

SENIOR PROJECT I

1 credit

Bulletin Description: This is the first course of the capstone experience in physics. It results in the proposal of an undergraduate research project that is carried out in the second capstone course.

Prerequisites: consent of instructor.

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Office hours: by arrangement

Course objectives: Synthesize and apply conceptual understanding and practical knowledge gained from coursework in order to produce a proposal for a semester-long undergraduate research project in physics. The proposed project must be feasible to be carried out by an undergraduate student. Physics majors are to complete Senior Project I and Senior Project II in their final year. Senior Project I precedes Senior Project II. In exceptional cases, which must be approved by the Capstone Committee, both courses can be taken simultaneously. Senior Project I requires students to identify a project and develop a proposal that is feasible to be carried out in Senior Project II, submit the proposal and obtain approval of the project from the Capstone Committee.

Project: The project should define and discuss a research problem or question related to a physical system or phenomenon of general interest, whose resolution would advance fundamental knowledge and have practical importance. The project must provide a broad context for understanding the nature and importance of the problem or question.

The project is to achieve the following:

- (1) define a problem of general interest related to a physical system or phenomenon;
- (2) review the current state of knowledge in the field and identify unresolved scientific issues;
- (3) state realistic objectives and longer-term goals for the project;
- (4) review background physics necessary to understand and address the objectives;
- (5) describe in detail specific methods and explain why they are appropriate;
- (6) discuss the broader significance of the work for the research field and for society.

When designing the project one should use the following guidelines. Students who are engaged in original research may use it as a basis for their project. In such cases, however, the project cannot be merely a presentation of their research. The project should include the broader scientific context of the research and must follow the same guidelines as above.

Finding a supervisor: A supervisor must be a tenured or tenure-track faculty member in the NDSU Department of Physics. *Exceptions require approval by the capstone committee.* In some cases students will have discussed research interests and potential projects with faculty members before their Senior year. If this is not the case, students are expected to set up multiple meetings with several potential faculty supervisors and engage in detailed discussions before a project is chosen.

Required student resources: To be determined by the student's supervisor.

Course Schedule: There are no formal class meetings, except for the organizational meetings in the first two weeks of the semester. But the students are required to meet with the Capstone Committee every two weeks to report progress. No later than the October 29, 2021 students must submit to the Capstone Committee a proposal (2-3 pages total), including (1) the name of the faculty supervisor, (2) a tentative title, and (3) a project description, including motivation, objectives, methods, and a plan/timeline. All proposals will undergo review, resulting in approval or revision requests. Also, students will prepare and present a 10 minute oral presentation of the proposal to the committee, which all students must attend. This presentation and project approval by the Capstone Committee prior to the end of the semester is required for a passing grade.

Students who receive approval prior to the semester end are strongly encouraged to start working on their research project.

Grading: Grading decisions are made by the Capstone Committee. Grading is pass/fail. An oral presentation and a proposal approval by the Capstone Committee are required for a passing grade.

Health and Safety Expectations, Attendance:

- **According to NDSU health regulations, a proper face covering must be worn for all face-to-face class activities.** Students must follow NDSU guidance on face coverings, physical distancing, and sanitation.
- Do not come to class if you are sick. You can ask any questions you have remotely.
- I will be flexible regarding deadlines for students who are experiencing illness or other challenges related to COVID-19. Please contact me as early as possible if you think you may not be able to complete an assignment or participate in the course due to illness.
- NDSU requires students to wear face coverings in classrooms. Wearing face coverings helps reduce the risk to others in case you are infected but do not have symptoms.
- You must properly wear a face covering (covering both the mouth and nose) for the entirety of the class.
- If you fail to properly wear a face covering, you will not be admitted to the classroom. The following will be used as needed: referral to Dean of Students Office or administrative removal from class.
- Students who cannot wear a face covering due to a medical condition or disability may seek accommodation through Disability Services (701-231-8463; <https://www.ndsu.edu/disabilityservices/>).
- Disinfecting supplies are provided for you to disinfect your learning space. You may also use your own disinfecting supplies.
- Students should observe social distancing guidelines whenever possible. Students should avoid congregating around instructional space entrances before or after class. Students should exit the instructional space immediately after the end of class to ensure social distancing and allow for the persons attending the next scheduled class to enter the classroom.
- In accordance with NDSU Policy 601, failure to comply with instructions, including this syllabus, may be handled according to the Code of Student Conduct resolution process and may result in disciplinary sanctions.

The academic community is operated on the basis of honesty, integrity, and fair play.

NDSU Policy 335: Code of Academic Responsibility and Conduct applies to cases in which cheating, plagiarism, or other academic misconduct have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and possibly including suspension and/or expulsion. Student academic misconduct records are maintained by the Office of Registration and Records. Informational resources about academic honesty for students and instructional staff members can be found at www.ndsu.edu/academichonesty.

Any students with disabilities who need accomodation in this course are encouraged to speak with the instructor as soon as possible to make appropriate arrangements.