



# Integrated Optics

## ECE 5012

**Credit Hours:**

3.00

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**Course Levels:**

Undergraduate (1000-5000 level)

Graduate (5000-8000 level)

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**Course Components:**

Lecture

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**Course Description:**

Fundamentals of planar lightwave circuits and guided wave devices; laser light in anisotropic media; electrooptic and nonlinear optical effects; concepts in telecommunications, RF photonics, nanobiotechnology.

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**Prerequisites and Co-requisites:**

Prereq: 3010, or Grad standing in Engineering, Biological Sciences, or Math and Physical Sciences.

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**Course Goals / Objectives:**

- Master the fundamentals of guided wave propagation of laser light in planar rectangular dielectric waveguides
  - Master concepts for design & synthesis of planar lightwave circuits & guided wave devices (modulators, resonators, switches, filters, couplers, interferometers, multiplexers, bistable devices, waveguide grating arrays, cross connects)
  - Competency toward to emerging research topics in telecommunications, RF photonics, and nanobiotechnology
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**Course Topics:**

- Wave theory of planar optical waveguides
  - Coupled mode theory
  - Electromagnetic wave propagation in anisotropic media
  - Electrooptic effect and devices
  - Nonlinear optical effects and devices
  - Beam propagation method
  - Periodic structures
  - Surface plasmons
  - Microelectromechanical systems (MEMS)
  - Planar lightwave circuits
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**Designation:**

Elective