OFFICE HOURS: T/Th 12:30-1:30 P.M. via Zoom or by appointment
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COURSE WEBPAGE: http://www.engreric.com/
LECTURE: Sec: 1, Class #: 5044,   Mon., Wed., 12:30 P.M. to 1:45 P.M.

A. DESCRIPTION

   The first in a two-course capstone senior project in computer engineering that fulfills GE integrative learning capstone. In this course the student will work in teams to define a problem, complete a design and provide both a written report and a multimedia presentation at the end of the semester. Letter Grade Only (A-F).

B. INTRODUCTION

   In the CECS Department we define a Computer Engineering Senior Project as an extensive project planned and carried out during the senior year of college as the culmination of the school experience. Computer Engineering Senior Design projects require higher-level thinking skills, problem-solving, and creative thinking. They are often interdisciplinary and may require extensive re-search. Projects culminate in a final report and presentation of the project to a panel of people, usually faculty and community mentors, sometimes students, who evaluate the student's work at the end of the year.

C. COMPUTER ENGINEERING SENIOR PROJECT REQUIREMENTS:

- A project can be a product or a research type project. The project will consist of a combination of software, digital hardware, and analog circuitry.
- Fifty percent of project must involve original circuit design as determined by the instructor. Verilog/VHDL counts as original circuit design.
- 75 percent of programming must be original (not from open source or libraries).
- Programming languages or HDLs (Hardware Descriptive Languages) used should be applicable to industry and not of a hobbyist grade, i.e. C, C++, Java, Python, Verilog, VHDL etc… would count toward the 75% original code requirement, but Node-RED, Matlab - Simulink and other GUI based code generators would not. These code generating tools may be used, however, they must not comprise a large percentage of the project
- A project can be either a student project or a team project. A team may consist of up to four students. The project difficulty is expected to increase with the number of students on a team. It is preferred that all projects are team projects.
- There should be a well-defined beginning and end to the project
- There should be clearly-defined criteria for success or failure
- The student or team is directly responsible for the project's success or failure
- The project should require some investigation before implementation
- The project should require creativity.

- The project should not be able to be done by a high school student
- The project should be more complex than any project in prior courses
- The solution should not be obvious
- Computer Engineering majors require a two semester senior project
- Projects are selected by the student or team in their area of interest
- Projects selected by the student or team must be approved by the instructor to be certain course requirements are met
- CECS 490B must be taken immediately following the CECS 490A course
- The student or team will be expected to develop their project according to standard engineering lifecycle practices beginning with requirements definition and analysis, followed by systems design, detailed design, implementation, prototype test, function test, and concluding with demonstration and reporting
- There will be considerable emphasis placed on testing and analyzing the developed product, and demonstrating its correct operation
- A 30-minute oral presentation is required at the conclusion of the project/semester
- A comprehensive, minimum of 30 pages, written report is required at the conclusion of the semester

D. TEXT

For Reference: "**Engineering Design, Planning, and Management**" Hugh Jack, 2013 Elsevier Inc. Materials to be handed out in Class

E. SKILLS

GE Integrative Learning Capstone

Students at CSULB must complete upper division GE capstone requirements. There are several types of courses that can satisfy these requirements. There's a category that is named Integrative Learning. The goal of courses in this particular category is to "recognize and respond to complexity of problems or issues by making reasonable and innovative connections across multiple perspectives and frameworks"

To meet the goals of Integrative Learning, this course reinforces knowledge and skills that are part of a general education. This course emphasizes the following GE Essential Skills.

Written Communication

Writing is taught in class and through the process of outlining, researching, writing, and evaluating a variety of credible sources; these will include the documentation of the whole design process from the project motivation to the embodiment design results with critical review and conclusion.

Critical Thinking

Because this is a design course, students will be regularly and actively engaged in the critical thinking process. This course will require you to participate extensively in different formats and

forums for developing critical thinking skills (including demonstrations, smallgroup activities, and oral presentations). A variety of writing assignments will require analysis, synthesis, and evaluation of engineering design.

Teamwork

  Teamwork in the computing field is vital to becoming a respected and successful professional. Functioning software/hardware development teams need members with a broad set of talents including creativity, communication, leadership, technical knowledge, planning and organization. A team's performance level may be determined by the interactions between individual attributes, communication, and the team's ability to effectively complete project tasks. For this course, the team will work on design project leading to development of a computer engineering application. Collaborative tools such as Google Docs, Piazza, and similar tools will be used to enable students to work in groups (both asynchronously and synchronously). Tools such as Google Hangouts, Skype or GoToMeeting are also encouraged for virtual meetings.

