	National Institute of Technology Meghalaya An Institute of National Importance	CURRICULUM

Programme	**Bachelor of Technology**	Year of Regulation	**2018**
Department	**Physics**	Semester	**I/II**

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
PH101	**Physics**	**3**	**1**	**0**	**4**	**50**	**50**	**100**	**200**

Course Objectives		Course Outcomes		
	To handle the concepts of mechanics with help of vector calculus		CO1	Students able to articulate and describe fundamental law of Physics
	To understand the fundamentals of electromagnetism		CO2	Gain the concept of electromagnetism applied to Engineering concepts
	To introduce various concepts of optical phenomena in Physics and Engineering		CO3	Students able to gain information about Geometrical and Physical Optics
	To introduce students, the developments of Physics in the 20th century		CO4	Able to understand the concepts and theories of 20-th century Physics and its applications.

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	**3**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2	CO2	**3**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
3	CO3	**3**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4	CO4	**3**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

SYLLABUS

No.	Content	Hours	COs
I	**Mechanics:** Vector Calculus, Revisiting Newton's laws of motion, Motion along a straight line, Motion in 2D and 3D, work and kinetic energy, Potential energy and energy conservation, momentum, impulse, and collisions, Rotation of rigid bodies	**13**	**CO1**
II	**Electromagnetism:** 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.	**13**	**CO2**
III	**Optics:** Interference - Coherence, Principle of Superposition, Young's double slit experiment, Newton's rings. Diffraction - Fresnel and Fraunhofer diffracting, Grating and its usages; Polarization- Introduction, Malus' law, Polarization by reflection and Brewster's law.	**13**	**CO3**
IV	**Modern Physics:** Old quantum theory, black body radiation, Planks 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.	**13**	**CO4**
	Total Hours	**52**	

Essential Readings

1. R. A. Serway and J. W. Jewett, "Physics for Scientists and Engineers with Modern Physics", CENGAGE Learning Custom Publishing, 9th edition,2012.
2. Hafez A. Radi, John O. Rasmussen, Principles of Physics for Scientists and Engineers, Springer, 2013

Supplementary Readings

1. J. C. Morrison, Modern Physics for Scientists and Engineers, Elsevier; 1st edition, 2011.
2. M. Mansfield and C. O'Sullivan, "Understanding Physics", Wiley-Blackwell; 2nd Edition, 2010.