ECE443
SENIOR DESIGN PROJECT

Term: Fall 2010 / Winter 2011 / Spring 2011
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 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)
Academic Dishonesty

At Oregon State University academic dishonesty is defined by the Oregon Administrative Rules 576-015-0020.1.a-c as: *An intentional act of deception in which a student seeks to claim credit for the work or effort of another person or uses unauthorized materials or fabricated information in any academic work.*

Academic dishonesty includes:

- **CHEATING** - use or attempted use of unauthorized materials, information or study aids or an act of deceit by which a student attempts to misrepresent mastery of academic effort or information. This includes unauthorized copying or collaboration on a test or assignment or using prohibited materials and texts.

- **FABRICATION** - falsification or invention of any information (including falsifying research, inventing or exaggerating data and listing incorrect or fictitious references.

- **ASSISTING** - helping another commit an act of academic dishonesty. This includes paying or bribing someone to acquire a test or assignment, changing someone's grades or academic records, or taking a test/doing an assignment for someone else (or allowing someone to do these things for you). It is a violation of Oregon state law to create and offer to sell part or all of an education assignment to another person (ORS 165.114).

- **TAMPERING** - altering or interfering with evaluation instruments and documents.

- **PLAGIARISM** - representing the word or ideas of another person as one's own OR presenting someone else's words, ideas, artistry or data as one's own. This includes copying another person's work (including unpublished material) without appropriate referencing, presenting someone else's opinions and theories as one's own, or working jointly on a project, then submitting it as one's own.

IEEE Code of Ethics

As a community of Electrical and Computer Engineers, we have a duty to present ourselves and our profession to each other and the public in the best light possible. The IEEE has a code of Ethics that should always be considered. It reads:

“We, the members of the IEEE, in recognition of the importance of our technologies in affecting the quality of life throughout the world, and in accepting a personal obligation to our profession, its members and the communities we serve, do hereby commit ourselves to the highest ethical and professional conduct and agree:

1. to accept responsibility in making decisions consistent with the safety, health and welfare of the public, and to disclose promptly factors that might endanger the public or the environment;
2. to avoid real or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist;
3. to be honest and realistic in stating claims or estimates based on available data;
4. to reject bribery in all its forms;
5. to improve the understanding of technology, its appropriate application, and potential consequences;
6. to maintain and improve our technical competence and to undertake technological tasks for others only if qualified by training or experience, or after full disclosure of pertinent limitations;
7. to seek, accept, and offer honest criticism of technical work, to acknowledge and correct errors, and to credit properly the contributions of others;
8. to treat fairly all persons regardless of such factors as race, religion, gender, disability, age, or national origin;
9. to avoid injuring others, their property, reputation, or employment by false or malicious action;
10. to assist colleagues and co-workers in their professional development and to support them in following this code of ethics.”
MAJOR ASSIGNMENTS AND PERCENT OF COURSE GRADE

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

BIWEEKLY MEETINGS (180 POINTS) – INDIVIDUAL GRADE
MONDAY OF WEEK 22, 24, AND 26
On Monday of weeks 22, 24, and 26 of the term, each group will have their beaver source tickets inspected starting at 5pm. For each inspection, groups should have at least 5 new tasks per member properly linked to a milestone and should have closed previous tasks with evidence. Evidence is vital for these check-offs as the instructor and TA will base their grade SOLELY on what is shown for each task.

FINAL PROJECT REVIEW (300 POINTS). – GROUP
The final project review is to be held during week 26 of the term. Electronic copies of all important datasheets must be on Beaversource before the scheduled review. They should be linked from each block that uses the datasheet. Datasheets for each silicon or electro-mechanical part must be included. Any ‘special’ components not covered by this statement must also have datasheets included. Additionally all of your testing should be updated with proof added.

Groups will sign-up for a meeting time before week 26, each group will 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. You should be prepared to show any of the system tests that you have reported as completed. Your score it based on if your design meets all of the engineering requirements developed in Fall term and the additional project improvements for spring term.

