SEMESTER-I Mechanics & Properties of Matter

PROGRAM OUTCOMES

- Discipline Knowledge: Knowledge of science and ability to apply to relevant areas.
- Problem solving: Execute a solution process using first principles of science to solve problems related to respective discipline.
- Modern tool usage: Use a modern scientific, engineering and IT tool or technique for solving problems in the areas of their discipline.
- Ethics: Apply the professional ethics and norms in respective discipline.
- Individual and teamwork: Work effectively as an individual as a team member in a multidisciplinary team.
- Communication: Communicate effectively with the stake holders, and give and receive clear instructions.

COURSE OUTCOMES

- Estimate the possible error in measurement of a physical quantity, using its dimensional equation, the least counts of instruments used and by actual measurements in the appropriate system of units.
- Apply laws of conservation of momentum and associated energy along with laws to motion to the systems of linear/rotational motion to determine different parameters associated with physically rigid bodies.
- Apply the concept of the relative frame of reference with appropriate postulates of the theory of relative motion to the measurement of length, time and velocity.
- Apply the laws of Gravitation and Kepler laws to describe the working of satellites and other applications.
- Determine theoretically and experimentally the relation between three elastic constants.
- Apply the concept of surface tension and viscosity of fluids.

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SEMESTER-II Electricity & Magnetism

PROGRAM OUTCOMES

- Discipline Knowledge: Knowledge of science and ability to apply to relevant areas.
- Problem solving: Execute a solution process using first principles of science to solve problems related to respective discipline.
- 3. Modern tool usage: Use a modern scientific, engineering and IT tool or technique for solving problems in the areas of their discipline.
- Ethics: Apply the professional ethics and norms in respective discipline.
- Individual and teamwork: Work effectively as an individual as a team member in a multidisciplinary team.
- Communication: Communicate effectively with the stake holders, and give and receive clear instructions.

COURSE OUTCOMES

- Give the applications of charge distribution and energy associated with a charge for various shapes of electrical conductors, using the principles of the different laws of electrostatic field and potential.
- Explain the impact of polarization due to an electrical field on a dielectric material, and the different terms related to dielectrics and the relation between them.
- To obtain the impact of the electrical field in producing a magnetic field with resulting laws and applications.
- Define various terms associated with a magnetic material and the relation between them, and demonstrate the types of the magnetic material in terms of their respective BH curves.
- Obtain Maxwell's equations in differential and integral forms of transverse electromagnetic waves based on Faraday's and Lenz's laws, along with their production.
- Obtain different quantities of resonance, power dissipation, quality factor and bandwidth for RL, RC, LCR series and parallel circuits, using basic laws of electrical circuits.
- Use Ballistic Galvanometer to obtain charge sensitivity and electromagnetic damping.

SEMESTER-III Wave motion and Optics

PROGRAM OUTCOMES

- Discipline Knowledge: Knowledge of science and ability to apply to relevant areas.
- Problem solving: Execute a solution process using first principles of science to solve problems related to respective discipline.
- Modern tool usage: Use a modern scientific, engineering and IT tool or technique for solving problems in the areas of their discipline.
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COURSE OUTCOMES

- Identify different types of waves by looking into their characteristics.
- Formulate a wave equation and obtain the expression for different parameters associated with waves.
- Explain and give a mathematical treatment of the superposition of waves under different conditions, such as, when they overlap linearly and perpendicularly with equal or different frequencies and equal or different phases.
- Describe the formation of standing waves and how the energy is transferred along the standing wave in different applications, and mathematically model in the case of stretched string and vibration of a rod.
- Give an analytical treatment of resonance in the case of open and closed pipes in general and Helmholtz resonators in particular.
- Describe the different parameters that affect the acoustics in a building, measure it and control it.
- Give the different models of light propagation and phenomenon associated and measure the parameters like the wavelength of light using experiments like Michelson interferometer, interference and thin films.
- Explain diffraction due to different objects like singles slit, two slits, diffraction of grating, oblique incidence, circular aperture and give the theory and experimental setup for the same.
- Explain the polarization of light and obtain how the polarization occurs due to quarter wave plates, half wave plates, and through the optical activity of a medium.

