**ENGINEERING CORE (ENGR)**

**ENGR 100  Intro to Eng and Computers  2 Credit Hours**
This course gives students a general introduction to the engineering profession and covers some of the elementary skills that students need in order to be successful in their engineering studies. The course covers topics and problems pertaining to mechanical, industrial/manufacturing, and electrical/computer engineering. Aspects of engineering analysis and design are highlighted. Computer skills and communication skills (both oral and written) are emphasized throughout the semester. Two-hour lecture/two-hour laboratory.

Corequisite(s): ENGR 100L

Restriction(s):
Can enroll if College is Engineering and Computer Science

**ENGR 126  Engineering Computer Graphics  2 Credit Hours**

Corequisite(s): ENGR 126L

Restriction(s):
Cannot enroll if Class is Graduate
Can enroll if College is Engineering and Computer Science

**ENGR 216  Computer Meth for Engineers  2 Credit Hours**
Computer programming in C (or one of its derivatives) and application to basic numerical techniques. Numerical integration, solution of systems of linear equations, root finding, curve fitting, error properties, numerical precision. (F,W,S).

Prerequisite(s): ENGR 100 and ENGR 126* and (MATH 216* and MATH 217* or MATH 227*) or MATH 228*

Restriction(s):
Can enroll if Class is Freshman or Sophomore or Junior or Senior
Can enroll if Level is Undergraduate
Can enroll if College is Engineering and Computer Science

**ENGR 250  Principles of Eng Materials  3 Credit Hours**
An introductory course in engineering materials. Particular emphasis is given to the correlation of material properties and internal structures; structure of materials; stress-strain curves; temperature effects; phase diagrams; ferrous and non-ferrous alloys; ceramics; polymers; composites; electrical, magnetic, and optical properties; corrosion and failure. Two-hour lectures and two-one-hour recitations.

Prerequisite(s): (CHEM 144 or CHEM 134) and (CHEM 146* or CHEM 136*) and MATH 115*

Corequisite(s): ENGR 250R

Restriction(s):
Cannot enroll if Class is Senior
Can enroll if College is Engineering and Computer Science

**ENGR 250R  Prin of Eng Materials Rec  0 Credit Hours**
Recitation component for ENGR 250. Must be taken concurrently with ENGR 250.

Corequisite(s): ENGR 250

**ENGR 290  Study Abroad Technical Subj  1 to 4 Credit Hours**
200-level study abroad course in technical subjects.

Restriction(s):
Can enroll if Class is Freshman or Sophomore or Junior or Senior
Can enroll if College is Engineering and Computer Science

**ENGR 332  Speech for Professionals  3 Credit Hours**
Professionals must effectively communicate in the technical and business environment of a company organization. The course pays particular attention to verbal communications within and between organizations, focusing on multiple audiences and their varying needs for information. Stressing audience awareness, organization, clarity and efficiency in speaking, it will improve speaking skills necessary for confident verbal presentations such as professional briefings and conferences.

**ENGR 350  Nanoscience and Nanotechnology  4 Credit Hours**
The terms "nanoscience" and "nanotechnology" have come to mean many different scientific and technical disciplines. The course will introduce students to the fundamentals of nanoscience and nanotechnology. Interesting phenomena about individual nanometer scale objects will be discussed. The difference in properties of objects of nanometer scale, containing hundreds or thousands of atoms and those exhibited by individual atoms or molecules or the properties of materials at the macroscopic scale with which we are most familiar will be covered. The analytical techniques that are used to characterize these objects will be discussed. The manufacturing techniques used to make these objects along with their applications will be covered. Cost benefit analysis of nanotechnology and its future will be discussed. (YR)

Prerequisite(s): PHYS 151 and (CHEM 124 or CHEM 134 or CHEM 144)

Restriction(s):
Can enroll if Class is Junior or Senior
Can enroll if Level is Undergraduate
Can enroll if College is Engineering and Computer Science or Arts, Sciences, and Letters
Cannot enroll if Major is

