

EE 496 Capstone Design Project

Credits: EE and CENG students are required to take at least 3 credits.

Categorization of credits: engineering topic

Instructor(s): All EE faculty

Textbook and Other Required Materials: Varies with projects and is determined by the faculty advisor.

Designation: Required

Catalog Description: EE 496 Capstone Design Project (V) Significant project integrating the design content of previous courses and incorporating engineering standards and realistic constraints. Written report must document all aspects of the design process: reliability, safety, economics, ethics. Repeatable unlimited times. A-F only. Pre: 396 or consent.

Pre- and Co-requisites: Pre-requisites: Senior standing and EE 396 Junior Project.

Class/Lab Schedule: Meetings arranged by the student and faculty advisor.

Topics Covered: EE 496 is a significant and advanced-level design project that integrates the design content of previous courses under the supervision of a faculty advisor. It can be an individual or team project, where the team may be a mix of beginning to advanced-level students. The project may be a continuation of an EE 396 project, an entirely new project, or a continuation of an earlier EE 496 if it spans multiple semesters. The project must cover at least two of the following four topics: (i) data collection and analysis; (ii) design methodology; (iii) design tools; and (iv) instruments. It must incorporate engineering standards and realistic constraints that include most of the following considerations: economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. The number of hours dedicated to each topic depends on the project that is undertaken.

Course Objectives and Relationship to Program Objectives:

The design experience is necessary to prepare students to become professional engineers. EE 496 places significant design responsibility on the students as they must plan and execute a major design problem. To prepare for EE 496, students must take at least one credit of EE 296 Sophomore Project and two credits of EE 396 Junior Project. The EE 496 capstone project gives students exposure to what they will see in the engineering industry with opportunities to work in teams, develop leadership skills, and work on more open-ended design projects.

A student demonstrates advanced-level design as part of a project. Project activities include most of the following: design, data collection and analysis, and learning design methodologies, design tools, instruments, engineering standards, and practical constraints. . [Program Objectives addressed by this course: 1, 2, 3, 4, and 5.]

Written Reports

EE 496 is a *writing intensive* (W) course and must conform to the *W Hallmarks* from UH General Education Office. If a student takes multiple EE 496s to complete a project (e.g., two credits of EE 496 in one semester and two credits of EE 496 in the next semester), *each* EE 496

is writing intensive and must conform to the W hallmarks. EE 496 requires a written final report, which must cover the following items:

- Project objectives and criteria
- A discussion of related work and how the project is different.
- Final design
- Alternate solutions
- Explanation of how previous and concurrent course work is related to the project.
- Future work or subsequent development
- At least two of the following four topics: Data collection and analysis, Design methodology Design tools, Instruments
- Engineering standards and practical constraints including most of the following considerations: Economic, Environmental, Sustainability, Manufacturability, Ethical, Health and safety, Social, Political

Oral Presentations EE 496 is an *oral intensive* (W) course and must conform to the *O Hallmarks* from UH General Education Office. It requires participation in a poster session that is organized by the Department. Rubrics for evaluating posters can be found on the Department website. In addition, to the poster session, students should give other oral presentations, where the faculty advisor will provide feedback.

Course Outcomes and Their Relationship to Program Outcomes The following are the course outcomes and the subset of Program Outcomes (numbered 1-7 in square braces "[]") they address:

- Accomplish advanced-level design with respect to engineering standards and practical constraints. [1, 2, 7]
- Learn new design methodologies; tools; techniques for data collection and analysis; and/or instruments with minimal instruction from the faculty advisor. [7]
- Orally communicate design and engineering concepts effectively. [3]
- Prepare clear written reports. [3]

Contribution of Course to Meeting the Professional Component:

Engineering topics: 100%

Computer Usage: Varies depending on the project. However, oral and written presentations are to be of professional quality and should be prepared using computer tools.

Design Credits and Features: The course has 3 design credits. The course and all of its assignments are dedicated to advanced-level design experience for senior-level students.

Person(s) Preparing Syllabus and Date: Galen Sasaki for the Undergraduate Curriculum Committee, Feb. 17, 2003. Revised, Wayne Shiroma, Jan. 23, 2006, Dec. 13, 2008, Feb. 7, 2014. Revised, Yingfei Dong, Oct. 7, 2014. Revised, Matthias Fripp, Jan. 21, 2021.