ECE 1895: Junior Design Fundamentals 01

Spring, 2025

COURSE DESCRIPTION

This course teaches students the engineering design process. Emphasis is placed on the development of fundamental hands-on skills commonly used in the design of modern electrical and computer engineering technologies. Students participate in a series of mock design experiences, culminating in the participation of a large-scale design project. After completion of this course, students will be able to design a system that meets specifications and satisfies a stakeholder's needs and requirements. Students will also learn how to create functional design prototypes and verify them.

INSTRUCTOR

Hao Qin, Room 527
Email: hao.qin@scupi.cn
Office Hours: Tuesday 3:30-5:30 pm, Thursday 3:30-5:30 pm, or by appointment

TEACHING ASSISTANT

Hong Liu, 2862644418@qq.com

LECTURES

Wednesday 8:15-11:00 am
Location: S506 SCUPI Building. In-person attendance is required for all class meetings.

RECITATION

TBA

TEXTBOOK

- *Susan McCahan et. al, Designing Engineers: An Introductory Text, 1st Edition: Wiley, 2015. (not required)*
- *Clive L. Dym, Engineering Design: A Project-Based Introduction, 4th edition. Wiley, 2013 (not required)*

COURSE OBJECTS AND LEARNING OUTCOMES

In this course, you will be expected to:

- Explain the steps in the engineering design process and how to meet a client's objectives.
- Define design requirements and articulate a design in engineering terms.
- Generate and evaluate design alternatives and select the best based on technical and non-technical constraints.
- Communicate design outcomes, including written documents such as a conceptual design and a test plan, and give oral presentations to describe a project.
- Design functional electronic prototypes that incorporate customized printed circuit boards, microprocessors, sensors, and power supplies.
- Implement a prototype for their design using modern tools and techniques.

ABET OUTCOMES
- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- An ability to function effectively on a team whose members together provide leadership, create a collaborative environment, establish goals, plan tasks, and meet objectives.
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

COURSE REQUIREMENTS AND GRADING
There will be homework assignments, quizzes, and two exams.
- Homework: 30%
- Quizzes: 10%
- Midterm Exam: 30%
- Final Exam: 30%

HOMEWORK
Homework assignments and their due dates will be given in the lectures. All work should be clearly presented, showing all steps to demonstrate your understanding of the process. While collaboration with classmates is encouraged, the final submission must be your own independent work, and plagiarism is strictly prohibited. **No late homework** will be accepted.

QUIZZES
There will be short quizzes given during the class meetings. Quizzes are designed to test basic skills and prepare you for the exams.

EXAMS
There is a midterm exam and a final exam. Each test will focus on the material presented since the previous exam, while also having the potential to include content from earlier sections. Attendance at all exams is mandatory. Make-up exams will only be given in the event of an emergency and only if advance notification is provided.

ACADEMIC INTEGRITY
Maintaining academic integrity is essential in this course. All work submitted must be your own, whether individual or group assignments. Plagiarism, cheating, or any form of dishonesty will not be tolerated and will result in disciplinary action as per the institution's policies. You are encouraged to collaborate with classmates on understanding concepts, but all submitted work must reflect your independent effort. Properly cite any sources or assistance received and uphold the highest standards of academic honesty in all your work.

TENTATIVE PROGRESS

	Topic Sections
1	Engineering design process
2	Problem Definition
3	Specifying design functions and requirements
4	Generating and evaluating design alternatives
5	Communicating the design outcome

6	Component and technology selection
7	Software Engineering basics
8	Wireless Communications
9	Machine Learning
10	Optimization Algorithms