COs, POs and PSOs
Department of Physics

BACHELOR OF SCIENCE	
PROGRAM: BSc (Physics)	
Program Outcomes	**PO1: Critical Thinking**: The principles in Physics will be studied in depth. Students will have deeper understanding of laws of nature through the subjects like Classical mechanics, quantum mechanics, electrodynamics, statistical physics etc. Students' ability of problem solving will be enhanced.
	PO2: Effective Communication: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
	PO3: Social Interaction: Elicit views of others, mediate disagreements and help reach conclusions in group settings.
	PO4: Effective Citizenship: Demonstrate empathetic social concern and equity centered national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.
	PO5: Ethics: Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.
	PO6: Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.
	PO7: Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological change
Program Specific Outcomes	**PSO-1**. Understanding of physics concepts appropriate to introductory level physics by connecting the terms, tools, and techniques
	PSO-2. Apply scientific and technical knowledge and skills to other disciplines and areas of study.
	PSO-3. To have deeper understanding of laws of nature through the subjects like classical mechanics, quantum mechanics, electrodynamics, statistical physics etc.
	PSO-4. Students will have acquired necessary skills and expertise to work in industry related to materials processing and quality control
Course Outcomes	
Mechanics and Properties of matter	**CO 1: [L2: Understanding]** Demonstrate an understanding of Newton's laws and applying them in calculations of the motion of simple systems.
	CO 2: [L3: Applying]Use the free body diagrams to analyzed the forces on the object.
	CO 3: [L2: Understanding]Understand the concepts of energy, work, power, the concepts of conservation of energy and be able to perform calculations using them.
	CO 4: [L3: Applying] Understand the concepts of elasticity and be able to perform calculations using them.
Physics Principles and Applications	**CO 1: [L2: Understanding]**To demonstrate an understanding of electromagnetic waves and its spectrum.
	CO 2:[L2: Understanding] To demonstrate an understanding of electromagnetic waves and its spectrum.
	CO 3: [L2: Understanding]To understand the general structure of atom, spectrum of hydrogen atom.
	CO 4:[L1: Remembering] To understand the atomic excitation and LASER principles**.**
Paper III	**CO 1: [L3: Applying]** Acquire technical and manipulative skills in using laboratory

Physics Practical	equipment, tools, and materials.
	CO 2: [L5: Evaluating] Demonstrate an ability to collect data through observation and/or experimentation and interpreting data.
	CO 3: [L6: Creating] Demonstrate an understanding of laboratory procedures including safety, and scientific methods.
	CO 4:[L4 : Analyzing] Demonstrate a deeper understanding of abstract concepts and theories gained by experiencing and visualizing them as authentic phenomena.
Heat and Thermodynamics	**CO 1: [L2: Understanding]** Describe the properties of and relationships between the thermodynamic properties of a pure substance.
	CO 2: [L2: Understanding] Describe the ideal gas equation and its limitations.
	CO 3:[L3: Applying] Apply the laws of thermodynamics to formulate the relations necessary to analyze a thermodynamic process.
	CO 4: [L1: Remembering]Analyze the heat engines and calculate thermal efficiency.
Electromagnetics (Electricity and Magnetism)	**CO 1:[L2: Understanding]** Demonstrate an understanding of the electric force, field and potential, and related concepts, for stationary charges.
	CO 2:[L3: Applying] Calculate electrostatic field and potential of simple charge distributions using Coulomb's law and Gauss's law.
	CO 3:[L1: Remembering] Demonstrate an understanding of the dielectric and effect on dielectric due to electric field.
	CO 4:[L1: Remembering] Demonstrate an understanding of magnetization of materials.
Physics Practical	**CO 1:[L3: Applying]** Acquire the complementary skills of collaborative learning and teamwork in laboratory settings.
	CO 2:[L4 : Analyzing] Demonstrate an ability to collect data through observation and/or experimentation and interpreting data.
	CO 3: [L5: Evaluating] Demonstrate an understanding of laboratory procedures including safety, and scientific methods.
	CO 4: [L6: Creating] Demonstrate a deeper understanding of abstract concepts and theories gained by experiencing and visualizing them as authentic phenomena.
Course Outcomes	
Mathematical Methodsin Physics I	**CO 1:[L2: Understanding]** Understand the complex algebra useful in physics courses
	CO 2: [L2: Understanding]Understand the concept of partial differentiation.
	CO 3: [L3: Applying]Understand the role of partial differential equations in physics
	CO 4: [L3: Applying] Understand vector algebra useful in mathematics and physics
Instrumen tation	**CO 1: [L2: Understanding]** Understand the functions of different instruments.
	CO 2:[L3: Applying] Use different instruments for measurement of parameters.
	CO 3:[L3: Applying] Design experiments using sensors.
	CO 4: [L1: Remembering]Temperature Measurement Techniques.
Electronics I	**CO 1: [L3: Applying]** Apply laws of electrical circuits to different circuits.
	CO 2: [L2: Understanding]Understand the relations in electricity
	CO 3: [L2: Understanding]Understand the properties and working of transistors.
	CO 4:[L2: Understanding] Understand the functions of operational amplifiers.
Oscillations, Waves andSound	**CO 1: [L3: Applying]**To Solve the equations of motion for simple harmonic, damped, and forced oscillators.
	CO 2:[L2: Understanding] Understand the physics and mathematics of oscillations.