SEMESTER-IV Thermal Physics And Electronics

PROGRAM OUTCOMES

- Discipline Knowledge: Knowledge of science and ability to apply to relevant areas.
- Problem solving: Execute a solution process using first principles of science to solve problems related to respective discipline.
- Modern tool usage: Use a modern scientific, engineering and IT tool or technique for solving problems in the areas of their discipline.
- Ethics: Apply the professional ethics and norms in respective discipline.
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COURSE OUTCOMES

- Apply the laws of thermodynamics and analyze the thermal system.
- Apply the laws of kinetic theory and radiation laws to the ideal and practical thermodynamics systems through derived thermodynamic relations.
- Use the concepts of semiconductors to describe different Semiconductor devices such as diode transistors, BJT, FET etc and explain their functioning.
- Explain the functioning of OP-AMPS and use them as the building blocks of logic gates.
- Give the use of logic gates using different theorems of Boolean algebra followed by logic circuits.

PROGRAM OUTCOMES

- Discipline Knowledge: Knowledge of science and ability to apply to relevant areas.
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COURSE OUTCOMES

- Identify the failure of classical physics at the microscopic level.
- Find the relationship between the normalization of a wave function and the ability to correctly
- Calculate expectation values or probability densities. Explain the minimum uncertainty of measuring both observables on any quantum state.
- Describe the time-dependent and time-independent Schrödinger equation for simple potentials like
- For instance one-dimensional potential well and Harmonic oscillator. Understand the concept of tunneling.

SEMESTER – V Elements of Atomic, Molecular & Laser Physics

PROGRAM OUTCOMES

- Discipline Knowledge: Knowledge of science and ability to apply to relevant areas.
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COURSE OUTCOMES

- Describe atomic properties using basic atomic models.
- Interpret atomic spectra of elements using vector atom model.
- Interpret molecular spectra of compounds using basics of molecular physics.
- Explain laser systems and their applications in various fields.
- Learn the importance of Statistical mechanics and different distribution functions.

SEMESTER – VI Elements of Condensed Matter & Nuclear Physics

PROGRAM OUTCOMES

- Discipline Knowledge: Knowledge of science and ability to apply to relevant areas.
- Problem solving: Execute a solution process using first principles of science to solve problems related to respective discipline.
- Modern tool usage: Use a modern scientific, engineering and IT tool or technique for solving problems in the areas of their discipline.
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COURSE OUTCOMES

- Explain the basic properties of nucleus and get the idea of its inner information.
- Understand the concepts of binding energy and binding energy per nucleon v/s mass number graph.
- Describe the processes of alpha, beta and gamma decays based on well-established theories.
- Explain the basic aspects of interaction of gamma radiation with matter by photoelectric effect,
- Compton scattering and pair production. Explain the different nuclear radiation detectors such as ionization chamber, Geiger-Mueller counter etc.
- Explain the basic concept of scintillation detectors, photo-multiplier tube and semiconductor detectors.

SEMESTER VI Electronic Instrumentation & Sensors

PROGRAM OUTCOMES

- Discipline Knowledge: Knowledge of science and ability to apply to relevant areas.
- Problem solving: Execute a solution process using first principles of science to solve problems related to respective discipline.
- Modern tool usage: Use a modern scientific, engineering and IT tool or technique for solving problems in the areas of their discipline.
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COURSE OUTCOMES

- Identify different types of tests and measuring instruments used in practice and understand their basic working principles.
- Get hands on training in wiring a circuit, soldering, making a measurement using an electronic circuit used in instrumentation.
- 3. Have an understanding of the basic electronic components viz., resistors, capacitors, inductors, discrete and integrated circuits, color codes, values and pin diagram, their practical us
- 4. Understanding of the measurement of voltage, current, resistance value, identification of the terminals of a transistor and ICs.
- Identify and understand the different types of transducers and sensors used in robust and hand-held instruments.
- Understand and give a mathematical treatment of the working of rectifiers, filter, data converters and different types of transducers.
- Connect the concepts learnt in the course to their practical use in daily life.
- Develop basic hands-on skills in the usage of oscilloscopes, multimeters, rectifiers, amplifiers, oscillators and high voltage probes, generators and digital meters.
- Servicing of simple faults of domestic appliances: Iron box, immersion heater, fan, hot plate, battery charger, emergency lamp and the like.
- Learn about Fourier series and its applications.

PROGRAM OUTCOMES

- Discipline Knowledge: Knowledge of science and ability to apply to relevant areas.
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COURSE OUTCOMES

- CO1: The students learn the scientific methodology in carrying out internship/project work including planning and execution of the experiment.
- CO2: The students acquire experiential learning by handling instruments/devices, etc., while setting up an experiment or by reading in-depth assigned subject for theoretical analysis.
- CO3: The students learn the importance of team work, mutual participation and nurture their motivation either towards theoretical or experimental internship/project work.
- CO4: Internship/project helps students to get research and industrial exposure and application of knowledge.

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