

Lesson Plan

Name of Institute : Ambala College of Engineering and Applied Research, Devsthali.

Name of the Faculty member : Mr. Ajay Singh

Discipline : Applied Sciences and Humanities

Semester : 3rd

Subject : Optics and Waves BS – 201A

Lesson Plan Duration : 15 weeks (from Oct2021 to Dec2021)

Work Load : L-3

| Week | Theory | |
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| | Lecture day | Topic (including assignment/ test) |
| 1 st | 1 st | Waves: Travelling waves, Characteristics of waves |
| | 2 nd | Mathematical representation of travelling waves |
| | 3 rd | General wave equation, Phase velocity |
| 2 nd | 4 th | Light source emit wave packets |
| | 5 th | Wave packet and Bandwidth |
| | 6 th | Group velocity and real light waves |
| 3 rd | 7 th | Propagation of light waves: Maxwell's equations |
| | 8 th | Electromagnetic waves and constitutive relations |
| | 9 th | Wave equation for free-space |
| 4 th | 10 th | Uniform plane waves, Wave polarization |
| | 11 th | Energy density |
| | 12 th | The pointing vector and intensity |
| 5 th | 13 th | Radiation pressure and momentum |
| | 14 th | Light waves at boundaries, Wave incident normally on boundary |
| | 15 th | Wave incident obliquely on boundary: law of reflection, Snell's law and reflection coefficients |
| 6 th | 16 th | Interference: Principle of Superposition, Conditions for Sustained interference |
| | 17 th | Young's double slit experiment |
| | 18 th | Division of wave-front: Fresnel's Biprism and its applications |
| 7 th | 19 th | Sessional-I |
| | 20 th | Division of amplitude: Interference due to reflected and transmitted light, Wedge-shaped thin film |
| | 21 st | Newton's rings and its applications |
| 8 th | 22 nd | Michelson Interferometer and its applications |

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| | 23 rd | Diffraction: Types of diffraction, Fraunhofer diffraction at a single slit |
| | 24 th | Plane transmission diffraction grating: theory |
| 9 th | 25 th | Secondary maxima and secondary minima |
| | 26 th | Width of principal maxima |
| | 27 th | Absent spectra, overlapping of spectral lines |
| 10 th | 28 th | Determination of wavelength, Dispersive power diffraction grating |
| | 29 th | Resolving power of diffraction grating |
| | 30 th | Polarization: Polarization of transverse waves |
| 11 th | 31 st | Sessional-II |
| | 32 nd | Plane of polarization, Polarization by reflection, Double refraction |
| | 33 rd | Nicol Prism |
| 12 th | 34 th | Quarter and half wave plate |
| | 35 th | Specific Rotation, Laurent's half shade polarimeter |
| | 36 th | Biquartz polarimeter |
| 13 th | 37 th | Laser: Stimulated Absorption, Spontaneous and Stimulated Emission |
| | 38 th | Einstein's Coefficients and its derivation |
| | 39 th | Population Inversion, Direct and Indirect pumping |
| 14 th | 40 th | Pumping schemes, Main components of Laser |
| | 41 st | Gas lasers (He-Ne, CO ₂) |
| | 42 nd | Solid state lasers (Ruby, Neodymium) |
| 15 th | 43 rd | Solid state lasers (semiconductor) |
| | 44 th | Dye laser, Characteristics of Laser, Applications of Laser |
| | 45 th | Sessional-III |

Mr Ajay Singh

Assistant Professor

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