Post Graduate Department of Physics
Name of Programme: B.Sc. (Non-Med)/ (Comp. Sc)

Programme Outcomes

PO 1 Critical Thinking: The programme aims to give knowledge with facts and figures related to various subjects in pure sciences such as Physics, Chemistry, Botany, Zoology, Mathematics, Computer Science, Economics, Quantitative Techniques, Bio-informatics, Bio-technology etc.

PO 2 Lifelong learning: Enable the students to understand the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevance in the day-to-day life.

PO 3 Logical experimentation: The learners acquire the abilities in handling scientific instruments, scheduling and executing the experiments in laboratories and to draw logical inferences from the scientific experiments.

PO 4 Creative thinking: They become capable of thinking creatively, to propose innovative ideas in clarifying facts and figures and providing new solution to the problems.

PO 5 Interdisciplinary approach: To give them knowledge about developments in any science subject and how interdisciplinary approach helps in providing better solutions and new ideas for the sustainable developments.

PO 6 Scientific Aptitude: The programme targets to develop scientific aptitude among the students to make them open- minded, critical and curious in order to deal with all aspects related to life.

PO 7 Self Reliant: To make them capable of applying their acquired knowledge and able to work on their own hence make themselves self-reliant and self-sufficient.

Mapping of Course Outcomes

Semester-I Paper: Mechanics

COURSE OUTCOMES	SKILL	PO	BLOOM'S TAXONOMY	ASSESSMENT TOOLS
CO 1: Students will be able to classify different coordinate systems and apply the knowledge to find various physical quantities in different co-ordinate system.	Remember, Understanding, Applying	PO 1/ PO 2	L1, L2, L3	Assignment/ Quiz
CO 2: Students will be able to reduce two body problem into one body problem using concept of reduced mass.	Understanding, Analyzing	PO 2/ PO 1	L2,L4	Assignment/ Class test
CO 3: Students will be able to understand motion of a body under central forces and apply the concept to Planetary motion.	Understanding, Applying	PO 2/ PO 6	L2,L3	Project/ Quiz
CO 4: Students understand the concept of inertial/ non-inertial frames apply the concept to explain some phenomenon in daily life	Remembering, Understanding, Applying	PO 2/ PO 1/ PO 6	L1,L2, L3	Project/ Assignment
CO 5: Students will understand elastic collisions in lab and C.M systems and will apply the concept to understand Rutherford scattering.	Remembering, Understanding, Applying	PO 2/ PO 1/ PO 6	L1, L2, L3	Assignment/ Exam
CO 6: Students will appreciate the concept of precession and its applications as elementary gyroscope.	Understanding, Applying, Analyzing	PO 2/ PO 1/ PO 6	L2,L3,L4	Project/ Quiz

Semester-I Paper: Electricity and Magnetism

COURSE OUTCOMES	SKILL	PO	BLOOM'S TAXONOMY	ASSESSMENT TOOLS
CO 1: Students will recall the basic ideas of vector calculus and will be able to apply it to vector fields.	Remembering , Understanding	PO 2/ PO 1	L1, L2	Assignment/ Exam
CO 2: Students will understand the concept and evaluate Electric field and potential difference due to different types of distribution of charges.	Understanding , Analyzing	PO 2/ PO1/ PO 6	L2, L4	Assignment/ Quiz
CO 3: Students will be able to understand transformation of the Electric and magnetic fields and related quantities in different inertial fields.	Remembering , Understanding	PO 2/ PO 1	L1, L2	Assignment/ Class test
CO 4: Students will understand	Understanding	PO 2/	L2, L4	Assignment/

and apply the concept of electrical images to find electric field.	, Analyzing	PO1/ PO 6		Class test
CO 5: Students will be able to classify the materials on the basis of their magnetic properties and their behavior in Magnetic field.	Remembering , Understanding ,	PO 2/ PO1/ PO 6	L1, L2	Project/Assignment/ Exam

Semester-II Paper: Relativity and Electromagnetism

COURSE OUTCOMES	**SKILL**	**PO**	**BLOOM'S TAXONOMY**	**ASSESSMENT TOOLS**
CO 1: Students will be able to understand the special theory of relativity.	Understanding	PO 2	L2	Project/ Quiz
CO 2: Students will understand the concept of Minkowski space and four vector formulism.	Understanding	PO 2	L2	Assignment/ Exam
CO 3: Students will learn about Hall effect and its applications.	Remembering, understanding and applying	PO 2/ PO 1/ PO 6	L1,L2,L3	Assignment/ Quiz
CO 4: Students will understand the concept of coupling of electrical circuits	Understanding , Applying,	PO 2/ PO1/ PO 3	L2,L3,L4	Lab Project/Assignment/ Exam
CO 5: Students will know about the fundamentals of E.M Waves and response of different media to E.M Waves.	Remembering, Understanding , Applying	PO 2/ PO 1/ PO 6	L1,L2,L3	Project/ Quiz