Course topics:

1. Microsoft Project – Project and Portfolio Management
2. Hardware and software flowcharts
3. Read, understand and compare component specification sheets, datasheets, and user guides.
4. Select design components based on functionality and price
5. Altium, Circuit Maker, and Orcad schematic capture. PCB (Printed Circuit Board)/PWB(Printed Wiring Board) layout and creation.
6. Power management, power supply types and design, battery management and power budgets.
7. Hardware and software verification.
8. Ethics

Course Objectives:

1) Apply principles of computer engineering theory, problem solving techniques, and practical laboratory knowledge to design, implement, test and bring to completion your design project from your Computer Engineering Senior Projects I course.
2) Demonstrate sufficient written communications skill
3) Demonstrate sufficient oral communication skills

Course Goals:

  This course will require the students to successfully complete the first half of a 6-unit, two-semester computer engineering senior project course. This will give the student the opportunity to put into practice all of the technology and skills they have learned. Taking an idea from a conception to actually producing a working engineering prototype will require the student to fully understand the product development cycle. It will engrain into the student the need to have a concrete understanding of a problem before a preliminary specification can be made. It will require the student to search for possible solutions and to then use fundamental engineering analysis to come up with an efficient and economical design proposal.

Learning Activities

To achieve the objectives of the course, students will carry out several activities:

1. Readings: The lectures will follow the topics as provided by the instructor and as supplemented by the class web page, online resources and class handouts. The reading assignments will elaborate on information presented in the lectures. This is a senior level class and students are expected to learn independently as much as needed in order to complete the project.

2. Class meetings: students are required to attend every class meeting; this is where the course material will be discussed and where other learning activities will take place. Class participation is highly encouraged and is part of your grade. The technologies required to be applied in the project will be presented in the lectures via examples from books and/or handouts. Class meetings will take place in a computer lab and some of the meetings will be set aside for students to meet and/or work on the project.

3. Assignments: homework will be assigned so that students may practice and apply the knowledge and skills that will be required for a successful completion of the project.

4. Exams: There will be no exams. Most of the grade in this class is based on the quality of your work in the project and on assignments tied to the project and/or skills that are required for the project.

5. Project: Projects will be either individual or team with a maximum of four members per team. Team size will be dependent upon the complexity of the project and the skills of the team members. Projects will be selected by the student with guidance from the course coordinator. Students will be encouraged to select projects that can be entered into existing design competitions (e.g. IEEE's Computer Science International Design Competition; Microsoft's ChallengE; Circuit Cellar's yearly Design Competition; etc.) Contracts will be created that define the scope and expectation of the student's project. The contract must be specific and must contain expected outcomes to be met before the project is completed. The contract must specify intermediate reports dates and requirements. Upon completion of the project a working engineering prototype must be presented to the faculty advisor at an open, semi-formal presentation. The student must submit his/her final report and be prepared to defend their design.

Grading:
Grading will be based on the student's ability to complete their project design. Students will receive both an individual grade as well as a team grade. Each team will name the task that each team member is responsible for. In your presentations and reports you will receive a grade for your contribution to your assigned area as well as a team grade. These will combine to give you your total grade for the course. Each of the two components, individual and team, will be equally weighted.

Grade Breakdown

Quizzes / Assignments / Progress Meetings	10%
Midterm Report #1	20%
Midterm Report #2 and Demo	20%
Final Project Report	30%
Oral Presentation and Final Demo	10%

No late work will be accepted.

Academic Honesty Policy

- You can discuss the course material (not the solutions on active assignments) with your classmates, but the work you submit must be your own.
- If sources other than the textbook are used, the student (or team if submitting teamwork) must provide adequate citations to each and every source used, everywhere that it is used, not doing so constitutes plagiarism. Sources could be other books, web sites, instructors, etc. A complete list of references must be provided with the assignment.
- Each student must complete the coursework on his/her own, unless directed to work in teams. Cheating and plagiarism of any form will not be tolerated. Once in teams, each team must complete their own work.
- All students involved in plagiarized work or in which cheating has taken place, or completed by team effort (when instructed otherwise) will receive a zero grade for the activity and their class grade will be lowered by a whole letter grade. Furthermore, the instructor will not approve requests to withdraw from the class by students involved.
- At the discretion of the instructor, any student involved in a plagiarism/cheating incident may be reported to university officials so that further disciplinary actions may be taken. See the CSULB Catalog concerning plagiarism/cheating.
- Do not use other people's work or give your work to others (intentionally or not) as this is considered cheating. E.g., do not leave print outs of code unattended, do not leave your computer unattended and do not forget to log out completely as this can result in cheating.

