Carmel College of Arts, Science & Commerce for Women, Nuvem Goa

Department of Physics

Programme: Bachelor of Science in Physics (B.Sc Physics)

Carmel College of Arts, Science & Commerce for Women, Nuvem Goa endeavours to achieve the following outcomes:

PO 1	**Attribute: KNOWLEDGE** Inculcate in our learners a quest for knowledge and an understanding of fundamental concepts and scientific principles related to various phenomena in daily life.
PO 2	**Attribute: CRITICAL THINKING** Acquire practical skills in handling scientific instruments and other experimental analysis, observational and problem-solving skills and draw logical inferences from scientific experiments.
PO 3	**Attribute: RESEARCH** Encourage student engagement for research skill development.
PO 4	**Attribute: SUSTAINABLE DEVELOPMENT** Have an interdisciplinary approach and provide solutions for sustainable development.
PO 5	**Attribute: COMMUNICATION SKILLS** Have good communication skills which help in expressing ideas and views clearly and effective.
PO 6	**Attribute: LIFE LONG LEARNING** Encourage a receptive mindset for lifelong learning
PO 7	**Attribute: SOCIETY** To groom an eco-conscious and ethical society

The department of physics, Carmel College of Arts, Science & Commerce for Women, Nuvem Goa endeavours to achieve the following outcomes:

Program Specific Outcomes (PSOs)	
PSO 1	**Academic and Analytic Competence** Learn fundamentals of various branches of physics, which is beneficial for pursuing the higher education in physics and in many other applied branches of sciences. Apply mathematical, analytical, and logical reasoning to solve problems and interpret physical phenomena.
PSO 2	**Experimental and Research Skills** Gain hands-on experience in performing physics experiments with accuracy and precision. Analyse data, identify errors, and use laboratory tools and computational techniques to explore and validate scientific principles.
PSO 3	**Scientific Curiosity and Inspiration** Foster a spirit of inquiry, innovation, and lifelong learning. Draw inspiration from the contributions of great physicists to develop independent thinking and apply physics knowledge to solve real-world challenges.

F. Y. BSc – Semester I&II

Course Code: PHY 100 **Course Title: Foundations of Physics**		
On completion of the course, the students will be able to:		**Cognitive level**
CO 1	Recall the fundamental concepts of Physics for critical thinking & problem solving.	1 (Remember)
CO 2	Understand the fundamental concepts to comprehend the physical phenomena happening around us.	2 (Understand)
CO 3	Apply fundamental concepts of Physics to solve these problems.	3 (Apply)
CO 4	Analyse the concepts in different scenarios.	4 (Analyse)

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	1	1	1	0	2	0	3	1	2
CO 2	3	2	1	2	1	2	1	3	2	3
CO 3	3	3	2	2	1	2	1	3	3	2
CO 4	2	3	3	2	2	3	1	3	3	3

Course Code: PHY 111 **Course Title: Everyday Physics**		
On completion of the course, the students will be able to:		**Cognitive level**
CO 1	Recall fundamental concepts in Physics and connect them in everyday life	1,2
CO 2	Describe the fundamental concept to understand the physical phenomena happening around us.	2
CO 3	Apply fundamental concepts in Physics to analyse these phenomena.	3,4
CO 4	Correlate the concepts of Physics in other branches of science.	4,5

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	1	1	2	0	2	2	3	1	2
CO 2	3	2	1	2	0	3	3	3	1	1
CO 3	3	2	1	2	1	2	3	3	2	1
CO 4	3	2	1	2	0	2	3	3	1	1

Course Code: PHY 131 **Course Title: History of Physics**		
On completion of the course, the students will be able to:		**Cognitive level**
CO 1	Understand that the development of Physics was incremental.	1
CO 2	Realise that a few great men and women influenced the development of physics.	1,2
CO 3	Analyse different laws and theories of physics and their impact on modern science.	4
CO 4	Understand that results that could not be explained often led to the introduction of radical new physics.	2,4

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	1	2	1	1	2	1	3	1	3
CO 2	2	1	2	1	2	3	2	2	1	3
CO 3	3	3	2	2	2	2	1	3	3	3
CO 4	3	2	3	2	1	3	1	3	2	3

Course Code: PHY 132 **Course Title: Indian Contribution to Physics**		
On completion of the course, the students will be able to:		**Cognitive level**
CO 1	Decipher contributions of Indians to Physics.	2
CO 2	Understand the role played by some of them in building modern India.	2,4
CO 3	Gain knowledge of Indian Atomic Energy Programme and Indian Space programme.	1,2
CO 4	Get inspired from the biographies of these men.	2

