Catalog Data: ECE 494: Capstone Design II. Three hours. Continuation and completion of design project initiated in ECE 492 Capstone Design I.

Prerequisites: ECE 492 and a 400-level electrical and computer engineering lecture-lab combination. Prerequisite topics for ECE 494: knowledge of engineering design methodology and senior-level knowledge of an electrical and computer engineering specialization; laboratory skills for test and measurement of electrical and computer engineering components and systems.

Corequisites: None

Textbook: None

Relationship of Course toward Meeting ABET Program Outcomes:

The course supports instruction for Program Outcomes B, C, E, G, H, and I as required by ABET Criterion 3 of EC 2000 and ABET Program Criteria. The relationships are indicated in the Course Learning Objectives.

The course supports assessment for Program Outcomes C, D, F, and G as required by ABET Criterion 3 of EC 2000 and ABET Program Criteria. The relationships are indicated in the Program Outcome Measure Assessments.

Course Learning Objectives:

This is the second course in a 2-semester sequence designed to introduce students to the steps in a systematic design process, to provide design experience through a capstone design project, and to build teaming, organizational, and communication skills. The first course will conclude with a formal Preliminary Design Review. The second course will conclude with a completed design and a Final Presentation. At the end of this course, students are expected to:

1. Identify an appropriate problem or desired need and then design a system, component, or program to solve the problem or address the desired need (Outcomes C and E).
2. Develop and conduct a validation test on the system, component, or program (Outcome B).
3. Incorporate appropriate standards into the system, component, or program (Outcome E).
4. Design a system within a set of realistic constraints including most of the following considerations: economic; environmental; sustainability; manufacturability; ethical; health and safety; social; and political (Outcomes C, E, and H).
5. Write a final report describing the design and validation test (Outcome G).
6. Use external resources to obtain technical information necessary to complete design of system, component, or program (Outcome I).

Program Outcome Measure Assessments:

During this course, learning assessments will be performed using specific Program Outcome Measures that demonstrate students are able to:

1. Design, conduct, and interpret a validation test. (Outcome C, Measure C6)
2. Work as members of a team to complete a project. (Outcome D, Measure D2)
3. Communicate effectively with team members regardless of technical discipline. (Outcome D, Measure D3)
4. Demonstrate knowledge of engineering ethical codes. (Outcome F, Measure F3)
5. Prepare and deliver an effective oral technical presentation. (Outcome G, Measure G4)
6. Employ engineering graphics effectively in oral presentations. (Outcome G, Measure G6)

Contribution of Course to Meeting the ABET Professional Component:

- Skills required, used, and developed are connected with the selected project, and are intended as the final steps of student preparation for their professional careers. Design project will incorporate engineering standards and realistic constraints.
- Estimated Content: Engineering Design: 3 credits
Relationship of Course to Program Objectives:

The course supports Program Objectives 1, 2, and 3 by: utilizing knowledge of engineering analysis, problem solving and design; continuing career-long professional development through engagement in life-long learning; and utilizing skills in effective communication, multidisciplinary teamwork, and adherence to principles of professional ethics.

Topics Covered During Class:

1. Engineering Design (10 hrs)
2. Design Documentation and Review (10 hrs)
3. Engineering Economics (4 hrs)
4. Engineering Management Tools and Techniques (4 hrs)
5. Design Validation (10 hrs)
6. Engineering Presentations (5 hrs)
7. Engineering Reports (2 hrs)

45 hours

Note: The previous course in the sequence, ECE 492 will have provided classroom instruction in the above topics. The design projects will have been initiated in ECE 492 (design teams will be required to make a formal Proposal Presentation), and ECE 492 will have concluded with the students conducting a formal Preliminary Design Review. The design projects will be completed in ECE 494. Formal presentations in ECE 494 will include a Critical Design Review and a Final Presentation.

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