**ENGR 360  Des Inovtn: Proc, Meth & Prct  4 Credit Hours**
Design Innovation: Process, Method and Practice is a highly interactive project-based introduction to design, structured as a hands-on course. This course brings a holistic vision to design innovation. Students work in teams that follow a process of immersion of user experiences, exploration of ideas and prototyping of potential solutions. To work effectively as a team, collaboration and project management concepts and methods are introduced. The course consists of two instructional elements: regular class lectures and in class hands-on exercises based on case studies. In addition, a semester long team based project allows students to apply classroom learnings to real life design problems. Teams present their design concepts, showcase prototypes in engaging and thoughtful ways. (F, W)

Restriction(s):
Can enroll if Class is Junior or Senior

**ENGR 390  Study Abroad Technical Subj  1 to 4 Credit Hours**
300-Level study abroad topics in technical subjects.

Restriction(s):
Can enroll if Class is Freshman or Sophomore or Junior or Senior
Can enroll if College is Engineering and Computer Science

**ENGR 390F  Study Abroad Technical Subj  3 Credit Hours**
Topic: Fuel Cell Principles. In this course the physical laws of thermodynamics and fluid mechanics will be applied to industrial components and equipment. Approved as an upper-level ME elective.

Prerequisite(s): ME 230
ENGR 399 Experiential Honors Prof. Prac  1 Credit Hour
Full Course Title: Experiential Honors Professional Practice-To provide undergraduate engineering and computer science students with an opportunity to develop skills, abilities, and behaviors through both hands-on learning and exposure to the professional work environment. The course provides supervised work experiences relevant to their degree programs with mutually agreed upon engineering work assignments among the student, employer and faculty advisor. (F,W,S)
Prerequisite(s): CIS 275 or (ECE 210 and ECE 273) or (IMSE 255 and IMSE 317) or (ME 230 or ME 260) and (ENGR 126 and ENGR 216 and ENGR 250)
Restriction(s):
- Can enroll if Class is Junior or Senior
- Can enroll if Level is Undergraduate
- Can enroll if College is Engineering and Computer Science

ENGR 400 Appl Business Tech for Engr  3 Credit Hours
This course will introduce the students those business skills/tools that will be needed in their jobs soon after graduation and will make them better and well-rounded engineers. They will be able to function better within today's global business environment. The major topics of the course are management finance including cost accounting, organizational behavior, program and project management and business related system thinking. Three hours of lecture per week.
Restriction(s):
- Can enroll if Class is Post-baccalaureate NCFD or Senior
- Can enroll if Level is Undergraduate or Professional Development

ENGR 490 Study Abroad Technical Subj  1 to 4 Credit Hours
400-level study abroad course in technical subjects.
Restriction(s):
- Can enroll if Class is Freshman or Sophomore or Junior or Senior
- Can enroll if College is Engineering and Computer Science

ENGR 492 Exper Honors Directed Research  1 Credit Hour
Full Title: Experiential Honors Directed Research. The Experiential Honor Directed Research project involves performing laboratory/experiential research under the supervision of a faculty member. The course involves regular meetings with the supervising faculty member and reading relevant research articles. Engineering student are expected to design and conduct experiments, and to analyze and interpret data. Computing students are expected to analyze a problem, and identify and define the computing requirements appropriate to its solution. A research project report and an oral presentation are expected at the end of the semester. (F,W,S)
Restriction(s):
- Can enroll if Class is Junior or Senior
- Can enroll if College is Engineering and Computer Science

ENGR 493 Exper Hnrs Dir Dsgn  1 Credit Hour
Full Title: Experiential Honors Directed Design The Experiential Honors Directed Design project involves the design, analysis, building and testing of software (a computer-based system, process, component, or program) or hardware (a component, assembly, device or system) to meet desired needs. A design project report and an oral presentation are expected at the end of the semester. (F,W,S)
Restriction(s):
- Can enroll if Class is Junior or Senior
- Can enroll if College is Engineering and Computer Science

* An asterisk denotes that a course may be taken concurrently.

Frequency of Offering