Semester-II Paper: Vibrations and Waves

COURSE OUTCOMES	**SKILL**	**PO**	**BLOOM'S TAXONOMY**	**ASSESSMENT TOOLS**
CO 1: Students will recall the concept of simple Harmonic Motion and compare free, damped and forced oscillators.	Remembering, Understanding	PO 2/ PO 1/ PO 6	L1, L2	Project/ Quiz
CO 2: Students will be able to apply the concept of damped and forced oscillators to electrical devices	Understanding, Applying	PO 2/ PO 1	L2, L3	Assignment/ Quiz
CO 3: Students will understand the concept of Coupled oscillators.	Understanding, Applying	PO 2/ PO 1	L2, L3	Assignment/ Quiz
CO 4: Students will understand and will be able to apply the concept of impedance matching for propagation of wave through different media.	Remembering, Applying	PO 2/ PO 1	L1, L3	Assignment/ Exam
CO 5:Students will understand the basic theory of Electromagnetic waves and their propagation through free space and some medium	Understanding, Applying	PO 2/ PO 1/ PO 6	L2, L3	Assignment/ Quiz

Semester-III Paper: Statistical Physics

COURSE OUTCOMES	SKILL	PO	BLOOM'S TAXONOMY	ASSESSMENT TOOLS
CO 1: Students will gain knowledge about the basic laws of statistical physics and its scope.	Remembering, Understanding	PO 2/ PO 1	L1,L2	Project/ Quiz
CO 2: Concept of microstate, macrostate and Phase space will be introduced to the students	Understanding, Applying	PO 2/ PO 6	L2,L3	Assignment/ Quiz
CO 3: They will learn about the basic approaches of Maxwell Boltzmann, Bose Einstein and Fermi Dirac statistics.	Remembering, Understanding, Applying	PO 2/ PO 1/ PO 6	L1, L2, L3	Assignment/ Exam
CO 4: Students will learn about the concept of entropy and its application to explain various natural Phenomena.	Remembering, Understanding, Applying	PO 2/ PO 1/ PO 6	L1, L2, L3	Project/ Quiz
CO 5: Maxwell Thermodynamics relations and their applications in different processes will be introduced to the students.	Remembering, Understanding, Applying	PO 2/ PO 1/ PO 6	L1,L2,L3	Assignment/ Quiz

Semester-III Paper: Optics and LASERS

COURSE OUTCOMES	SKILL	PO	BLOOM'S TAXONOMY	ASSESSMENT TOOLS
CO 1: Students will be able to explain the concept of interference of light by division of amplitude and wave front.	Remembering, Understanding , Applying	PO 2/ PO 1/ PO 6	L1,L2,L3	Assignment/ Quiz
CO 2: Students will be able to apply the concept of interference of light to non-reflecting thin films and optical devices.	Understanding , Applying	PO 1/ PO 6	L2,L3	Assignment/ Exam
CO 3: Students will understand concept of polarization and apply it to produce and analyze polarized light	Remembering, Understanding , Applying	PO 1/ PO 3/ PO 6	L1,L2,L3	Lab Project/ Assignment/ Exam
CO 4: Students will be explain about construction and application of Nicol prism, Quarter and Half wave plate.	Remembering, Understanding , Applying	PO 1/ PO 2/ PO 6	L1,L2,L3	Assignment/ Quiz
CO 5:Students will understand the fundamentals of Laser and learn about various processes involved in LASER action	Remembering, Understanding	PO 2/ PO 1	L1, L2	Project/ Quiz
CO 6:They will learn the principle, Construction and working of different lasers: Ruby laser, Nd:YAG laser and He-Ne laser	Remembering, Understanding	PO 2/ PO 1	L1, L2	Assignment/ Test

Semester-IV Paper: Quantum Mechanics

COURSE OUTCOMES	SKILL	PO	BLOOM'S TAXONOMY	ASSESSMENT
CO 1: Students will learn about the formalism of Wave mechanics, Normalization and Probability interpretation of wave function.	Understanding, Applying	PO 1/ PO 6	L2,L3	Assignment/ Quiz
CO 2: They will explain the concept of wave particle duality	Remembering, Understanding	PO 2/ PO 1	L1,L2	Assignment/ Exam
CO 3: The students will illustrate the applications of Uncertainty principle.	Remembering, Understanding, Applying	PO 2/ PO 6	L1,L2,L3	Project/ Quiz
CO 4: Students will understand the fundamental postulates of wave mechanics	Remembering, Understanding	PO 2/ PO 1	L1,L2	Assignment/ Quiz
CO 5: Students will be able to understand Schrodinger equation for free as well for particle subjected to Forces and will learn to apply Schrodinger equation to various problems of Physics.	Remembering, Understanding, Applying	PO2/ PO 1/ PO 6	L1,L2,L3	Assignment/ Exam

