

ECE490/1: Design Lab I/II

Fall 2025 – Sections: 5319 and 9371, 3 Credits

Dates/Time: Mondays & Wednesdays from 1:10 – 2:30pm
Class Location: EN-101 (CNSE downtown)
Email (Professor): jmuckell@albany.edu

Office Hours:

Students are encouraged to seek help early and often. The professor's office hours are available every weekday.

- **Mondays:** 3-4pm in EN-305B
- **Tuesdays:** 11-12pm in EN-305B
- **Wednesdays:** 3-4pm in EN-305B
- **Thursdays:** 3 – 5:50pm in EN-101*
- **Fridays:** 3 – 5:50pm in EN-101*

**Thursday and Friday office hours coincide with the instructor lab sessions for ECE332 and ECE334. Students are welcome to come to the labs to seek assistance. However, students enrolled in those dedicated lab times will have priority.*

Scheduling an Appointment

If you are unable to make the regular scheduled office hours, you can schedule an appointment using the following link (<https://calendly.com/jonmuckell/30min>). All appointments are held in CNSE Downtown EN-305B. If changing circumstances prevent you from making an appointment, make sure to cancel within one business day.

Remote Option

If it is difficult for you to attend office hours or appointments in person, please let the instructor/TA know that you prefer to meet via Zoom.

ECE490 - Course Description

Part one of a two-semester-long capstone design experience that provides the opportunity for teams of students to propose, prototype/design, build, test, demonstrate, present and fully document a working prototype of a sophisticated electronic system. In this first part, student teams interact with industry sponsors and/or faculty to develop a proposal for a system, component or process to meet desired needs and specifications within constraints. Student teams will identify opportunities, develop requirements, perform analysis and synthesis, generate multiple solutions, evaluate solutions against requirements, consider risks, and make trade-offs.

ECE490 Prerequisites

All three of the following are required prerequisites: ECE300 *Introduction to Electronics*, ECE371 *Signals & Systems*, and ECE442 *Systems Analysis & Design*. In addition, you must have taken at least one of the following courses: ECE310 *Engineering Electromagnetism* or ECE334 *Programming Hardware Systems*.

ECE491 - Course Description

Part two of a two-semester-long capstone design experience that provides the opportunity for teams of students to propose, prototype/design, build, test, demonstrate, present and fully document a working prototype of a sophisticated electronic system. In this second part, student teams continue to interact with

industry sponsors and/or faculty as they implement their design and conduct validation experiments to demonstrate that their design meets all engineering specifications, standards, and constraints. In documenting their work, student teams will also evaluate their designs in global, cultural, social, environmental, and economic context and develop recommendations for future development

ECE491 Prerequisite

Students must have taken ECE490 *Design Lab I*.

Learning Objectives

After successful completion of this course, students will be able to:

1. Develop practical, creative ideas to solve organizational problems by treating innovation as a design process.
2. Employ information gathering skills to develop requirements consistent with the stakeholder's global, economic, environmental, and social mission.
3. Apply oral and writing communication skills to describe proposed engineering solution(s) for a range of audiences and the relevance of the solution to meeting organizational requirements/objectives.
4. Work as a member of a team, effectively collaborate to balance varying skillsets to meet deliverables and craft solutions.
5. Apply technical, mathematical and engineering competencies to review prior work, identify gaps in current solutions, and craft a useful, unique solution balancing constraints.
6. Demonstrate ethical principles throughout the engineering design processes and application of a complex engineering project.

Required Material:

- **Laptop (Required):** All Electrical and Computer Engineers majors are required to have a personal laptop (Chrome book is not sufficient). Additional Details are available here ([University at Albany Laptop Program](#)).
- **There is no textbook required for this course:** Although there is no required textbook you will be required to locate, read, and synthesize articles through a review of background literature related to your specific problem domain area and to evaluate potential solutions. Details will be discussed in class.

Grading Policies

Letter Grade and Scale:

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
100-95	94-90	89-87	86-83	82-80	79-77	76-73	72-70	69-67	66-63	62-60	59-0

Grading Rubric: Detailed grading rubric is posted at the end of the syllabus.

Although most course work is completed as part of a team, final grades are based on your individual contributions. There is not a single team grade given to all members of the team.

All members of a team may receive different final class grades. You will receive feedback on your performance throughout the semester. However, to enable students to adjust to mistakes or changing project circumstances, as well as to incentivize continuous improvement and design iteration, grades will not be finalized until the end of the

semester. If you are unsure how you are performing, you are encouraged to talk to the professor well before the end of the semester.

