Computer Engineering Design 1

CEN 4907C

Academic Term: Spring 2025

Instructor:
Jeremiah Blanchard
jjb@eng.ufl.edu
352-294-6643

Course Description

First course in computer engineering design sequence; Reinforces critical computer engineering skills through laboratory practice and launch of capstone project. Students will develop a project pitch, design plan, pre-alpha build, and design prototype. The project will meet defined specifications and will be completed using a structured design methodology and project management techniques. (3)

Course Pre-Requisites / Co-Requisites

Prerequisites: CEN 3031 and EEL 3744C with minimum grades of C. Co-requisite: COP 4600.

Course Objectives

Students will reinforce basic design methodology and learn advanced techniques for digital systems to support design and initial development of a computer engineering project. This will include low-level software topics, PCB design, and specialization in preparation for the capstone.

Materials and Supply Fees

None

Professional Component (ABET):

This course serves criteria (b) of ABET Professional Component, namely: "one and one-half years of engineering topics, consisting of engineering sciences and engineering design appropriate to the student's field of study". This course constitutes one-semester of engineering-specific coursework.

Relation to Program Outcomes (ABET):

The table below is an example. Please consult with your department's ABET coordinator when filling this out.

Outcome	Coverage*
1. An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics.	Medium
2. An ability to apply both analysis and synthesis in the engineering design process, resulting in designs that meet desired needs.	Medium
3. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	Medium
4. An ability to communicate effectively with a range of audiences	Medium
5. 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.	Medium
6. An ability to recognize the ongoing need for additional knowledge and locate, evaluate, integrate, and apply this knowledge appropriately.	Medium
7. An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty	Medium

*Coverage is given as high, medium, or low. An empty box indicates this outcome is not covered or assessed.

Required Textbooks and Software

There are no require materials for this course. All materials will be provided by the instructor. The College of Engineering requires students to have a mobile computing device (laptop).

Course Schedule (Subject to Adjustment)

Week 1: Introduction & Design Process
Week 2-3: Equipment Use & PCB Design (Pitches Due)
Week 4-5: Boot Process (Design Draft Due)
Week 6-7: Drivers (Design Plan Due)
Week 8-9: Pre-Alpha Build
Week 10-12: Design Prototype (Elected Lab Due)
Week 13-14: Prototype Presentations

Grading Breakdown

Category	Percent
Foundational Assignments	30%
Project Artifact(s)	25%
Communication & Teamwork	15%
Project Documentation	15%
Capstone Presentations	15%
TOTAL	100%

Evaluation of Grades

Assignment	Points	Percent
Syllabus & Design Quizzes	2 x 15	3%
Equipment Demo	30	3%
PCB Schematic	30	3%
Lab Assignments (3)	3 x 70	21%
Pitch	50	5%
Design Draft	50	5%
Design Plan (Final)	100	10%
Pre-Alpha Build	50	5%
Design Prototype	200	20%
Prototype Presentation	100	10%
Check-In Meetings (13-Drop-1)	5 x 12	6%
Peer Evaluation / Status Report (3)	20 x 3	6%
Presentation Review (2)	10 x 2	2%
Professional Interaction	10	1%
TOTAL	1000	100%

Percent	Grade	Grade Points
93 - 100	A	4.00
90 - 92	A-	3.67
87 - 89	B+	3.33
83 - 86	B	3.00
80 - 82	B-	2.67
77 - 79	C+	2.33
73 - 76	C	2.00
70 - 72	C-	1.67
67 - 69	D+	1.33
63 - 66	D	1.00
60 - 62	D-	0.67
0 - 59	E	0.00

Grading Policy

Final grades will be rounded to the nearest whole percentage point. Grades will not be "bumped up", and no additional credit will be offered at the end of the term – so do not ask! Any request for a final grade increase, via "bumping" or "extra credit" will result in a deduction of 1% of the student's final grade. More information on UF grading policy can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Attendance Policy, Class Expectations, and Make-Up Policy

Attendance is mandatory for course meetings. Students are expected to participate as audience members for the presentations of other students in the class and submit graded presentation review. There are no exceptions unless due to emergency or pre-arranged and with prior approval. Excused absences must be consistent with university policies in the undergraduate catalog (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx) and require appropriate documentation.

Code & Schematic Submissions

Functionality is key to success in computer engineering, so it is **extremely important** that the guidelines are followed. Failure to follow these instructions will result in penalties.

1) Code must compile / run in debug and release mode, and schematics must be error-free. Debug information should never be released in the final version of a software project. **Projects that do not compile AND run will be marked zero**.

2) Include only those files specified by the documents in your archives. Projects should have only directory structure explicitly mentioned in the documentation (i.e., relevant files and folders should be submitted in the root of the zip file.) It should be possible to open the archive, copy your files directly into the project, compile, and then run the project without further steps. Packaging errors will result in a grade of **zero**.

Equipment, Demonstrations, Designs, and Labs
To prepare students for the design process, students will complete a series of course assignments. The first five modules will have required assignments, and the last will have topics (with lab assignments) elected by students individually according to needs of their design projects or interests. Modules are as follows:

Required Assignments	Elected Labs (Choose One)
Engineering Design Process Quiz	Buffered Memory
Laboratory Equipment Demo	Virtual Machine Bindings
PCB Schematic Design	I2C Timers
Boot Process Lab	Embedded Rust
Drivers Lab (Select OS or Embedded)	-

Design Project
This course is part of a sequence for the Computer Engineering program culminating in a capstone project. As such, in this course, students will begin to work through the design for the project which they will complete in Computer Engineering Design 2. All designs must be of general use – they must ultimately serve as more than merely an opportunity for students to practice their skills. All projects should have as a goal the creation or improvement of a useful product or contribution to scientific research. As such, projects will be vetted by stakeholders beyond the student engineers. In weeks 5-14 of the course, students are expected to dedicate 5 hours weekly to the project (in addition to other course requirements), for a total, individually, of **60 hours by end of semester**.

