DEPARTMENT OF PHYSICS

Programme: B.Sc., Physics

PO No.	Programme Outcomes Upon completion of the B.Sc. Degree Programme, the graduate will be able to
PO-1	emerge with competency in the subject of Physics and apply knowledge to cater to the needs of Society / Employer / Institution / Own Business Enterprise
PO-2	imbibe analytical/critical/logical/innovative thinking skills in the various fields of theoretical and experimental Physics
PO-3	acquire distinct traits and ethics with high professionalism to gain a broader insight into the domain concerned for nation building
PO-4	recognize the need for and have an ability to engage in life-long learning and be able to demonstrate knowledge of contemporary issues
PO-5	plan, execute and report the results of a complex, extensive experiments or investigation using apt methods to analyze data and to evaluate the level of its accuracy

PSO No.	Programme Specific Outcomes Upon completion of these courses the student would
PSO-1	develop the scientific attitudes among students to enhance rational reasoning, critical thinking and develop skills to face various aspects of life like higher studies, research activities, various competitive exams, entrepreneurship and employment
PSO-2	acquire the in-depth knowledge in theoretical and experimental Physics.
PSO-3	produce graduate with leadership quality and to integrate their knowledge with Computer Science, Electronics, Chemistry and mathematics to face challenges taking place rapidly at global level.

Course Title	MECHANICS, PROPERTIES OF MATTER AND ACOUSTICS	
CODE	**23PHUC101**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Learn the basic concepts of Rigid body dynamics, Gravitation, Properties of Matter and Acoustics.	K1
CO-2	Understand the concept of Radius of Gyration, Moment of Inertia, Elasticity, Surface tension and Types of Vibration.	K2
CO-3	Understand the principles of Low Pressure Gauges and their measurements.	K2
CO-4	Understand the applications of Acoustics and Ultrasonics.	K2
CO-5	Apply the basic concepts in real world problems.	K3

Course Title	HEAT, THERMODYNAMICS AND STATISTICAL MECHANICS	
CODE	**23PHUC102**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand the concepts of Heat, Thermodynamics and Statistical Thermodynamics.	K1
CO-2	Procure basic knowledge about real gas, specific heat and Entropy.	K2
CO-3	Get ideas about liquefaction of gases.	K2
CO-4	Understand the laws of thermal radiation.	K2
CO-5	Acquire knowledge in classical and Quantum Statistics.	K3

Course Title	ELECTRICITY AND MAGNETISM	
CODE	**23PHUC203**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Know the basic concepts of Electricity and Magnetism.	K1
CO-2	Understand the various phenomenons in Electricity andMagnetism.	K2
CO-3	Understand Circuit analysis and network theorems.	K2
CO-4	Explain the Dynamics of Charged Particles.	K2
CO-5	Apply the acquired knowledge to solve the problems.	K3

Course Title	NUCLEAR AND PARTICLE PHYSICS	
CODE	**23PHUC204**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand the basics concepts of atomic structure and general static properties of atomic nuclei.	K1
CO-2	Analyze different nuclear models knowing the properties of nuclei.	K2
CO-3	Analyze the various techniques of nuclear radiation detectors.	K2
CO-4	Apply the knowledge of radioactivity to realize the concept of artificial radioactivity.	K3
CO-5	Acquire knowledge on the kinematics of high energy collusion of nuclear elementary particles.	K3

Course Title	CORE PRACTICAL I	
CODE	**23PHUCP01**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Determine the various properties of materials.	K4
CO-2	Apply the knowledge of Physics fundamentals.	K3
CO-3	Find the errors and adjust it to get the nearer ideal readings using specific measurement techniques.	K3
CO-4	Quantify the measurement of the reflection or transmission properties of a material.	K4
CO-5	Determine the characteristics of the electronic devices.	K5

