# Senior Design I (ENR 405)

Fall, 2025
Lectures (ENR 405): MW/3:00 pm to 4:20 pm — CHS 148
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Student Hours: walk-in (WF 9:00 am – 12:00 pm) or by individual appointments
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## Course Description:

In senior design, you will use the knowledge and skills you gained from your previous classroom to address and solve a real-life problem. The scope of the project will be discussed, defined and iterated between you and the instructor. You will experience teambuilding, concept and practical design based on multiple constraints, and time management to deliver a project that will meet the design specification.
Prerequisites: Computational Methods in Physics and Engineering (ENR-145) and senior Standing.

## Measurable Learning Objectives:

You will demonstrate that you can transform the tools and trades from the academic environment to a commercial/professional one.
You will able to:

- Define a real-world, open-ended problem with measurable design criteria and constrains
- Conduct literature review and data gathering to identify the state of the art of the field of knowledge.
- Apply iterative design to provide solutions to emerging problems.
- Use analytical and modeling tools to inform design decisions.
- Organize and manage project development (planning, risk assessment, and task delegation, etc.) in a teamwork setting.
- Experience the cycle of design, prototyping, validation.
- Manage documentation, project proposal/updates, and final presentation to technical and non-technical audience.
- Identify social, environmental and ethical impacts of your design choice.

## Required Texts and/or Course Materials:

- There is no traditional textbook; curated online references and readings will be provided throughout the term.

## Course Policies:

**Official catalog description:** ENR-405 Senior Design 1 Introduces final project work. The class is divided into two parts. In the first portion, the students will learn effective team organization, team planning, time management, literature research methods, record keeping, technical writing,

professional ethics and development, among other skills required to be an effective engineer in the classroom. In parallel, the students will be developing, under the supervision of a mentor, their project in which they will design a project and execute all steps.
Prerequisites: Computational Methods in Physics and Engineering (ENR-145) and senior Standing.

*Schedule of major due dates*

Senior design I is the first half of the final project work. The process involves background study, conceptual design, modeling, prototyping and demonstration of proof-of-concept. The goal is to set a strong foundation for full system application in Senior Design II.
Since each project will be different, each milestone will be different. Here's a general example of how milestones will be delivered on weekly base:

| **Week** | **Milestone/Deliverable** | **Milestone Counts** |
|---|---|---|
| 2 | Team building + project proposal draft | 2 |
| 4 | Problem statement + background research | 2 |
| 6 | Design specification + evaluation criteria | 2 |
| 8 | Midterm design review (concept presentation) | 1 |
| 10 | Preliminary models / simulations | 2 |
| 12 | Proof-of-concept (POC) prototype + testing plan | 2 |
| 14 | Draft final report | 0 |
| 15 | Final report and presentation | 2 |
| Total | | 13 |

*Method for determining final grade*

Almost all work will be evaluated with a standard based grading, your submissions will be assessed against clearly stated expectations using the following marks:

- Meets Standard (Full Credit)
- Needs Revision (Resubmit permitted, no penalty)
- Incomplete or Not Submitted

Additionally, an "Exemplary" mark will be earned if any of the submissions exceed the expectations and show a high level of effort, passion or professionalism.

No partial credit is given on individual submissions, but **revision opportunities** are built into the schedule for iterative improvement. Final grades are based on consistent meeting of standards and active team participation.

Your grade is assigned with the table listed below. Each row indicates the minimum number of successful results needed to satisfy the requirement for that grade. For example, you will be required to earn 13 or more success marks on foundation skills to get a grade of B.

| Grade | Milestones that meet standard |
|---|---|
| A | 12 |
| B | 10 |

| | |
|---|---|
| C | 8 |
| D | 6 |

A grade of “F” is assigned if no requirements for a “D” are met.
Plus grades: A "plus" is given on a letter grade if you satisfy all the requirements plus one of the following:

- six or more exemplary marks on the milestones.

Minus grades: no “minus” will be given on a letter grade.

*Participation expectations, if applicable*

Attendance is tracked but not graded. I will follow up with students with excessive absences, but no direct penalty will be incurred. You do not need to seek permission to miss a class.

*Late work policy, if applicable*

You will start the semester with 5 tokens. You will spend 1 token to:

- Extend the deadline on any submissions by 36 hours

Deadline extension must be requested before the original deadline.

*Acceptable methods for submitting work*

Microsoft PowerPoints/google slides will be the preferred submission format. Hand writing, hand sketch, or multimedia format will be acceptable only if it’s comprehensive to me, but won’t earn an “Exemplary” grade.
“Slide deck skill” will be essential for your future career, now it’s a good time to practice!

*Course management system /website, if applicable*

Lecture slides and lab resources will be posted and maintained on Moodle and GitHub.

*Information about Final Exam and course meetings through the end of the term*

You will have a chance to do a presentation, and a large component of your final project will be the presentation, i.e. not just the method, data, result, but a good story telling.

*Any additional information or class policies on ChatGPT/AI/generative technology*

**General rule-of-thumb: AI tools are roller skates, not crutches.**

AI tools (like ChatGPT or Copilot) may be used as long as they support your learning and do not replace your independent thought or effort.
All AI-generated content must be clearly cited and labeled. You must include the prompt(s) used as an appendix to your assignment or code.
All AI-generated code must be clearly labeled, here’s an example below:

**################### Begin AI generated code ##########################**

```
print("Hello human")
print("Welcome our AI overlord")
```

**################### End AI generated code ############################**

**College-wide Policies removed, please refer to the version on Moodle for details.**