Student projects may be overseen in one of three ways:

1) Faculty Advisor
   A faculty member may sponsor or otherwise oversee student team projects. Such projects can be practical products (such as hardware or software), or they may serve to advance the state-of-the-art in computer engineering research. The faculty advisor in this case will be responsible for identifying the goals of the project and will work with course instructors to set quality and scope expectations.

2) Approved Outside Party
   The course instructors may approve outside entities – such as open-source organizations, non-profit organizations, or organizations that have partnered with the university – to guide capstone projects. When an outside party has been approved, a contact point will be designated for the party. The contact point in this case will be responsible for identifying the goals of the project and will work with course instructors to set quality and scope expectations.

3) Course Instructors
   Students who for whatever reason do not have a faculty advisor and who are not working with an approved outside party will develop projects under the guidance of course instructors directly. Course instructors will consider proposed projects based on the pitches put forth by students in order to determine practicality, appropriate scoping, and sufficient rigor in projects.

Design Milestones
To prepare students for the final course in the sequence (Computer Engineering Design 2), students will complete the following milestones throughout this course:

Project Pitch – One-minute "elevator pitch" for project (Due Week 3)
Design Plan – A preliminary plan for the project's design prototype (Due Week 8)
Final Design – Shows key elements (hardware sketch, back-end dataflow chart, and/or UI wireframe) (Week 8)
Alpha Milestone – "Proof of Life"; demonstration of "vertical slide" of functionality (Week 10)
Design Prototype – "Proof of Life"; demonstration of "vertical slide" of functionality (Week 13)
Design Prototype Presentation – Full, live presentation of prototype work before audience of peers (Week 13-14)

Evaluations, Reviews, & Reports
Students are expected to participate in meaningful self-reflection and peer review. To this end, students in groups of more than two (2) students will submit a total of four (4) peer evaluations of their team members, which shall be held in confidence by instructors, but which students must report honestly according to UF's Honor Code. Students with two or fewer team members will submit a self-reflective status report of their own progress. Likewise, each student will submit four (4) presentation reviews of the work of other teams at the end of the course.

Meetings with Stakeholders and Instructor
Students will attend a series of 13 meetings – 8 with their class stakeholder and an additional 5 with the instructor of the course – to discuss the projects status, successes, and challenges. These meetings are mandatory and graded. Meetings with the instructor of the course will occur during regularly scheduled class hours.

Course Expectations
Academic Dishonesty will be dealt with strictly. Sharing / copying, "borrowing" of code structure, discussing code structure, looking at code from another student or providing such code, and plagiarism, in addition to other dishonest behaviors, are all considered academic dishonesty. Absolutely no information regarding assignment solutions may be shared by students except at a conceptual level. If students implement algorithms from other sources, they must cite those sources. Students may not copy code from the Internet or other sources under any circumstances. Any student found to have violated these rules, whether a provider or receiver or unauthorized help, will be assigned a **grade of E (failing) in the course** and referred to the Honor Court. **When in doubt, ask.**

Grade reviews must be requested within one week of a grade being posted. After two weeks, no grade will be revisited. In the event of a grade review, the entire assignment will be reviewed.

All assignments are due by the time listed on Canvas. Projects and homework with a cascading deduction: one (1) weekday late for 10% penalty; two (2) for 25% penalty; or three (3) for 50% penalty. Quizzes and presntations may not completed late for credit except with instructor approval for extenuating circumstances (see below).

Quiz, presentation, and meeting make-ups will not be permitted except in extenuating circumstances. For make-up consideration students will be required to submit written documentation from a reputable source as evidence. For any planned event (e.g., a wedding), the student is expected to contact the instructor no less than two weeks in advance for consideration. Please note that there is no guarantee that requests will be accommodated. Social, networking, and club events may be taken into consideration strictly at the discretion of the instructor.

Students should visit office hours for project help and grade questions. Do not send email to, send private messages to, or "@" instructors or TAs about project help or grades. The TAs and instructor will often try to answer questions when possible in chat, but the way to get personalized help is to visit or make arrangements!

Students should not distract others in the lab. Students should refrain from watching videos; playing games; talking; sleeping; howling; biting toe nails; screeching like a banshee; and other distracting behaviors in the lab.

Important non-project correspondence be via email. The chat system is helpful for simple questions and allows students to help one another, but students should not expect responses to important questions via chat. Please allow 48 business hours for responses; instructors and TAs have many responsibilities and respond as is practical.

Student Privacy
There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: https://registrar.ufl.edu/ferpa.html

Students Requiring Accommodations
Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

In-Class Recording
Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Commitment to a Safe and Inclusive Learning Environment
The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:
- Your academic advisor or Graduate Program Coordinator
- Jennifer Nappo, Director of Human Resources, 352-392-0904, jpennacc@ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

University Honesty Policy
UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (https://sccr.dso.ufl.edu/process/student-conduct-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Software Use
All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Campus Resources:

Health and Wellness

U Matter, We Care:
Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: https://counseling.ufl.edu, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence
If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

Academic Resources

E-learning technical suppor*t*, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling; https://career.ufl.edu.

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.

Student Complaints Campus*:* https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/;https://care.dso.ufl.edu.

On-Line Students Complaints*: https://distance.ufl.edu/state-authorization-status/#student-complaint*.