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	0	1	0	2	2	1	2	0	2
CO 2	3	0	0	1	2	2	2	2	0	2
CO 3	3	1	0	0	2	2	2	2	0	1
CO 4	3	0	0	0	2	2	2	2	0	2

Course Code: PHY 141 **Course Title: Basic Experimental Techniques**		
On completion of the course, the students will be able to:		**Cognitive level**
CO 1	Identify different components and Experimental instruments	1
CO 2	Gain Basic understanding of Experimental instruments.	2
CO 3	Develop Skills in Performing Physics experiments.	3
CO 4	Calculate errors in an experiment and other parameters related to the experiment.	4,5

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	3	2	1	1	2	2	3	2	2
CO 2	3	3	2	1	1	2	2	3	2	2
CO 3	3	3	3	1	1	2	2	3	2	2
CO 4	3	3	3	1	1	2	2	3	2	2

Course Code: PHY 144 **Course Title: PCB Designing**		
On completion of the course, the students will be able to:		**Cognitive level**
CO 1	Develop the necessary skills in drawing circuit diagrams and use techniques of circuit analysis for designing a given circuit as per given specifications.	3,4
CO 2	Use a Breadboard for a prototype implementation of circuits, test the performance of the circuit design using testing and measuring instruments (Multimeter, CRO, power supply etc).	3,5
CO 3	Develop soldering and de-soldering techniques and develop the necessary skills in etching PCB's.	3
CO 4	Create and fabricate a PCB, construct and test the circuit design on PCB's.	6

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	3	2	1	1	2	2	3	2	2
CO 2	3	3	2	1	1	2	2	3	2	2
CO 3	3	3	3	1	1	2	2	3	2	2
CO 4	3	3	3	1	1	2	2	3	2	2

S. Y. BSc – Semester III&IV

Course Code: PHY 200 **Course Title: Properties of Matter and Sound**		
On completion of the course, the students will be able to:		**Cognitive level**
CO 1	Understand fundamental concepts of mechanical properties of solids and liquids and understand concepts of oscillatory motion.	2
CO 2	Analyze beams subjected to stress and estimate their deformation.	4
CO 3	Interpret interference of sound and explain formation of beats.	2,3
CO 4	Analyze wave motion to evaluate speed of sound.	4,5

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	2	1	1	1	2	1	3	1	2
CO 2	3	2	2	1	1	2	1	3	2	2
CO 3	3	2	1	1	1	1	1	3	1	2
CO 4	2	2	1	1	1	1	1	2	1	2

Course Code: PHY 213 **Course Title: Heat and Thermodynamics**		
On completion of the course, the students will be able to:		**Cognitive level**
CO 1	Recall the fundamental properties of gases and laws of Thermodynamics	1
CO 2	Understand the principles of heat and thermodynamics.	2
CO 3	Apply the law to analyse the process.	3
CO 4	Analyse the factors influencing Behaviour of gas.	2,4
CO5	Examine principles and applications of low-temperature technology.	3,4

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	3	1	2	2	23	2	3	3	3
CO 2	3	3	2	2	2	3	2	3	3	3
CO 3	3	3	2	2	2	3	2	3	3	3
CO 4	3	3	2	2	2	3	3	3	3	3
CO5	3	3	3	3	2	3	3	3	3	3

Course Code: PHY 202 **Course Title: Electronics**		
On completion of the course, the students will be able to:		**Cognitive level**
CO 1	Understand the working principles of rectifiers and their applications.	2,3
CO 2	Develop a solid understanding of transistor operation and characteristics.	2
CO 3	Define and explain key amplifier parameters such as gain, bandwidth, and input/output impedance.	1,2
CO 4	Understand the characteristics and operation of Class A amplifiers and its stability	2
CO 5	Define and explain the concept of feedback in electronic circuits.	1,2
CO 6	Understand the characteristics and applications of operational amplifiers (Op-Amps).	2,3

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	3	3	3	1	3	3	3	3	3
CO 2	3	3	3	2	0	3	1	3	3	3
CO 3	3	3	2	1	2	3	2	3	3	3
CO 4	3	3	2	1	0	3	2	3	3	3
CO 5	3	3	3	2	2	3	3	3	3	3
CO 6	3	3	3	3	1	3	2	3	3	3

