

ECE 4900: Capstone Design II

Department of Electrical and Computer Engineering

Instructor: Dr. Christopher Ball
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Section: (28055) Tuesday/Thursday 12:45 – 2:05 pm
Classroom – Caldwell 109, Lab Workspace – Dreese 761

Office Hours: Monday, by appointment, Tuesday/Thursday before/after scheduled class

Course Objective: To provide students with a realistic engineering design experience in which they propose, manage, and execute a design project. Key goals include:

- Demonstrate competence in applying engineering design methods
- Demonstrate competence in the management of a project
- Demonstrate competence in a team-based environment
- Demonstrate mastery in technical writing and presentation skills
- Demonstrate competence in considering multiple realistic constraints to a design
 - Resources, economic, environmental, sustainability, manufacturability, ethical, health and safety, social, and political issue
- Design, build, demonstrate and report on a major project, integrating material learned
- Integrate concepts learned throughout the engineering core curriculum
- Apply modern engineering practices and standards
- Develop communication skills
- Use teamwork to optimize project performance

Text: Design for Electrical and Computer Engineers, Ford and Coulston, 2008

Prerequisites: Option 1: 2560, 3010, 3020, 3030, 3040, 3050, 3090, and 3900 and Sr standing, and enrollment in Electrical Engineering Program of Study (EES subplan) of the ECE major. Prerequisites or concurrent: 3080.

Option 2: 3020, 3090, 3561, 3567, 3900, CSE 2231, and 2451, and Sr standing, and enrollment in Computer Engineering Program of Study (CES subplan). Prerequisites or concurrent: 3080 and 5362.

Exclusions: Not open to students with credit for 4900H, 4901 or Engr 4903 or 5902.01.

Assignments [Grading]:

- Individual and Team Assignments [10%]
- Preliminary Design Review (PDR) Presentation & Preliminary Design Review (PDR) Report [25%]
- Weekly Progress Reports [10%]
- Preliminary & Final Demonstration [15%]
- Minutes from meetings with professor [5%]
- Final Design Review (FDR) Presentation & Final Design Review (FDR) Report [35%]
 - Self and Team Member Evaluations (submit individually) – Based on peer reviews and my observations I reserve the right to adjust grades by ± 1 letter grade

Written assignments: Due by the end of day (11:59 pm) on their scheduled due date.

Presentation files: Due at the end of the day (11:59 pm) of the day before the presentation. Revised presentation files are due at the end of the following day (11:59 pm) on which the presentation is made.

Submission: Electronically through individual or team drop box on Carmen

Presentations: All team members are expected to participate (develop and present).

Late assignments: **No late work will be accepted without prior permission.**

Other Notes:

- Student work loading:
 - Students should plan on and expect to spend six (6) hours a week on this class and lab combination.
- Role of the instructor:
 - This is your design; I will not dictate a specific technical approach. Take ownership of the project and figure out how to get it done. I am available and eager to help you and mentor you, but you need to take responsibility for involving me if you need help.
 - I will want to meet with each team (see schedule). You should keep the scheduled class time free even when class is not meeting. You can also use the class time for team meetings (highly recommended).
- Teamwork expectations:
 - Teams are expected to schedule a **regular meeting** (should be part of your project plan). Procure a notebook and appoint someone to document each meeting: ideas and options discussed, decisions made, progress (success and failures), etc. These notes will be the basis for your weekly progress reports.
 - I expect all team members to contribute. Sand bagging will not be tolerated. I reserve the right to **promote/demote** any team member(s) a full letter grade from their team's grade based on my judgment of that individual's contribution to the team effort.
- Teamwork expectations continued:
 - Under **extreme conditions** a team can petition to have a team member who is not contributing removed from the team (fired). It is required that the team wishing to remove a member provide documented evidence to support their claim of non-support to me. The team member that is being removed has the option of providing their own evidence in their defense. If the professor removes a team member for non-support then that team member has a few options:
 - Petition other teams to be accepted. That means you will need to sell yourself and the value you bring to other teams.
 - Work out an agreement with your original team to be brought back on.
 - Drop the class and retake it when the student has better time/commitment.
- Components and supplies:
 - You may/will need to purchase components and supplies in order to build and test your prototype design. You should plan for a budget of approximately \$500 for any additional supplies or components you might need.
 - **ALLOW PLENTY OF TIME FOR THE UNIVERSITY TO PROCESS AND PLACE THE ORDER AND THE VENDOR TO DELIVER.**
 - There are limited components available in the lab (Dreese 761). Please familiarize yourself with the resources available there as early as you can.
 - Do not expect to be reimbursed for purchases that you make out of pocket.
 - Plan to purchase some of the smaller items and items that are time critical out of pocket.

Health and safety requirements

All students, faculty and staff are required to comply with and stay up to date on all university safety and health guidance (<https://safeandhealthy.osu.edu>), which includes wearing a face mask in any indoor space and maintaining a safe physical distance at all times. Non-compliance will be warned first and disciplinary actions will be taken for repeated offenses.

Carmen access

You will need to use [BuckeyePass](#) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you take the following steps:

- Register multiple devices in case something happens to your primary device. Visit the [BuckeyePass - Adding a Device](#) help article for step-by-step instructions.
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me new codes** button that appears. This will text you ten passcodes good for 365 days that can each be used once.
- Download the [Duo Mobile application](#) to all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.
- If none of these options will meet the needs of your situation, you can contact the IT Service Desk at 614-688-4357 (HELP) and IT support staff will work out a solution with you.

Course Technology Resources

For help with your password, university email, Carmen, or any other technology issues, questions, or requests, contact the Ohio State IT Service Desk. Standard support hours are available at ocio.osu.edu/help/hours, and support for urgent issues is available 24/7.

