Department of Electrical and Computer Engineering
Syllabus for Senior Design I and II - ESE440 and ESE441
Fall 2020 and Spring 2021

Instructors

Professor Harbans Dhadwal

All Sections – office hours
Tu & Th 2 :00 pm – 4:00 pm
213 Light Engineering Building
631-632-8396
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Technical staff

Mr. Tony Olivo
283B Light Engineering Building
631-632-8390
Anthony.Olivo@stonybrook.edu
(Senior Design and 3D Printing Lab)

Mr. Scott Campbell
281 Light Engineering Building
631-632-8390
Scott.Campbell@stonybrook.edu
(CAD Lab)

Classroom (s)

Online Zoom meeting
Tues and Thurs, 6:30 pm to 7:50 pm

Senior design web page - https://sites.google.com/a/stonybrook.edu/seniordesignportal/

[Note: You must login with your SBU Google account]

Catalog description

The senior design sequence (ESE440 and ESE441) is a two-semester, team based, independent capstone project. The primary objective of the senior design course sequence is to provide a vehicle for students to transition from an academic environment to that of a commercial/professional engineering environment. Students learn to work in teams to complete an engineering project from concept, through practical design based on multiple constraints, to creating a deliverable product meeting the design specifications. Students present written, oral and poster presentations of the project. While most of the project work is done outside the classroom, guest speakers provide insight into other related topics from resume preparation, to program management, to team dynamics and to design methodologies used in industry. The project incorporates appropriate engineering standards and multiple realistic constraints.

Cannot be used to satisfy technical elective requirement.

Laboratory fee required.

Fall prerequisites (ESE440)

1. ESE or ECE major and U4 standing
2. ESE300
3. Other:
   i) EE majors: ESE324 and two ESE technical electives
   ii) CE majors: Two CE technical electives

Spring prerequisites (ESE441)

1. ESE440

Reference book

"Design for Electrical and Computer Engineers: Theory, Concepts, and Practice." Ralph M. Ford, Chris S. Coulston, McGraw-Hill (2008)

Course sequence description

This two-semester capstone design project sequence provides senior electrical and computer engineering undergraduate students with significant design experience to practice knowledge, motivate learning, prepare for their careers, collaborate, develop innovative techniques and serve the community. Students work in groups, designing and implementing their projects based on the total design methodology.

The design process consists of the following major steps:

1) Teaming and project selection
2) Market and user needs analysis
3) Product design specification (PDS) initialization and updating
4) Conceptual design
5) Detail design
6) Prototyping
7) Testing
8) Final prototype presentation
9) Final project documentation

The design process spans two semesters. The first semester will emphasize design and analysis. Students will go through the major design steps. By the end of the first semester, each team should generate a complete set of design details of the project, including results of simulation and schematics. The second semester will emphasize implementation (fabrication and packaging) and testing. Students will fabricate and refine their prototypes, based on testing, to realize proposed functions. *Projects with a significant hardware component may by adversely affected by the on-going COVID-19 pandemic. Revision to the syllabus and course requirements will be posted on Blackboard.*

Requirements

Table 1 lists critical milestones which provide a method for continuous assessment. All assignments must be submitted by the due dates. All written submissions must adhere to specific posted guidelines.

Table 1: 2020/21 Senior Design Critical Dates	
Topic	**Due Date**
Request for project descriptions	1-Jul
Project descriptions posted	24-Jul
Project requests	1-Aug
Project teams announced	24-Aug
Proposal	8-Sep
Progress Report I	13-Oct
Interim Report (ESE440 report)	7-Dec
Oral presentations via Zoom	TBA
Topic	**Due Date**
Progress Report 2	30-Mar
Senior Design Project Report	10-May
Posters	26-Apr
Collect printed posters	30-Apr
Poster Day	24-May
Project delivery to faculty advisors	7-May
Oral presentations - on line via Zoom	TBA

Note: Dates are subject to change. All changes will be posted on Blackboard

Work effort

The senior design course sequence is a capstone project which is a completed by a team of students. Most of the work (95%) is performed outside the scheduled lecture time slot. Students are expected to do at least 9.5 hours of course-related work or activity each week during both semesters. This includes scheduled meetings, as well as, time spent doing technology research, project development, preparing written assignments, lecture attendance and other project-related tasks. The lecture time slots are used to provide additional course related material, oral presentations project teams, presentations by invited guest speakers from local industry and members of the campus community. Event calendar is posted on Blackboard and regularly updated.

Course learning outcomes (ABET)

	Student Outcomes	% contribution
1.	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	20
2.	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	10
3.	an ability to communicate effectively with a range of audiences.	10
4.	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	10
5.	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	10
6.	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.	20
7.	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	10
8.	application of engineering standards and multiple constraints and skills acquired in earlier course work. [*This is departmental requirement*]	10

Grading policy

ESE 440 letter grade of **R** will be assigned to each student provided they complete the EE440 requirements. The **R** grade will be converted to the earned grade for the completed senior design project at the end of the Spring semester. You receive the same grade for ESE440 and ESE441.

