OPTICAL ENGINEERING (OEN)

OEN 510 Advanced Engineering Mathematics (3 Credits)
This course covers advanced mathematical tools and, techniques for optical and electronics engineering, including linear algebra, advanced vector calculus, complex variable theory, ordinary and partial , differential equations and integral transform. , Emphasis will be on using software such as , MATLAB and Mathematica for solving engineering, problems.

OEN 520 Optical Design and Instrumentation (3 Credits)
Introduces geometrical and physical optics systems and their ramifications will be discussed. Course exposes the student to a variety of optical equipment, including mirrors, prisms, beam splitters, couplers, polarization equipment, lasers and laser coupling techniques. Laboratory experiments will introduce basic photonic, geometric and physical optics instrumentation as well as measurement techniques.

OEN 530 Optical Materials (3 Credits)
This course relates optical behavior to the fundamental chemical, physical and micro-structural properties of conductors, insulators and semiconductor materials. Specialty topics such as Kerr effect, Stark effect, Zeeman shift, radiative and non-radiative transitions, up-conversion processes and other energy transfer mechanisms will be discussed, with an emphasis on semiconductor materials. Students will gain an insight into the kinds of materials engineering and processing conditions that are necessary to produce a material with a desired optical property

OEN 540 Lasers and Photonics (3 Credits)
This course reviews the electromagnetic principles, of optics, including Maxwell's equations; optical, amplification processes; Gaussian beams; and modal, characteristics of laser resonators. An overview, of gas, solid state, and semiconductor laser, systems is presented. Finally, foundational, principles of selected photonic devices, including, semiconductor-based detectors and photovoltaic, devices are introduce

OEN 560 Optical Communications I (3 Credits)
Advantages of optical communication and the, fundamental components of a communication system, will be covered. Topics will include waveguide, theory, signal impairments such as fiber, attenuation and dispersion, laser modulation,, photo detection and noise and coherent, communications.

OEN 561 Optoelectronic and Photonic Devices for (3 Credits)
The course provides an understanding of the, combined use of optoelectronic and photonic, components and devices, which enables the design, of a well-engineered fiber optic communication, system. The first part of the course provides a, review of sources, amplifiers, detectors and, signal degradation mechanisms in optical fibers., The second part of the course focuses on, wavelength-division multiplexed fiber networks and, optical switching cores for routing. Finally,, system design, testing and performance, optimization for different network configurations, will also be tested with the aid of system, modeling software.

OEN 580 Quantum Mechanics (3 Credits)
Contact the department for specific course information

OEN 630 Opto-Electronic Devices (3 Credits)
Materials for optoelectronics, optical processes in semiconductors, absorption and radiation, transition rates and carrier lifetimes are discussed. Principles of LEDs, lasers, photo detectors, modulators and solar cells and optoelectronic integrated circuits are discussed in detail.

OEN 661 Optics and lasers (3 Credits)
See department for more information

OEN 690 Applied Optics Research Seminar (3 Credits)
Invited speakers with optical engineering, experience will meet with the class to describe, their experiences, entrepreneurial ventures, and, research challenges.

OEN 698 Master's Thesis Research (3 Credits)
Required by thesis option students. Students must, have a research advisor and be working on a, research project.

OEN 699 Master's Thesis (6 Credits)
Contact the department for specific course, information.