OPTI 429/529: Integrated Optics for Information Technology: Design and Fabrication Process

Instructor: Mahmoud Fallahi,

3 Credits

This course provides a fundamental understanding of the concept, fabrication, operation and performance of key integrated optic and photonic components that are widely used in optical communication and information technology. It intends to give the senior undergraduate students a broad understanding of the components and system and prepare them after graduation. The following topics will be covered:

Prerequisite: *knowledge of semiconductor physics and semiconductor materials*

- Introduction to Integrated Optics, Optic Communication and other applications

- Elements of Integrated optics
  - Slab, channel waveguides
  - Y-junction
  - Directional coupler
  - Fabry-Perot etalon
  - Ring resonators
  - Waveguide grating
  - Wavelength filters and switches

- Micro/Nanofabrication in Integrated optics
  - Epitaxial growth,
  - Lithography,
  - Etching,
  - Metallization,
  - Passivation and packaging

- Active semiconductor components: Diode Lasers, Detectors
  - Semiconductor lasers: heterojunction, quantum wells
  - Various types of diode lasers, DFB, DBR, VCSEL, tunable lasers
  - Optical amplifiers: EDFA, Semiconductor
  - Modulators: Electroabsorption, electrooptic, Mach-Zehnder
  - Integration challenges

Grading:

Attendance:	10%
Exam 1:	30 %
Exam 2:	30 %
Final Project:	30 %