

Syllabus

Information at a Glance

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Lectures:	Mon 4:00 p.m. - 5:15 p.m., Hasbrouck, Rm 134
Lab:	Marcus Hall, Rm 12
Textbook:	None
Microsoft Teams:	Team "SDP23"
Website:	https://www.ecs.umass.edu/sdp/sdp23

Course Description and Objectives

This syllabus covers a two-course sequence that forms the ECE Senior Design Project:

ECE 415: The course requires students to work in small design teams to solve a significant engineering problem. Students develop, design, and implement a solution to the engineering problem in conjunction with a faculty advisor. The course reinforces principles of the engineering design process and serves as a capstone for electrical and computer engineering knowledge obtained in the ECE curriculum. The consideration of the ethical and social implications of technology and the basic concepts of business are also aspects of the course. Each student design team is expected to present information related to their project in both written and oral formats. Preliminary paper design is followed by implementation in the lab using digital and analog hardware design techniques and through software engineering. It is expected that a complete or partially working system will be demonstrated at the end of the course. Satisfies the Integrative Experience requirement for BS-CompE and BS-EE majors. Prerequisites: ECE 304. For EE and CompE majors only.

ECE 416: Continuation of ECE 415. Design of small computer/electronic system built, refined, tested, and demonstrated. Final prototype is shown to meet initial specifications at final design review presentation. Prerequisite: ECE 415.

After successfully completing this course, you should be able to:

1. Apply engineering design principles to formulate a problem statement; analyze requirements; form specifications and testing plan; and produce system-level HW and SW diagrams.
2. Prototype an electronic and/or software system to meet given specifications.
3. Integrate knowledge from across the core CompE or EE curriculum.
4. Take a systems-level approach to problem solving.
5. Work productively in a team environment.

6. Effectively communicate technical ideas and concepts.

Course Deliverables

ECE 415 and ECE 416 require the preparation of several deliverables including:

- Slide Decks: from PDR, MDR, CDR, FPR
- Reports: draft versions and final report
- Review Presentations
- Poster for SDP Day demo
- Demonstration videos
- System Prototype
- Project Website: Information on project and design documents

More details on each deliverable will be provided in class. See the schedule for dates and deadlines.

Documents

The creating of all documents is to be a team effort. You are encouraged to work closely with your advisor on these assignments, but remember that you, not your advisor, are responsible for them.

Problem Statement: You are asked to prepare a statement of the problem for the project you have chosen.

System Specifications and Test Plans: You are asked to prepare a requirements specification for the project you have chosen.

System Diagrams: You are asked to prepare HW and SW diagrams of a system that meets the specifications in the requirements specification document. A general description of how the system works accompanies these diagrams.

Final Report: One of the main deliverables of your project is a technical report that contains all the information on system specifications and testing plan, design, design tradeoffs, analysis results, implementation details, etc. You are required to develop this report over several iterations. Each submission must adhere to the style and formatting guidelines provided in class. Your draft report should describe the methods that your group will use to develop your project and demonstrate the feasibility of each technique. The final report should define the problem you have solved, explain how you solved the problem, and demonstrate the performance of your solution.

Reviews

Design review presentations are the main mechanism for evaluating progress in SDP. The twofold purpose of design reviews is for the team to gain experience in presenting their work and to receive feedback from the evaluators. Each team member participates in the preparation and delivery of the presentation. There are several review presentations scheduled during the year. Details on the process of each review will be provided in class.

Preliminary Design Review (PDR): The PDR presentation in early fall should cover the project's problem statement, requirement specifications, system-level block diagram and project

specifications, as well as the team's proposed MDR prototype specifications. The advisor and Faculty Review Board may suggest modifications to the proposed MDR prototype specifications at the PDR.

Midway Design Review (MDR): MDR takes place before the Faculty Review Board and the team advisor near the end of fall semester (see schedule). The hardware and/or software prototype presented should demonstrate that the chosen design path is likely to lead to a completed project in April which meets or exceeds the project specifications.

Comprehensive Design Review (CDR): At CDR, teams present the final design that has been chosen for prototyping to the review board. It is expected that all design decisions have been completed and can be justified at this point. The prototype at the CDR should demonstrate all major functionality of the finished project.

Final Project Review (FPR): At FPR, teams present their completed system and its functionality. Teams should lay out how the prototyped software/hardware meets project specifications.

