PH 502: APPLIED OPTICS (3-0-0: 3)

Review of Fresnel's Equations
Total internal reflection and evanescent waves, various states of polarization and their analysis.

Anisotropic Media
Plane waves in anisotropic media, uniaxial crystals, and some polarization devices.

Coherence and Interferometry
Basics of coherence theory, spatial and temporal coherence, two beam and multiple beam interference and its application to spectral analysis.

Diffraction
The diffraction integral, Fresnel and Fraunhoffer diffraction through slits, diffraction of a Gaussian beam, diffraction grating.

Fourier Optics
Spatial frequency, Fourier transform property of lens, spatial-frequency filtering, phase-contrast microscope.

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.

Introduction to Optical Fibers
Step index, graded index fibers and applications of optical fibers.

Textbooks and References:
1. A. Ghatak, "Optics", McGraw Hill.
2. M. Bass, "Handbook of Optics: Volume- I", McGraw Hill.
3. R. S. Sirohi, "Wave Optics & its Applications", Orient Longman.
4. F. L. Pedrotti and L. S. Pedrotti, "Introduction to Optics", Prentice-Hall International.
5. J. W. Goodman, "Introduction to Fourier Optics", McGraw Hill.
6. G. R. Fowles, "Introduction to Modern Optics", Dover Publications.