

ECE 419
Senior Design
Fall 2009

Description:

This is a course designed for senior-level students in the Electrical and Computer Engineering Department. The objective is to apply technical skills learned in undergraduate courses (mathematics, physics, economics, computer engineering, electronics, etc) to design, develop and solve a practical problem in some area of electrical, electronic or computer engineering.

The students learn and apply a structured approach to design. The concepts learned in the Senior Design Projects courses will assist in the transition from solving typical textbook problems to defining and executing projects that are encountered in real-life entry-level engineering positions.

The format for the first semester (ECE 419) consists of classroom lectures on design of projects, including writing proposals, assessing customer needs, defining and writing requirements, developing a system specification, and preparing a project plan. Each student is assigned to a project team of 2-4 members. Projects are planned and executed as a team, and grades are given for teamwork as well as for technical accomplishments. A project plan is prepared that defines tasks, resources, schedules, milestones, and deliverables.

The second semester (ECE 420) is used for developing and executing the project. Regular status reports (typically, monthly) compare technical progress against the project plan. The project is completed and documented by a final report, a poster, and an oral presentation to peers, faculty and sponsoring company.

Prerequisites:

Senior standing in EECE, plan to finish undergraduate requirements by Spring or Summer of the ECE420 completion

Textbook: not required, class notes prepared by the instructor

Table I: Objectives, Implementation, and Assessment

Objectives		Implementation	Assessment	A	B	C	D	E	F	G	H	I	J	K
O ₁	Discussion of engineering as a profession and the role of a design engineer	2 hrs. lecture in 1 st week	Entrance probe						X		X	X	X	X
O ₂	Guest lectures and potential customers present possible projects. Students choose (or are assigned to) a project	3 hrs. lecture in 2 nd and 3 rd weeks	Assignment of the project		X	X	D	X	X		H		J	X
O ₃	Learn to assess project requirements, customer needs, and define metrics of the project completion. Write a requirement specification	4 lectures	Requirement specification	X	X	X		X						X
O ₄	Learn the system design process, block diagrams, and design documentation.	2 lectures	Design specifications	X		X		X						X
O ₅	Learn the basics of project planning and management, including scheduling, resource allocation (Ghannt charts), budgeting, and reporting	4 lectures	Project plan	X	X	X	X	X		X				X
O ₆	Learn the basics of project management, and principles of verification	2 lectures	Test plan		X	X	X	X		X				X
O ₇	Design and start execution of assigned project. Detailed Design Review	Project meetings	Status Report	X						X				X

**Table II: Expectation and Assessment Outcome
Fall 2009, Dr. Olga Lavrova**

General expectations:

Students are expected to use this class as a first experience in project definition, management and execution.

Entrance Survey:

Entrance Survey is intended to assess incoming levels, knowledge and approaches of the students in relation to project formulation, management, metrics, and teamwork.

For the survey results, expect:

- 100% of the students to understand multi-disciplinary nature of engineering projects
- 100% of the students to understand benefits of the teamwork
- 75% of the students to understand different roles of the team members
- 75% of the students to have a knowledge of a variety of engineering tools and methods available to modern engineers

Project Plan, Test Plan:

Expect 85% of the students to provide Project and Test Plans consistent with modern engineering standards for the documentation (such as ISO standards)

Approved design, Status Reports:

Expect 85% the students to provide Approved designs and Status Reports consistent with modern engineering standards for the documentation and records keeping (such as ISO standards).

Objectives		Assessment	Outcome measurement
O ₁	Discussion of engineering as a profession and the role of a design engineer	Entrance probe	√ Entrance Probe: √ 100% of students un understand multi-disciplinary nature of engineering ≥85% students understand benefits of the teamwork ≥80% students could name engineering team members and their roles, >50% could name non-engineering team members and their roles √ ≥80% students have an understanding of tools and applications available to modern engineer
O ₂	Guest lectures and potential customers present possible projects. Students choose (or are assigned to) a project	Assignment of the project	√ 100% of the students were able to select a project of their interest
O ₃	Learn to assess project requirements, customer needs, and define metrics of the project completion. Write a requirement specification	Requirement specification	√ ≥90% of the students provided detailed documentation Top 5% of the students provided outstanding level of understanding of how to document the requirements.
O ₄	Learn the system design process, block diagrams, and design documentation.	Design specifications	√ ≥90% of the students provided detailed documentation Top 5% of the students provided outstanding level of understanding of how to document the requirements.

O ₅	Learn the basics of project planning and management, including scheduling, resource allocation (Ghannt charts), budgeting, and reporting	Project plan	√ ≥90% of the students provided detailed documentation Top 5% of the students provided outstanding level of understanding of how to document the requirements.
O ₆	Learn the basics of project management, and principles of verification	Test plan	√ ≥90% of the students provided detailed documentation Top 5% of the students provided outstanding level of understanding of how to document the requirements.
	Design and start execution of assigned project. Detailed Design Review	Status Report	√ ≥90% of the students provided detailed design review ≥90% of the students have started implementing the design and working on the projects.

√ means passing expectation