To receive credit for your individual contributions, your contributions must be documented and verifiable.

It is your responsibility to make sure that evidence of your contributions is documented throughout the semester and adequately communicated to the professor. All students are required to make substantial contributions to engineering-related tasks. Details on how to capture this evidence will be provided in class.

Time Management

For every credit hour that a course meets, students should expect to work 3 additional hours outside of class every week. For this three-credit course, you should expect to work 9 hours ($3 \times 3 = 9$) outside of class every week. **To be successful in this class, it is critical to properly manage your time throughout the semester.**

Course Policies

Team Sizes

To ensure that all team members are engaged in all critical aspects of the project, team sizes will be kept small and manageable. The typical team size consists of three students.

Attendance Policy

It is important to be on-time, be engaged and attend every class. If you have a major life event (e.g. major medical issue) that causes you to miss a substantial amount of class, you will be required to document and obtain approval of an extended absence from the Office of the Vice Provost for Undergraduate Education to avoid a grade penalty. Wasting time during class, texting, surfing the web, and lack of engagement in class activities will count as an absence. Some projects may benefit from working off-site during class-time. In those circumstances, teams should discuss this option with the course instructor.

Email Communication

Email will be a vital channel for important course communications to the class and project teams. These messages may include reminders about upcoming deadlines, clarification of expectations, tips for improving work quality, and updates on any changes to the course.

Students are expected to read and be aware of the information in professor emails within **one business day** (defined as a day when classes are in session). If any part of the message is unclear, students should reply promptly with questions. This ensures that everyone has the information needed to stay on track and meet course expectations.

Late Assignments:

Late assignments will not be accepted. However, deadline extensions are possible, see below for details.

Deadline Extensions

There may be moments where a short deadline extension would be reasonable to improve the overall quality of the work. Short extensions may be granted for valid reasons for individuals/teams that have demonstrated steady progress throughout the semester. Requests for extensions must be submitted in writing (via email) to the instructor with all team members included on the email indicating the reason for why a deadline extension should be granted. These requests must occur significantly before the deadline, not the day before the due date. Extensions **will not** be granted for individuals/teams that request extensions shortly before the due date or have otherwise shown not to have managed time properly throughout the semester. Deadline extension requests will also be denied if the extension would hinder the class schedule, such as dates of team presentations. You should assume that a

deadline extension request is denied until you receive written approval (via email) from the instructor indicating otherwise.

Withdrawal from the course

Check the university's academic calendar (<https://www.albany.edu/registrar/academic-calendar>) to find the last day to drop the course. That is the last date you can drop a course and receive a 'W'. It is your responsibility to act by this date if you wish to drop the course. Grades of "incomplete" will not be awarded to students because they missed the drop deadline.

Incompletes

As per the Undergraduate Bulletin, the grade of Incomplete (I) will be given "only when the student has nearly completed the course requirements but because of circumstances beyond the student's control the work is not completed." A student granted an incomplete will make an agreement specifying what material must be made up, and a date for its completion. The incomplete will be converted to a normal grade on the agreed upon completion date based upon whatever material is submitted by that time. ***Important!*** Incompletes will not be given to students who have not fulfilled their classwork obligations, and who, at the end of the semester, are looking to avoid failing the course. This is asking for special treatment.

Academic Integrity

It is every student's responsibility to become familiar with the standards of academic integrity at the University. Claims of ignorance, unintentional error, or academic or personal pressures are not sufficient reasons for violations of academic integrity. See: http://www.albany.edu/undergraduate_bulletin/regulations.html

Use of Artificial Intelligence

AI tools (e.g., ChatGPT, Copilot, Gemini) can be valuable learning tool and can be useful in brainstorming ideas, checking code, or refining drafts, etc... However, these tools are not a substitute for your own understanding and problem-solving.

You may use AI in this course if:

1. **Understanding:** You fully understand any AI-assisted content you submit and can explain the reasoning, methods, and results without AI assistance.
2. **Accountability:** You are prepared to answer questions about your work in meetings, presentations, or oral checks without AI assistance.

Important: Submitting AI-generated work you cannot explain, that misrepresents your own ability, or that bypasses your own thinking will not receive credit.

Responsible Use of Information Technology

Students are required to read the University at Albany Policy for the Responsible Use of Information Technology, available at: http://www.albany.edu/its/policies_responsible_use_of_IT.htm

General Education Competencies

This course includes material and instruction to help you in the general education competencies of Advanced Writing, Critical Thinking, Information Literacy, and Oral Discourse required for all majors at the university. Descriptions of specific course activities and deliverables related to each general education competency is described below.

