

EECE 4792 Capstone Design II

SPRING 2013 SEMESTER

Course Instructors

Instructor 1 and Coordinator : Prof. Bahram Shafai
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Group Meetings: During the Week, Capstone Studio (8 Hayden)
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Instructor 2: Prof. Charles Dimarzio
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Instructor 3: Prof. Masoud Salehi
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Instructor 4: Prof. Waleed Meleis
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Course Description

EECE 4792 is the second of a two-course sequence that aims to give undergraduate engineering students (you) significant experience in dealing with a large design project from the beginning to end. In EECE 4790 you will review your proposal prepared in EECE 4790 and organize a detailed set of working plans for the selected project solution. After completion of the design phase, you will implement the project and provide the final report. In addition, a subset of the projects will be chosen to participate in the first phase of capstone design competition, which will be evaluated by external judges. Each group is responsible for an oral presentation and a demonstration of the designed system. One week later, the rest of the projects will participate in the second capstone design competition, which will be judged by design advisors and two additional faculty members.

This Semester as member of a design team you will be responsible for actual design and implementation of the project. This will include ordering and preparing all the tools and equipment needed, performing your assigned task, produce and evaluate subsystems, realize the overall system and check its functionality, preparing final report and oral presentation.

Course Objectives

The main objective of the senior capstone design course is to provide a multidisciplinary experience, integrating knowledge from the core, intermediate, and advanced courses in electrical engineering. Most undergraduate engineering courses teach students problem solving in a particular area. Information is presented in organized lectures and students demonstrate their mastery of it through written problems and exams.

In contrast to this learning style, practicing design engineers are often given an open-ended problem, and they must seek the appropriate resources to solve it while they remain within certain budget constraints. These resources may include hardware and software tools, research papers and reports, books describing relevant ideas and other people with useful experiences. Part of their task may be to determine if any solution to the problem exists at all. They may work in teams, so they have to be able to organize themselves, decide who does what and meet regularly to check on progress and discuss the difficulties encountered in the process. Finally, at the end of the project they need to be effective in demonstrating their results and defending their design decisions. By taking part in this course, you will get experience with all these aspects of teamwork during the engineering design process.

A typical project that utilizes a systematic approach consists of four phases:

1. The Conception Phase, in which ideas are devised and brainstormed.
2. The Study Phase, in which potential designs are investigated.
3. The Design Phase, in which the system is actually designed in detail

4. The Implementation Phase, in which the system is constructed and delivered.

The first two goals are achieved in EECE 4790. The last two goals should be accomplished in EECE 4792.

ACE Objectives

EECE 4792 incorporates the University-wide Academic Common Experience (ACE) Goals as they were emphasized in EECE 4790.

Facilities:

You have workspace and some equipment, along with a storage locker, in the ECE Capstone Lab (8 Hayden). Each group should attach a piece of paper to the workbench including the information about the group code, the title of the project, the group members, and the advisor name(s).

Course Requirements

Your major task this Semester is to design and implement your proposed project and write a detailed final report and defend it orally. You are expected to be involved with the following activities:

1. Organize and assign design tasks.
2. Develop design phase details (specifications, drawings, etc.).
3. Determine the solution to be implemented.
4. Obtain means, facilities, materials, equipment for the implementation
5. Perform the tasks and monitor the productivity.
6. Address the technical problems associated with each task and correct them.
7. Produce and evaluate subsystems.
8. Realize the overall system by interconnections.
9. Test and improve the functionality of the designed project.
10. Prepare final report and oral presentation.

Tentative Schedule

Date	In Class	Deliverables
Jan 8	Organize the design phase work	
Jan 15	Determine the solution to be implemented	Prepare a report
Jan 22	Obtain implementation phase, funding and equipment	
Jan 29	Allocate implementation tasks to the team members	
Feb 5	Prepare and produce the subsystems	
Feb 12	Discuss issues and problems to be resolved	
Feb 19	Realize the system and evaluate its operation	
Feb 26	Make corrections	
Mar 12	Complete the Design Project	
Mar 19	Final Implementation and Improvement	
Mar 26	Preparation for Final Demo	Final Report Draft
Apr 2	Report on participation in capstone design competition	
Apr 5	Submission of 1 Page Summary	Oral Dry Run
Apr 10	Final Design Presentation (Competition)	
Apr 17	Final Report Due	

Grading Scheme

Your grade will be based both on group and individual work and is out of 100 points.

Weekly Progress Report	15
Design Task	10
Implementation Task	30
Final Written Proposal	15
Final Oral Presentation	15
Class Participation and Teamwork	15
TOTAL	100 points

All members of a team receive the same score for all the parts except from the last one. The Class Participation score may vary among members of a team. It will be used to evaluate an individual's participation not only in the presentations of his/her own team, but also in the presentations of other teams.

Areas of Instructors expertise

The research areas of instructors and their expertise can be found in the ECE department web page: <http://www.ece.neu.edu>

Prof. Bahram Shafai areas of expertise are in: *control systems and signal processing.*

Prof. Charles Dimarzio areas of expertise are in: *Optics, Electromagnetics, Sensors and Signal Processing.*

Prof. Masoud Salehi areas of expertise are in: *Communications, Coding, and Digital Signal Processing.*

Prof. Waleed Meleis areas of expertise are in: *Computer Engineering, Architecture, and Performance Optimization.*