

ECE 4512  
EE DESIGN I

CATALOG DATA: ECE 4512. EE Senior Design I. Credit: 2. Lecture: 1. Laboratory: 1. Lectures on the process of engineering design; a seminar series devoted to selected topics including entrepreneurship, project management, professional development and ethics. Students must propose a project, complete the simulation and prototyping aspects of the design, and present their findings to a committee of experts at a design review. Prerequisite: Credit or registration in an ECE technical elective; approval of a project proposal by your advisor.

PREREQUISITES BY TOPIC:

1. Linear circuit analysis.
2. Digital devices and logic circuit analysis.
3. Basic electronic circuit design.
3. Signals and system theory.
4. Familiarity with computer simulation tools such as PSPICE and MATLAB.
5. Familiarity with office automation tools such as Microsoft Office and Powerpoint.
6. Credit or registration in an EE technical elective course.
7. Approval of a project proposal and team by your faculty project advisor and the course instructor.

TEXTBOOK(S) AND OTHER REQUIRED MATERIAL:

G. Volland, *Engineering By Design*, Addison-Wesley, 1999, ISBN 0-20-14985-10.

GENERAL COURSE OBJECTIVES AND RELATIONSHIP TO PROGRAM OBJECTIVES:

1. Initiate a project definition, design specifications, and milestone schedule as a team project. [2,3,4]
2. Design a system that meets the project's design constraints and incorporates real world constraints such as cost, size, weight, and power [3,8].
3. Simulate the design using contemporary software tools such as PSPICE and Matlab, and demonstrate conformance to the design constraints [1,2].
4. Construct a prototype of the system and demonstrate conformance to the design constraints [4,5].
5. Present project to a panel of peers and experts in a concise, informative series of reviews. [3,7,8].
6. Attend a series of lectures on contemporary global issues in engineering [8].

TOPICS COVERED:

PRINCIPLES OF DESIGN (5 Lectures):

- A. Philosophy of Design - What Constitutes Design? [3]
- B. The Engineering Design Process [3]
- C. Design Validation Through Simulation and Experimentation [2,4]
- D. Hardware and Software Co-Design [1,2,3]
- E. Economic, Social and Political Implications In Design [5,8]

PROFESSIONAL DEVELOPMENT (9 Lectures):

- A. Entrepreneurship [7]
- B. Principles of Project Management and Teaming [6]
- C. Career Management, Professional Licensing, and the Importance of Life-Learning [8,9]
- D. Intellectual Property Issues [8]

DESIGN REVIEWS (5 Lectures):

- A. Evaluate Other ECE 4512 and 4522 Presentations [3, 7]
- B. Preliminary Design Review [7]

- C. Final Design Review (Emphasis on Prototyping) [4]
- D. Practice Presentations [7]
- E. Project Web Site [7]

**CONTRIBUTIONS TO PROFESSIONAL COMPONENT:**

Engineering Science	0 hours
Engineering Design	2 hours
Basic Math and Science	0 hours

**ASSESSMENT:**

1. Design document.
2. Design reviews (peer review and faculty committees)
3. Web site.
4. Peer review, project advisor and course instructor team reviews.

**SPECIFIC COURSE OBJECTIVES AND RELATIONSHIP TO MEASURABLE OUTCOMES:**

- Objective 1:    1.1    Conceive and plan a large-scale engineering project to construct an interesting and non-trivial electrical system. (3,5,7,8)
- 1.2    Establish measurable design constraints. (4,8)
- Objective 2:    2.1    Simulate the system and demonstrate conformance to the design constraints. (2, 5)
- 2.2    Construct a fully-functional prototype; demonstrate conformance to the design constraints. (4,5)
- Objective 3:    3.1    Demonstrate the ability to execute a large-scale engineering project involving detailed documentation, design reviews, and prototype demonstrations (6,7,8).

**PREPARED BY:**

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