ECE 4900: Capstone Design II

Course Description
Application of design principles and methodology to conceptual and detailed technical design, implementation, and testing of a capstone project.

Prior Course Number: 682
Transcript Abbreviation: Capstone Design 2
Grading Plan: Letter Grade
Course Deliveries: Classroom
Course Levels: Undergrad
Student Ranks: Senior
Course Offerings: Autumn, Spring
Flex Scheduled Course: Never
Course Frequency: Every Year
Course Length: 14 Week
Credits: 3.0
Repeatable: No
Time Distribution: 3.0 hr Rec, 3.0 hr Lab
Expected out-of-class hours per week: 3.0
Graded Component: Laboratory
Credit by Examination: No
Admission Condition: No
Off Campus: Never
Campus Locations: Columbus
Prerequisites and Co-requisites: Prereq: Option 1: 2560 (265), 3010 (312), 3020 (323), 3030 (432), 3040 (341), 3050 (352), 3090 (582), and 3900 and Sr standing, and enrollment in Electrical Engineering Program of Study (EES subplan) of the ECE major. Prereq or concur: 3080 (481). Option 2: 3020 (323), 3090 (582), 3561 (561), 3567 (567), 3900, CSE 2231 (321), and 2451, and Sr standing, and enrollment in Computer Engineering Program of Study (CES subplan). Prereq or concur: 3080 (481) and 5362 (662).
Exclusions: Not open to students with credit for 4900H (683H), 4901 (683), or 682, or Engr 4903 or 5902.01.
Cross-Listings:

Course Rationale: Existing course being revised to allow focus on design, implementation and testing aspects of capstone project with new course 3900 taken prior term.

The course is required for this unit's degrees, majors, and/or minors: Yes
The course is a GEC: No
The course is an elective (for this or other units) or is a service course for other units: No

Subject/CIP Code: 14.1001
Subsidy Level: Baccalaureate Course

Programs

<table>
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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>CpE</td>
<td>Computer Engineering</td>
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<tr>
<td>EE</td>
<td>Electrical Engineering</td>
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General Information
The scheduled recitation time will be used for team presentations for progress reports and final project reporting; and for team meetings both with the instructor and amongst team members.

Course Goals

- Demonstrate competence applying engineering design methods
- Demonstrate competence in the management of a project
- Demonstrate competence in a team-based environment
- Demonstrate mastery in technical writing and presentation skill
- Design, build, demonstrate, and report on a major project, integrating material learned
- Be exposed to relevant engineering standards
- Demonstrate familiarity in considering multiple realistic constraints (e.g. economic, environmental, sustainability, manufacturability, ethical, health and safety, social and political issues) while carrying out their design

Course Topics

<table>
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<tr>
<th>Topic</th>
<th>Lec</th>
<th>Rec</th>
<th>Lab</th>
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<th>IS</th>
<th>Sem</th>
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<tbody>
<tr>
<td>Senior project design</td>
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<td>Project execution, test, and analysis</td>
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<td>Documentation of project</td>
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Representative Assignments

- Project proposal document, with problem definition statement, requirements and systems specifications, project implementation and test plan, Gantt charts and budget estimates.
- Working prototype.
- Final presentation.
- Final report.

Grades

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Design proposal/ planning presentation</td>
<td>15%</td>
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<tr>
<td>Design proposal/planning report</td>
<td>20%</td>
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<tr>
<td>Regular progress/status reports</td>
<td>15%</td>
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<td>Preliminary and final demonstrations</td>
<td>15%</td>
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<tr>
<td>Final presentation</td>
<td>15%</td>
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<td>Final report</td>
<td>20%</td>
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<td>+/- one letter grade from team grade based on individual and teamwork assessment</td>
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Representative Textbooks and Other Course Materials

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
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<tr>
<td>Design for Electrical and Computer Engineers: Theory, Concepts and Practice</td>
<td>Ralph M. Ford and Chris S. Coulston</td>
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ABET-EAC Criterion 3 Outcomes
### Course Contribution | College Outcome
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*** | a. An ability to apply knowledge of mathematics, science, and engineering.
** | b. An ability to design and conduct experiments, as well as to analyze and interpret data.
*** | c. An ability to design a system, component, or process to meet desired needs.
*** | d. An ability to function on multi-disciplinary teams.
*** | e. An ability to identify, formulate, and solve engineering problems.
* | 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 and societal context.
** | i. A recognition of the need for, and an ability to engage in life-long learning.
* | j. A knowledge of contemporary issues.
*** | k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

### Additional Notes or Comments
- Added quarter equivalents of prereqs. Add 4901 to exclusions. Update press and exclusions to university format.
- Update prereqs to 3561 instead of 3567 for CpE 4/23/12
- Corrected prereq to show 5362 only required of CES subplan. 4/27/12
- Changed text to Ford and Coulston 3/27/13
- Added ENGR 4903 to exclusions.
- Update course goals, lectures, grading, and Criterion 3 outcomes 5/8/14
- Correct ABET outcome f to two stars 7/2/14
- Update course for program change splitting lecture content into ECE 3900 10/7/14
- Added ENGR 5902.01 to exclusions. BLA 2/25/15
- Removed ECE 3027 from prerequisites (temporarily) due to transition issues for the ECE program change. Need to add it back when the majority of students in the program have been required to take ECE 3027. Approved by CCAA with 3027 removed today. GJV 9/3/15

**Prepared by:** George Valco