ECE4872: ECE Culminating Design II (0-0-6-2)
SPRING 2021

Contact information and office hours:
TBD

Prerequisites: (*=concurrency allowed) ECE 4013 and ECE3005 and ((ECE 3020 and ECE 3030) or (ECE 3025 and ECE 3072 and ECE 3084)) [all courses minimum C]

Lectures: TBD

Laboratory Section: TBD

Optional Text: Hyman, *Fundamentals of Engineering Design*, Prentice-Hall, 2nd ed., 2003.

ECE 4014 Grading:

Professionalism	10%
Oral Project Proposal Presentation	10%
Final Project Oral Presentation	(REQUIRED)
Final Project Demonstration	25%
Final Report	25%
Expo Registration before the Deadline	5%
Weekly Reports & Electronic Deliverables	10%
Design Notebooks	15%

Materials - Course materials and announcements may be distributed on CANVAS**,** or as otherwise specified in the ECE 4014 information. Students are expected to read email on a daily basis. You are responsible for all announcements or materials, regardless of the manner of distribution.

Late Policy - All items are expected to be turned in by the specified due date and time. Late submissions, if accepted, may be subject to a penalty.

Exams - No exams will be conducted during ECE4014.

Professionalism - This grade component is based on your professional behavior during ECE 4014. Points may be deducted for unprofessional behavior by a student during the semester, including: a) missing scheduled meetings with your project advisor or other team members, b) unprofessional behavior as noted by the instructors or as reported by other team members, the project advisor, or industrial sponsors, c) failure to function properly as a member of the design team, d) lack of professionalism in submitted assignments, e.g., chronic failure to follow required format, e) failure to adhere to the Georgia Tech Academic Honor Code

Attendance - Attendance is encouraged but not mandatory during all ECE 4014 team meetings and events. This will be graded via the professionalism component of the grade.

Revised Project Proposal & Oral Presentation - The Project Proposal is a team written, formal document that accurately describes the proposed project in the format introduced in ECE4013. After receiving feedback from the team faculty advisor as part of at the end of ECE4013, the team is responsible for revising the project proposal to incorporate the agreed upon project content. Additionally, the team is responsible for holding a presentation of the revised content during Week 1-2 of ECE4014 with their advisor / sponsor. The oral presentation is recommended to be formatted with the same sections as the written project proposal.

Design Notebook - An INDIVIDUAL design notebook MUST be maintained throughout ECE 4014. Your design notebook must be usable to follow-on projects or other people who need to refer to it at a later time. Usability will be judged from adherence to standards, overall organization, legibility, intelligibility of technical content, and meeting / notebook maintenance. A discussion of your Design Notebook contents is available online.

NOTE: In past semesters of ECE4013 & ECE4014, students have maintained a physical, bound notebook. You are allowed to use online journal apps for keeping individual student electronic notebooks, which would affect some of the requirements listed below**.**

Points
3 Each page is numbered, dated and signed
1 The notebook does not have removable pages
1 All blank pages/areas are marked Intentionally Left Blank• Your name, projects name, contact info, and team members contact info are recorded on the
4 cover or inside of the cover 1 All Notebook entries are in chronological order
1 All notebook entries are in ink, i.e., no pencil entries allowed
3 Record team meetings dates, those present, and meeting highlights Detailed meeting notes (if project has software component this includes documenting coding
2 progress and source code locations) Document information resources accessed (websites, books, scientific papers, professors,
1 industry professionals, etc.)
3 Record design ideas in the form of block diagrams, sketches, etc. Documentation of Engineering Results and Data (test plans, raw data, analysis and discussion of
3 results)
. 2 Generate to-do items and place a box in the left hand margin ahead of listed item
. 3 Include check boxes for yours and your team's and list individual responsibilities and
        deadlines
1 Check off to-do items when they are completed and write in completion date
1 To-do items should run chronologically through the notebook as your design work progresses
3 Professionalism (general organization, neatness, professional language)
33 Total

Student-Faculty Expectations Agreement - At Georgia Tech we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. See http://www.catalog.gatech.edu/rules/22/ for an articulation of The Institute's basic expectations. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the sought environment. Therefore, you are encouraged to remain committed to the ideals of Georgia Tech while in this class.

Course Outcomes – Upon successful completion of this course, students should be able to:

1. Understand how professional issues (teamwork, ethics, licensure, engineering standards, social factors, environmental factors, and economic factors) relate to the practice of engineering design.
2. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
3. Create engineering designs 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.
4. Effectively communicate engineering designs with a range of audiences.
5. Exercise leadership skills.
6. Understand issues, methods and tools used in the engineering practice.
7. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
8. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
9. Acquire and apply new knowledge as needed, using appropriate learning strategies.

Student Outcomes - In the parentheses for each Student Outcome, "P" for primary indicates the outcome is a major focus of the entire course, "M" for moderate indicates the outcome is the focus of at least one component of the course, but not majority of course material.

1. (P) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. (P) 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
3. (P) an ability to communicate effectively with a range of audiences
4. (M) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. (P) 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
6. (P) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

7. (P) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Topical Outline - Working in teams, students will complete the second semester of their two-semester design project requiring specification, design, implementation, testing, and project demonstrations. Projects must be based on the knowledge and skills acquired in earlier course work, and incorporate appropriate engineering standards and multiple realistic constraints. For teams including CmpE majors, the project must incorporate both hardware and software design elements and trade-offs between the two. Emphasis is placed on the design process, the technical aspects of the design, and on reducing the proposed design to practice.

Topics presented in the common one-hour lecture:
a. Course overview and deliverables
b. Mid semester Critical project review instructions
c. Project Final Report and Oral Presentation instructions

Topics for the scheduled weekly meeting with the team's faculty advisor include the following:
a. Criticial Review II: Revised project proposal presentation and report
b. Revised Project approval & permission to begin the project 'build' phase
c. On-going meetings with team's faculty advisor
d. Mid-semester critical design review report and presentation
e. Project Final Presentation
f. Project Final Report
g. Project demonstration