|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NITM.jpg | | **National Institute of Technology Meghalaya**An Institute of National Importance | | | | | CURRICULUM | | | | | |
| Programme | | **Master of Science in Physics** | Year of Regulation | | | | 2019 | | | | | |
| Department | | **Physics** | Semester | | | | II | | | | | |
| Course Code | | Course Name | Credit Structure | | | | Marks Distribution | | | | | |
| L | T | P | C | INT | MID | | END | | Total |
| **PH 408** | | **Applied Optics** | **3** | **0** | **0** | **3** | **50** | **50** | | **100** | | **200** |
| SYLLABUS | | | | | | | | | | | | |
| No | Content | | | | | | | | Hours | |  | |
| 1 | **Potentials and Fields**  Potential formulation, scalar and vector potential, gauge transformation, Retarded potential, Jefimenko equations, Lienard-Weichart Potentials, The field of a moving charge, Radiations from dipoles | | | | | | | | 8 | |  | |
| 2 | **Lasers and Optics** Interference, Michelson Interferometer, Fabry Perot Interferometer, Diffraction Integral, Basics of Laser, Einstein coefficients, Population inversion, two and three level systems, Total internal reflection and evanescent waves, Polarization states. | | | | | | | | 8 | |  | |
| 3 | **Fourier Optics**  Spatial frequency, Fourier transform property of lens, spatial-frequency filtering, phase-contrast microscope. | | | | | | | | 5 | |  | |
| 4 | **Guided Wave Optics**  Waves between parallel planes, transmission line theory. TM and TE waves in rectangular guides, circular waveguide, attenuation factor and Q of waveguides. | | | | | | | | 6 | |  | |
| 5 | **Introduction to Optical Fibers**  Step index, graded index fibers and applications of optical fibers, photonic crystals, bragg gratings | | | | | | | | 5 | |  | |
| 6 | **Anisotropic Media**   Plane waves in anisotropic media, uniaxial crystals, and some polarization devices. | | | | | | | | 4 | |  | |
| **Total Hours** | | | | | | | | | 36 | |  | |
| **Textbooks and References** | | | | | | | | | | | | |
| A. Ghatak, “Optics”, McGraw Hill. | | | | | | | | | | | | |
| A. Ghatak & K. Thyagarajan, “Optical Electronics”, New Delhi Cambridge University Press | | | | | | | | | | | | |
| R. S. Sirohi, “Wave Optics & its Applications”, Orient Longman. | | | | | | | | | | | | |
| F. L. Pedrotti and L. S. Pedrotti, “Introduction to Optics”, Prentice-Hall International. | | | | | | | | | | | | |
| J. W. Goodman, “Introduction to Fourier Optics”, McGraw Hill. | | | | | | | | | | | | |
| E. Hecht & A. R. Ganesan,”Optics”, New Delhi Pearson 2008. | | | | | | | | | | | | |
| D. J. Griffith, “Introduction to Electrodynamics”, 4thedition, Prentice Hall India, 2017. | | | | | | | | | | | | |