ENGINEERING (ENGR)

ENGR-310 Electronics I 4 Credits
An introduction to the theory and application of electronic (analog and digital) circuits and devices. The course focuses on the analysis and building of simple electronic circuits. Topics covered include: steady state circuit analysis using complex numbers, simple time-domain analysis and circuit simulation software, semiconductor physics, junctions and transistors, amplifiers, feedback, control circuits, filters, oscillators, optoelectronic devices, electronic noise and signal to noise improvement, field effect transistors, logic gates, digital electronics, signal processing and hybrid analog/digital circuits, and AM/FM and high frequency circuits. This course will be taught in a workshop format which combines laboratory and lecture in the same session.
Terms Typically Offered: Spring, even years.

ENGR-310L Electronics I Lab 1 Credit
This course supports the ENGR-310 lecture, which will be taught in a workshop type format that combines laboratory and lecture in the same session.
Terms Typically Offered: Spring, even years.

ENGR-320 Optics 4 Credits
This is an introductory Optics course with emphasis on applying lectured, theoretical principles in a hands-on setting. This course will cover the fundamental properties of light propagation and interaction with amtter under the approximations of geometrical optics and scalar wave optics. In particular, topics in geometrical optics will include: ray-tracing, aberrations, lens design, apertures and stops, radiometry and photometry. Topics covered in wave optics include: basic electrodynamics, polarization, interference, wave-guiding, Fresnel and Fraunhofer diffraction, image formation, resolution. The course will be taught in a workshop format which combines laboratory and lecture in the same session.
Terms Typically Offered: Fall, even years.

ENGR-320L Optics Labratory 1 Credit
This course supports the ENGR-320 lecture, which will be taught in a workshop type format that combines laboratory and lecture in the same session.
Terms Typically Offered: Fall, even years.

ENGR-400 Introduction to Materials Science Engr. 3 Credits
This course is designed to introduce the students to basic materials science and engineering and applications of this field in emerging technologies. Topics include: . Atomic structure, chemical bonding, crystal structure, defects, diffusion, phase diagrams, mechanical and magnetic properties, thermal, electrical and optical behavior . Correlation of the mechanical, electrical and optical properties of different material systems such as metals and alloys, ceramics, polymers to the microstructure of the material. . How material properties are influenced by thermal and mechanical treatments . Strengthening mechanisms in materials. . The effects of the environment on materials and the possible failure modes of structures. . Application of material systems in photonics, microelectronics, and other technology fields. . Design limitation for metal alloys, ceramics, semiconductors and polymers . Application of materials design concepts to selecting the material most suitable for a given application. Students will need to have prior basic knowledge of chemistry and physics. Lecture three hours.
Terms Typically Offered: Spring, even years.

ENGR-400L Intro/Materials Science Laboratory 1 Credit
This laboratory course supports the ENGR-400 lecture.
Terms Typically Offered: Spring, even years.