

ECE442

SENIOR DESIGN PROJECT

Term: Winter 2008
Section: 001
Time: W 4:00 – 5:50 pm
Location: Cov 216
Grading: as listed below

Administrator: Donald Heer
email: heer@ece.orst.edu
phone: x7-2978
office: KEC1117
office hours: T 2-4 and W 1-3

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. Plan, schedule, and carry out an engineering design project.
2. Develop and implement an electrical system using effective design/project techniques.
3. Design and implement test plans and evaluate results.
4. Collaboratively produce written project reports that effectively communicate project information to their target audience(s)—i.e., that are rhetorically appropriate for these audiences and follow disciplinary conventions of usage, vocabulary, format, and citation.
5. Participate effectively in the peer review process.
6. Compose a variety of job-search-related texts, including resumes, cover letters, and professional email communications.
7. Prepare and present formal project-management reviews and other oral presentations.

ABET OUTCOMES

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. Record technical results and measure progress. (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

ECE442

LATE WORK POLICY

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

ATTENDANCE – INDIVIDUAL GRADE

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.

COMPLETED TEST PLAN (PASS/FAIL) - GROUP GRADE

Copy to Instructor, mentor, and Sponsor (hard copy)

Groups are responsible for developing and executing tests with their designs. These tests should include safety, block, and system tests. Each group is responsible for establishing important tests for their project and executing these tests to satisfaction.

This document will be used to evaluate your final prototype. Testing plans will be evaluated by the senior design team and project mentors. Teams and instructor will agree on and sign testing plan. Grading of the test plan is pass or fail. If the plan is turned in on time, you can pass the course. If it is not turned in on time, you will not pass the course.

Testing plan is due to mentor and instructor by **Monday of the week 12 @ 5PM.**

Following the submission of your testing plan, your group should sign-up for a 30 minute meeting time held during the second week to get approval of your testing plan. The appointments are made first come first served.

GANTT CHART (270 POINTS) - INDIVIDUAL GRADE

Maintain a current weekly status through the use of a Gantt chart. Each week, your Gantt chart will be reviewed **Tuesday @ 5PM.** Each week 30 points will be assigned for a total of 270 of your final grade (**week 12 through week 20**). Please place a current pdf of your Gantt chart on your webpage. Gantt charts should be sized to fit readably on one 8.5"x11" sheet of paper. **DO NOT REMOVE OLD GANTT CHARTS.** Grading is done based on if you are maintaining your chart and that you demonstrate revisions and changes to your schedule using the chart as well as if you are achieving deadlines and making progress. There must be a Gantt chart for each member of your group as well as one chart for the entire group. To get your weekly credit, you will need to submit this file via the 'teach' interface. Only one person needs to submit the group's Gantt chart each week.

Use of a software tool designed for project tracking is recommended. MS Project or similar allows you to enter dependencies between tasks and quickly manage your schedule. They do take more time on initial setup. If you spend more than two hours configuring your project in a tool like this, you are likely being more detailed than needed. If you would like to use a spread sheet file or even hand written Gantt chart, you are welcome to. Please ensure it is legible.

MIDTERM PROJECT REVIEW (180 Points) - GROUP GRADE

The midterm project review is conducted with your team members and one or more members of the ECE senior design instructional team. You will be reviewed on your progress and apparent understanding of your project. Electronic copies of all schematics and important datasheets are due to your instructor by **Monday of week 15 @ 5PM.** All files included in the zip must be in **pdf** format. These files should be zipped into a single file with the name "group#.zip" Hence group 1 would submit a file called '1.zip'. Also included in this file should be:

1. **Datasheets** – For each silicon or electro-mechanical part a data sheet must be included. Any 'special' components not covered by this statement must also have datasheets included.
2. **Copy of Test Plan with Results to Date** – Include a copy of your groups test plan with verification of the results of tests to date. The senior design team will ask for in person verification of some test during their review of your design.

These files will be submitted using the TEACH interface on the college of engineering website. You will be able to submit multiple times. Only one member from each group needs to submit the group's paperwork.

Each group will be expected to sign up for a 1 hour time slot to discuss their project. These slots are first come first served.