Semester-IV Paper: Atomic Spectra and Laser

COURSE OUTCOMES	SKILL	PO	BLOOM'S TAXONOMY	ASSESSMENT
CO 1: Students will understand the one electron atomic spectra, and explain their fine structure	Remembering, Understanding , Applying	PO 2/ PO 6	L1,L2,L3	Project/ Quiz
CO 2: Students will learn concept of Vector model of atom.	Understanding , Applying	PO 2/ PO 6	L2,L3	Assignment/ Quiz
CO 3: Students will understand the concept of LS, JJ Coupling schemes. Lande‘s-g factor will be introduced to them.	Remembering, Understanding	PO 2/ PO 1	L1,L2	Assignment/Class test
CO 4: Students will explain spectra of many electron systems e.g. of Helium and Alkaline Earth Spectra.	Remembering, Understanding	PO 2/ PO 1/ PO 6	L1,L2	Assignment/ Seminar
CO 5: Students will learn about Production of X-rays and their Spectra.	Remembering, Understanding ,	PO 2/ PO 1	L1,L2,L3	Assignment/ Class test
CO 6: Students will learn about Rotational, Vibrational, electronic energy levels and spectra of molecules.	Understanding , Applying	PO 2/ PO 6	L2, L3	Assignment/ Seminar

Semester-V Paper: Condensed Matter Physics

COURSE OUTCOMES	SKILL	PO	BLOOM'S TAXONOMY	ASSESSMENT
CO 1: Students will understand about the basics of crystal structure and symmetries operation in two and three dimensional crystals	Remembering, Understanding	PO 2/ PO 1	L1,L2	Assignment/ Quiz
CO 2: Students will be able to understand the experimental methods for crystal structure studies	Understanding, Applying	PO 2/ PO 3	L2,L3	Lab Project/ Seminar
CO 3: Students will be able to understand various reciprocal lattice, construction of Brillouin Zone in Two and three dimensions.	Remembering, Understanding, Applying	PO 2/ PO 1/ PO 6	L1,L2,L3	Assignment/ Exam
CO 4: Students will be able to understand the Concept of Phonons and calculate the density of modes of vibrations	Remembering, Understanding, Applying	PO 2	L1,L2,L3	Assignment/ Class test
CO 5: Students will understand about the basic concepts of band theory and compare between conductors, semi-conductors and insulator using Kronig-Penny model	Remembering, Understanding	PO 2/ PO 6	L1,L2	Project/ Quiz

Semester-V Paper: Nuclear Physics

COURSE OUTCOMES	SKILL	PO	BLOOM'S TAXONOMY	ASSESSMENT
CO 1: Students will learn about the constituents of nucleus and various properties of nucleus.	Remembering, Understanding	PO2	L1,L2	Project/ Quiz
CO 2: Students will be introduced with the various modes of decay of radioactive nuclides and the laws governing the radioactive decay.	Understanding , Applying	PO1/ PO2	L2,L3	Assignment/ Quiz
CO 3: Students will gain knowledge about different types of nuclear reactions, their reaction cross section and conservation laws followed by them.	Remembering, Understanding , Applying	PO2	L1,L2,L3	Assignment/ Exam
CO 4: They will be explained different Nuclear models- Liquid drop model and shell model.	Understanding , Applying	PO2	L2,L3	Project/ Quiz

Semester VI: Paper: Electronics

COURSE OUTCOMES	SKILL	PO	BLOOM'S TAXONOMY	ASSESSMENT
CO 1: Students will be able to understand the working and applications of junction diodes.	Understanding, Applying	PO 2	L2,L3	Assignment/ Quiz
CO 2: Students will explain about different transistors and the characteristics of their different configurations	Understanding, Applying	PO 2	L2,L3	Assignment/ Exam
CO 3: Students will be able to construct h parameters and outline their use for amplifier analysis	Remembering, Understanding, Applying	PO 2/ PO 1/ PO 6	L1,L2,L3	Lab Project/ Assignment/ Exam
CO 4: Students will be able to understand the concept of feedback and use of negative feedback in amplifiers.	Understanding, Applying	PO 2/ PO 1	L2,L3	Assignment/ Quiz
CO 5: Students will understand Barkausen condition for sustained oscillations as well as construction and working of different types of oscillators	Remembering, Understanding, Applying	PO 1/ PO 3/ PO 6	L1,L2,L3	Lab Project/ Assignment/ Exam

Semester-VI Paper: Radiation and Particle Physics

COURSE OUTCOMES	SKILL	PO	BLOOM'S TAXONOMY	ASSESSMENT
CO 1: Students will list various types of accelerators used for accelerating the charge particles.	Remembering, Understanding, Applying	PO 1	L1,L2,L3	Assignment/ Quiz
CO 2: Students will learn and appreciate Large Hadron Collider.	Understanding, Applying	PO 2	L2,L3	Assignment/ Exam
CO 3: Students will understand Different modes of interaction of heavy charge particle with matter and losses in energy due to interaction.	Understanding, Applying	PO 2	L2,L3	Lab Project/ Assignment/ Exam
CO 4: Students will explain Bethe-Bloch formula which tells about the energy loss per unit length when a charged particle enters into the matter.	Remembering, Understanding, Applying	PO 1	L1,L2,L3	Project/ Quiz
CO 5: Students will be introduced to various ways of interaction of gamma rays with matter. Photoelectric effect, Compton effect and pair production processes will be explained to them.	Remembering, Understanding, Applying	PO 1/ PO 2	L1,L2,L3	Assignment/ Quiz