

# ECE 1895: Junior Design Fundamentals 01

Spring, 2026

## 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 514

Email: [hao.qin@scupi.cn](mailto:hao.qin@scupi.cn)

Office Hours: Tuesday 1:30-5:30 pm, or by appointment

## TEACHING ASSISTANT

Qiushi Zhao, 2022141520257@stu.scu.edu.cn

## LECTURES

Tuesday 8:15-11:00 am

Location: 211 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 four projects.

- Projects: 100% (project1: 20%; project2: 20%; project3: 30%; project4: 30%.)

## Projects

Projects and their due dates will be given in the lectures. All work should be clearly presented. While collaboration with classmates is encouraged, the final submission must be your own independent work, and plagiarism is strictly prohibited.

## 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

	<b>Topic Sections</b>
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