

EECE 4790: Electrical and Computer Engineering Capstone 1

Syllabus

Instructor: Prof. John Kimani

Course Site: www.coe.neu.edu/~jkimani/eece4790

Check the course site regularly for class materials and additional resources

Course Description:

EECE 4790 is the first 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 select a project and prepare a detailed proposal describing the work to be done for completing it. In EECE 4792, you will implement the project and provide the final report.

This semester as member of a design team you will be responsible for researching the project topic, identifying the tasks to be performed, determining the availability of all the tools and equipment needed, defining your milestones, and preparing and delivering written and oral presentations on the design proposal. The emphasis will be first on selecting an interesting and challenging project and then on explaining the design tradeoffs that exist at all stages of the project. In addition you should have all equipment that you will need identified and ordered before the start of the second phase in EECE 4792.

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 team work during the engineering design process.

ACE Objectives:

EECE 4790 incorporates the following University-wide Academic Common Experience (ACE)

Goals: the skills of effective thinking and communication, information literacy, and interpersonal skills, the awareness of the contexts of the natural world and the social and cultural world, and connections across disciplines, between theory and application, and between college and work. In addition many projects will incorporate the ACE Goals of awareness of historical, ethical, aesthetic, and personal perspectives and connections between individuals and society and between college study and lifelong learning.

Facilities:

You will have workspace and some equipment, along with a storage locker, available to you in the ECE Capstone Lab in Hayden Hall

Course Requirements:

Your major task this semester is to formulate and write a detailed proposal, due Tuesday, June 23rd for Summer 1, describing the work to be done on the project and defend it orally. The final oral presentations will be on the week of June 15th. The proposal should at least include:

1. A complete specification of the problem you will try to solve.
2. The results of a thorough literature survey of the appropriate topics and a bibliography.
3. A breakdown of the project into tasks and a description of how these tasks interact with each other.
4. The approach you will use to address the technical problems associated with each task and a description of work in progress.
5. A description of the tools and equipment that you think will be needed, and orders for all equipment parts you need to get.
6. A project organization plan identifying individual responsibilities, team work, status report, realistic schedule for the next quarter with milestones to the project completion.

Assessment and Grading:

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

- Attendance and Participation 20%
- Weekly Written Progress Reports and Deliverables 20%
- Teamwork & Group Participation 20%
- Final Oral Presentation 20%
- Final Written Proposal 20%

Tentative Schedule

Date	In Class & Team Meetings	Deliverables
Week 1	Introduction to Capstone Form project groups	
Week 2	Propose project ideas and brainstorming Discuss proposal ideas Brief “white” papers	Project Ideas Brief
Week 3	Present tasks breakdown Discuss approach for each task	Weekly progress report
Week 4	Discuss responsibilities and time plan Final Technical Discussion of Study Phase	Weekly progress report
Week 5	Identify equipment need, Cost Analysis Preparing Proposal draft and presentation	Weekly progress report
Week 6	Final Progress Report Final Proposal Presentation	Weekly progress report Presentation slides/video
Week 7	Final Proposal due	Proposal report

Sample Report Format:

- Cover Page: Project Title, Team members, Advisor(s), and Date
- Table of Contents
- Abstract
- Introduction
- Problem Formulation
- Impact of the Project
- Analysis
- Design Strategy (Include options considered, ones selected, and alternatives for risk reduction)
- Division of tasks among team members
- Time line showing dependencies and major testable milestones
- Cost (Show total cost and cost to project in separate columns if different, eg. because of borrowed or donated items)
- Conclusion
- Appendices

Have fun and learn something new...!