THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

# Nonlinear Optics

## ECE 6511

**Credit Hours:**
3.00 - 3.00

**Course Levels:**
Graduate (5000-8000 level)

**Course Components:**
Lecture

**Course Description:**
Nonlinear optics for the generation, propagation, amplification, and control of laser light; all-optical switching and solitons; modern applications in high speed lightwave devices and systems.

**Prerequisites and Co-requisites:**
Prereq: 5012, or Grad standing.

**Course Goals / Objectives:**
- Learn the fundamentals of the variety of nonlinear optical phenomena
- Learn concepts for design and synthesis of lightwave devices and systems
- Exposed to emerging research topics involving laser light

**Course Topics:**
- Nonlinear polarization of material media
- Wave equation description of nonlinear optical interactions
- Harmonic, sum, and difference frequency generation
- Parametric amplification and oscillation
- Field and intensity dependent refractive index
- Stimulated Raman and Brillouin scattering
- All-optical switching and solitons
- Wavelength conversion and phase conjugation
- Modern applications

**Designation:**
Elective