PHYS 489 SENIOR PROJECT

BASIC INFORMATION

Course prefix, catalog number, and title: PHYS 489, Senior Project
Number of credits: 3 credit hours
Term and year: Spring 2024
Classes: Mon, 3:00 - 4:00 pm, South Engineering 221

Instructor's name: Dr. Andrei Kryjevski
Office location: SE 318D
Office hours: Tue, Thu 3:30 - 5:00 pm or by appointment
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BULLETIN DESCRIPTION

In this course, students research and present on a selected topic for students and faculty. In addition to feedback from peers and instructors, various resources for professional development (e.g., CVs and resumes, careers and job searching skills, public speaking, scientific writing, etc.) will be provided and discussed.

COURSE OBJECTIVES

The main objective of this course is to help students gain both a better understanding of current physics topics and practical skill sets for their future careers. Students are to select and study a topic related to current physics research, which will be the subject of their final presentation and report. Students are to apply conceptual understanding and practical knowledge gained from coursework to complete a semester-long research project. The scope and depth of the proposed project must be feasible for an undergraduate student. Students will further attend a series of seminars designed to provide professional development skills. After completing this course, students will be able to explain fundamental concepts underlying current physics topics, deliver professional presentations to both scientific audiences and the general public, and be well-prepared to pursue diverse career paths.

PRESENTATION TOPIC

Within the first three (3) weeks of the semester the Senior Project Committee will review the proposed topic and decide on its approval. Below are a few *examples* of possible presentation topics:

- Medical physics (MRI, X-rays, CT, ultrasound, etc.)
- Quantum computing/information science/engineering
- Nanotechnology and its future
- Biophysics and its future
- Climate change (causes, impacts, responses)
- Topological Materials: physical principles
- Superconductors: physical principles and applications
- AI: impacts on science, education, and society

The topic may be related to a research project in which you have been involved. However, the project cannot merely present this research. The emphasis must be on its broader underlying scientific context.

REQUIRED STUDENT RESOURCES

This course has no textbook.

COURSE CONTENT ON THE WEB

Syllabus, Announcements, and Notes will be posted on our Blackboard course homepage: https://bb.ndsu.nodak.edu

HOMEWORK ASSIGNMENTS

This course has no homework assignments beyond researching and presenting a selected topic.

COURSE SCHEDULE/OUTLINE/CALENDAR OF EVENTS

Week	Topic	
1	Searching, reading, and citing scientific literature	
2	Scientific and technical writing skills	
3	Presentations and public speaking skills	
4	Responsible conduct of research, professional ethics	
5	Applying to graduate programs	
6	Careers and job searching skills	
7	CVs and resumes	
8	Diversity, equity, and inclusion in science	
9	Special seminar on request	
10	Student presentation*	
11	Student presentation	
12	Student presentation	
13	Student presentation	
14	Student presentation	
15	Student presentation	
16	Student presentation	
17	Written report submission	

*After all student presentations have been completed, the scheduled student presentation slot will be substituted with presentations by invited speakers.

EVALUATION PROCEDURES AND GRADING CRITERIA

Final letter grades for the course will be computed using the following weights:

- Seminar participation: 10 %
- Oral presentation: 50 %
- Written report: 40 %

NO MAKE-UP EXAMS ARE ALLOWED

Grades A: $\geq$ 90 %, B: $\geq$ 80 and < 90 %, C: $\geq$ 70 and < 80 %, D: $\geq$ 60 and < 70 %, F: < 60 %

SEMINAR PRESENTATION & FINAL REPORT

PRESENTATION INFORMATION

Each student will deliver a 35-minute presentation on their chosen topic, followed by a 25-minute question and answer session. **All students must attend all seminars and ask at least two** meaningful questions per seminar.

WRITTEN REPORT FORMAT AND DUE DATE

The written final report should include the following components (single-spaced, 11-point font):

- Title and abstract (summary of your topic): 1/2 page
- Introduction (motivation of the topic): 1 page
- Background information (literature review on the topic): 2 pages
- Details of the topic (multiple sections depending on the topic): 2-4 pages
- Discussion, broader significance, conclusions: 1-2 pages
- References (articles, books, etc. cited)

The final written report must be submitted by the final exam date.

ATTENDANCE

According to NDSU Policy 333 (www.ndsu.edu/fileadmin/policy/333.pdf), attendance in classes is expected. Veterans and student service members with special circumstances or who are activated are encouraged to notify the instructor as soon as possible and are encouraged to provide Activation Orders.

AMERICANS WITH DISABILITIES ACT FOR STUDENTS WITH SPECIAL NEEDS

Any students with disabilities or other special needs, who need special accommodations in this course, are invited to share these concerns or requests with the instructor and contact the Center for Accessibility and Disability Resources (www.ndsu.edu/disabilityservices) as soon as possible.

ACADEMIC HONESTY

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.

Note: The instructor reserves the right to modify this syllabus if it is deemed beneficial to student learning.