Cheating and *plagiarism* will not be tolerated in this course. Any individual caught cheating on quizzes, homework, lab projects, or the final exam will be punished to the full extent allowed under University regulations. Plagiarism on papers or assignments is not acceptable and work that is plagiarized will not receive credit. Plagiarism is considered cheating. *Note:* Any time another person's work is used without giving them proper credit, it is considered plagiarism and cheating.

- ***At a minimum,*** any student caught cheating will receive no credit for the work concerned, and will receive a reduction of one letter grade from their final course grade.

- The official CSULB Policy on Cheating and Plagiarism can be found here:http://web.csulb.edu/divisions/aa/catalog/current/academic_information/cheating_plagiarism.html

Grading Policy
- If you do not agree with the grade on any activity, you may request that the grading of the activity be re evaluated. The request must be made within 48 hours of having received the graded activity. The graded activity must be submitted to the instructor at the time of the request.
- The project will have several milestone submissions throughout the semester; these must be turned in on time and cannot be made up.

Withdrawal

Students need to check the University website for important registration deadlines. Students may drop classes during the first two weeks of the semester. Starting the third week of the semester, withdraw from a class requires the signatures of the instructor and department chair and will result in a W in your transcript. Typically, students may drop up until the end of the twelfth week of the semester. Dropping classes during the final three weeks of instruction is not permitted except in the case of accident or serious illness occurring during this period. Ordinarily withdrawals in this category will involve total withdrawal from the university and require approval of the instructor, the chairperson, and the dean. Do not wait until the last minute to seek these approvals. You should allow for the possibility that your instructor, as well as the department chairperson, may be unavailable on a given day. Whenever you consider dropping a class you should have a discussion with your instructor and also with your adviser in order to determine the best course of action.

University policies and information
Be aware of important dates and deadlines as posted by the University: Spring Term and Fall Term Key Registration Dates and Deadlines.

Cheating and Plagiarism
The University Catalog provides information to students regarding cheating and plagiarism. You may also want to refer to the official and complete campus policy on cheating and plagiarism.

Student Academic Honors Pledge
The CSULB Campus Regulations states the following regarding the academic honors pledge
"The Student Academic Honors Pledge was approved by the Academic Senate and Associated Student Senate in 2004. The pledge states, 'I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination.' "

Recommended Student Load
The CSULB Student Load Regulations state that students are expected to spend, on the average, two hours of preparation and study for each hour of class time. Thus, a three unit lecture or discussion course normally demands a commitment of nine hours per week averaged over the semester, with

the class meeting for three hours a week. This may be considered sufficient time to enable a student to do satisfactory work. Students who desire to achieve "A" or "B" grades may wish to spend proportionately more time in their studies.

Definitions of Grades and Grading Symbols
The University Catalog defines the grades to be assigned as follows. Note, this is taken from the CSULB catalog section on Academic Credit and Regulations, Part One: Definitions. The following definitions apply to grades assigned in all undergraduate and graduate courses.

"A" Performance of the student has been at the highest level, showing sustained excellence in meeting all course requirements and exhibiting an unusual degree of intellectual initiative.
"B" Performance of the student has been at a high level, showing consistent and effective achievement in meeting course requirements.
"C" Performance of the student has been at an adequate level, meeting the basic requirements of the course.
"D" Performance of the student has been less than adequate, meeting only the minimum course requirements.
"F" Performance of the student has been such that minimal course requirements have not been met.

J. CLASS PREREQUISITES (Dates may vary due to holidays and project requirements)
   CECS 347, Senior Standing.

K. COE TUTORING SERVICES AVAILABLE FOR MAJOR CLASSES
   The College of Engineering Tutoring Center offers free tutoring for many lower and upper division engineering courses in MAE, CECS, CECEM, CHE and EE. Tutors are available Monday through Friday during the fall and spring semesters between the hours of 9:00am-6:00pm in EN2-300.
Visit the following website for detailed tutoring schedules:
http://web.csulb.edu/colleges/coe/views/essc/academic_success/engineering_tutor.shtml#asp_ETP

L. ACCOMMODATIONS:
   Students with disabilities who need reasonable modifications, special assistance, or accommodations in this course should promptly direct their request to the course instructor. If a student with a disability feels that modifications, assistance, or accommodations offered are inappropriate or insufficient, he/she should seek the assistance of the Director of Disabled Student Services on campus.

M. FOOD AND HOUSING ASSISTANCE

   Any student who is facing academic or personal challenges due to difficulty in affording groceries/food and/or lacking a safe and stable living environment is urged to contact the CSULB Student Emergency Intervention & Wellness Program. The website outlining the resources available is www.csulb.edu/basicneeds. Students can also e-mail supportingstudents@csulb.edu or call 562/985.2038. If comfortable, students may reach out to the professor as they may be able to identify additional resources.