities that promote sustainable and green living

B.Sc. Physics Model II Programme Specific Outcomes

- Develop deep understanding of the various subjects of physics.
- Enhance practical and mathematical skills and competencies to conduct scientific experiments.
- Create analytical thinking and interpret the inferences from verbal, mathematical and graphical data.
- Develop problem solving skills and formulate questions from theoretical understanding of the subject.
- Equipped with knowledge to participate in the design and development of electronic systems.
- Ability to perform various task using their creativity, intellectual capacity, innovative thoughts and enthusiasm with precision and responsibility.
- Skill to organize events and transfer knowledge through fruitful communications and interact effectively with people from sundry backgrounds.

- Ascertain their area of interest in academic and R&D and get prepared for competitive exams.

B. SC. PHYSICS MODEL II: APPLIED ELECTRONICS

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 conversion process and to identify the application of binary numbers in computers.

3. Learn the relevance of vectors in physics.

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

5. Attain knowledge on the importance of care to be taken while doing experiment and distinguish different types of errors that can involve in the experiment.

AE1VOT01 PRINCIPLE OF ELECTRONIC COMPONENTS

1. Understand the fundamental operation of various electronic components.
2. Find out the unknown value of resistance, capacitance and inductance.
3. Construct, understand and analyze various electronic circuits.
4. Apprehend the principles and working of transformers.
5. Understand the working of display devices like LED, LCD etc.

AE1VOT02 - ELECTRONICS APPLICATION

1. Analyze and describe the working of fundamental electronic circuits.
2. Familiarize transducers and understand the working of various types of transducers.
3. Describe soldering technique and design electronic circuits on PCB.
4. Acquire knowledge in using different types of measuring instruments used in the electronics laboratory.

SEMESTER II

PH2CRT02: MECHANICS AND PROPERTIES OF MATTER

1. Understand superposition of waves.

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

3. Analyze 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.

AE2VOT03 - BASICS OF POWER ELECTRONICS

1. Gain knowledge about power electronic components like FET and its applications.
2. Comprehend different types of MOSFETS.
3. Understand the working of FET Amplifier and evaluate its practical significance.
4. Describe the basic operation of field effect transistors.

AE2VOT04 - POWER ELECTRONICS

1. Acquire knowledge in different thyristors
2. Identify the role of power electronics in electrical energy management.
3. Describe various phase controlling circuits.
4. Solve numerical problems related to SCR, TRIAC and UJT.

SEMESTER III

PH5CRT03 OPTICS, LASER AND FIBER OPTICS

1. Distinguish the basic phenomena like interference, diffraction and polarization that occur in nature.

2. Understand the basic theories and applications of these phenomena.

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

4. Familiarize applications of lasers in different fields.

5. Study the light propagation in optical fibres and acquaint with different kinds of optical fibres and its applications.

AE3VOT05 - MICROPROCESSOR AND INTERFACING DEVICES

1. Understand Architecture of Intel 8085.

2. Familiarize different types of program instructions.

3. Write programs for addition, subtraction, division, multiplication, sorting etc.

4. Write programs for delay subroutines.

AE3VOT06 - COMMUNICATION ELECTRONICS

1. Discuss various forms of communication systems including mobile communication.
2. Analyze the process of Modulation and Demodulation; the heart of modern communication systems.
3. Describe various communication systems and their pros and cons.
4. Understand PAL-D color television and Radar system.

SEMESTER IV

PH5CRT04 SEMICONDUCTOR PHYSICS

1. Provides the student with the fundamental skills to understand the basic of semiconductor components like diode, transistor, FET, MOSFET and operational amplifier.
2. Build foundation to understand the role of electronic components such as resistors, capacitors, inductors, ordinary diode, zener diode etc. in a circuit when connected individually or in combination.
3. Equipped with knowledge to participate in the design and development of electronic systems.

AE4VOT07-LINEAR INTEGRATED CIRCUITS

1. Gain knowledge of various Linear Integrated Electronic circuits and its application.
2. Design and analyze filter circuits, 555 timer etc. using op-amp.
3. Distinguish digital IC's and linear IC's.
4. Gain theoretical understanding of different IC's and use them in laboratory sessions.
5. Analyze applications of amplifiers.

AE4VOT08 - APPLICATIONS OF MICROPROCESSORS

1. Write programs for stepper motor control using Intel 8255.

2. Write programs for traffic control using PPI 8255.

3. Write programs for temperature control.

4. Write a program for square wave generator.

5. Write programs for seven segment display.

SEMESTER V

PH5CRT05 ELECTRICITY AND ELECTRODYNAMICS

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

2. Realize how the development of modern technological world rely on the field-   electricity and electrodynamics.

3. Comprehend various phenomena and applications around them related to electric and magnetic field.

4. Understand the power of Maxwell's Equations and their various solutions to ponder into various topics that include Energy and Momentum of Electromagnetic Fields, Radiation Sources and Antennas, Electrodynamics in Macroscopic Media, Wave Guides and Cavities.

5 Acquire practical knowledge to handle electronic gadgets and explain its working principle.

PH5CRT06 CLASSICAL AND QUANTUM MECHANICS

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

2. Appreciate the historical development and origin of quantum mechanics.

3. Understand the basic mathematical formulation of quantum mechanics.

4. Apply the Schrodinger equation for solving the problem of a particle in a box.

5. Distinguish between classical mechanics and quantum mechanics.

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.

3. Design different registers and counters.

4. Design basic combinational and sequential logic circuits.

5. Simplify Boolean algebra expressions using Karnaugh maps.

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

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

PH5CRT08 ENVIRONMENTAL PHYSICS AND HUMAN RIGHTS

1. Gain basic knowledge about water resources and proper water management.
2. Realize different aspects of pollution, its dangers and means to prevent it.
3. Recognize the need to protect various energy sources and understand advantages of renewable energy sources and steps to harness them.
4. Identify different means of harnessing solar energy and its advantages.
5. Understand their basic rights as well as ways and means to prevent the violation of rights.

SEMESTER VI

PH6CRT09 THERMAL AND STATISTICAL PHYSICS

1. Define the concept of entropy and explain its physical significance.
2. Explain fundamental concepts of statistical mechanics.
3. Explain Lees Disc experiment and can calculate the thermal conductivity by experimentally.
4. Derive Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac distribution laws and compare the laws.

PH6CRT10 RELATIVITY AND SPECTROSCOPY

1. Explain special theory of relativity.
2. Derive Lorentz transformation equations.
3. Illustrate twin paradox.
4. Explain relativistic time dilation and length contraction.
5. Derive Einstein's mass energy relation $E=mc^2$.

PH6CRT11 NUCLEAR, PARTICLE AND ASTROPHYSICS

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

2. Differentiate the different types of nuclear reactions.

3. Explain the origin and effects of cosmic rays.

4. Develops a research interest in nuclear & Astrophysics.

PH6CRT12 SOLID STATE PHYSICS

1. Realize the importance of crystallography in solid state physics.
2. Classify materials as metals, semiconductors and insulators based on band theory.
3. Distinguish various chemical bonding in common crystal structures.
4. Describe material properties such as magnetism, dielectric properties, super-conductivity and understand the theoretical framework of the same.
5. Solve problems and analyze experimental results.

PH6CBT03 COMPUTATIONAL PHYSICS (CHOICE BASED COURSE)

1. Understand the methods to solve linear algebraic and nonlinear equations.

2. Explain the methods of curve fitting.

3. Discuss numerical differentiation and integration methods.

4. Understand numerical differentiation and integration methods.

5. Use numerical methods to solve ordinary differential equations.