

ECE441

SENIOR DESIGN PROJECT

Term: Fall 2007 / Winter 2008 / Spring 2008
Section: 001
Time: W 4:00 – 5:50 pm
Location: Pharm 305
Grading: as listed below
Text: Design for Electrical and Computer Engineers
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COURSE OVERVIEW

ECE441/2/3 is the Electrical Engineering **capstone design sequence**. This three-course sequence provides practical experience in new product development and project management through the design, manufacturing, and testing of a new product or process. Course topics include Project Planning and Scheduling, Marketing and Quality Functional Deployment, and Product Development. Specifically the sequence consists of creating a paper describing the complete design by the end of ECE441, construction of a prototype (including design iteration) during ECE442, and presentation of the completed refined and tested project in ECE443. The sequence must be taken in consecutive terms. While attendance of organizational lectures and seminars is mandatory, the majority of the work in this sequence occurs outside of class. Students should expect to spend approximately 240 hours of total time on the project per student.

As well as being the department's capstone sequence, ECE441/2/3 is also Electrical Engineering's designated **writing-intensive (WIC) sequence**. As such, students enrolled in this sequence complete a variety of formal written and oral assignments that support the design process and further their engineering communications skills. In completing these assignments, ECE441/2/3 students are expected to review and respond to one another's writing, revise individually and collaboratively produced drafts and use informal writing techniques to explore and solve engineering design problems.

It is important to remember that success in this course is your responsibility. Do not depend on the faculty advisor, sponsor, or mentor to keep your project on schedule. Advisors and mentors will support and guide you in completing your project successfully, but you must take the initiative and seek out their help. A successful project is worth your effort, and it provides a tangible example of your capabilities to potential employers.

COURSE LEARNING OUTCOMES

At the completion of the courses, students will be able to perform the following tasks:

1. Write a concise project description stemming from an identified objective.
(ABET outcomes e, f, g)
2. Collect and review technical information on a project from relevant external resources. (ABET outcomes e, j)
3. Project the impact constraints for projects (Resources, Time, Finances)
(ABET outcomes d, f)
4. Identify project milestones (ABET outcomes d, g)
5. Acquire tooling and hardware (components) for a breadboard / prototype. (ABET outcome k)
6. Present project information succinctly to a technically aware audience.
(ABET outcomes a, f, g)

MAJOR ASSIGNMENTS AND PERCENT OF COURSE GRADE

LATE WORK POLICY

All late work will receive no credit. Only pre-discussed exceptions will be accepted.

ATTENDANCE – INDIVIDUAL GRADING

During required meeting times for the ECE441 course, attendance will be taken. Every missed session will result in reduction of your final grade in the course by 50 points. In the event of an emergency, please contact the instructor as soon as possible to discuss the situation.

WEB PAGE SETUP AND PROJECT DESCRIPTION (50 POINTS) – GROUP GRADING

Your group will need to establish a webpage that will act as a permanent repository of your project design. This webpage will be the primary method of showing your project to people both inside and outside of the university. This needs to be a well presented and professional webpage. Once your group has been assigned, we will assign each group space on the ENGR server. Your webpage must be housed there, NOT linked from another location, your webpage is due **5PM on Monday of Week 3**.

Scoring: 50pts. - Satisfactory, 0pts. - Unsatisfactory

If your web page is considered unsatisfactory, you will be given until **5pm on Friday of Week 3** to revise it for full credit.

PROJECT SPECIFICATION (TECHNOLOGY REVIEW) (150 POINTS) – INDIVIDUAL GRADING

(2000-3000 words, 8-12 pages **DOUBLE** spaced)

Copies to Instructor (KEC1148) and Sponsor/Mentor

In this review you will explain what your project is (in your own words, do not simply copy the description from class), what design issues are involved, and what's been done to date in this area. The primary purpose is to review the 'state of the art' and find other projects that you can borrow ideas from. To write this report, you will need to conduct library research, patent searches, interview your sponsor, etc. Cite your sources according to IEEE format (see <http://standards.ieee.org/guides/style/section7.html> for details). The report will be carefully reviewed for technical content and quality of writing by your group's faculty advisor and project sponsor.

The specification is due **5PM on Monday of Week 4**.