ESE 441 letter grade **A through F**

Score range	Above 90	89-85	84-80	79-75	74-70	69-65	64-60	59-55	54-50	49-45	Below 45
Letter grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F

Notes:

1- All interim grades will be assigned by the faculty advisor, except for the poster grade, which will be assigned by the class instructor.
2- Attendance penalty for missed scheduled lectures: 0% for 2 lectures; 2% for 3 to 5; and 5% for 5 or more. [*aggregated over both semesters*]

3- Final course grade (ESE440 and ESE441) to be reviewed by Senior Design Project Committee before posting on Solar by course instructor.
4- Individual grades within a team may vary in exceptional circumstances.
5- Reports submitted after the deadline will be **NOT** be accepted. The late assignment will receive a ***zero***. [***NO EXCEPTIONS***]

ESE440		ESE441	
Topic	Score (%)	Topic	Score (%)
Project request	x	Progress report 2	5
Project proposal	5	Project Delivery	10
Progress report 1	5	Project report	50
ESE440 Report	10	Poster presentation	10
ESE440 Oral presentation	2.5	Oral presentation	2.5

Project teams

It should be appreciated that when you join the workforce, you will be assigned to a project that matches your knowledge and experience. You will be expected to work and behave with other team members in a professional manner. In keeping with this expectation, you will be asked to submit a Project Request Form, which will be available after the project descriptions have been posted on Blackboard. The team assignments will be posted on Blackboard by the first day of classes. One of the team members will be identified as the team leader, and he will perform the function of a project manager.

The first task of the project teams will be to select a team name and a logo. This will be communicated to the course instructor by the team leader. *As indicated by SBU guidelines pertaining to COVID-19, teams can either meet in person or via an online meeting platform, such as Zoom.* While critical project milestones have been identified in Table 1, however, teams should have additional milestones, which should be identified using program management tools, such as, Gannt charts.

Meetings with faculty advisor

Project teams are required to meet with the faculty advisor at regular intervals, at least every other week. Each member should take part in the oral briefing to their faculty advisor. Teams will set-up a meeting schedule with the project faculty advisor, (and industry advisor) by the end of the first week of classes.

Team meetings

Team members are required to have regular project meetings, at least once a week. The team leader is required to keep a record of these meetings, the record should include, approval of minutes from the previous meeting, attendance and agenda for the current meeting. Significant absences or lack of progress by individual members is to be promptly reported to the faculty advisor.

Scheduled lecture attendance

Students are reminded that most of the project work is performed outside the scheduled class lectures, which are primarily used for presentations by external speakers, for oral presentations and team meetings with the course instructor. A schedule of mandatory attendance will be posted on Blackboard and updated as needed. *Due to the COVID-19 pandemic, all lectures and student presentations will be delivered through Zoom.*

Laboratory space

Due to the COVID-19 pandemic, please check blackboard for specific instructions regarding the use of common laboratory space. You can send specific requests for laboratory access to Tony Olivo.

Typically, students might work in the faculty advisor's research laboratory, however, when this is not possible, Room 283B in the Light Engineering building is the designated space for the senior design class. While most Computer Aided Design (CAD) programs can be used on your personal computers, the CAD facility in Room 281 is available to you. The Modern Circuit Board Design and Prototyping Laboratory, in Room 283A, may also be utilized in the latter stages of the project, during fabrication and prototyping. However, to access this facility contact Mr. Tony Olivo or Prof David Westerfeld.

When using common laboratory space, you are responsible for cleaning your work area after every use and for returning all test equipment, including probe leads, to their original location. *You must follow posted guidelines for rules on using the common laboratory spaces, particularly, in the current pandemic environment.*

Project budget and reimbursement policy

1) The budget limit for the entire senior design project is $115/student. *For example, the reimbursement is limited to $445 for a project team with three students.*
2) The reimbursement of project related purchase covers only materials and components.
3) Sales tax cannot be reimbursed.
4) Detailed instructions and reimbursement forms are available on Blackboard.

Additional opportunities

- IEEE LISAT conference (call for paper will posted in the "Documents" folder in Blackboard) https://ieee.li/event/lisat-2018-conference/
- URECA competition (College-wide competition, more details to follow), https://www.stonybrook.edu/commcms/ureca/
- DARE competition (University-wide business plan competition, work with MBA students to develop a business plan, etc). https://research.stonybrook.edu/business
- http://lemelson.mit.edu/studentprize - The competition recognizes students at any U.S. college or university who have tested prototypes of technology-based inventions in healthcare, food/water and agriculture, transportation and mobility, and consumer devices.

Americans with Disabilities Act

If you have a physical, psychological, medical or learning disability that may impact your course work,

please contact Disability Support Services [https://www.stonybrook.edu/dss/], ECC (Educational Communications Center) Building, room 128, (631) 632-6748. They will determine with you what accommodations are necessary and appropriate. All information and documentation are confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website: http://www.stonybrook.edu/ehs/fire/disabilities

Statement on academic dishonesty

Academic dishonesty is an extremely serious offense and will not be tolerated in any form. Academic dishonesty in general is the presentation of intellectual work that is not originally yours. Examples include, *but are not limited to*, copying or plagiarizing class assignments including homework, reports, designs, and other submitted materials; copying or otherwise communicating answers on exams with other students; bringing unapproved aids, either in physical (written) or electronic form to an exam; obtaining copies of an exam prior to its administration, etc. Academic dishonesty violates both the ethical and moral standards of the Engineering profession and all infractions related to academic dishonesty will be prosecuted to the fullest via the CEAS CASA committee. For you, the honest student, academic dishonesty results in lower class curves, hence a depression in your GPA and class standing, while cheapening the degree you earn.

For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website
at http://www.stonybrook.edu/commcms/academic_integrity/index.html

Critical incident management

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.