

M. Hohle:

Physics 77: Capstone Project



Timeline

1) introduction Oct 23rd

2) students form groups of 4 – 5 Oct 30th

[Google Sheet](#)

3) find a project and submit a proposal (HW assignment)
→ reviewed and accepted by us Nov 10th **equivalent to HW assignments**

4) checkpoint Nov 17th

5) presentations (20min + Q&A)
→ during lecture time/ tutorials week of Dec 6th

6) final submission after feedback from presentations Dec 13th

7) grading

Deliverables

1. **Capstone Project Proposal** (5 points): 1-2 paragraphs. The proposal will be graded individually on a pass/fail basis (i.e., full credit for passing). If you work in a group, **each of the participants must submit their own proposal**, but please list the other members of your group.
2. **Capstone Project Checkpoint** (5 points): You will need to demonstrate your project status to your GSI in the Workshop section **and** upload your current work to the Capstone Project Checkpoint assignment page. The checkpoint will be graded individually—**each student is responsible for their own submission**.
3. **Capstone Project Presentation** (20 points): We will schedule demonstrations (individually or with group partners) of the projects to take place during the lecture time of this course. The presentation will be graded as a group; **all members** of your group need to submit the presentation materials (i.e., slides in PDF format and/or Jupyter notebook).
4. **Capstone Project Report** (40 points): A short write-up (few pages) that would briefly describe your project, algorithm, and any tests you have performed. These write-ups will be graded individually (i.e., **each student needs to submit their own**).
5. **Capstone Project Code Submission** (30 points): Your primary deliverable is a piece of code and associated data (if any). The project code will be graded as a group, but **each student needs to submit their own**.

Project Report (.pdf):

- Introduction: What is the problem? Why is it important? Brief historical view.
- Methods: algorithms, models
- Implementation: How did you do it exactly.
- Evaluation: Present results in a clear and coherent way.
- Discussion: Interpret results, discuss limits of your model and improvements
- References

Code of Honor:

- don't copy/paste someone else's (**including AI**) code
- it should be **your(!)** work
- cite, if you use **any** external source
- not following the code of honor is considered **cheating and will be graded as fail!**

What are possible projects?



Topics

Below you will find an overview of appropriate topics for your Capstone Project and examples of previous reports. This list is not comprehensive! Feel free to propose your own topic and discuss with your instructor or GSI.

Coupled oscillators

[Kuramoto model](#) ➞

Neuron dynamics

[Hodgkin-Huxley model](#) ➞

[Fitzhugh-Nagumo model](#) ➞

Chaotic systems

[Universality in chaos \(Feigenbaum constant\)](#) ➞

[Strange attractors](#) ➞

[Glycolysis cycle \(self regulation, see Fig 2 therein\)](#) ➞

Questions?