Department:	**Physics**	Semester:	**Odd**
Program:	**B. Tech. (Non-circuit branches)**	Code:	**PH100N**
Course:	**Engineering Physics**	Credits:	**3:0:2 = 4**

Prerequisite:	1. Interest in physics governing the physical world. 2. Background in basic physics and mathematics at school level.
Course Outcomes:	1. Ability to calculate relativistic effects such as time dilation, length contraction, and mass-energy conversion. 2. Understanding the quantum nature of systems at atomic scale and studying it in simple situations. 3. Ability to conduct physics experiments, gather, analyse and infer from the data. Develop the ability to think based on first principles.

Week	**Learning content** (weekly syllabus, max 20 words x 12 weeks)
1	Newton's laws and Galilean transformation, Swimmers in a river, Concept of relative velocity
2	Michelson-Morley experiment, failure of ether theory, postulates of STR
3	Consequences of Einstein's postulates - length contraction, time dilation, velocity addition
4	Lorentz transformations (w/o derivation), spacetime intervals, simultaneity. Length contraction, time dilation, velocity addition from Lorentz transformations
5	Relativistic energy, momentum, Mass-energy relationship, relativistic system of units
6	Review of EM waves: interference, diffraction. [Experiments: Set up laser diffraction experiment to determine the wavelength of the laser; Set up Newton's rings (interference) experiment to determine the radius of curvature of a curved surface.]
7	Photoelectric effect – experiment and theory [Experiment: determination of work function of a given photoelectric material]
8	Wien's law, Rayleigh Jeans, Planck's quantum hypothesis and radiation law (w/o derivation)
9	Compton's effect – experiment and theory
10	de Broglie hypothesis, Davisson-Germer experiment, uncertainty relationship for classical waves, Heisenberg uncertainty principle, wave packets, phase velocity and group velocity, probability and randomness
11	Properties of waves at boundaries, standing waves in a box; Schrodinger equation, probabilities, normalization [Experiment: Standing wave pattern and resonance experiments]
12	Infinite potential well, finite potential well (only in 1D), idea of quantum tunnelling (only qualitative) [Experiment on quantum tunnelling in Zener diode.]
Textbooks:	1. Kenneth Krane, Modern Physics, 3rd edition, 2012 2. Arthur Beiser, Concepts of Modern Physics
Handbooks:	1. Kleppner & Kolenkow, An Introduction to Mechanics, 1st edition, 1973
MOOC:	MIT OpenCourseWare, freely available online

Evaluation scheme:

Name of the evaluation component	**% weightage to grades**
End semester exam (theory part)	45%
Mid semester exam (theory part)	25%
Laboratory project (continuous in-semester evaluation)	30% (Regular evaluation 20% + exam 10%)