PHYSICS					
Course Code	**FE 120 / FE220**		**Credits**	**3**	
Scheme of Instruction	**L**	**T**	**P**	**TOTAL**	
Hours/ Week	**3**	**0**	**0**	**39 hrs/sem**	
Scheme of Examination	**IA**	**TW**	**TM**	**P**	**O**
TOTAL = 125 marks	**25**	**0**	**100**	**0**	**0**

Course Outcomes:

The student will be able to:

CO1	Logically derive necessary formulae using basic concepts of physics
CO2	Explain thin film interference and production of ultrasonics and demonstrate its various scientific and industrial applications
CO3	Differentiate between the various types of magnetic materials and explain semiconductor transport phenomena
CO4	Illustrate the basic principles of LASERs and fibre optics and its applications in various industries
CO5	Explain various concepts and applications of modern physics like X-rays and wave-particle duality
CO6	Solve problems in various topics of fundamental and modern physics

UNIT -1	
INTERFERENCE OF LIGHT: Geometric and optical path, Phase change at reflection (only statement), Interference based on division of amplitude, Interference due to reflected and transmitted light in thin parallel film, Interference in wedge shaped film, Newton's rings for reflected and transmitted light, Determination of radius of curvature of plano-convex lens, wavelength of light used and refractive index of liquid using Newton's ring experiment, applications of interference.(Surface smoothness) **ULTRASONICS**: Production of ultrasonic waves, Magnetostriction, Piezoelectric oscillator, detection of ultrasonic waves, Properties, Application of ultrasonics in various fields, Measurement of wavelength and velocity by acoustic diffraction grating.	10hrs
UNIT -2	
MAGNETISM: Introduction, Origin of magnetization, Classification of magnetic materials, Magnetic hysteresis, Soft and hard magnetic materials, Applications of magnetic materials. Electron Ballistics: CRO **SEMICONDUCTORS**: Band theory of solids, Energy Gap, Energy band structure of semiconductors, Mobility, Drift velocity, Conductivity of charge carriers, Hall effect	10hrs
UNIT -3	
LASERS: Interaction of radiation with matter from quantum mechanical point of view: absorption, stimulated and spontaneous emission of radiation, Active medium, Metastable state, Einstein's theory of stimulated emission(no derivation), Condition for light amplification, Population inversion, Pumping, Pumping schemes, Optical resonator, Properties of laser, He-Ne laser, Ruby laser, Applications. **FIBER OPTICS**: Total internal reflection, Propagation of light in optical fiber, Structure of an optical fiber and fiber cable, Acceptance angle and cone,	10hrs

Numerical aperture, Modes of propagation, Types of optical fibers: single and multimode fibers, Applications- fiber optic communication , endoscopy.	
UNIT -4	
X-RAYS: Origin of X-rays, characteristic and continuous X-ray spectra, Mosley's law, X-ray diffraction: Bragg's law and Bragg's spectrometer, properties and applications. **WAVE-PARTICLE DUALITY**: Compton effect, Expression for Compton shift, Wave nature of particle, de Broglie hypothesis, Davisson-Germer experiment.	9 hrs

TEXTBOOKS	
1	M. N. Avadhanulu& P. G. Kshirsagar; A text book of engineering Physics; S. Chand & company Pvt. Ltd. Revised edition 2015.
2	A. S. Vasudeva; Modern Engineering Physics; S. Chand & Company Pvt. Ltd. Revised Edition. 2015
REFERENCES	
1	Uma Mukherji; Engineering Physics; Narosa Publications. 2012
2	R. K. Gaur & S. L. Gupta; Engineering Physics; Dhanpat Rai Publications Pvt. Ltd. Reprint 2013.
3	K. Rajagopal; Engineering Physics; PHI Learning Pvt. Ltd. Third Printing 2009.