EE 496 Capstone Design Project

**Designation:** Required

**Catalog Description:** EE 496 Capstone Design Project (V) Significant project integrating 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.

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

**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:**
A student participates in advanced-level design as part of a project, either individually or in a team. The project must integrate the design content of previous courses. At least two of the following four topics will be covered:
- Data collection and analysis
- Design methodology
- Design tools
- Instruments

It is essential to incorporate engineering standards and realistic constraints that include most of the following considerations: economic; environmental; sustainability; manufacturability; ethical; health and safety; social; and political.
The number of hours dedicated to each topic depends on the project that is undertaken.

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

**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, major 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, engineering standards and practical constraints. The projects may be individually structured or in teams, where a team can 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. A student must give 30 minutes of oral presentation, where the faculty advisor will provide feedback. In addition, the course is writing intensive (W) and therefore has significant writing assignments as described here:
(adapted from UH General Education Office, “Hallmarks of Writing Intensive
Classes
http://www.hawaii.edu/gened/focus/w.htm#hallmarks)

- The course uses writing to promote the learning of course materials, including, but not limited to, progress reports and a final report.
- The course provides interaction between the instructor and students while students do assigned writing, in the form of comments on drafts.
- Written assignments contribute at least 40% to each student’s course grade.
- The course requires students to do a minimum of 4,000 words, or about 16 pages.
- To allow for meaningful professor-student interaction on each student’s writing, the class is restricted to 20 students. [The course addresses the following Program Objectives: 1, 2, 3, 4, 5.]

Course Outcomes and Their Relationship to Program Outcomes
The following are the course outcomes and the subset of Program Outcomes (numbered 1-11 in square braces "[ ]") they address:

- Accomplish advanced-level design with respect to engineering standards and practical constraints. [3,5,11]
- Learn new design methodologies; tools; techniques for data collection and analysis; and/or instruments with minimal instruction from the faculty advisor. [9,11]
- Orally communicate design and engineering concepts effectively. [7]
- Prepare clear written reports. [7]

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. Written reports are to be prepared using word processors, and oral presentations should be done using computer presentation tools such as Powerpoint.

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.

Instructor(s): All EE faculty