

ECE 4512 — Senior Design I
Fall Semester 2000

- 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 project management, fundamentals of hardware and software design, professional development and ethics. Students must propose a project, complete the simulation aspects of the design, and present their findings at a design review. Prerequisite: Credit or registration in an ECE technical elective; approval of a project proposal by your advisor.
- Textbook: G. Volland, *Engineering By Design*, Addison-Wesley, 1999, ISBN 0-20-14985-10.
- Reference: P. Horowitz and W. Hill, *The Art of Electronics*, 2nd Edition, Cambridge University Press, 1994, ISBN: 0-521-37095-7.
- Coordinator: Dr. Raymond S. Winton, Professor of Electrical and Computer Engineering
- Goals: To provide the student with a capstone electrical engineering design experience that prepares them for engineering practice by introducing practical design constraints such as conformance to engineering standards, economics, manufacturability, ethics, and safety. In the first semester, of this two semester sequence, students will focus on verification of a design through simulation, and successfully defend their design at a formal design review that includes academic and industrial professionals.

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. Approval of a project proposal by your advisor.

Topics:

1. PRINCIPLES OF DESIGN (5 Lectures):
 - A. Philosophy of Design - What Constitutes Design?
 - B. The Engineering Design Process
 - C. Design Validation Through Simulation and Experimentation
 - D. Hardware and Software Co-Design
 - E. Economic, Social and Political Implications In Design

2. PROFESSIONAL DEVELOPMENT (5 Lectures):
 - A. Principles of Project Management and Teaming
 - B. The Role of Documentation In Engineering
 - C. Effective Presentation Strategies
 - D. Career Management, Professional Licensing, and the Importance of Life-Learning
 - E. Intellectual Property Issues

3. DESIGN REVIEWS (5 Lectures):
 - A. Evaluate Other ECE 4512 and 4522 Presentations
 - B. Preliminary Design Review
 - C. Final Design Review (Emphasis on Simulation)
 - D. Project Web Site

Computer Usage:

The students will use contemporary computer tools, such as MATLAB and PSPICE to simulate key aspects of their designs and verify performance. Students will also use standard desktop publishing packages such as Microsoft Word, Powerpoint, and Excel to document their projects.

Laboratory:

- A. Prototyping and Feasibility Study (5 classes)
- B. Theoretical Aspects of the System Design (5 classes)
- C. Simulation and Certification (5 classes)

ABET category content as estimated by faculty member who prepared this course description:

Engineering Science:	0 credits or	0%
Engineering Design:	2 credits or	100%

Prepared by: Joe Picone

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