

SEMESTER 1
MAJOR: PHM111(T)
Compulsory Course: 4-Credits

Semester: 1	Course No.: 111	Course Code: PHM 111(T) Course Title: Mechanics, Basic analog Electronics and Optics.
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	Introduction, Applications of Vector Multiplication, Triple Scalar Product, Triple Vector Product, Differentiation of Vectors, Fields, Directional Derivative, Gradient, Some other Expressions involving ∇ , Green's Theorem in the plane, The Divergence and the Divergence theorem. Gauss's law, The curl and Stoke's theorem.	15
2	Diode: load line analysis of diode circuit Rectifier : Full wave rectifier circuits, Mathematical analysis of full wave rectifier circuit, Important aspects of rectifier circuits, comparison of half wave and full wave rectifier, Bridge rectifier Transistor: Transistor, Naming the transistor terminals, some facts about the transistor, transistor action, Transistor symbols, transistor as an amplifier, Transistor connections, CB connection, Characteristics of CB connection, CE connection, Measurement of leakage current, characteristics of CE connection, CC connection, comparison of transistor connections, commonly used transistor connection, Transistor as an amplifier in CE arrangement, Transistor load line analysis, operating point, Practical way of drawing CE circuit, output from transistor amplifier, Performance of transistor amplifier, cut off and saturation points.	15
3	Farmat's principle and its applications: Farmat's principle of least time, laws at reflection, laws of refraction. Interference in thin films: Thin film, Plane parallel film, Interference due to transmitted light, Haidinger fringes, variable thickness (wedge-shaped) film, Newton's ring. Michelson interferometer (Only construction and working) Matrix Method in Optics : Introduction, The matrix method, Unit planes, Nodal point planes, A system of two thin lenses.	15
4	Waves and oscillations	15

	Composition of two S.H.M. , Lissajous figures , Lissajous figures by C.R.O. , motion due to constant force , a particle executing S.H.M. acted upon by a harmonic force, motion in a resisting medium, forced vibration, amplitude resonance , maximum energy of the system , phase of the forced vibration , power supply in forced vibration. Velocity of plane longitudinal waves in gas , velocity of sound through gases , velocity of longitudinal wave in a solid medium , velocity of transverse wave along a stretched string .	
--	--	--

Suggested Text Books:

1. Mathematical methods in Physical Sciences By M.L. Boas , chapter 6 , articles 1 to 7 and 9 to 11 , 3rd edition ,2006, John Willey & Sons.
2. Fundamentals of Electronics by Anokh Singh Chapter-5, articles-5.1 to 5.9 4th Edition 1986, Khanna Publishers.
3. Principles of Electronics V. K. Mehta and Rohit Mehta , Chapter-8, 8.1 to 8.27 34th edition , 2017, S. Chand publication .
4. Electronics devices and circuits – An introduction Allen Mottershead Ch-2 , article 2.1 PHI learning private Ltd. , 2011
5. A text book of Optics by N. Subrahmanyam, Brijlal and M. N. Avadhanulu, Chapter 2 articles: 2.2, 2.5, 2.6, chapter 15 articles 15.1 to 15.6 ,15.7.1, 15.7.2, 15.7.3, 23rd edition , 2006 , S. Chand and company Ltd.
1. Optics – Ajoy Ghatak,,chapter 4 , articles 4.1 to 4.5, 3rd Edition, 2005, TMH Publication.
2. A text book on oscillations, waves & Acoustics by M. Ghosh, D. Bhattacharya . Chapter2 , articles 2.10 to 2.12 , chapter 3 , articles 3.2, 3.4 to 3.10 , chapter Chapter 9, articles 9.1 to 9.5. 3rd edition , 2006, S. Chand and Company limited.

Suggested Reference Books:

1. Mathematical Methods for Physicist, Arfken, Weber and Harris 7th Edition , 2012, Elsevier.
2. Basic Electronics and Linear Circuits , N.N,Bhargava , D.C. Kulshrestha and S.C.Gupta , 2nd Edition , 2017 , NITTR , Chandigarh.
3. Physics-volume 1 – 5th edition , 2002 , Robert Resnick, David Halliday, Kenneth Krane John Willey & Sons.
4. Optics by Satyaprakash, 8th edition, 2021 Pragati Prakshan