

## ENGR 4010: Senior Capstone Design Project

This course is required for all Engineering majors.

Course Coordinator:

Gene Dixon

Catalog Description:

Senior capstone course involves open-ended design project, exposing students to practice of engineering design and problem solving. Emphasis on real problems and working with real clients. Students required to visit facilities, interact with client employees, determine on-site data measurement strategies, and perform any necessary literature search. Develop proposal for project to be performed in ENGR 4020.

Course Structure:

One 50-minute lecture and 2 lab hours per week.

Prerequisites:

Consent of instructor

Required Materials:

N/A

Course Learning Outcomes:

Upon completion of this course each student will be able to:

- Demonstrate an understanding of the design process from conceptual to detailed design including constraints, engineering standards, literature review, and intellectual property issues.
- Demonstrate application of engineering skills to identify alternatives and select a conceptual design solution in a manner equivalent to expectations in the entry level professional work place.
- Demonstrate written communication skills by completing a conceptual design report, establishing a foundation for preliminary and final design (for completion in ICEE 4020).
- Demonstrate oral communication skills for engineers by making presentations to clients and an engineering jury.
- Demonstrate project team skills by working in groups of at least two persons.
- Demonstrate an understanding of the importance of professionalism, ethics, and continuing professional development in the context of engineering design.
- Demonstrate understanding of the impact of engineering solutions.
- Demonstrate the professional skills required for career development and job search

Lecture Topics:

- Introduction to Senior Design Capstone /Non-disclosure (1 class)
- Projects team dynamics and conceptual design (1 class)
- Scope and customer requirements (1 class)
- Professionalism and career planning: resume, job search, dress (1 class)
- Conceptual design planning, responsibilities, and organization (1 class)
- Constraints (1 class)
- Literature review, prior art, intellectual property, and engineering standards (1 class)
- Contemporary issues in engineering and engineering design (1 class)
- Analysis and identification of feasible solutions (1 class)
- Registration, ethics, and continuing professional development (1 class)
- Preliminary design steps (2 classes)
- Societal impact of engineering solutions (1 class)

- Detailed design steps (1 class)
- Effective presentation skills (1 class)

Laboratory/Recitation Topics:

Lab sessions will be focused on project team design activities including weekly meetings with faculty design advisors

Relevant Program Outcomes

Graduates of the engineering program will demonstrate

- a) an ability to apply knowledge of mathematics, science, and engineering.
- c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.
- d) an ability to function on multi-disciplinary teams.
- f) an understanding of professional and ethical responsibility.
- g) an ability to communicate effectively.
- h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context
- i) a recognition of the need for, and an ability to engage in life-long learning.

Professional Component Content:

Math/Science: 0; Engineering: 2 credits; General Education: 0

Assessment Requirements:

Student Work Samples:

- Conceptual design report demonstrating formulation of problem, recognition of constraints, and identification of feasible solution from alternatives.
- Assignment showing understanding of professional and ethical responsibilities including lifelong learning
- Assignment showing recognition of global, economic, environmental, societal issues in design
- Assignment showing awareness of contemporary issues in engineering.

Targeted Exam Questions:

- N/A

Student Course Survey

Last Review:

March 17, 2008 by Gene Dixon