Physics 488 **Fall 2022**

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 (PHYS 489).

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 sequentially in their final year. In exceptional cases, which must be approved by the Capstone Committee, both courses may be taken simultaneously. Senior Project I requires students to identify a project and develop and submit a proposal that is feasible to be carried out in Senior Project II, and obtain approval of the proposal from the Capstone Committee. In addition, students in PHYS 488 will attend a series of seminars designed to provide professional development skills.

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 should meet the following requirements:
(1) define a problem of general interest related to a physical system or phenomenon;
(2) review the 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.

The guidelines below should be used when designing the project. Students who are already engaged in original research may use their research as a basis for their project. In such cases, however, the project cannot merely present their research, but should include the broader scientific context of the research and meet the same requirements as above.

Finding a supervisor: A supervisor must be a tenure-line 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 choosing a project topic.

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

Course Schedule: In the first two weeks of the semester, organizational meetings with the Capstone Committee will be arranged and the schedule of professional development seminars will be announced. Students are expected to meet regularly (e.g., weekly) with their supervisors to discuss research and report progress. No later than **October 28** students must submit to the Capstone Committee a proposal (3-4 pages total), including (1) the name of the faculty supervisor, (2) a tentative title, and (3) a project description, including motivation, objectives, methods, a plan/timeline, and references. All proposals will undergo review, resulting in approval or revision requests. Students must also give a 10 minute oral presentation of their proposal to the Committee and attend presentations of all other students. Approval of the presentation and proposal by the Capstone Committee prior to the end of the semester are required for a passing grade. Students who receive early approval of their proposal are encouraged to commence work on their project.

Grading: Pass/fail grading decisions are made by the Capstone Committee. A passing grade requires (1) a research proposal and oral presentation approved by the Capstone Committee and (2) participation in the professional development seminars.

Health and Safety Expectations, Attendance:

• Do not come to campus if you are sick or, if infected by COVID-19, during your five-day isolation period. Please protect your health and the health of others by staying home.
• If you are unable to attend a meeting or seminar at the scheduled time due to illness or exposure, email your supervisor or me promptly for alternate arrangements.
• For information on COVID-19, symptoms, testing, and steps to stay healthy see

`https://www.ndsu.edu/studenthealthservice`

• Do not come to class if you have been exposed to individuals who tested positive for COVID-19 and/or you have been notified to self-quarantine due to exposure.
• If you tested positive for, or were exposed to, COVID-19, please follow CDC guidance:
`https://www.cdc.gov/coronavirus/2019-ncov/your-health/isolation.html`
`https://www.cdc.gov/coronavirus/2019-ncov/your-health/if-you-were-exposed.html`
• 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 accommodation in this course are encouraged to speak with the instructor as soon as possible to make appropriate arrangements.