

**NORTHEASTERN UNIVERSITY**  
**Department of Electrical and Computer Engineering**

**Syllabus of Capstone Design Course I: EECE 4790**

**Term:** Summer 2, 2021

**Course Title:** Electrical and Computer Engineering Capstone I (Capstone Design I)

**Course Number:** EECE 4790

**Instructors:** Capstone Advisors

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**Office Hours:** TBD by capstone advisors

**Prerequisite: Senior Standing**

Basic Mathematical knowledge of Calculus, Differential Equations & Linear Algebra. General Knowledge of Electrical and Computer Engineering: Circuits, Electronics, Microprocessor and Programming, Knowledge of Signals and Systems, Communications, and Control.

**Course Description and Objectives:**

EECE 4790 is the first of a two-course sequence that aims to give undergraduate engineering students significant experience in dealing with a large design project from the start to end. In EECE 4790 students form teams and select their capstone advisors. Each team will select a project and prepare a detailed proposal describing the work to be done for completing it. The students are required to propose a design project involving an electrical, electronic, and/or software system, including evaluation of multiple constraints and use of appropriate engineering standards in the design, to carry out the project, analyze the project, feasibility study, and prepare weekly reports and attending the meetings with their capstone advisor. Finally, students must specify the materials needed for their project, provide a cost analysis, prepare and deliver written and oral presentations on the design proposal. Subsequently, they need to prepare themselves to take capstone 2 EECE 4792 in the following semester for final implementation of their project.

**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.

### **Project Selection and Weekly Meetings:**

Students form teams and select their faculty advisor. Projects can be industrially sponsored, departmentally through research projects proposed by faculty, or student ideas. Students are expected to communicate with their faculty advisor in person through meetings or virtual meetings using the Internet, teleconferencing, and other electronic methods.

**Credit Hours:** Capstone 1 (EECE 4790) is 4 credit hours.

**Mandatory Requirement:** Capstone 1 (EECE 4790) is required course by all senior undergraduate students. It is also required that students continue to take Capstone 2 (EECE 4792).

**Textbook:** No Textbook

However, necessary documents, sample past proposals and information relevant to design projects will be provided for the students.

**Topics to be covered include:** Brainstorming, Analysis of the Project, Feasibility Study. Division of Tasks and Project Management, Intellectual Property, Materials Selection, Effective Written and Oral Communication.

### **Tentative Schedule and Deliverables**

July 6, Introduction to Capstone  
July 12, Form project groups  
July 15, Propose project ideas and brainstorming  
July 19, Discuss proposal ideas  
July 22, Identify Project and Analysis,  
July 26, Present tasks breakdown, Discuss approach for each task  
July 29, White Paper describing in-depth report of the project  
Aug 2, Discuss responsibilities and time plan  
Aug 5, Final Technical Discussion of Study Phase  
Aug 9, Identify equipment and cost analysis within budget  
Aug 12, Preparing Proposal draft and Presentation  
Aug 18, Final Proposal Presentation Final Proposal due  
Aug 19, Final Proposal Presentation Final Proposal due

### **Course Requirements**

Your major task this semester is to formulate and write a detailed proposal, no later than August 25 describing the work to be done on the project and defend it orally. 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. Analysis and break down 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 effort, status report, realistic schedule for the next quarter with milestones to the project completion.

**Facilities:**

Students will have workspace and some equipment, along with a storage locker, available in the ECE Capstone Lab.

**Grading:**

Weekly Progress Report:	10 Points
Individual Task and Presentation:	15 Points
Midterm Report “White Paper”:	15 Points
Final Written Proposal:	20 Points
Final Oral Presentation:	20 Points
Meeting Participation and Teamwork:	20 Points
TOTAL	100 points

**Grading Remarks:** Grading in EECE 4790 Capstone 1 is based on weekly meetings, progress report, analysis and feasibility study, written reports, oral presentations and the final proposal. However, the advisor may have specific strategy to give the above grade distribution which is determined based on the metrics for success developed by the team and his own evaluation criteria.

**Note for Summer 2021: Due to the ongoing COVID-19 Pandemic, all rules and regulations are subject to change. Meetings can be arranged based on mutual agreement of Capstone Advisors and Students.**