Semester 2
MajorCourse-121T
(Compulsory Course – 4 Credits)

Semester: 2	**Course No.: 121(T)**	**Course Code:** PHM 121(T) **Course Title:** Digital electronics , Electricity magnetism and Nuclear Physics.
Credits: 4		**Course Category: core paper**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO111 T-1	REMEMBERING	Overview of some basic theories related to the subject and study of fundamental concepts in physics
CO111 T-2	UNDERSTANDING	Understanding essential to study various different fields in Physics will be developed.
CO111 T-3	APPLYING	Ability to apply concepts of physics in science engineering and technology will be developed that will strengthen student's analytical abilities.
CO111 T-4	ANALYSING	
CO101.5	EVALUATING	

Unit No.	Unit Contents	Sessions Allotted
1	DC Circuits: RL circuits (Growth and decay of current), RC circuit (Charging and discharging of capacitor) L-C-R circuit in series with DC source only the case if $R^2/(4L^2) = 1/LC$ (i.e. up to the differential equation only). **Digital Electronics** Binary system, Binary to decimal and decimal to binary conversion, Binary arithmetic – addition and subtraction, unsigned numbers, signed numbers, 1's complement, arithmetic sums and subtraction using 2's complement, Logic gates: OR, AND, NOT gates, universal gates NOR and NAND gates, Boolean laws and theorem, De Morgan's theorem, Duality theorem.	**15**
2	**Electrostatics:** 1. Force, Field and Energy in Electrostatics: Gauss' Law (Differential form), Some Applications of Gauss' Law, A Useful Theorem in Electrostatics, Electrostatic Potential, Relation between the Field and the Potential, Two Important Relations, Equipotential Surfaces, Electrostatic Energy, Electric Dipole, Dipole in Uniform Electric Field, Electric Dipole in a Non-uniform Electric Field. Text Book: Electromagnetics by B. B. Laud, New Age International Publishers (2nd Edition) Articles: 1.7 to 1.17.	**15**
3	**Magnetostatics:** Electric current, and continuity equation, Magnetic effects, The magnetic field, force on a current, Biot Savart law, The laws of magnetostatics, the magnetic potentials, Magnetic dipole in non-uniform magnetic field, Magnetic vector potential due to a small current loop, Magnetic media, Magnetisation, Magnetic field vector, Magnetic susceptibility & permeability.	**15**
4	**Nuclear physics Radioactivity :** The law of radioactive decay (review), Radioactive growth and decay, ideal equilibrium, Transient equilibrium and secular equilibrium, Radioactive series, Radioactive isotopes of lighter elements, Artificial radioactivity, Age of earth, Carbon dating (Archaeological time scale) **The Q Equation :** Types of Nuclear Reactions, The balance of mass and Energy in Nuclear reactions, The Q Equation, Solution of the Q Equation. **Constituents of the nucleus**	**15**

	properties: Measurements of Nuclear radius, Constituents of the nucleus and their properties.	

Suggested Text Books:

1. Digital principles and applications by A P Malvino and D P Leach ,

Chapter 1, articles 1.3 to 1.7 , Chapter 4, articles 4.1 to 4.3 , Chapter 5,5.1 to 5.6, 4th edition,1986, Mc-Graw Hill Publication.

2. Electromagnetics, Chapter 1 articles 1.7 to 1.15 , B B Laud third edition ,2011 , New Age International Publishers,

3 Electromagnetics by B. B. Laud, Chapter 4, articles : 4.1, 4.4 to 4.9, 4.11 to 4.17, third edition ,2011 , New Age International Publishers,

4 Nuclear Physics by S.B. Patel , chapter 2 , articles 2.1 to 2.13 , chapter 3 , articles 3.1 to 3.5 , 2nd edition , 2018, New age international (P) Ltd.

Reference books:

1. Digital electronics by G. K Kharate, 2nd edition, 2010, Oxford university press.
2. Introduction to electrodynamics by David J. Griffiths; Cambridge University Press , 4th edition , 2013.
3. Classical electromagnetism by H. C. Verma; 1st edition - Bharati Bhavan Publishers & Distributors.
4. Electrodynamics by Gupta, Kumar and Singh, 22nd edition, 2014 Pragati Prakashan.