# NE310 AUG 3:0

# Photonics technology: Materials and Devices

## Instructor

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## Teaching Assistant

Email:

**Department: Center for nano Science and Engineering**

Course Time:

Lecture venue:

Detailed Course Page:

## Announcements

## Brief description of the course

This is an advanced graduate level photonics course. Candidates who are interested in understanding light propagation and manipulation in integrated photonic devices could take this course.

## Prerequisites

Students are expected to have taken

NE 213/E7-213 Introduction to photonics and has a grasp of Electromagnetic and Optics concepts.

## Syllabus

Optics fundamentals; ray optics, electromagnetic optics and guided wave optics, Light-matter interaction, optical materials; phases, bands and bonds, waveguides, wavelength selective filters, electrons and photons in semiconductors, photons in dielectric, Light-emitting diodes, optical amplifiers and Lasers, non-linear optics, Modulators, Film growth and deposition, defects and strain, Fabrication technology for photonics, III-V semiconductor device technology and processing, silicon photonics technology, photonic integrated circuit in telecommunication and sensors.

## Course outcomes

A student,

should have gained knowledge of properties of light in dielectric and free space.

should be able to understand optical wave propagation in dielectric medium.

should be able to design photonic devices to manipulate properties of light using waveguides.

should be able to interpret wave propagation dynamics in complex medium.

should be able to design optical functions such as, light coupling, wavelength filtering, power splitting, polarisation rotation, light generation and detection.

should be able to identify suitable material and fabrication process to realise photonic functionalities on-chip.

## Grading policy

Assignments 30%

Midterm + surprise Quiz 30%

Final exam 20%

Design project 20%

## Assignments

## Resources