AHL-101-A	APPLIED PHYSICS-I	L	T	P	Cr.
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(Common for B. Tech, Integrated M. Tech, Dual Degree MBA)

OBJECTIVE:

Students should become proficient in the topics of Optics, Dielectrics, Quantum Mechanics, Magnetism, Thermal Physics and Relativity. Superconductivity, Fiber Optics, Holography, Nanoscience, Acoustics and Ultrasonics are emerging trends in technology covered in this syllabus. Students should be able to connect the concepts presented in this syllabus to the uses in engineering applications.

SECTION A

UNIT - I

INTERFERENCE: Principle of superposition, interference of light, coherent sources, conditions for sustained interference, Young's double slit experiment, Division of wave front, Fresnel Biprism experiment, Newton's ring experiment and applications, Michelson interferometer and its applications.

UNIT – II

DIFFRACTION: Difference between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction due to single slit and N-slit diffraction grating, absent spectra, Dispersive power of a grating, Rayleigh criterion of resolution, Resolving power of grating, Numerical problems based on diffraction grating.

UNIT - III

POLARISATION: Polarised and Un-polarised light, Double refraction, Uniaxial crystals – calcite, Nicol Prism, Quarter and Half wave plate, Production and analysis of plane, circular and elliptical polarised lights, Specific rotation, Laurent's polarimeter, Bi-Quartz polarimeter

SECTION B

UNIT – IV

LASERS: Introduction - Characteristics of lasers, Spontaneous and stimulated emission of radiation, Einstein's coefficients, Population inversion, Helium-Neon laser, Semiconductor laser, Applications of lasers in industrial, scientific and medical fields.

FIBER OPTICS: Introduction - Principle of optical fiber, Acceptance angle and acceptance cone, Numerical aperture, Types of optical fibers and refractive index profiles, Attenuation in optical fibers, Application of optical fibers

UNIT - V

SPECIAL THEORY OF RELATIVITY: Inertial and non inertial frames, Michelson-Morley experiment, Einstein's postulates, Lorentz's transformation equations, Length

contraction, Time dilation, Addition of velocities, variation of mass with velocity, Mass-energy equivalence.

UNIT - VI

SCIENCE OF NANOMATERIALS: Introduction to Nano materials, Basic principles of Nanoscience & Technology-Quantum size effect and surface to volume ratio, Fabrication of nano materials-sol gel method, Carbon nanotubes – structure, properties and applications, Applications of nanotechnology to electronics & automobiles

NOTE:

1. The syllabus is divided into 2 sections comprising three units each. Total seven questions would be set. One question would be compulsory that would comprise all the units. Remaining six questions will be set from both the sections taking three questions from each section. Students need to attempt at least two questions from each section. A student has to attempt five questions in all.
2. 20% numerical problems are to be set.
3. Use of Scientific (non-programmable) calculator is allowed.

TEXT BOOKS:

1. Modern Physics for Engineers by S.P.Taneja (R.Chand)
2. Engineering Physics by S. L. Gupta, Vol 1 & 2
3. Engineering Physics by Satya Prakash (Pragati Prakashan)

REFERENCE BOOKS:

1. Nanotechnology by Mark Ratner and Daniel Ratner, (Pearson)
2. Materials Science and Engineering by V. Raghavan; Prentice-Hall India
3. Engineering Physics by Dr. M. Arumugam; Anuradha Agencies
4. Engineering Physics by A. S. Vasudev (S. Chand Publishers)
5. Nanomaterials by A.K. Bandyopadhyay;NewAge Publishers
6. Engineering Physics by M.N. Avadhanulu & P.G. Kshirasagar
7. Concepts of Modern Physics by Arthur Beiser (Mc-Graw Hill)
8. Optics by Ajoy Ghtak (TMH)