



National Institute of Technology Meghalaya

An Institute of National Importance

CURRICULUM

Programme	Bachelor of Technology	Year of Implementation	2024-2025
Department	Physics	Semester	I/II

Course Code	Course Name	Pre-Requisite	Credit Structure				Marks Distribution			
			L	T	P	C	INT	MID	END	Total
PH101	Engineering Physics	-----	3	0	0	3	50	50	100	200
				CO's	Statement				Bloom's Taxonomy	

Course Objectives	Course Outcomes	CO's	Statement		Bloom's Taxonomy
			PH101.1	PH101.2	
To understand the concepts of fundamentals of em wave, vectors, vector calculus and its relevance to science and engineering	Course Outcomes	PH101.1	Able to gain the knowledge of electromagnetism applied to Engineering concepts	Understanding Applying	
To introduce various concepts of special theory of relativity		PH101.2	Able to gain the knowledge of special theory of relativity	Understanding	
To introduce various concepts of different optical phenomena observed in nature.		PH101.3	Able to gain the knowledge about Geometrical and Physical Optics and its applications .	Understanding Applying	
To introduce the developments of Quantum Physics in the beginning of 20th century and the development thereafter.		PH101.4	Able to understand the concepts and theories of 20-th century Physics and its applications .	Understanding Applying	

COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
PH101.1	3	2													
PH101.2	3	2													
PH101.3	3	2													
PH101.4	3	2													
PH101	3	2													

SYLLABUS

No.	Content	Hours	COs
I	Electromagnetism: Vector calculus, Gauss's law and its applications, divergence and curl of electrostatic fields, electrostatic potential. Lorentz force, Biot-Savart and Ampere's laws and their applications, divergence and curl of magnetostatic fields, force and torque on a magnetic dipole, motional EMF, Faraday's law, Lenz's law, Maxwell's equations, Postulates of Special theory of relativity, Lorentz transformation, time dilation, length contraction.	14	PH101.1, PH101.2
II	Optics: Interference - coherence, principle of superposition, Young's double slit experiment, Newton's rings, diffraction - Fresnel and Fraunhofer diffracting, grating and its usages, polarization, Malus' law, polarization by reflection and Brewster's law.	14	PH101.3
III	Modern Physics: Old quantum theory, black body radiation, Planck's law, photoelectric effect, Compton effect, de-Broglie's hypothesis, Heisenberg uncertainty principle, wave packet, group and phase velocities, postulates of Quantum mechanics. Schrödinger's equation, application in 1-dimension: particle in a box.	14	PH101.4
Total Hours		42	

Essential Readings

1. R. A. Serway and J. W. Jewett, "Physics for Scientists and Engineers with Modern Physics", CENGAGE Learning Custom Publishing, 10th edition, 2017.
2. Paul G. Hewitt, "Conceptual Physics", Pearson, 13th edition, 2022.

Supplementary Readings

1. J. C. Morrison, Modern Physics for Scientists and Engineers, Elsevier; 2nd edition, 2015.
2. M. Mansfield and C. O'Sullivan, "Understanding Physics", Wiley-Blackwell; 3rd Edition, 2020.