B. Tech. – I (All Branches)

	L	T	P	C
ASP102ABC(T): Engineering Physics (Theory)	**3**	**0**	**2**	**4**

- **ELECTROMAGNETISM (06 Hours)**

  Ampere's law, Bio-Savart's law, Lorentz force, Electromagnetic waves: Maxwell's equations in vacuum & medium.

  Types of matter magnetism: Ferromagnetism, Paramagnetism and Diamagnetism, Nuclear magnetism, Three magnetic vectors, Magnetic susceptibility, Curie's law.

- **OPTICS AND LASER PHYSICS (12 Hours)**

  Spatial and temporal coherence, Interference by division of wave front and amplitude, Interference by thin films, Newton's rings, Michelson's Interferometer. Fraunhofer diffraction at double slits, multiple slits and circular aperture.

  Polarization, polarizing sheets, Malu's law, Polarization by reflection and Brewster's Law, Polarization by double reflection, circular and elliptical polarization, Quarter wave and halfwave plates.

  Spontaneous and stimulated emission, Metastable states, Optical pumping, Population inversion, Einstein's A and B coefficients, Types of LASERS and their applications.

- **QUANTUM PHYSICS (10 Hours)**

  Black body radiation, Dual nature of matter and radiation, Compton effect, Pair production, de Broglie waves, Uncertainty principle.

  Wave equation: Probability and wave function, Time dependent and time independent Schrödinger equation, Particle in a box.

- **SOLID STATE PHYSICS (10 Hours)**

  Basics of crystal structure, Bravais lattice, Unit cell, Packing fraction, Miller indices. *X*-Ray properties, diffraction and Bragg's law.

  Bonding in solids: Ionic, Covalent, Metallic, Van der Waals' and Hydrogen. Free-electron theory of metals, Band theory of solids, Semiconductors: Intrinsic and extrinsic, Hall effect, Superconductivity: Type I and type II, Meissner effect.

- **NUCLEAR & PARTICLE PHYSICS (07 Hours)**

  Nuclear structure, Atomic mass, Stable nuclei, Binding energy, Nuclear fission and fusion. Classifications of particles and Standard model.

Total Contact Time : 45 Hours

BOOKS RECOMMENDED :

Text Books:

1.	**R. Resnick and D. Halliday**	Physics (Part I & II)	Wiley	2007
2.	**A. Beiser**	Concept of the Modern Physics	McGraw-Hill	2008

Reference Books

1.	**E. Hecht and A. R Ganesan**	Optics	Dorling Kindersley	2008
2.	**D. J. Griffiths**	Introduction to Electrodynamics	Addison-Wesley	2012
3.	**C. Kittel**	Introduction to Solid State Physics	Wiley	2012

B. Tech. – I (All Branches)

ASP102ABC(P): Engineering Physics (Practical)	**L**	**T**	**P**	**C**
	3	**0**	**2**	**4**

- **LIST OF EXPERIMENTS (ANY EIGHT EXPERIMENTS IS COMPULSORY):**

1. To apply radiation correction to the temperature values measured in the Joule's experiment by electrical method.
2. Prism angle measurements by Spectrometer.
3. To study the variation in the magnetic field with respect to (a) current and (b) axial distance.
4. To verify Malus' law for the plane polarized light using photovoltaic cell.
5. To verify Stefan's fourth power law of black body radiation.
6. To determine value of Planck's constant (h) using a photovoltaic cell.
7. To determine the wavelengths of different colours in mercury spectrum by plane diffraction grating.
8. To measure the radius of curvature of given convex lens using Newton's rings method.
9. To determine the resistivity and band gap of a given material (Ge) using four probe method.
10. To determine the Hall coefficient (R_H) and carrier concentration of a given material (Ge) using Hall effect.