Course Title	ALLIED PHYSICS PAPER I - MECHANICS, HEAT, SOUND, SOLAR PHYSICS, ELECTRICIRY AND MAGNETISM	
CODE	**23PHUA101**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand the basic concepts in mechanics, Solar energy, electricity and magnetism.	K1
CO-2	Investigate the effects of gravity and elasticity.	K2
CO-3	Explore the concepts of heat and thermodynamics.	K2
CO-4	Provide the opportunity to integrate theory and the application of it in everyday experience.	K3
CO-5	Understand the Fundamental properties of electricity and magnetism.	K3

Course Title	ALLIED PHYSICS PAPER II –MODERN PHYSICS, ELECTRONICS AND DIGITAL ELECTRONICS	
CODE	**23PHUA202**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand new types of Lasers for commercial applications.	K2
CO-2	Understand the concepts in nuclear and particle Physics.	K2
CO-3	Procure knowledge in electronic devices and systems.	K2
CO-4	Understand the principles of modern communication systems.	K2
CO-5	Analyze and construct various digital circuits.	K3

Course Title	ALLIED PHYSICS PRACTICALS	
CODE	**23PHUAP01**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Determine the various properties of materials.	K4
CO-2	Apply the knowledge of Physics fundamentals.	K3
CO-3	Find the errors using error correction methods.	K3
CO-4	Quantify the measurement of the physical properties of a material.	K4
CO-5	Determine the characteristics of the electronic devices.	K5

Course Title	OPTICS	
CODE	**21PHUC305**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Describe the general method for analyzing and predicting the aberrations in lens and to find the velocity of light.	K1
CO-2	Understand the basic concepts of the interference through experiments with visible lights.	K2
CO-3	Interpret various Diffraction techniques to determine the wavelength of light.	K2
CO-4	Infer the basic concept of polarization and their application in the field of Photonics.	K2
CO-5	Illustrate the phenomenon of dispersion and to discuss its advantages.	K3

Course Title	DIGITAL ELECTRONICS	
CODE	**21PHUC406**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Recognize and converts different types of codes and number systems which are used in computer system and digital communication.	K1
CO-2	Optimize simple logic using K-map and simplify Boolean laws using the basic Boolean property.	K2
CO-3	Relate logical processes and implement logical operation using combinational logic circuits.	K2
CO-4	Analyze and design sequential and counter circuits.	K2
CO-5	Classify the different types of magnetic memory and Semiconductor memory	K3

Course Title	CORE PRACTICAL II	
CODE	**21PHUCP02**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Apply the knowledge of Physics fundamentals.	K4
CO-2	Determine the various properties of materials.	K3
CO-3	Find the errors using error correction methods.	K3
CO-4	Quantify the measurement of the physical properties of a material.	K4
CO-5	Determine the characteristics of the electronic devices.	K5

Course Title	ALLIED PHYSICS PAPER I - MECHANICS, HEAT, SOUND, SOLAR PHYSICS, ELECTRICIRY AND MAGNETISM	
CODE	**21PHUA303**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand the basic concepts in mechanics, Solar energy, electricity and magnetism.	K1
CO-2	Investigate the effects of gravity and elasticity.	K2
CO-3	Explore the concepts of heat and thermodynamics.	K2
CO-4	Provide the opportunity to integrate theory and the application of it in everyday experience.	K3
CO-5	Understand the Fundamental properties of electricity and magnetism.	K3

Course Title	ALLIED PHYSICS PAPER II –MODERN PHYSICS, ELECTRONICS AND DIGITAL ELECTRONICS	
CODE	**21PHUA404**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand new types of Lasers for commercial applications.	K2
CO-2	Understand the concepts in nuclear and particle Physics.	K2
CO-3	Procure knowledge in electronic devices and systems.	K2
CO-4	Understand the principles of modern communication systems.	K2
CO-5	Analyse and construct various digital circuits.	K3

Course Title	ALLIED PHYSICS PRACTICALS	
CODE	**21PHUAP01**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Apply the knowledge of Physics fundamentals.	K4
CO-2	Determine the various properties of materials.	K3
CO-3	Find the errors using error correction methods.	K3
CO-4	Quantify the measurement of the physical properties of a materials.	K4
CO-5	Determine the characteristics of the electronic devices.	K5