Course Code: PHY 203 **Course Title: Optics and Modern Physics**		
On completion of the course, the students will be able to:		**Cognitive level**
CO 1	Analyse the intensity variations of light due to interference, diffraction and polarization.	4
CO 2	Apply and demonstrate the various phenomena of optics using experimental methods.	3
CO 3	Understand the fundamental principles of particle acceleration.	2
CO 4	Explore principles of atomic physics in various scientific disciplines.	3,4
CO 5	Discuss application of X-rays in various fields.	2,3
CO 6	Discuss the applications of crystallography in in various sciences.	2,3

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	3	1	1	2	3	1	3	2	3
CO 2	3	3	3	1	2	3	1	3	3	3
CO 3	3	3	1	1	2	3	1	3	2	3
CO 4	3	3	2	1	2	3	1	3	2	3
CO 5	3	3	3	1	2	3	1	3	2	3
CO 6	3	3	3	1	2	3	1	3	2	3

Course Code: PHY 204 **Course Title: Classical Mechanics - I**		
On completion of the course, the students will be able to:		**Cognitive level**
CO 1	Understand the basic principles of kinematics and dynamics for motion in one and two dimensions.	2
CO 2	Demonstrate a thorough understanding of projectile motion concepts.	2,3
CO 3	Understand the concept of central forces and their implications on the motion of particles.	2
CO 4	Comprehend the concept of a moving coordinate system and its advantages in problem-solving.	2,3
CO 5	Understand the principles of rotational motion and dynamics of rigid bodies.	2

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	2	1	1	1	2	2	3	1	1
CO 2	3	2	1	1	1	2	2	3	1	1
CO 3	2	1	1	1	1	2	1	2	1	1
CO 4	2	1	1	1	1	2	2	2	1	1

Course Code: PHY 205 **Course Title: Mathematical Methods of Physics - I**		
On completion of the course, the students will be able to:		**Cognitive level**
CO 1	Explain the properties of Matrices, determinants and discuss its applications.	2,3
CO 2	Discuss vector analysis and its applications.	2,3
CO 3	Solve problems on limits, continuity and differentiation.	3
CO 4	Explain and solve the problems on integration and differential equations.	2,3

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	2	2	1	1	2	0	3	2	2
CO 2	3	3	2	1	1	2	0	3	2	2
CO 3	3	3	2	1	1	3	0	3	2	2
CO 4	3	3	3	2	1	3	1	3	3	3

Course Code: PHY 206 **Course Title: Electricity and Magnetism**		
On completion of the course, the students will be able to:		***Cognitive level***
CO 1	Understand the basic principles of electric circuits.	2
CO 2	Understand the behaviour and characteristics of inductors and analyze the role of inductance in electrical circuits.	2,4
CO 3	Analyze the response of DC and AC circuits.	4
CO 4	Understand the Lorentz force acting on a moving charged particle in a magnetic field.	2
CO5	Apply the right-hand rule to determine the direction of the force experienced by a current-carrying conductor in a magnetic field.	3
CO6	Understand the torque experienced by a current loop in a magnetic field.	2

PO **CO**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
CO 1	3	2	1	2	3	2	1	3	2	2
CO 2	3	3	1	2	2	2	1	3	3	2
CO 3	3	3	2	2	2	2	1	3	3	3
CO 4	2	3	1	2	2	2	1	3	2	2
CO 5	2	3	1	2	2	3	1	2	3	2
CO 6	3	3	1	3	2	2	1	3	2	3

Course Code: PHY 221 **Course Title: Communication Physics**		
On completion of the course, the students will be able to:		***Cognitive level***
CO 1	Understand basics of electronic communication.	2
CO 2	Understand transmission lines and antenna systems.	2
CO 3	Gain insights about fibre optic communication.	1,2
CO 4	Appreciate basics of satellite communication.	2
CO 5	Develop conceptual understanding of cellular communication.	4

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	2	1	2	3	2	1	3	2	2
CO 2	3	3	1	2	3	2	1	3	3	2
CO 3	3	2	2	1	2	2	1	3	3	3
CO 4	3	2	1	3	2	2	1	3	2	2
CO 5	3	3	2	2	2	2	1	3	3	3

Course Code: PHY **Course Title: Measurements Using Arduino**		
On completion of the course, the students will be able to:		***Cognitive level***
CO 1	Demonstrate Knowledge of Arduino Components.	1,2
CO 2	Analyze sensor data collected through Arduino, interpreting it to make informed decisions for various applications	4
CO 3	Assess the effectiveness of Arduino-based systems.	5
CO 4	Create functional Arduino projects exhibiting proficient programming skills and component interfacing.	6

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	1	0	0	0	1	0	2	2	1
CO 2	2	3	2	2	1	1	2	3	3	2
CO 3	2	3	2	1	2	1	2	2	3	2
CO 4	3	3	2	2	2	3	2	3	3	3