	CO 3: [L1: Remembering]Formulate these equations and understand their physical content in a variety of applications,
	CO 4: [L3: Applying]Describe oscillatory motion with graphs and equations, and use these descriptions to solve problems of oscillatory motion.
Optics	**CO 1:[L2: Understanding]** Acquire the basic concepts of wave optics
	CO 2: [L3: Applying]Describe how light can constructively and destructively interference.
	CO 3: [L3: Applying] Explain why a light beam spreads out after passing through an aperture.
	CO 4:[L1: Remembering] Summarize the polarization characteristics of electromagnetic waves.
Physics Practical	**CO 1: [L4 : Analyzing]**Analyze data, plot appropriate graphs and reach conclusions from your data analysis.
	CO 2: [L5: Evaluating] Work in a group to plan, implement and report on a project/experiment.
	CO 3:[L2: Understanding] Keep a well-maintained and instructive laboratory logbook.
	CO 4:[L6: Creating] Set up experimental equipment to implement an experimental approach.
Course Outcomes	
Mathematical Methodsin Physics II	**CO 1: [L3: Applying]**This course acts as a foundation for other courses taught in Physics.
	CO 2: [L3: Applying] Apply special mathematical function appropriately in solving problems in physics
	CO 3: [L2: Understanding] Students get advance knowledge regarding the basicand advanced mathematical background required for other courses such as; classical mechanics, quantum mechanics, statistical physics, electrodynamics etc.
	CO 4:[L3: Applying] After successfully completing this course students get thorough knowledge of basics of curvilinear co-ordinate system, differential equations, special functions and special theory of relativity.
Classical Mechanics	**CO 1: [L3: Applying]** Be able to solve Maxwell's equations in free space and write equation of plane e-m waves.
	CO 2: [L3: Applying] The students are able to solve the Newton equations for simple configurations using various methods.
	CO 3: [L3: Applying] All the classical concepts are useful and applicable to day today life.
	CO 4:[L2: Understanding] Students are understanding of intermediate classical mechanics topics such as coordinate transformations, oscillatory motion, gravitation and other central forces, and Lagrangian mechanics.
Paper III	**CO 1: [L1: Remembering]**Be able to use method of images in electrostatics to solve

Electrodynamics	the boundary value problems.
	CO 2: [L2: Understanding] Should have understood the basic laws in magneto statics like Biot-Savart's law, Ampere's law etc.
	CO 3: [L2: Understanding] Have understood the concept of magnetic vector potential.
	CO 4: [L3: Applying] Be able to solve Maxwell's equations in free space and write equation of plane e-m waves.
Atomic and Molecular Physics	**CO 1: [L2: Understanding]** Development of Atomic structures starts from Rutherford's atomic model up to Vector atomic model.
	CO 2: [L2: Understanding] Concept of atomic absorption and emission spectra, spectra associated with hydrogen atom.
	CO 3: [L3: Applying] Pauli Exclusion Principle, Spectral notation for quantum states.
	CO 4: [L3: Applying] The concepts of space quantization, Spectra of sodium atom.
Computational Physics	**CO 1: [L1: Remembering]** After successfully completing this course students get thorough knowledge of basics concepts of algorithms and flowcharts, programming in C language
	CO 2: [L2: Understanding]Students will get practice of programming through small programs like sorting array, graphics, finding factorial, using functions and pointers etc.
	CO 3: [L3: Applying]To learn how to interpret and analyze data visually, both during and after computation.
	CO 4: [L1: Remembering] Students learn various errors in computations and various numerical analysis methods such as, obtaining roots of a function, finding integration.
Renewable Energy Sources	**CO 1: [L2: Understanding]**Students learns about the Conventional and non-conventional sources of energy, Structure and characteristics of sun.
	CO 2: [L2: Understanding] Students understand the application of solar energy such as Solar distillation, Solar drying, Solar cooker(box type), Solar water heating systems
	CO 3:[L3: Applying] Students study Photovoltaic principle, Power output and conversion efficiency, Types of solar cells, Application of solar photovoltaic systems.
	CO 4:[L3: Applying] To understand the positive and negative aspects of solar energy in relation to natural and human aspects of the environment.