Course Title	MATHEMATICAL PHYSICS	
CODE	**21PHUC507**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Gain knowledge on vectors a basic mathematical structure which is essential in solving problems in various branches of Physics as well as in engineering.	K1
CO-2	Solve ordinary differential equations that are common in the Physical Sciences.	K2
CO-3	Develop an understanding of how to model a given physical phenomena such as pendulum motion, rocket motion, stretched string etc., into set of ODE's, PDE's and solve them.	K2
CO-4	Explore the students to applied mathematics and mathematical modeling that enhance them for further studies.	K2
CO-5	Learn the beta, gamma functions and Dirac delta function its properties and their applications in doing integrations, which have applications in various branches of Physics, especially quantum mechanics.	K3

Course Title	ATOMIC AND SOLID STATE PHYSICS	
CODE	**21PHUC508**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Recognize various quantum numbers associated with vector atom model and explain the change in behaviour of atomic spectral lines on externally applied magnetic fields.	K1
CO-2	Differentiate between different crystal structures in terms of the crystal lattice and explain the concepts of reciprocal lattice.	K2
CO-3	Interpret the characteristics of various crystal defects and be familiar with the crystal growth mechanisms and techniques.	K2
CO-4	Apply the basic theories to describe electronic behavior in the metals and familiar with the unusual properties that are exhibited by superconducting materials.	K3
CO-5	Develop an understanding of the unique properties and characteristics of dielectrics and insulating based materials.	K3

Course Title	ELECTRONIC CIRCUITS AND DEVICES	
CODE	**21PHUC509**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Know the basic principles about semiconductor diodes.	K1
CO-2	Understand the various phenomena of Transistor circuits.	K2
CO-3	Understand different types of amplifier.	K2
CO-4	Analyze the working of oscillator and multivibrators.	K2
CO-5	Apply the acquired knowledge to solve the problems	K3

Course Title	PROGRAMMING IN 'C' AND 'C++'	
CODE	**21PHUE511**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Improve their understanding and ability to use data types, variables and arithmetic operators available in C program.	K1
CO-2	Able to understand the basic oops concepts and control structures of C++ program.	K2
CO-3	Acquire the knowledge of classes and objects to implement oops concepts in C++ program.	K2
CO-4	Learn to implement constructors, destructors and inheritance in writing a C++ program.	K3
CO-5	Illustrate the concept of function overloading, operator overloading, virtual functions and develop the understanding of working with files.	K3

Course Title	PYTHON PROGRAMMING	
CODE	**21PHUE521**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Able to know the basics of Python program and data types.	K1
CO-2	Understand the various operators and decision control statement.	K2
CO-3	Understand the different types of Functions in Python programming.	K2
CO-4	Able to analyze different types of Data structures.	K3
CO-5	Apply the acquired knowledge and able to write simple scientific Python programs.	K3

Course Title	CLASSICAL MECHANICS AND RELATIVITY	
CODE	**21PHUC610**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand and apply Newton's laws of motion to simple physical problems of interest.	K1
CO-2	Build strong knowledge about different types of constraints and apply it to formulate and solve problems using Lagrangian equation of motion.	K2
CO-3	Gain a clear understanding of vibrational calculus and apply Hamiltonian formalisms to solve real world problems.	K2
CO-4	Demonstrate the knowledge of central force problems and classical scattering theory.	K3
CO-5	Explain the fundamental concepts in relativity.	K3

Course Title	QUANTUM MECHANICS	
CODE	**21PHUC611**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Introduce wave properties of Matter, Uncertainty Principle, concept of Angular Momentum and Spin.	K1
CO-2	Study about Basic concepts in Quantum Mechanics such as the Schrodinger equation, wave function and its statistical interpretation.	K2
CO-3	Acquire Basic knowledge on operator used in Quantum Mechanics.	K2
CO-4	Solve Schrodinger equation for one electron in simple potential function.	K3
CO-5	Apply the quantum mechanical concepts to solve hydrogen atom and simple harmonic oscillator problem with computational solution using different software.	K3

