

Department of Electrical and Computer Engineering
520.410 Fiber Optics and Photonics
Spring 2008

2007-09 Catalog	This course covers light propagation in fiber optic light guides, integrated optic wave guides, photodetectors, and the photon nature of light. Topics include light propagation in step-index and graded-index optical fibers, dielectric slab waveguides, photodetectors, photon shot noise, and photodetector signal-to-noise ratios. (3 credit hours/Elective)
Prerequisite(s):	520.214 Signals and Systems 520.219-220 Fields, Matter and Waves or equivalent
Textbook:	Saleh and Teich, <i>Fundamentals of Photonics</i> , Wiley; Agrawal <i>Fiber-Optic Communication Systems</i> , Wiley
Course Objectives:	The objective of this course is to familiarize the students with operating principles of optical devices and the methods for their design, fabrication and integrating into optoelectronic systems.
Topics Covered:	<ol style="list-style-type: none">1. Communication capacity, Geometrical Optics2. Image Formation, lenses, mirrors, aberrations3. Diffraction, resolving power, microscope, telescope, telephoto lens4. Gradient index optics5. Optical fibers, dispersion6. Optical properties of semiconductors, radiative recombination7. Semiconductor LEDs and lasers, threshold and slope efficiency8. Quantum well lasers9. Electro-Optic modulation of light10. Acousto-Optic Modulation of light11. Detectors12. Noise in the detectors, coherent detection13. Multichannel light-wave systems – TDM and WDM, laser Amplifiers
Class Schedule:	One - one hour and forty-five minute lecture/ week

Contribution of Course to Meeting the Professional Component (credit hours):

Engineering Science	Engineering Science and Design
3	

Relationship of Course to Program Educational Outcomes (\checkmark those that apply):

x	Apply mathematics, probability and statistics, basic science, and computer science
x	Design and conduct experiments, analyze and interpret data
x	Identify, formulate and solve electrical engineering problems
	Use technical skills and modern engineering tools to design to meet needs
	Communicate effectively and work on multidisciplinary teams
	Contemporary issues, ethical responsibilities, environmental, health, safety issues
	Engage in life-long learning

Prepared November 1, 2007 by: Jin U. Kang