**ACADEMIC PLAN FOR I-SEMESTER**

**ETPH: 103**

**SUBJECT**: APPLIED PHYSICS-I

TOTAL TEACHING WEEK IN SEMESTER: 16 WEEKS

TOTAL LECTURES CLASSES AVAILABLE: 32

TOTAL TUTORIAL CLASSES AVAILABLE: 16

CREDITS: 03

|  |  |  |
| --- | --- | --- |
| **TOPICS** | **LECTURE** | **TUTORIALS** |
| **UNIT I:- INTERFERNCE** |  |  |
| 1. Introduction: Definition, Huygen’s principle, path difference, phase difference, fringe width, types of sources, types of interference(Division of wave front and division of amplitude) | 1 | 1 |
| 1. Fresnel’s biprism, white light fringes, Parallel thin film. | 1 |
| 1. Wedge shaped film (No derivation). Formation Newton’s Rings | 1 | 1 |
| 1. Determination of wavelength and refractive index, white light fringes in Newton’s Rings | 1 |
| **DIFFRACTION** |  |  |
| 1. Introduction: Definition, difference between Fresnel and Fraunhoffer diffraction | 1 | 1 |
| 1. Fraunhoffer diffraction due to single slit (using Phasor notation) | 1 |
| 1. Diffraction due to N-slits, Transmission diffraction grating. | 1 |
| 1. Absent spectra, Resolving power & dispersive power (No derivation), Determination of wavelength using grating | 1 | 1 |
| **UNIT II:- POLARIZATION** |  |  |
| 1. Introduction: Production of plane polarized light by different methods, Brewster’s law & Malus law(definition only), optic axis, plane of polarization, plane of vibration, uniaxial crystal(positive and negative and their wavefronts) | 1 | 1 |
| 1. Double refraction, Nicol prism(construction, **Working** and limitations) | 1 |
| 1. Quarter wave plate, Half wave plate, production of plane, circular and elliptically polarized light | 1 | 1 |
| 1. Specific rotation, Laurent’s half shade polarimeter | 1 |

|  |  |  |
| --- | --- | --- |
| **LASER** |  |  |
| 1. Principle of laser, Spontaneous and emission | 1 | 1 |
| 1. Einstein’s coefficients, He-Ne laser | 1 |
| **FIBER OPTICS** |  |  |
| 1. Introduction, Step index and graded index fiber, single mode and multi mode fiber. | 1 | 1 |
| 1. Acceptance angle and numerical aperture, Pluse dispersion mechanism (No derivation). | 1 |
| **CLASS TEST** |  |  |
| **UNIT III:- THEORY OF RELATIVITY** |  |  |
| 1. Introduction, Frame of reference, Galilean transformation. | 1 |  |
| 1. Michelson-Morley experiment. | 1 |  |
| 1. Postulates of special theory of relativity, Lorentz transformations. | 1 | 1 |
| 1. Length contraction, Time dilation | 1 | 1 |
| 1. Mass energy relation. | 1 | 1 |
| **ULTRASONICS** |  |  |
| 1. Introduction of Ultrasonic wave, Properties of ultrasonics | 1 | 1 |
| 1. Production of Ultrasonics by magnetostriction and Piezoelectric methods. | 1 |
| 1. Applications of ultrasonics. | 1 |
| **UNIT IV:- NUCLEAR PHYSICS** |  |  |
| 1. Nuclear forces, Radioactivity- definition, law of radioactive disintegration, half life, mean life, radio isotopes and their uses. | 1 |  |
| 1. α-decay, β-decay, γ-decay | 1 |
| 1. Conservation laws, disintegration energy, Q – value, threshold energy. | 1 | 1 |
| 1. Theory of nuclear fission, liquid drop model, controlled chain reaction and nuclear reactor. | 2 | 1 |
| 1. Nuclear fusion, Stellar thermo nuclear reaction, comparison between fission and fusion. | 1 | 1 |
| 1. Particle accelerators: linear accelerator, cyclotron | 1 | 1 |
| 1. Radiation detector: ionization chamber, GM counter. | 1 |

**Text Books:**

[T1]. Arthur Beiser. ‘Concepts of Modern Physics’, [McGraw-Hill]. 6th Edition, 2009.

[T2]. H.K. Malik & A.K. Singh ‘Engineering Physics’ [McGraw-Hill]. 1st Edition, 2009.

**Reference Books:**

[R1]. A. Ghatak ‘Optics’, TMH, 5th Edition, 2013

[R2]. G. Aruldhas ‘Engineering Physics’ PHI 1st Edition, 2010.

[R3]. Fundamentals of Optics: Jenkins and White Latest Edition.

[R4]. C. Kittle. “Mechanics”, Berkeley Physics Course, Vol.-1.

[R5]. Feynman “The Feynman lectures on Physics Pearson Volume 3 Millennium Edition, 2013.

[R6]. Uma Mukheji ‘Engineering Physics’ Narosa, 3rd Edition, 2010.

[R7]. A.S.Vasudeva, ‘Modern Engineering Physics’, S. Chand. 6th Edition, 2013.

[R8]. Irving Kaplan ‘Nuclear Physics’ Latest Edition.