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 specifying a complete paper design by the end of ECE441, construction of a prototype (including design iteration) during ECE442, and presentation of the completed refined 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 or sponsor 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. It gives a tangible example of your capabilities to potential employers and can lead to valuable references for your resume.

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 PORTION OF COURSE GRADE (1000 POINTS TOTAL)

ECE442

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

DESIGN REVIEWS (50 POINTS) - INDIVIDUAL
During the first 45 minutes of each class, three groups will be randomly chosen to present their projects. Each member of the group will present one block that they are responsible for. Each person will have 3 minutes to present their block. The presentations will be scored. The only allowed visual aids will be the BeaverSource web pages. If at the time the groups are selected a member of the group is missing, they will be deducted 50 points.

BIWEEKLY MEETINGS (SCALAR) – INDIVIDUAL GRADE
Submitted during special time
During weeks 12, 14, 16, 18 and 20 of the term, each group will meet with the teaching assistants. The meeting will be 30 minutes in length. During this meeting a to-do list will be created and students will assign tasks from this list. Points are assigned during the following meeting. Points are based upon the number of tasks completed, if the tasks were entered into BeaverSource, if each student brings a list of tasks to the meeting, and if the completion of the tasks was in the spirit of the task. These points are individually assigned.

The week 20 meeting will be your opportunity to present your final system for grading according to the Final Project review assignment.

The final percentage of these meetings for each person will be multiplied by the score the group receives on its Final Project review. This will be the maximum points each person can receive for the Final Project review.

MIDTERM PROJECT REVIEW (400 points) – GROUP/INDIVIDUAL 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 personal and group progress on the project. By the midterm review your group should have completed designing and building every block in your design including testing and BeaverSource must be updated. The blocks should be assembled into a system but the system tests may not be successful. Electronic copies of all important datasheets must be on BeaverSource by Friday of week 14 at 5pm. 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.

Each group will be expected to meet during the same time as they would meet with TAs for Biweekly meetings. All of the meeting will be in DB211. Please come ready to demonstrate any block tests noted as successful on BeaverSource.

MIDTERM PEER REVIEW (50 Points) - INDIVIDUAL GRADE
Copies to Instructor (hard copy)
All group members will individually prepare a “peer review,” which will be handed in to KEC1148 individually. 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. Due Monday by 5PM of Week 15.

FINAL PROJECT REVIEW (400 POINTS). - GROUP
The final project review is to be held during week 20 of the term. Electronic copies of all important datasheets must be on BeaverSource by Friday of week 19 at 5pm. 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.

During the Biweekly meeting in week 20, 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.

The final score received by the group is scaled by each individual’s performance in Biweekly meetings. This scaled score is what will be received for this assignment.

FINAL PEER REVIEW (100 Points) - INDIVIDUAL GRADE
Copies to Instructor (hard copy)
All group members will individually prepare a “peer review,” which will be handed in to KEC 1148 individually. 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. Due **Monday by 5PM of Finals week.**

**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.
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