OPTI 626- Integrated Optics and Optoelectronics

Course Description:

This course aims to give a broad understanding of the physics and technology of discrete and integrated optical and optoelectronic components. The main focus is on important optoelectronic components such as waveguides, lasers, detectors and other photonic components. Included are the state-of-the-art technology for monolithic integration of optical/optoelectronic components for optical communication. Prequisite: OPTI 501.

Grading Policy:

- Midterm 30%
- Final 30%
- Project 30%
- Attendance 10%

Outline

Waveguides

- Introduction to waveguiding.
- Planar and strip waveguides.
- Directional couplers.

Diffraction Grating

- Introduction.
- Grating couplers.
- Grating-assisted optical components.

Semiconductor Lasers

- Basics.
- Design.
- Fabry-Perot lasers.
- DFB, DBR lasers.
- VCSEL.

Photodetectors

- Basics.
- PIN photodiodes.
- MSM detectors.
Device Design and Processing Technology

- Design steps.
- Lithography.
- Etching.
- Metallisation.
- Packaging.

Photonic Integrated Circuits (PIC)

- Integration Issues.
- Examples of PIC.

Optoelectronic Integrated Circuits (OEIC)

- Introduction.
- Examples.

System Applications

- Fiber optic communications.
- WDM systems.