Course Title	MICROPROCESSOR AND INTRODUCTION TO IoT	
CODE	**21PHUE612**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand the general architecture of a microcomputer system and architecture of 8085 microprocessor and its operations.	K1
CO-2	Acquire knowledge of various addressing modes and instructions of the 8085 microprocessor.	K2
CO-3	Interpret the operations of microprocessor using timing diagrams.	K2
CO-4	Apply the interfacing concepts to Interface memory & various I/O devices with 8085 microprocessor.	K3
CO-5	Develop assembly language programs of 8085 microprocessor and recognize the key mechanisms that make up an IoT system.	K3

Course Title	LASERANDSPECTROSCOPY	
CODE	**21PHUE622**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Know the basic concepts and principles of laser and working of different types of lasers.	K1
CO-2	Explicate the basic laws and principles of atomic spectra.	K2
CO-3	Acquire the knowledge based on molecular symmetry to predict spectroscopic properties.	K2
CO-4	Apply the concept of transitions between the vibrational energy levels of molecules in the infrared region.	K3
CO-5	Explore the use of various spectroscopic techniques for the characterization of compounds with the instruments.	K3

Course Title	COMMUNICATION ELECTRONICS	
CODE	**21PHUE613**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Know the basic concepts of Modulation and demodulation.	K1
CO-2	Understand the various phenomenon in digital communication.	K2
CO-3	Understand about broad band communication system.	K2
CO-4	Acquire the basic knowledge on fiber optics and satellite communication.	K2
CO-5	Apply the acquired knowledge in new situation.	K3

Course Title	NUMERICAL METHODS	
CODE	**21PHUE623**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand the curve fitting for various polynomials.	K1
CO-2	Apply numerical methods to find out solutions for algebraic equations.	K2
CO-3	Learn how to integrate and interpolate the given set of values.	K2
CO-4	Apply numerical methods to obtain approximate solutions of linear equations to mathematical problems.	K2
CO-5	Workout ODE problems whenever and wherever routine Methods are not applicable.	K3

Course Title	CORE PRACTICAL III	
CODE	**21PHUCP03**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Explain Basic laws and theories of diode, transistors, operational amplifiers, etc.	K1
CO-2	Describe the basic concepts and its physical significance.	K2
CO-3	Implement the basic theory knowledge to set up experiments.	K2
CO-4	Construct amplifier, oscillator and multivibrator circuits.	K3
CO-5	Analyse the result qualitatively and quantitatively.	K3

Course Title	CORE PRACTICAL IV	
CODE	**21PHUCP04**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Explain the basic laws of electronic components and their performance.	K1
CO-2	Analyse a given electronic component using basic test and measuring instruments.	K2
CO-3	Design and analyze of analog circuits	K2
CO-4	Design and construct the integrated circuits that perform the desired logic operation	K3
CO-5	Use the basic knowledge of analog and digital electronics to evaluate the given electronic circuits.	K3

Course Title	ELECTIVE PRACTICAL - PROGRAMMINGIN'C'AND'C++'	
CODE	**21PHUEP11**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Explain the procedure of problem-solving using computer.	K1
CO-2	Outline an algorithmic solution for a given problem.	K2
CO-3	Write a C, C++ and Scilab program for a given algorithm.	K2
CO-4	Debug a given C, C++ and Scilab program.	K3
CO-5	Interpret and check a given C, C++ and Scilab program.	K3

Course Title	ELECTIVE PRACTICAL-PYTHON PROGRAMMING	
CODE	**21PHUEP21**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand the basic concepts of programming like input statements, arithmetic operations and fundamental data types.	K1
CO-2	Write and execute basic python programs using functions, Loops and conditional constructs.	K2
CO-3	Plot expressions involving concepts in Physics, using appropriate python libraries and interpret them for better understanding.	K2
CO-4	Write programs in python to solve problems in physics.	K3
CO-5	Use Python as a visualization tool in physics.	K3