PROJECT SPECIFICATION (PRELIMINARY DESIGN) (200 POINTS) – GROUP GRADING

(7500-12,500 words, 15-25 pages single spaced)

Copies to Instructor (KEC1148) and Sponsor/Mentor

For this submission, you will revise your previous work and will brainstorm together to develop a list of possible design solutions along with a brief technical description of the feasibility of each with supporting calculations and analysis as appropriate. From this list of possible solutions, the group will identify a general approach they feel is most appropriate. This should not necessarily be a specific design at this point, but rather a general group of similar designs. You must include a system-level block diagram and explain all inputs or outputs clearly. In summary, the preliminary design proposal should be a stand-alone document providing a complete description and background technology of the project, a wide range of possible design solutions, a general indication of the direction the group plans to take in solving the design problem, and a system level block diagram with input and output specifications.

The specification is due **Monday at 5PM the 6th week** of the term.

PROJECT SPECIFICATION (FINAL DESIGN) (250 POINTS) – GROUP GRADING

(17,500-32,500 words, 35-45 pages single spaced)

Copies to Instructor (KEC1148) and Sponsor/Mentor

This is a stand-alone report documenting the project design. The first part of this report consists of the Preliminary Design Proposal revised to address the comments made by the faculty advisor, sponsor, and mentor on their grading sheets. In the second part of this report, the group describes the specific design they have selected, explains their reasons for making that choice (including detailed engineering analysis), and documents the sub blocks of their design. **The final design must be fully specified so that construction of a prototype can begin during the winter break.** The final design proposal will include all sections listed on the assignments sheets as well as the following addendums.

The specification is due at **5PM on Monday of Finals Week**.

ETHICS CASE STUDY (50 POINTS) – GROUP GRADING

For the ethics case study, we will first talk about ethics in engineering and then each group will discuss several possible case studies. In your groups, you will need to review the material and decide what choices were made and if they were the ‘right ones.’ Groups will be randomly asked to present briefly to the class what they found from their case study.

PRELIMINARY DESIGN PRESENTATIONS (100 POINTS) – INDIVIDUAL GRADING

During times *outside of class* the groups will be asked to present their preliminary designs. You will be allowed 18 minutes for the presentation with up to 8 minutes for questions. A sign-up sheet will be posted during **week 6**. The presentation should be based on information already in your preliminary design specification. You are simply presenting the work. Each member of the group must present technical information and will be evaluated independently. All group members must be present for all presentations during their chosen section.

The presentations will be held during class **weeks 6 and 7** of the term.

PROJECT KNOWLEDGE QUIZ (100 POINTS) – INDIVIDUAL GRADING

During **week 8** of the term, each group will be given a short quiz over their project. Questions on the quiz will be derived from the material in the preliminary design specification submitted earlier. Each group will have a different quiz, but all members of the group will have the same questions. Questions will be limited to electrical systems and design trade-offs.

PEER REVIEWS TO ACCOMPANY FINAL DESIGN PROPOSAL (100 Points) – INDIVIDUAL GRADING

Copies to Instructor (KEC1148)

All group members will individually prepare a “peer review,” which will be handed in at the same time as the Final Design Proposal. In these reviews, students will reflect on their own work and their peers’ work. This is due on **5PM on Monday of Finals week**.

SCHEDULE

Week	In Class Topic	Assignment due	Reading
1 4-5pm	Review syllabus, present projects	Project Selection Forms (Thursday 9am)	
5-5:50pm	Student Discussion about Projects		
2 4-5 pm	Technology Research Report Discussion		1, 9
5-5:50 pm	Groups and Distributed Communications		
3 4-5 pm	Pending	Webpage Completed (Monday 5pm)	2, 10
5-5:50pm			
4 4-5 pm	Communications (Jed Irvine)	Technology Research Report (by 5pm Monday)	
5-5:50pm	Group Meetings (All Week)		
5 4-5 pm	Summary of Reports		3, 4, 7
5-5:50pm	Group Meetings (All Week)		
6 4-5 pm	Effective Presentations	Prelim. Design Specific. (by 5pm Monday)	12
5-5:50pm		Presentations (All Week)	
7 4-5 pm	Summary of Preliminary Specifications	Ethics Case Study (in class)	11
5-5:50pm	Ethics	Presentations (All Week)	5, 6
8 4-5 pm	Project Knowledge Quiz	Project Knowledge Quiz (in class)	
5-5:50pm			
9 4-5 pm	Building Things (Roger Traylor)		8
5-5:50pm			
10 4-5 pm	Project Planning (???)		
5-5:50pm	Preview of next term		
Finals week		Final Design Specification, Project Reviews (by 5pm Monday)	

* Please note that the schedule above is subject to change. Please refer to the most recent information supplied on the Senior Design Calendar linked to the course webpage.