Other required presentations are the following:

SDP Day: Senior Design Project Day is when each project is presented to your colleagues in the college of engineering. Teams present their final prototype with posters as presentation aids. Teams are judged for their overall accomplishments and presentation skills.

ECE Projects Showcase: On the Saturday following SDP day, you will demonstrate your project to the broader community including family and friends.

SDP Process

To ensure the successful completion of Senior Design Project, the following process has been established and is to be followed by all teams.

Team Coordination

In order to facilitate team organization and communication, each team has one member who is designated as the logistics lead. Responsibilities of the logistics lead include

- functioning as liaison between the team, the advisor, and the course coordinators,
- ensuring that the team is prepared for the weekly advisor meetings,
- being responsible for assembling weekly team report, and
- being responsible for logistics and confirmations associated with weekly team meetings, weekly advisor meetings, the PDR, MDR, CDR, FPR, SDP Day, and the ECE Projects Showcase (this includes room and presentation equipment reservations).

Meetings

Weekly Team Meetings

Weekly team meetings are for the team members to meet with each other. This can be either before or after the weekly advisor meetings, but meeting the day before the advisor meeting is encouraged in order to be prepared to make best use of the time with the advisor. It is the logistics lead's responsibility to set up these meetings.

Weekly Advisor Meetings

Each project team holds a weekly meeting with their project advisor. Ideally, these meetings should be scheduled to take place during the same time each week. The purpose of each meeting is to have each team member report on progress that has been made, barriers that have been identified and clarification of short- and long-term goals. It is the team coordinator's responsibility to set up these meetings with the project advisor.

Course Meetings and Attendance

Course meetings and events are specified in the course calendar. Attendance at lectures, review presentations, and other events is required.

Supplies & Equipment

A wide range of supplies and equipment are available in the SDP lab. For parts that are not stocked, each team is assigned a budget for purchasing components and supplies for their project. For each requisition, a Purchase Order Request Form is submitted to the course Technician. Purchases that do not follow the outlined procedures will not be reimbursed.

Grading

The final grade for ECE 415 and ECE 416 will be a weighted average of the following grade components:

- Advisor grade (50%): Given at the discretion of the advisor.
- Evaluators grade (30%): Average of PDR and MDR (for ECE 415) or CDR and FPR (for ECE 416) grades.
- Course Coordinator grade (10%): Based on course participation and performance
- Weekly progress reports (5%)
- Lecture attendance (5%)

Course Policies

The following course policies apply (in addition to all university, college, and department regulations):

- Late / make-Up policy: Assignments are due as posted. Late submissions will not be accepted except in medical emergencies or other extenuating circumstances as stated in the Student Handbook. In such cases, late submission can be requested by contacting the instructors no later than 7 days after the deadline. Proof may be requested (e.g., note from a medical professional). If an extension is granted, it is expected that late work is completed no later than 14 days after the missed deadline or the end of the emergency.
- Accessibility Support Services: Your success in this class is important to me. We all learn differently and bring different strengths and needs to the class. The University of Massachusetts Amherst is committed to making reasonable, effective, and appropriate accommodations to meet the needs of all students and help create a barrier-free campus. Beyond disability accommodations, if there are aspects of the course that prevent you from being fully included in the class, please let me know as soon as possible. Together we'll develop strategies to meet both your needs and the requirements of the course.

If you have a documented disability on file with Disability Services, you may be eligible for reasonable accommodation for this course. If your disability requires accommodation, please notify me as early as possible in the course – preferably no later than the first week - so that we may plan in a timely manner. Returning students and new students who have met with an AC over the summer to discuss their accommodations, can send their "Letter of Accommodation Eligibility" to faculty or instructors of record through Clockwork beginning Tuesday, August 16th. If you have a disability but are not yet affiliated with Disability Services, please register with Disability Services, and let me know. Information on services and materials for registering are also available on their website (<https://www.umass.edu/disability/students>). If you are eligible for exam accommodations, your exams will typically be administered by the exam proctoring center. Contact Disability Services immediately, and comply with their exam scheduling policies, including the requirement that you book your exams at least seven days in advance of the exam date.

