



SWR GOVT COLLEGE (W), KALIKIRI

DEPARTMENT OF PHYSICS

B.SC

(Revised on 2021-2022)

COURSE OUTCOMES

Course I: MECHANICS, WAVES AND OSCILLATIONS - SEMESTER-I

Course outcomes: On successful completion of this course, the students will be able to:

- Understand Newton's laws of motion and motion of variable mass system and its application to rocket motion and the concepts of impact parameter, scattering cross section.
- Apply the rotational kinematic relations, the principle and working of gyroscope and its applications and the precessional motion of a freely rotating symmetric top.
- Comprehend the general characteristics of central forces and the application of Kepler's laws to describe the motion of planets and satellite in circular orbit through the study of law of Gravitation.
- Understand postulates of Special theory of relativity and its consequences such as length contraction, time dilation, relativistic mass and mass-energy equivalence.
- Examine phenomena of simple harmonic motion and the distinction between undamped, damped and forced oscillations and the concepts of resonance and quality factor with reference to damped harmonic oscillator.
- Appreciate the formulation of the problem of coupled oscillations and solve them to obtain normal modes of oscillation and their frequencies in simple mechanical systems.

Course II: WAVE OPTICS - SEMESTER-II

Course Outcomes: On successful completion of this course, the student will be able to:

- Understand the phenomenon of interference of light and its formation in (i) Lloyd's single mirror due to division of wave front and (ii) Thin films, Newton's rings and Michelson interferometer due to division of amplitude.
- Distinguish between Fresnel's diffraction and Fraunhofer diffraction and observe the diffraction patterns in the case of single slit and the diffraction grating
- Describe the construction and working of zone plate and make the comparison of zone plate with convex lens.
- Explain the various methods of production of plane, circularly and polarized light and their detection and the concept of optical activity.
- Comprehend the basic principle of laser, the working of He-Ne laser and Ruby lasers and their applications in different fields.
- Explain about the different aberrations in lenses and discuss the methods of minimizing them.
- Understand the basic principles of fibre optic communication and explore the field of Holography and Nonlinear optics and their applications.

Course-III: HEAT AND THERMODYNAMICS - SEMESTER-III

Course outcomes: On successful completion of this course, the student will be able to:

- Understand the basic aspects of kinetic theory of gases, Maxwell- Boltzman distribution law, equip partition of energies, mean free path of molecular collisions and the transport phenomenon in ideal gases
- Gain knowledge on the basic concepts of thermodynamics, the first and the second law of thermodynamics, the basic principles of refrigeration, the concept of entropy, the thermodynamic potentials and their physical interpretations.
- Understand the working of Carnot's ideal heat engine, Carnot cycle and its efficiency
- Develop critical understanding of concept of Thermodynamic potentials, the formulation of Maxwell's equations and its applications.
- Differentiate between principles and methods to produce low temperature and liquefy air and also understand the practical applications of substances at low temperatures.
- Examine the nature of black body radiations and the basic theories.

Course-IV: ELECTRICITY, MAGNETISM AND ELECTRONICS- SEMESTER-IV

Course outcomes: On successful completion of this course, the students will be able to:

- ❖ Understand the Gauss law and its application to obtain electric field in different cases and formulate the relationship between electric displacement vector, electric polarization, Susceptibility, Permittivity and Dielectric constant.
- ❖ Distinguish between the magnetic effect of electric current and electromagnetic induction and apply the related laws in appropriate circumstances.
- ❖ Understand Biot and Savart's law and Ampere's circuital law to describe and explain the generation of magnetic fields by electrical currents.
- ❖ Develop an understanding on the unification of electric and magnetic fields and Maxwell's equations governing electromagnetic waves.
- ❖ Phenomenon of resonance in LCR AC-circuits, sharpness of resonance, Q- factor, Power factor and the comparative study of series and parallel resonant circuits.
- ❖ Describe the operation of p-n junction diodes, zener diodes, light emitting diodes and transistors
- ❖ Understand the operation of basic logic gates and universal gates and their truth tables.

Course V: MODERN PHYSICS - SEMESTER-IV

Course outcomes: On successful completion of this course, the students will be able to:

- ❖ Develop an understanding on the concepts of Atomic and Modern Physics, basic elementary quantum mechanics and nuclear physics.
- ❖ Develop critical understanding of concept of Matter waves and Uncertainty principle.
- ❖ Get familiarized with the principles of quantum mechanics and the formulation of Schrodinger wave equation and its applications.
- ❖ Examine the basic properties of nuclei, characteristics of Nuclear forces, salient features of Nuclear models and different nuclear radiation detectors.
- ❖ Classify Elementary particles based on their mass, charge, spin, half life and interaction.
- ❖ Get familiarized with the nano materials, their unique properties and applications.
- ❖ Increase the awareness and appreciation of superconductors and their practical applications.

COURSE 6B: LOW TEMPERATURE PHYSICS & REFRIGERATION - SEMESTER-V
(SKILL ENHANCEMENT COURSE (ELECTIVE), CREDITS: 05)

Learning Outcomes: Students after successful completion of the course will be able to

- Identify various methods and techniques used to produce low temperatures in the Laboratory.
- Acquire a critical knowledge on refrigeration and air conditioning.
- Demonstrate skills of Refrigerators through hands on experience and learns about refrigeration components and their accessories.
- Understand the classification, properties of refrigerants and their effects on environment.
- Comprehend the applications of Low Temperature Physics and refrigeration.

COURSE 7B: SOLAR ENERGY AND APPLICATIONS - SEMESTER-V
[SKILL ENHANCEMENT COURSE (ELECTIVE), CREDITS: 05]

Learning Outcomes: After successful completion of the course, the student will be able to:

- Understand Sun structure, forms of energy coming from the Sun and its measurement.
- Acquire a critical knowledge on the working of thermal and photovoltaic collectors.
- Demonstrate skills related to callus culture through hands on experience
- Understand testing procedures and fault analysis of thermal collectors and PV modules.
- 5Comprehend applications of thermal collectors and PV modules.

Course 6C: APPLICATIONS OF ELECTRICITY & ELECTRONICS - SEMESTER-V
(SKILL ENHANCEMENT COURSE (ELECTIVE), CREDITS: 05)

Learning Outcomes: Students after successful completion of the course will be able to:

- Identify various components present in Electricity& Electronics Laboratory.
- Acquire a critical knowledge of each component and its utility (like resistors, capacitors, inductors, power sources etc.).
- Demonstrate skills of constructing simple electronic circuits consisting of basic circuit elements.
- Understand the need & Functionality of various DC & AC Power sources.
- Comprehend the design, applications and practices of various electrical & Electronic devices and also their trouble shooting.

Course 7C: ELECTRONIC INSTRUMENTATION - SEMESTER-V
[SKILL ENHANCEMENT COURSE (ELECTIVE), CREDITS: 05]

Learning Outcomes: Students after successful completion of the course will be able to:

- Identify various facilities required to set up a basic Instrumentation Laboratory.
- Acquire a critical knowledge of various Electrical Instruments used in the Laboratory.
- Demonstrate skills of using instruments like CRO, Function Generator, Multimeter etc. through hands on experience.
- Understand the Principle and operation of different display devices used in the display systems and different transducers
- Comprehend the applications of various biomedical instruments in daily life like B.P. meter, ECG, Pulse oxymeter etc. and know the handling procedures with safety and security.