Course Code: PHY 231 **Course Title: Landmark Experiments in Physics**		
On completion of the course, the students will be able to:		***Cognitive level***
CO 1	Recall pivotal experiments, associated scientists, and physics discoveries	1
CO 2	Illustrate understanding of experimental methods and their relation to observed phenomena and theories.	2
CO 3	Develop a scientific mindset by critically evaluating experimental methodologies, and results	5
CO 4	Appreciate implications of scientific discoveries in technology.	2

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	0	1	1	1	2	0	2	1	3
CO 2	3	3	2	1	1	2	0	3	3	2
CO 3	2	3	3	1	2	2	1	3	3	3
CO 4	3	2	1	2	1	3	2	2	1	3

T. Y. BSc – Semester V&VI

Course Code: PHY 300 **Course Title: Analog and Digital Electronics**	
On completion of the course, the students will be able to:	**Cognitive level**
CO 1	Understand the principles of multivibrators and their applications.	2,3
CO 2	Comprehend the working principles of FET's, understand their biasing and impact on circuit performance.	2,4
CO 3	Analyse the operation of IC 555 timers and their & their applications in pulse generators, oscillators.	3,4
CO 4	Analyse logic circuits and their truth tables.	4
CO 5	Understand the concept of flip flops and their applications in sequential logic circuits.	2,3

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	2	1	0	1	2	0	3	2	2
CO 2	3	3	1	0	1	2	0	3	2	2
CO 3	3	3	1	0	1	2	0	3	3	2
CO 4	3	3	1	0	1	2	0	3	2	1
CO 5	3	2	1	0	1	2	0	3	2	2

Course Code: PHY 301 **Course Title: Atomic and Molecular Physics**	
On completion of the course, the students will be able to:	**Cognitive level**
CO 1	Recall Schrödinger's equation, analyze atomic and molecular phenomena.	1,2,4
CO 2	Interpret spectra of atom.	2,3
CO 3	Apply quantum mechanics concepts to predict and interpret atomic and molecular behaviours.	3
CO 4	Analyze atomic and molecular phenomena by applying Schrödinger's equation and using quantum numbers	3,4

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	3	3	1	2	3	2	3	3	3
CO 2	3	3	3	1	2	3	2	3	3	3
CO 3	3	3	3	1	2	3	2	3	3	3
CO 4	3	3	3	1	2	3	2	3	3	3

Course Code: PHY 302 **Course Title: Physics Laboratory - I**		
On completion of the course, the students will be able to:		**Cognitive level**
CO 1	Develop proficiency in using a variety of laboratory instruments and equipment.	1,2,3
CO 2	Acquire skills in collecting and recording experimental data	3
CO 3	Learn to analyse and interpret experimental results.	3
CO 4	Gain proficiency in using statistical methods to analyse uncertainties and errors.	4
CO 5	Learn to identify and troubleshoot experimental issues. Gain familiarity with advanced laboratory instruments and technologies.	5, 6

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	3	3	1	2	3	3	3	3	3
CO 2	3	3	3	1	2	3	3	3	3	3
CO 3	3	3	3	1	2	3	3	3	3	3
CO 4	3	3	3	1	2	3	3	3	3	3
CO 5	3	3	3	3	2	3	3	3	3	3

Course Code: PHY 303 **Course Title: Special Theory of Relativity**		
On completion of the course, the students will be able to:		**Cognitive level**
CO 1	Understand the historical context and experimental observations that led to the development of special relativity.	2
CO 2	Develop a deep understanding of Lorentz transformations and apply relativistic kinematics to describe time dilation and length contraction	2,3
CO 3	Understand the concept of relativistic mass and its implications	2,4
CO 4	Apply spacetime diagrams to visualize relativistic effects	3
CO 5	Analyse the Twin Paradox qualitatively using time dilation and relativistic effects	4
CO 6	Understand the principle of equivalence and its role in the development of general relativity.	2

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	2	1	0	1	2	0	3	1	2
CO 2	3	3	1	0	1	2	0	3	1	1
CO 3	3	2	1	0	1	2	0	2	0	1
CO 4	2	3	0	0	1	1	0	3	1	1
CO 5	2	3	0	0	1	1	0	3	0	2
CO 6	3	2	1	0	1	2	0	2	0	2

