

ECE 4522
EE DESIGN II

CATALOG DATA: ECE 4522. EE 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 implement, debug, and verify a large-scale multidisciplinary team-based design project that meets or exceeds design specifications. Students focus on packaging, integration, and productization in the second semester of this two-semester sequence. Students present their findings to a committee of experts at a design review. Prerequisite: Completion of ECE 4512, and a working prototype that has been approved by the team advisor.

PREREQUISITES BY TOPIC:

1. Completion of the design, simulation and prototyping phase of the project as required in ECE 4512.

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. Continue management and execution of the hardware phase of a large-scale project [3,6,7]
2. Construct a packaged version of the previous semester's prototype that meets the project's design constraints and demonstrates a reasonable degree of integration and productization [3,8].
3. Present project to a panel of peers and experts in a concise, informative series of reviews. [3,7,8].
4. Attend a series of lectures on contemporary global issues in engineering [8].

TOPICS COVERED: PRINCIPLES OF DESIGN (5 Lectures):

- A. What is the design content in your project? [3,5]
- B. The Engineering Design Process [3]
- C. Design Validation Through Testing 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 (5 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:

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| 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 | Develop an extensive hardware testing plan. (4) |
| Objective 2: | 2.1 | Implement a system and demonstrate conformance to the design constraints. (2, 5) |
| | 2.2 | Analyze performance differences with prior simulations and prototypes (1,5) |
| Objective 3: | 3.1 | Demonstrate the ability to execute a large-scale engineering project involving detailed documentation, design reviews, and hardware demonstrations (6,7,8). |

PREPARED BY: Dr. Joseph Picone, Professor of Electrical and Computer Engineering,
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