DESIGN EXPOSITION (300 POINTS). – GROUP
Unless prohibited by the project sponsor, all groups are required to participate in the COE Design Exposition held during spring term. Students are to create posters, display their functional prototype, and prepare other supporting material to present and explain their project to fellow students, OSU faculty, industrial representatives, and the general public. The expo is Friday, May 20th from 11am-5pm.

• Contact Card: A business sized card that contains all members names and contact emails. Additionally, the project website, sponsor, and a logo should be included. Your contact card is due via BeaverSource and should be linked to Section 9 Expo Materials, on Monday @ 5pm of Week 28. You are responsible for printing your own contact cards for the Expo.

• Poster: A minimum format poster template will be provided. The best 3 posters as decided on by the graders will receive 20 extra credit points each. Your poster is due via the TEACH interface on Monday @ 5pm of Week 27 and must be posted to BeaverSource and should be linked to Section 9 Expo Materials. Posters must be in either MS PowerPoint or Adobe PDF format. The School of EECS will pay for the cost of printing posters that are submitted on time.

• Brochures: A minimum format brochure template will be provided. The best 3 brochures as decided on by the graders will receive 20 extra credit points each. Your brochure is due via BeaverSource and should be linked to Section 9 Expo Materials, on Monday @ 5pm of Week 28. Brochures must be in either MS PowerPoint or Adobe PDF format. You are responsible for printing your own brochures for the Expo.

• Attendance: Each member of the group should plan to station the booth for at least two hours on the day of the event and the both may not be left unattended. If the booth is ever unattended, it will reduce the score for the individuals assigned for that time by 50 points. A printed schedule is due to the instructor the day before the Expo @ 5pm.

• Trade Show Goodies: It is not required, but recommended you have some ‘Trade show goodies’ at your booth. This creates a more memorable experience for possible employers. Any ‘candy type’ goodies are due to the instructor the day before the expo.

FINAL PRESENTATION (170 POINTS) - INDIVIDUAL GRADE
The presentations will be a 10 minute recorded presentation with a prototype demonstration. You are responsible for recording your presentation. We are not expecting master video work, but the audio and video should be of a decent quality. This means that voices should be clear compared to other noises and that the video should be of a high enough quality to see all details of the demonstration.
You are encouraged to be creative with different camera shots or even interviews from the Expo, but do not lose sight that it should be a technical presentation. The best 3 presentations as decided on by the graders will receive 30 extra credit
points each. The ECE senior design instructional staff will be the evaluators of these presentations. The presentations must be posted to beaver source on your main page before Friday of week 29. The video must be accessed by clicking on and image of the video display prominently on the main page.

**FINAL PEER REVIEW (50 POINTS) - INDIVIDUAL GRADE**

Copies to Instructor (hard copy)

All group members will individually prepare a “peer review,” which will need to be printed and slipped under my door in KEC1117. In these reviews, students will reflect on their own work and their peers work. Specific topics to be addressed in this evaluation will be provided. The form provided online MUST be used to receive credit. Due Friday of week 29 by 5PM.

**EXTRA CREDIT (?? Points) – INDIVIDUAL GRADING**

Throughout the term, you will be given opportunities to earn extra credit by attending extra lectures and seminars. Based on the content and length of the seminar, a varying amount of extra credit will be given. Watch the Google calendar for these opportunities. Be sure to fill out the sign-up sheet at these events.

**COURSE SCHEDULE**

The course schedule and details of each lecture is available on the ‘Google™ calendar.’ While no changes are expected, please review it periodically to double check.

**IMPORTANT INFORMATION**

Texas Instruments
- Enter the TI Analog University Design Contest at the link below. Follow the steps to sample parts.

**BEAVERSOURCE**

BeaverSource is a university sponsored tool for project management. At a minimum you will use BeaverSource to organize and display your design specification. You are encouraged however to fully utilize the abilities of the tool since it is likely to make you life easier. Some important things you could look into are the SVN abilities for software, and more advanced use of the ticketing/bug tracking systems.

**DB211 Lab Policies**

Clean-up:
- As needed, the graduate TAs will come by the lab at 1pm on Mondays 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.