Course Code: PHY 304 **Course Title: Electromagnetic Theory**		
On completion of the course, the students will be able to:		**Cognitive level**
CO 1	Understand the fundamental principles of electrostatics.	2
CO 2	Develop problem-solving skills for various electrostatic scenarios	3
CO 3	Understand the macroscopic and microscopic response of materials to electric fields.	2,4
CO 4	Calculate work done in various electrostatic scenarios.	3
CO 5	Analyse the behaviour of magnetic fields in different materials.	4
CO 6	Familiarize with Maxwell's equations & their significance.	2,5

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	2	0	0	1	2	0	3	2	2
CO 2	2	3	1	0	1	2	0	3	2	1
CO 3	3	2	1	0	1	2	0	3	2	2
CO 4	2	3	1	0	1	2	0	3	2	1
CO 5	2	3	1	0	1	2	0	3	2	2
CO 6	3	2	1	0	1	2	0	3	2	2

Course Code: PHY 305 **Course Title: Quantum Mechanics - I**		
On completion of the course, the students will be able to:		***Cognitive level***
CO 1	Understand the historical development and key contributors to the quantum theory.	2
CO 2	Define and understand the concept of the wave function in quantum mechanics	2
CO 3	State Heisenberg's Uncertainty Principle and understand its implications.	2
CO 4	Derive and understand Schrödinger's time-independent wave equation.	4
CO 5	Apply Schrödinger's time-independent wave equation to solve problems in quantum mechanics.	3

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	2	1	0	1	2	0	3	1	2
CO 2	3	2	1	0	1	2	0	3	1	2
CO 3	3	2	1	0	1	2	0	2	1	2
CO 4	3	3	1	0	1	2	0	3	1	2
CO 5	3	3	1	0	1	2	0	3	1	2

Course Code: PHY 306 **Course Title: Physics Laboratory - II**		
On completion of the course, the students will be able to:		**Cognitive level**
CO 1	Develop proficiency in using a variety of laboratory instruments and equipment.	3
CO 2	Acquire skills in collecting and recording experimental data.	3
CO 3	Learn to analyse and interpret experimental results.	4
CO 4	Gain proficiency in using statistical methods to analyse uncertainties and errors.	3,4
CO 5	Learn to identify and troubleshoot experimental issues.	5
CO 6	Gain familiarity with advanced laboratory instruments and technologies.	2

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	2	3	2	0	1	2	0	2	3	2
CO 2	2	2	2	0	1	2	0	2	3	1
CO 3	2	3	2	0	1	2	0	3	2	2
CO 4	2	3	2	0	1	2	0	3	2	1
CO 5	2	3	2	0	1	2	0	3	2	2
CO 6	2	2	1	0	1	2	0	2	4	1

Course Code: PHY 321 **Course Title: Experimental Physics**		
On completion of the course, the students will be able to:		***Cognitive level***
CO 1	Demonstrate a thorough understanding of fundamental concepts and principles in physical measurement.	2
CO 2	Understand the functioning and limitations of different instruments & design experimental setups for specific measurements.	2,6
CO 3	Design experiments based on the principles of experimental logic.	6
CO 4	Differentiate between signal and noise in a measurement system & Identify source of noise in measurement systems.	4
CO 5	Apply signal-to-noise considerations in practical applications & understand the impact of signal-to-noise ratios on measurement accuracy.	2,3

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	2	2	1	1	2	1	3	2	2
CO 2	2	3	3	2	1	2	1	3	3	2
CO 3	2	3	3	1	1	2	1	3	3	2
CO 4	1	2	2	1	0	1	1	2	3	1
CO 5	1	2	2	1	0	1	1	2	3	1

Course Code: PHY 324 **Course Title: Solid State Devices & Instrumentation**		
On completion of the course, the students will be able to:		**Cognitive level**
CO 1	Understand the principles and functionality of different two terminal devices.	2
CO 2	Gain a comprehensive understanding of industrial devices and their applications.	2,3
CO 3	Develop proficiency in the use of various measuring instruments for electrical and electronic parameters.	3
CO 4	Understand the basic principles of operation of an oscilloscope.	2
CO 5	Analyse the characteristics and performance of various transducers.	4
CO 6	Analyse and interpret signals generated by signal generators.	4,5

PO **CO**	***PO1***	***PO2***	***PO3***	***PO4***	***PO5***	***PO6***	***PO7***	***PSO1***	***PSO2***	***PSO3***
CO 1	3	2	1	0	1	2	0	3	2	2
CO 2	3	2	1	0	1	2	0	3	1	2
CO 3	2	3	1	0	1	2	0	2	3	1
CO 4	2	2	1	0	1	2	0	2	2	1
CO 5	2	3	1	0	1	2	0	3	2	1
CO 6	2	3	1	0	1	2	0	3	2	1