

## Department of Physics

Faculty of Engg. & Technology, V.B.S. Puravnchal University, Jaunpur

### Syllabus

#### ENGINEERING PHYSICS-I (EAS-101)

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#### Unit – I Relativistic Mechanics:

Inertial & non-inertial frames, Michelson- Morley experiment, Einsteins postulates. Lorentz transformation equations. Length contraction & Time dilation, Addition of velocities; Variation of mass with velocity Mass energy equivalence. 06 Hrs.

#### Unit - II

##### Optics:

Interference: Interference of light, Biprism experiment, displacement of fringes, Interference in thin films- wedge shaped film, Newton's rings, Diffraction - Single, Double & N- Slit, Diffraction grating, Grating spectra, Rayleigh's criterion and resolving power of grating. 10 Hrs.

#### Unit - III

**Polarization-** Phenomena of double refraction, Nicol prism, Production and analysis of plane, circular and elliptical polarized light, Fresnel's theory of optical activity, Polarimeters .

**Laser:** Spontaneous and stimulated emission of radiation, Einstein's Coefficients, construction and working of Ruby, He-Ne lasers and laser applications. 08 Hrs.

#### Unit – IV

##### Fiber Optics and Holography

Fundamental ideas about optical fiber, Types of fibers, Acceptance angle and cone, Numerical aperture, Propagation mechanism and communication in optical fiber. Attenuation, Signal loss in optical fiber and dispersion. Basic Principle of Holography, Construction and reconstruction of Image on hologram and applications of holography.

06 Hrs.

##### Reference Books:

- (i) Concepts of Modern Physics - Aurthur Beiser (Mc-Graw Hill)
- (ii) Introduction to Special theory of Relativity - Robert Resnick - Wiely
- (iii) Optics - Ajoy Ghatak (TMH) Brijlal & Subramanian (S. Chand )
- (iv) Optical Fibre & Laser - Anuradha De. ( New Age )
- (v) Fundamental of Physics - Resnick, Halliday & Walker (Wiely )
- (vi) Principles of Physics - R.A. Serway & J.W. Jewett (Thomson Asia Pvt. Ltd.)

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### Syllabus

#### ENGINEERING PHYSICS-II (EAS-202)

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#### **Unit – I: Wave Mechanics and X-ray Diffraction**

Wave- particle duality, de-Broglie matter waves, Phase and Group velocities, Davisson-Germer experiment, Heisenberg uncertainty principle and its applications, Wave function and its significance, Schrödinger's wave equation – particle in one dimensional box. Diffraction of X-rays by crystal planes, Bragg's spectrometer, Compton's effect. 10 Hrs.

#### **Unit – II: Dielectric and Magnetic Properties of Materials:**

Dielectric constant and Polarization of dielectric materials, Types of Polarization (Polarizability) . Equation of internal fields in liquid and solid ( One- Dimensional), Claussius Mussoiti- Equation, Ferro and Piezo electricity (Qualitative), Frequency dependence of dielectric constant, Dielectric Losses, Important applications of dielectric material, Langevin's theory for dia and paramagnetic material, Phenomena of hysteresis and its applications. Ultrasonic: Generation, detection and application of ultrasonics 08 Hrs.

#### **Unit-III: Electromagnetics**

Displacement Current, Maxwell's Equations ( Integral and Differential Forms). Equation of continuity, EM- Wave equation and its propagation characteristics in free space and in conducting media, Poynting theorem and Poynting vectors. 06 Hrs.

#### **Unit-IV: Superconductivity and Science and Technology of Nanomaterials:**

Temperature dependence of resistivity in superconducting materials, Effect of magnetic field (Meissner effect ), Type I and Type II superconductors, Temperature dependence of critical field, BCS theory (Qualitative), High temperature superconductors. Characteristics of superconductors in superconducting state, Applications of Super-conductors. **Introduction to Nanomaterials-** Basic principle of nanoscience and technology, creation and use of buckyballs, structure, properties and uses of Carbon nanotubes, Applications of nanotechnology.

06 Hrs.

#### **Reference books:**

- 1- Concept of Modern Physics - by Beiser (Tata Mc-Graw Hill)
- 2- Solid State Physics - by C. Kittel, 7th edition (Wiley Eastern)
- 3- Materials Science and - by V. Raghavan (Prentice- Hall India) Engineering
- 4- Solid State Physics - by S.O. Pillai, 5th edition (New Age International )
- 5- Nanotechnology - by Rechar Bookers and Earl Boysen (Wiley Publishing)