- **Health and Wellbeing:** You are not alone at UMass – many people care about your wellbeing and many resources are available to help you thrive and succeed. The College recognizes that coursework is challenging and that classes are not the only demand in your life. Success in this course and the College of Engineering depends heavily on your personal health and wellbeing. Recognize that while stress is an expected part of the college experience, it can be compounded by unexpected setbacks or life changes outside the classroom. Strive to reframe challenges as an unavoidable pathway to success. Reflect on your role in taking care of yourself throughout the term, before the demands of exams and projects reach their peak. Please feel free to reach out to me about any difficulty you may be having that may impact your performance as soon as it occurs and before it becomes too overwhelming.

You can learn about the confidential mental health services available on campus by calling the Center for Counseling and Psychological Health (CCPH) by visiting their website at umass.edu/counseling. They provide a lot of resources beyond individual therapy. Check-out some of their great, free resources, including Togetherall and Welltrack. There are many other resources on campus for students facing personal, financial or life challenges to find support, stay in school, and graduate (<https://www.umass.edu/studentlife/single-stop>). Within the College, you may reach out to myself, your academic advisor, the Office of Student Affairs (<http://engineering.umass.edu/current-students/academics-advising>) or the Office of Diversity, Equity, and Inclusion (engindiversity@umass.edu). I encourage you to contact support services on campus that stand ready to assist you. Remember that as your instructor, I am here to help you find the resources you need.

- **Academic Honesty:** Maintaining the integrity of scholarship and research within institutions of higher education requires a cultural commitment. The University Academic Honesty Policy Applies in this and all courses. This policy can be found on the University Web Page (<https://www.umass.edu/honesty/>). Academic dishonesty includes but is not limited to cheating, fabrication, plagiarism, and *abetting or facilitating* dishonesty. Since students are expected to be familiar with this policy and the commonly accepted standards of academic integrity, ignorance of such standards is not normally sufficient evidence of lack of intent. Concerns about academic dishonesty may be reported to the course instructor, another trusted faculty or staff member, the department head, or anonymously through the department (refer

to departmental webpage) or College's classroom experience form (<https://tinyurl.com/UMassEngineerClassroom>).

- Inclusion: Everyone should feel that they are an integral part of the community and that all individuals and their perspectives are respected. A diversity of perspective and experience provides a valuable source of ideas, problem solving strategies, and engineering creativity. If you feel that your contribution is not being valued or respected for any reason, please speak with me privately. If you wish to communicate with someone else in the College or University, there are several ways to do so anonymously or to provide contact information if you so choose:
 1. Notify the University Diversity, Equity, and Inclusion Office through the "Report a Climate Incident" form: <https://www.umass.edu/diversity/incident-report-form> Note that this form requires sharing name and contact information.
 2. Speak with Assistant Dean Dr. Paula Rees (rees@umass.edu).
 3. Report an incident anonymously to the College of Engineering Diversity, Equity, and Inclusion Office
 - Climate Concerns and Suggestions - <https://tinyurl.com/UMassEngineerClimate>
 - Classroom Experience - <https://tinyurl.com/UMassEngineerClassroom>
 4. Reach out to the departmental DEI Committee:
 - Anonymous ECE feedback form: <https://ece.umass.edu/ece-diversity-equity-inclusion> (scroll down for feedback link)

We are all members of an academic community with a shared responsibility to cultivate a climate where all individuals are valued and where both they and their ideas are treated with respect.

- Pronouns and Names: Everyone has the right to be addressed by the name and pronouns that they use for themselves. Students can indicate their preferred/chosen first name and pronouns on SPIRE, which appear on class rosters. Please let me know what name and pronouns I should use for you if they are not on the roster. Please kindly correct me and fellow classmates when we make mistakes. To learn more, please see this resource: https://www.umass.edu/stonewall/sites/default/files/pronouns_intro.pdf
- Gender Respect and Title IX: The University of Massachusetts Amherst aspires to be a university environment that is free of discrimination, sexual harassment, and sexual violence. If you or someone you know has experienced sexual assault, sexual misconduct, or sexual discrimination please see <https://www.umass.edu/titleix/> for information about resources and reporting options. A report to the Title IX Coordinator, Kerri Thompson Tillett, J.D., may be made at any time through the online reporting tool, the Title IX Coordinator's email (TitleIXCoordinator@umass.edu), telephone number (413-545-3464) or mail. UMass Amherst is committed to supporting community members who report concerns of prohibited conduct. Please reach out to me if you would like assistance connecting with any of these resources/options.