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| 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. |