Applied Physics

Code	Credit Hours
PHY- 102	2-1

Course Description

The course comprises the topics of Physics, which are directly related to Engineering and Technology. These include Motion, Friction, Moment of inertia, Oscillations, waves and propagation, Electric Charge & Coulomb's Law, Electric Field, Electric Potential, Capacitors & Dielectric, Magnetic fields.

The course aims to give students both a theoretical and a practical foundation for engineering courses, like; Engineering Mechanics, Electromagnetic Field Theory, Systems and Signals, Control Systems, Transmission Lines and Antennas& Microwave Devices. The course gives the students a sound knowledge of Physics with its applications to problems of practical nature. After studying this course, the students will be able to apply Physics as a strong tool to understand and develop the problems which they come across in Engineering/Technology.

Text Book:

1. Physics for Scientists & Engineers by Serway Jewett (10th Edition)
2. Fundamentals of Physics By Halliday, Resnick & Walker (9th Edition)

Reference Book:

1. University Physics by Sears & Zemansky (15th Edition).

Prerequisites

A-Level / F.Sc Physics

ASSESSMENT SYSTEM FOR THEORY

Quizzes	10%
Assignments	10%
Mid Terms	30%
ESE	50%
Total	100% Theory Component: 66 %

ASSESSMENT SYSTEM FOR LAB

Quizzes	10%-15%

Assignments	5% - 10%
Lab Work and Report	70-80%
Lab ESE/Viva	20-30%
Total	100% Lab Component: 34%

Total = Theory Component: 66 % + Lab Component: 34% = 100%

Teaching Plan

Week No	Topics	Learning Outcomes
1	Newton Laws, Work, Energy	Applications of Newton's 1st, 2nd and 3rd Laws Work and Energy
2-6	Friction, Rotation, Moment of Inertia, Oscillations, Waves	Tension, Normal and Frictional forces, Dynamics of uniform circular motion, Kinematics of rotational motion, related problem solving, Simple harmonic motion, SHM and energy, Damped and forced oscillations, Oscillations and wave propagation, Energy and power carried by waves, Reflection, interference and diffraction, Charge and Coulomb's law, Electric field and superposition principle
7-8	Electric Dipole, Electric Flux, Maxwell's 1st Equation (Gauss's Law)	Electric dipoles, Electric flux, Gauss' law and different symmetries.
9	**MID TERM EXAM**	
10-12	Electric Potential, Electric Current, Resistance, Resistivity, Ohm's Law, Magnetic Force	Electric potential (point charges and dipole), Electric potential from electric field and vice versa, Conductors and equipotential surfaces, Electric Current, Current density, Drift Velocity, Resistance and Resistivity, Ohm' Law (Microscopic and Macroscopic), Magnetic force on a moving charge
13-17	Magnetic force on current carrying wires, Maxwell's 3rd and 4th Equations	Magnetic force on a current carrying wires, Torque on current loop and magnetic dipoles, Ampere's law and magnetic field due to long wires, Magnetic field due to solenoid and toroid.

	Generators and Motors, Energy stored in capacitors and Inductors	Faradays Law of induction, Lenz's law, toroid Motional EMF, Generators and Motors, Induced Electric field, Capacitance, Energy Stored in an Electrical Field, Inductance, Energy Stored in magnetic field
18	**End Semester Exams**	

Practical:

Experiment No	Description
1	Introduction to Lab
2	Understanding Errors
3	Mini-launcher (Exp. 1,2,3)
4	Mini-launcher (Exp. 4,6)
5	PAScar with Mass (Exp. 1,2,3)
6	PAScar with Mass (Exp. 4,6)
7	Compound Pendulum
8	Heat Engine/Gas Laws (Exp.1,2,3)
9	Ripple Tank
10	Faraday's Law
11	DC Electronics
12	DC Electronics