- I. ***Advanced Writing:*** Students will write a detailed engineering design report that will be completed in stages, with feedback and revisions occurring throughout the semester.

- II. **Critical Thinking:** Students will analyze and discuss a problem of critical importance to a project stakeholder, formulate requirements, develop a design to satisfy those requirements, present and defend key decisions.
- III. **Information Literacy:** Students will select an engineering problem, search and cite background information, including possible existing solutions, propose a solution, and evaluate the effectiveness of their solution compared to alternatives.
- IV. **Oral Discourse:** Students will have multiple opportunities to present their work, including a short lightning talk and a more detailed technical deep dive presentation. Presentations will occur across a wide range of audiences including, but not limited to, the class, stakeholders, and department faculty.

Available Support Services

Reasonable accommodation

Reasonable accommodation will be provided for students with documented physical, sensory, cognitive, learning and psychiatric disorders. If you believe you have a disability requiring accommodation in this class, please notify the Director of Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. In general, it is the student's responsibility to contact the instructor at least one week before the relevant assignment to make arrangements.

Supplemental Support Services

It is difficult to succeed academically if you don't have enough to eat, a safe place to live and sleep, or are struggling with an unforeseen emergency. Knowing the resources available on your campus to help you succeed is key! If you need help meeting these or other basic needs, please seek assistance from Supplemental Support Services in the Dean of Students Office. View the basic needs assistance offerings at <https://www.albany.edu/dean-students/supplemental-support-services>. While you're there, see the variety of helpful services available to you at the Dean of Students at <https://www.albany.edu/dean-students>. Contact information can be found on these websites

Curriculum Advisement

The College of Engineering and Applied Science (CEAS) has a small team of dedicated advisors that can help you with decisions related to your major and/or minor. If you have questions about your major or minor, contact the CEAS advisors at CEASAdvise@albany.edu

Writing Center

Students are highly encouraged to take advantage of free writing assistance through the university's writing center. If your team goes to the writing center, please notify your course instructor. This will help us better coordinate writing assistance and consider possible incentives. For details or to make an appointment, visit the writing center website: <https://www.albany.edu/writing/>

ECE490/1 - Course Schedule

Teams are **required** to use class time to make steady and sustained progress on their projects. The default assumption is that teams will work in the classroom location or design lab room. Alternatively, teams may work offsite (such as the stakeholder's location). If you plan on working on the stakeholder's location or another site, please communicate this with the instructor beforehand.

Highlighted areas are required class meetings. Please do not schedule stakeholder meetings or visit during those times, as attendance is required. In addition, please pay attention to presentation dates for your engineering design reviews and other scheduled team meeting with the professor that are not highlighted below.

Class Meeting Schedule

Wk	Day	Date	Topic
1	Mon.	08/25	All Class Meeting: Course Introductions
	Wed.	08/27	All Class Meeting - Kick-off Presentations
2	Mon.	09/01	NO CLASS – LABOR DAY
	Wed.	09/03	All Class Meeting - Kick-off Presentations
3	Mon.	09/08	All Class Meeting - Kick-off Presentations
	Wed.	09/10	All Class Meeting - Kick-off Presentations
4	Mon.	09/15	All Class Meeting: Project Launch
	Wed.	09/17	Team Work Session & Team/Prof. Meetings
5	Mon.	09/22	Team Work Session & Team/Prof. Meetings
	Wed.	09/24	Team Work Session & Team/Prof. Meetings
6	Mon.	09/29	Lightning Presentation – Startup Pitch (2 min): Plans & Goals
	Wed.	10/01	Team Work Session & Team/Prof. Meetings
7	Mon.	10/06	Engineering Design Reviews
	Wed.	10/08	Engineering Design Reviews
8	Mon.	10/13	NO CLASS – FALL BREAK
	Wed.	10/15	All Class Meeting: Midsemester Performance Reviews
9	Mon.	10/20	Engineering Design Reviews
	Wed.	10/22	Engineering Design Reviews
10	Mon.	10/27	Team Work Session & Team/Prof. Meetings
	Wed.	10/29	Team Work Session & Team/Prof. Meetings
11	Mon.	11/03	All Class Meeting: End of Semester Expectations
	Wed.	11/05	Team Work Session & Team/Prof. Meetings
12	Mon.	11/10	Presentations – Drafts/Discussion
	Wed.	11/12	Presentations – Drafts/Discussion
13	Mon.	11/17	Presentations – Drafts/Discussion
	Wed.	11/19	Presentations – Drafts/Discussion
14	Mon.	11/24	Lightning Talks – Final
	Wed.	11/26	Technical Deep Dive Presentations / Demo
15	Mon.	12/01	Technical Deep Dive Presentations / Demo
	Wed.	12/03	Technical Deep Dive Presentations / Demo
16	Mon.	12/08	Technical Deep Dive Presentations / Demo

Dates are subject to change. It is important to regularly attend class meetings and carefully read emails to stay updated on any modifications to the course schedule.

