Programme	B.Sc. (Engg.) Energy Engineering	Course Code	NS 112	Credit Hours	2 + 1 = 3
Course Title	**Applied Physics**				

Course Introduction

This course bridges the gap between theoretical physics and practical applications, covering key concepts in mechanics, electromagnetism, thermodynamics, and modern physics. You'll explore how these principles are applied in real-world technologies and systems, from renewable energy solutions to advanced materials and medical devices. Through a combination of theoretical study and hands-on experiments, this course aims to provide you with a robust understanding of the physical principles that underpin modern technological advancements.

Mapped SDGs	SDG 9: Industry, Innovation, and Infrastructure

Learning Outcomes

On the completion of the course, the students will:

1. **Illustrate** the mechanical phenomena used in science and engineering. (C2)
2. **Interpret** basic electric circuits used in science and engineering. (C2)
3. **Examine** the mechanical phenomena including straight line motion and simple harmonic motion along with their mathematical models. (P2)

Course Content		Assignments/Readings
Week 1	**Unit 1: Force and Motion** Motion along a straight line. Vectors.	The teacher may assign home assignments/problem-based learning/reading materials/learning activity etc.
	Position, velocity and acceleration Newton Law of Motion.	
Week 2	Force Friction	
	Drag Force and terminal velocity	
Week 3	**Unit 2: Mechanics** Work and Energy Kinetic and Potential energy	
	Conservation of energy.	
Week 4	Linear momentum. Torque and angular momentum.	
	Gravitation Equilibrium and elasticity	
Week 5	**Unit 3: Electric Charge** Introduction to electric charge Conductors and Insulators Coulomb's Law	
	Charge is quantized Charge is conserved	
Week 6	**Unit 4: Electric Fields** Introduction to Electric Field A point charge in electric field A dipole in electric field	
	Electric Flux Gauss' Law and its Applications	

Week 7	**Unit 5: Electric Potential** Electric potential and Electric potential energy Potential due to a point charge	
Week 8	Potential due to group of charges Potential due to an electric dipole	
Week 9	**Unit 6: Capacitance** Introduction to capacitance Capacitors in parallel and series	
	Energy stored in an electric field Dielectric	
Week 10	**Unit 7: Magnetic Fields** Introduction to magnetic fields What produce magnetic field	
	The Hall effect	
Week 11	Faraday s Law Phenomena of Mutual and Self Induction	
	Magnetic force on a current carrying wire	
Week 12	Torque on a current loop	
	Tutorial	
Week 13	**Unit 8: Circuits** Introduction to electric circuits Pumping charges	
	Work, energy and EMF	
Week 14	Series and Parallel combinations of resistors, capacitors and inductors	
	Calculating the current in single loop circuit	
Week 15	Multi loop circuits	
Week 16	Working of the ammeter and voltmeter	

Textbooks and Reading Material

Textbooks.

1. University Physics by Hugh D. Young and Roger A. Freedman, 14th Edition.
2. Fundamentals of Physics Extended by D. Halliday, R. Resnick, J. Walker. 10th edition.
3. Fundamentals of Electromagnetic Phenomenon by D. Corson & Lorrain.
4. Theraja, B.L. 2004. A Text Book of Electrical Technology. S. Chand & Co. Ltd. New Delhi, India

Teaching Learning Strategies

1. Lecturing
2. Written Assignments/Quiz
3. Report Writing
4. Presentations

Assignments: Types and Number with Calendar

Week	1	2	3	4	5	6	7	8
Activity	-	-	Quiz 1	-	-	-	Quiz 2	-

Week	9	10	11	12	13	14	15	16
Activity	-	Quiz 3	-	-	Quiz 4	-	-	-

The abovementioned schedule of assignments/quizzes/presentations is tentative. The schedule will be provided to the students at the start of semester.

Assessment

Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written assessment at the mid-point of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work, report writing, and viva-voce examination, etc.
2.	Sessional Assessment	25%	This assessment may include classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written assessment at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work, report writing, and viva-voce examination, etc.