OPTICAL ENGINEERING (OEN)

OEN 200 Geometric and Instrumentation Optics (3 Credits)

Basic principles of geometric optics, refraction, and reflection will be discussed. Gaussian optics of axially symmetrical systems and other related topics as well as simple optical instruments such as magnifying lenses, compound microscopes, refracting telescopes, and other simple optical systems will be discussed.

OEN 200L Geometric & Instrumentation Optics Lab (1 Credits)

This is a course in intermediate geometric optics that provides students with state-of-the art laboratory exercises and equipment that will allow them to do fundamental experiments using lasers, fiber optic systems, and diodes. This course complements OEN 200 and students are advised to take these courses concurrently.

OEN 201 Physical and Instrumental Optics (3 Credits)

This course is the second half of OEN 200 with more detailed discussion of topics such as interference and interferometers, Fresnel and Fraunhofer diffraction, spectroscopic instrumentation, electro-optic effects and elements of quantum and nonlinear behavior. **Prerequisites:** Take OEN-200.

OEN 201L Physical & Instrumentation Optics Lab (1 Credits)

This laboratory is designed to complement the topics discussed in OEN 201 and students are advised to take these courses concurrently. **Prerequisites:** Take OEN-201.

OEN 290 Optical Engineering Seminar I (1 Credits)

Provides an introduction to contemporary topics in optical engineering, including contemporary technical topics, professional topics, and emerging areas for employment and career advancement.

OEN 297 Summer Research I (3 Credits)

Undergraduate research supervised by a faculty member. Development of the skills of research, including preparations, design, and execution of experiments and data analysis.

OEN 320 Optical Systems Analysis (3 Credits)

Development of tools and techniques for engineering of optical systems. Study of specifications, system design and analysis, tradeoffs and optimization, and manufacturing. **Prerequisites:** Take OEN-201.

OEN 340 Lasers and Photonics (3 Credits)

Covers condensed matter physics, including issues in solid state physics, laser physics, laser light, and laser components, systems, and measurements.

Prerequisites: Take OEN-320., Take OEN-340L.

OEN 340H Lasers and Photonics (3 Credits)

Covers condensed matter physics, including issues in solid state physics, laser physics, laser light, and laser components, systems, and measurements.

Prerequisites: Take OEN-320;, Take OEN-340L

OEN 340L Laser and Photonics Lab (1 Credits)

This course is the study of laser and photonics in a laboratory setting. **Prerequisites:** Take OEN-340.

OEN 360 Introduction to Optical Materials (3 Credits)

Provides students with the basic principles of optical properties of different material systems that influence optical transitions in conductors, insulators, and semiconductors. Specialty topics covering quantum and nonlinear effects will also be covered.

OEN 360H Honors Intro to Optical Materials (3 Credits)

Provides students with the basic principles of optical properties of different material systems that influence optical transitions in conductors, insulators, and semiconductors. Specialty topics covering quantum and nonlinear effects will also be covered.

OEN 380 Introduction to Quantum Optics (3 Credits)

Introduces students to theoretical concepts and experimental evidence of quantum phenomena that allows them to gain a fundamental understanding of a number of novel semiconducting and photonic systems. Students completing this course will understand fundamental quantum concepts that are prevalent in many novel systems, including nanostructures and electronic and optical materials that can be used to designanext-generation optoelectronic and optical devices.

OEN 390 Optical Engineering Seminar II (1 Credits)

This course provides an introduction to contemporary topics in optical engineering, including contemporary technical topics with relevance to modern practice. The course is comprised of three four-week modules and one three-week module. The individual modules will review a foundational technical area within optical engineering. The module topics will vary annually.

OEN 397 Summer Research II (3 Credits)

Undergraduate research supervised by a faculty member. Further development of the skills of research including preparations, design, and execution of experiments and data analysis.

OEN 460 Optical Communications I (3 Credits)

Study of optical communication components and applications to communications systems, including fiber attenuation and dispersion and noise and coherent communications.

OEN 460L Optical Communication I Laboratory (1 Credits)

Study of optical communication components and applications to communications systems in a laboratory setting. **Prerequisites:** Take OEN-460.

OEN 461 Optical Communications II (3 Credits)

Further discussion of coherent communications as it relates to distribution networks for fiber-to-the-premises (FTTP) and optical sensing.

Prerequisites: Take OEN-460.

OEN 461L Optical Communications II Laboratory (1 Credits)

This laboratory is designed to complement the topics discussed in OEN 461. Students are advised to take these courses concurrently.

OEN 471 3D Printing & Laser Processing (3 Credits)

Introduces students toabasic principles and theory of 3D printing and laser processing for various applications. Provides classroom lectures on optical engineering principles, computer-aided design (CAD) technology, and rapid prototyping technology using 3D printing and lasers. Includes a lab component foradesign and fabrication of 3D devices for engineering applications. Students will conduct team projects to design, fabricate, and analyze prototyped devices using rapid prototyping tools. **Prerequisites:** Take OEN-201. Take OEN-2011. Take EEN-211.

OEN 471H Honors 3D Printing/Laser Processing (3 Credits)

Introduces students toabasic principles and theory of 3D printing and laser processing for various applications. Provides classroom lectures on optical engineering principles, computer-aided design (CAD) technology, and rapid prototyping technology using 3D printing and lasers. Includes a lab component foradesign and fabrication of 3D devices for engineering applications. Students will conduct team projects to design, fabricate, and analyze prototyped devices usingarapid prototyping tools.

OEN 490 Sr Seminar (1 Credits)

This course provides an introduction to various aspects of engineering practice, engineering ethics, and career opportunities through invited lectures.

OEN 498 Sr Project I (3 Credits)

In this course, students plan and design capstone engineering projects incorporating realistic and diverse constraints of technical, budgetary, and social aspects. Both written reports and oral presentations are required.

OEN 499 Sr Project II (3 Credits)

This course is the implementation phase of capstone projects designed in OEN 498. Demonstration of the final working project is required along with a written report and oral presentation.