

Multidisciplinary Course (MDC) - for UG Program

Title of the Course:	Physics for Everyone
IDC Minor Paper Code:	
Semester = I	
Credit = 3	
Objectives of the Course:	To introduce key ideas such as motion, energy, forces, quantum mechanics, cosmology in a way that is understandable without advanced math . It will help them to understand the relevance of physics in daily life, from how household appliances work to natural phenomena.
Learning Outcomes of the Course	<p>Upon completing a "Physics for Everyone" course, students can expect the following outcomes:</p> <ol style="list-style-type: none"> 1. Basic Understanding of Physics Principles: Students will have a foundational grasp of key physics concepts, such as Newton's laws, energy, forces, and waves. 2. Enhanced Scientific Literacy: Students will be able to understand and interpret everyday phenomena through the lens of physics. 3. Updated with recent advancements in science: They will be able to grasp the basic knowledge of advanced physics in a nutshell. Moreover, students will be able to know India's fundamental contribution in advanced physics, especially in the space sector.
<u>Course Content</u>	
Module: -1	<ol style="list-style-type: none"> (a) Physical quantities and units (SI system), Dimensional analysis, Buoyancy, Newton's Laws of Motion, Force, friction, and tension, Circular motion and gravitation, Central force. (b) States of matter (solids, liquids, gases, plasma), Elasticity and material properties, Fluid dynamics (Bernoulli's principle).

<p>Module: -2</p>	<p>(a) Types of waves (mechanical, electromagnetic), Properties of waves (frequency, wavelength, speed), Sound waves and resonance, The electromagnetic spectrum, Doppler effect, Ultrasonic, Radio wave, LASER.</p> <p>(b) Introduction to quantum mechanics (basic concepts only) -Failure of Newtonian Physics, Wave particle duality, Uncertainty Principles, Motion of electron in atom, Bohr's theory, De Broglie hypothesis, Davison Germer's experiment.</p>
<p>Module: -3</p>	<p>(a) History of radioactivity, contribution of pioneer scientists' (Henry Becquerel, Marie Curie, J.J Thomson, James Chadwick, Rutherford etc.) Fission, Fusion, Manhattan project, Nuclear medicine in diagnosis and cancer treatment.</p> <p>(b) Limitations of Newtonian Physics, Introduction to Special Theory of Relativity (space-time, time dilation, mass-energy equivalence)</p> <p>(c) Stars, galaxies and the universe, White dwarf, Neutron star, supernova, Black hole, The Big Bang and the expansion of the universe, Chronological history of India's space research.</p>
<p>Suggestive Readings:</p>	<ol style="list-style-type: none"> 1. A History of Physics over the Last Two Centuries by Mario Gliozzi & Alessandra Gliozzi; Cambridge Scholar Publishing 2. Concept of Modern Physics by Arthur Beiser; McGraw-Hill Publishing 3. Principles of Physics by David Halliday, Robert Resnick; Wiley Publishing 4. Nuclear Physics by S. N Ghoshal; S. Chand Publishing 5. Physics of Atoms and Molecules by B.H. Bransden and C. J Joachain; Pearson
<p>Method of Assessment, Measurement, & Evaluation:</p>	
<p>Method of Internship, Apprenticeship, Project, Community Engagement:</p>	