

Applied Optics and Photonics (PHO)

Students taking the MS Written Comprehensive Exam in Photonics will be tested on a graduate question based on ECE 240A-B-C.

The graduate level section on Photonics will consist of two multiple-part question: one covering physical optics, and one covering optoelectronics.

The material covered can be found in two graduate-level text books:

- *Introduction to Fourier Optics*, Joseph Goodman (McGraw Hill, 2nd Edition, 1996)
- *Quantum Electronics*, Amnon Yariv (Wiley, 3rd Edition, 1989)

Students may also find an undergraduate text useful for background:

- *Optics*, Eugene Hecht (Addison Wesley, 4th Edition, 2002)

The topics covered may include:

Physical Optics

- Geometrical optics,
- Polarization
- Interferometry
- Optical resonators
- Fiber and planar waveguides
- Fresnel and Fraunhofer diffraction
- Gaussian beam propagation
- Wave propagation in anisotropic media
- Coherent and incoherent image processing

Optoelectronics

- Optical amplification
- Laser oscillation
- Q-switching and mode locking of lasers
- Specific laser systems (semiconductor, solid state, and gas)
- Amplitude and phase modulation
- Switching
- Electro-optics
- Acousto-optics
- Optical detection and noise