FINAL PROJECT REVIEW (350 POINTS). - GROUP GRADE

The final project review is to be held during **week 20** of the term. Electronic copies of all schematics and important datasheets are due to your instructor by **Monday of week 19 at 5pm**. These files should be zipped into a single file with the name “group#.zip” Hence group 1 would submit a file called ‘1.zip’. All files included in the zip must be in **pdf** format. Also included in this zip file should be:

- 3. Datasheets** – For each silicon or electro-mechanical part a data sheet must be included. Any ‘special’ components not covered by this statement must also have datasheets included.
- 4. Design Specification** – A current copy of your design specification. It should be updated to match your current design, and should have the revision history updated. Your mentor will be consulted to assess the quality of this document.
- 5. Copy of Test Plan with Results** – Include a copy of your groups test plan with verification of the results. The senior design team will ask for in person verification of some test during their review of your design.

These files will be submitted using the TEACH interface on the college of engineering website. You will be able to submit multiple times. Only one member from each group needs to submit the group’s paperwork.

During **week 20**, each group should sign-up for one thirty minute time slot to demonstrate their project. Some groups may require more time and will be arranged on an individual basis. During this time, you will show your design, and be asked questions about its operation.

MIDTERM PEER REVIEWS (50 Points) - INDIVIDUAL GRADE

Copies to Instructor (hard copy)

All group members will individually prepare a “peer review,” which will be handed in after the midterm reviews. In these reviews, students will reflect on their and their peers work. Specific topics to be addressed in this peer review will be provided. Due **Friday by 5PM of week 16**.

FINAL PEER REVIEWS (100 Points) – INDIVIDUAL GRADE

Copies to Instructor (hard copy)

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 and their peers work. Specific topics to be addressed in this peer review will be provided. Due **Friday by 5PM of week 20**.

PROJECT IMPROVEMENTS (10%) - GROUP GRADE

Copies to Instructor (electronic), Advisor, and Sponsor

Each group should list improvements that should make to their existing design or prototype. These improvements could include; enclosures, PCB designs, modified architectures, different components, etc... Each suggested improvement should be accompanied by the reasoning for implementing or not implementing the improvement to date, a ranking as to which improvements are more important, and an expected time to complete each improvement in hours. Due **Friday by 5PM of week 20**.

DB211 Lab Policies

Clean-up:

As needed, the graduate TAs will come by the lab at 1pm on Monday’s to clean up the lab. Any materials left on a desk not currently occupied will be gently placed into a large box and left near the main door. Exempt items include laptops and appliances. Loose chips and the like will not be spared.

Be Considerate:

We all need to share the room. Please be considerate. Use headphones and shower as to avoid interpersonal conflicts. Do not leave your materials spread all over even if ‘you are only leaving for a few hours’ as the space maybe needed by another group.

Tools and Safety:

A small first aid kit will be attached to the wall near the entry door in the upcoming days. Please only use this kit as needed. Be aware of the tools you are using and turn them off prior to leaving the lab. The tools are a shared resource, if all of the soldering iron tips become damaged due to long term heating, it hurts everyone.

Schedule

Week	Topic	Assignment Due
11	Course Overview	
	Test Plan Information	
12	Prototyping and Building Skills	Testing Plan (Due Mon. 5pm)
	(Roger Traylor)	Gantt Chart (Due Tues. 5pm)
		Testing Plan Approved
13	Communication	Gantt Chart (Due Tues. 5pm)
	(Jed Irvine)	
14	Risk Assessment	Gantt Chart (Due Tues. 5pm)
	(Dennis Bullock)	
15	Ethics Exercises	Midterm Design Review (All Week)
		Gantt Chart (Due Tues. 5pm)
16	No Class	Midterm Design Review (All Week)
		Gantt Chart (Due Tues. 5pm)
17	No Class	Gantt Chart (Due Tues. 5pm)
18	No Class	Final Design Review (Thursday)
		Gantt Chart (Due Tues. 5pm)
		(Multidisciplinary)
19	Final Information	Gantt Chart (Due Tues. 5pm)
		Final Design Files (Due Fri. 5pm)
20	Final Information	Final Design Review (All Week)
		Gantt Chart (Due Tues. 5pm)
Finals week		