Class Deliverables & Due Dates

Date	Individual or Team Deliverable	Deliverable
Weekly	Individual	Submit Inventor's Notebook entries weekly
Weekly	Individual	Submit GitHub commits weekly
Weekly	Individual	Update the GitHub project board reflecting current tasks and responsibilities
08/29 (Friday)	Individual	Semester Kick-off
09/19 (Friday)	Team	Project Kick-off
09/19 (Friday)	Team	Team Contract
09/29 (Monday by noon)	Team	Lightning Presentation – Startup Pitch (2 min – focusing on semester goals)
10/06 to 10/22	Team	Engineering Design Review Handout & Presentation.
10/10 (Friday)	Team	Project Scope Agreement: Stakeholder/Professor Sign-off
10/10 (Friday)	Team	Team Progress Summary
10/17 (Friday)	Individual	Midsemester Eval. Clarifications & Amendments – Optional
10/24 (Monday by noon)	Team	Lightning Presentation (5 min)
10/31 (Friday)	Team - Separate reports for ECE490 & ECE491	Report - Draft
11/24 to 12/05	Team	Project Transition & Handoff
11/26 to 12/08	Team	Technical Deep Dive Presentations (25 minutes)
11/28 (Friday)	Team	Team Progress Summary
12/05 (Friday)	Individual	Self-Evaluation: Clarifications & Amendments – Optional
12/08 (Friday)	Team - Separate reports for ECE490 & ECE491	Final Report
12/08 (Friday)	Individual	Peer Evaluation (Not Shared with Team)

Dates are subject to change. It is important to regularly attend class meetings and carefully read emails to stay updated on any modifications to the course schedule.

Name:

Team:

Design Lab I/II: End-of-Semester Grading Rubric

Section A: Team Baseline Score

Evaluates the shared outcomes and deliverables for the entire team.

This section is identical for all members on the team.

Category	Criteria	Points
System Design & Integration	System design is coherent, meets requirements, and integrates all subsystems effectively. Includes clear justification for design choices and trade-offs.	/ 25
Stakeholder Alignment	Design and deliverables are clearly driven by stakeholder needs; trade-offs are documented and justified with respect to those needs.	/ 15
Prototype / Technical Deliverable	Working or simulated prototype delivered as agreed, tested against requirements, and demonstrates key functionality.	/ 20
Design Documentation	Reports, diagrams, requirements, and supporting materials are complete, accurate, and sufficiently detailed for understanding the system.	/ 15
Communication & Presentations	Presentations are well-organized, clearly explain goals, progress, design choices, and outcomes, and engage the audience.	/ 15
Reproducibility	Documentation, code, and resources in GitHub are organized, complete, and enable reproduction of the work without significant additional information.	/ 10
Team Baseline Score This is <u>not</u> your final grade, see next section		/ 100

Instructor Comments to the Team:

Section B: Individual Contribution Modifiers

Individual scores are adjusted based on each student's contributions relative to team expectations. A 0-point modifier is common for students who contribute reliably and meet expectations. Positive modifiers reflect exceptional initiative or impact, while negative modifiers apply when contributions fall short. **Larger adjustments may be made in rare cases of extraordinary leadership or minimal participation.**

Category	Criteria	Typical Range	Individual Modifier
Initiative & Ownership	Takes on and follows through with responsibilities. Modifiers apply only if initiative clearly exceeded or fell short of team norms.	±3pts	
Depth of Personal Contributions	Delivers technical work with notable complexity or insight. Modifiers apply only for individual contributions that clearly exceed or fall short of the project's technical demands.	±5pts	
Professionalism & Growth	Meets expectations for attendance, communication, and follow-through. Modifiers apply only for sustained excellence or repeated issues in reliability, or for clear evidence of reflection and growth.	±2pts	
Extra Credit	For participation in an optional extra credit activity discussed in class.	+1pt	
Individual Grade Modifier			

Instructor Comments to the Individual:

Section C: Final Grade

Final grade = [Team Baseline Score] ± [Individual Grade Modifier]

Final Score (Numeric): _____/100

Final Letter Grade: _____