- **Self-Service and Chat support:** ocio.osu.edu/help
- **Phone:** 614-688-4357(HELP)
- **Email:** servicedesk@osu.edu
- **TDD:** 614-688-8743

Baseline technical skills for online courses

- Basic computer and web-browsing skills
- Navigating Carmen: for questions about specific functionality, see the [Canvas Student Guide](#).

Required Technology skills specific to this course

- [CarmenZoom virtual meetings](#)

Required equipment

- Computer: current Mac (OS X) or PC (Windows 7+) with high-speed internet connection
- Webcam: built-in or external webcam, fully installed and tested
- Microphone: built-in laptop or tablet mic or external microphone
- Other: a mobile device (smartphone or tablet) or landline to use for BuckeyePass authentication

Required software

- [Microsoft Office 365](#): All Ohio State students are now eligible for free Microsoft Office 365 ProPlus through Microsoft's Student Advantage program. Full instructions for downloading and installation can be found [at go.osu.edu/office365help](https://go.osu.edu/office365help).

Copyright disclaimer

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course.

Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Accessibility Accommodations for Students with Disabilities

Requesting accommodations

The university strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability including mental health, chronic or temporary medical conditions, please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. **SLDS contact information:** slds@osu.edu; 614-292-3307; 098 Baker Hall, 113 W. 12th Avenue.

Accessibility of course technology

This online course requires use of Carmen (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations with your instructor.

- [CarmenCanvas accessibility](#)
- Streaming audio and video
- [CarmenZoom accessibility](#)
- Collaborative course tools

Ohio State Academic Integrity Policy

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the university's [Code of Student Conduct](#), and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the university's *Code of Student Conduct* and this syllabus may constitute "Academic Misconduct."

The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the university or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the university's *Code of Student Conduct* is never considered an excuse for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by university rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the university's *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the university. If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- The Committee on Academic Misconduct web pages ([COAM Home](#))
- *Ten Suggestions for Preserving Academic Integrity* ([Ten Suggestions](#))
- *Eight Cardinal Rules of Academic Integrity* (www.northwestern.edu/uacc/8cards.htm)

Statement on Title IX

All students and employees at Ohio State have the right to work and learn in an environment free from harassment and discrimination based on sex or gender, and the university can arrange interim measures, provide support resources, and explain investigation options, including referral to confidential resources.

If you or someone you know has been harassed or discriminated against based on your sex or gender, including sexual harassment, sexual assault, relationship violence, stalking, or sexual exploitation, you may find information about your rights and options at titleix.osu.edu or by contacting the Ohio State Title IX Coordinator at titleix@osu.edu. Title IX is part of the Office of Institutional Equity (OIE) at Ohio State, which responds to all bias-motivated incidents of harassment and discrimination, such as race, religion, national origin and disability. For more information on OIE, visit equity.osu.edu or email equity@osu.edu.

Your Mental Health

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you find yourself feeling isolated, anxious or overwhelmed, please know that there are resources to help: ccs.osu.edu. You can reach an on-call counselor when CCS is closed at (614) 292-5766 and 24 hour emergency help is also available through the 24/7 National Prevention Hotline at 1-(800)-273-TALK or at suicidepreventionlifeline.org. The Ohio State Wellness app is also a great resource available at go.osu.edu/wellnessapp.

Student Emergency Financial Support

The **Student Advocacy Center** staff members are continuing to serve students during normal business hours and are accepting online appointments.

The **Student Emergency Fund** is available to students who may otherwise be at risk of dropping out of college due to an unexpected financial emergency. If you, or a student you know, are experiencing an unplanned expense, the Student Emergency Fund may be an option. Their office is accepting applications and may be able to award up to \$1,000 to eligible students. [**Learn more and apply.**](#)

The Together As Buckeyes emergency grants program, funded primarily by the federal Coronavirus Aid, Relief and Economic Security (CARES) Act, is available to all students — undergraduate, graduate and professional — through the Student Financial Aid office. To apply for a grant, students need to complete a one-page [**Emergency Request form**](#) and provide any supporting documentation. The Office of Student Financial Aid will process applications after determining eligibility based on each student's circumstances and guidance from the U.S. Department of Education.

Franklin County Department of Job and Family Services has amended its Prevention, Retention and Contingency Program to provide targeted relief for families impacted by the COVID-19 pandemic. The Franklin County COVID-19 Response PRC Program provides eligible families with \$500 in one-time cash assistance to help address emergent needs and expenses brought about by the public health emergency. Families can [**apply online**](#) today.

The **Student Wellness Center** offers financial coaching through the Scarlet and Gray Financial nationally recognized peer financial coaching program. Through the program, students will learn about financial goal setting, banking basics, budgeting, credit education, debt repayment education and saving and retirement education. [**Learn more.**](#)

Food Assistance

It's a common idea that pervades American culture: when you're in college, it's simply a rite of passage to sustain yourself on cheap, unhealthy food. We disagree. We highly recommend OSU's **Buckeye Food Alliance** Lincoln Tower 150 food pantry (<https://www.buckeyefoodalliance.org>) and the **MidOhio Foodbank** (<https://www.midohiofoodbank.org>). The **Buckeye Food Alliance** will remain open to support students in need. Starting Monday, March 23 the pantry will be open Monday/Thursday 10 a.m. – 2 p.m.; Tuesday/Wednesday 4 – 8 p.m. and Friday 11 a.m. – 3 p.m. If these times do not work for your schedule, you can schedule a special appointment by contacting Nick Fowler at fowler.318@osu.edu.