FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Bachelor of Technology
In Effect from Academic Year 2016-17

Subject Code: 1ET1000102	Subject Title: PHYSICS
Pre-requisite Subject	Physics majors are expected to have a basic understanding of calculus, physics and chemistry.

Course Objective:
Physics and Technology are very much related Which deals with understanding of the natural world, while technology aims to apply this understanding into the man-made world. Technology might even be considered as the offspring of Physics. Physics is the discipline devoted to creating and optimizing engineering solutions through enhanced understanding and integrated application of mathematical, scientific, statistical, and engineering principles. The discipline is also meant for cross-functionality and bridges the gap between theoretical science and practical engineering with emphasis in research and development, design, and analysis.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
				Theory		Practical		Total (T+P)
Lecture	Tutorial	Practical	Credit	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	-	2	4	70	30	-	20	120

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	**SI UNITS & MEASUREMENTS:** Explain Physical Quantities and their units. Measure given dimensions by using appropriate instruments accurately. Calculate error in the measurement Solve numerical based on above outcomes **FORCE AND MOTION:** List Newton's laws of motion Differentiate among various forces in nature Define inertia, momentum and impulse of force State Newton's laws of motion Solve numerical problems based on above topics	06	10
2	**SEMICONDUCTOR PHYSICS:** Band theory of Solids Classification of solids on based of Band theory Energy band structure of conductors, insulator and semi conductions types of diodes (simple diode, Zener diode, varactor diode, LED Solar cells, photovoltaic cell, Photo Conductivity, Hall effects.	05	10
3	**ACOUSTIC AND ULTRASONIC** **ACOUSTIC:** Introduction, Classification and Characteristics of sound, Sabine's formula for reverberation (Without Derivations), Introduction of Absorption co-efficient Sound absorbing materials, Factors affecting the acoustics of building and their remedies **ULTRASONIC:** Properties of ultrasound, Generation of ultrasound by (1) piezoelectric method and	07	15

	(2) magnetostriction method, Methods for Ultrasound Velocity measurement Applications of ultrasound: Industry, Medicine		
4	**SUPERCONDUCTIVITY:** Superconductivity, General Properties of superconductors, Types of Superconductors, High Temperature superconductors, Applications: Magnets, Josephson effect, SQUID, Maglev, other	05	10
5	**FIBER OPTICS:** Introduction and principle of Optical Fiber, Advantages of Optical Fiber, Total Internal Reflection, Numerical Aperture and Acceptance angle, Modes of Propagation, Types of Optical Fiber, Applications of optical fiber	05	15
6	**MODERN PHYSICS:** X-rays: Origin of x-ray, production, properties and applications Introduction, Characteristics of laser radiation, Introduction to LASER: Einstein's theory, Properties of LASER. Population inversion and pumping. Production of LASER: Nd-YAG laser, CO2 laser. Applications of LASER	05	10
7	**NANO TECHNOLOGY:** Nanoscale, Surface to volume ratio and Surface effects on Nanomaterials, Electron confinement, Nanomaterials and Nanotechnology, properties and Applications of Nanomaterials, Advantages and Disadvantages of Nanomaterials, Synthesis of Nanomaterials. Carbon Nanotubes: Introduction, Structure, Fabrication, Properties and applications	06	15
8	**ENGINEERING MATERIALS:** **SHAPE MEMORY ALLOYS** Introduction, Synthesis, Properties and Applications **METALLIC GLASSES** Introduction, Synthesis, Properties and Applications **ENERGY MATERIALS** Solar cells, Fuel cells (H_2O_2, Lithium cell), Ultra-capacitors **MAGNETIC MATERIALS:** Definitions: Magnetic moment, Magnetic dipole, Magnetic Field strength, Magnetic flux density, Intensity of magnetization, Magnetic dipole moment, Magnetic Field intensity, Magnetic permeability, magnetic susceptibility, Bohr magnetron. Classification of Magnetic Materials on the basis of magnetic moment Magnetic Recording and Readout Storage of magnetic data.	06	15

Course Outcome:

- An ability to apply knowledge of mathematics, science, and engineering.
- An ability to design and conduct experiments, as well as to analyse and interpret data.
- An ability to design a system, component, or process to meet desired needs within realistic constraints such as economics, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- An ability to identify, formulate, and solve engineering problems.
- An understanding of professional and ethical responsibility.
- An ability to communicate effectively.
- The broad education necessary to understand the impact of engineering solutions in a global economic.

List of References:

1. Sears and Zemansky University Physics Pearson Publication
2. Fundamental of Physics – Halliday, Resnick& Walker; John Wiley & Sons, Inc.
3. G Vijayakumari Engineering Physics, 7th & 2nd edition Vikas-Publication
4. Concepts of modern physics by Arthur Beiser
5. Engineering Physics by V. Rajendran: Tata McGraw-Hill Education.
6. University Physics with Modern Physics by Young, Freedman & Lewis Ford
7. Engineering Physics - Gaur R.K. and Gupta S.L

List of Experiments:

1. Characteristics of P-N Junction Diode
2. Characteristics of Zener Diode
3. Characteristics of Light Emitting Diode
4. Optical Fiber Communication using analog link
5. Numerical Aperture of Various Optical Fiber Cable
6. Study the temperature dependence of resistance of a semiconductor by four probe method
7. To find Ultrasonic velocity in given liquid medium by ultrasonic interferometer
8. To Determine Hall Co-efficient & Mobility of Semiconductor by Hall Effect.
9. Characteristics of a solar cell.
10. To determine the Young's modulus of elasticity of the material of a sample beam by bending.
11. Hysteresis Loop of a Magnetic Material
12. Determine dielectric constant of Solid Materials.
13. Determine the wavelength of the laser light by diffraction grating method