

# Professional Skills for Physicists (PHYS 690)

Mon 0900      **Physics 226**

**Instructor:** Dr. Michael Hayden    **TA:** none  
**Office:** PHYS 218      Phone: 5-3199    **Office Hours:** by appointment or stop by

## Overview

The purpose of this course is to provide you with some of the practical skills necessary for operation as professional physicists in academia, government labs, and industry. Through handouts, web modules, guest speakers, discussions, homework, presentations, and a written grant proposal, we will explore and develop the skills you will need to be successful teachers and researchers in whichever arena you choose.

## Learning outcome

Development of enhanced communications skills as required for professional presentations and publications. This learning outcome will be assessed in the grant writing, CV preparation, and oral presentation assignments, as well as your presentation skills during the ethics case studies.

## Summary of course topics

*Library research skills* – full text journal searching, database searching, thesis searches, Inspec, Interlibrary Loan, Web of Science, Google Scholar

*Ethics in science* – responsible conduct of research, proper authorship, academic integrity

*Thesis proposals* – how, what, when

*Oral and poster presentations* – speaking skills, organizational skills, graphic skills

*Writing a journal article* – format, content, writing style, reviewer skills

*Grant proposals* – full submission, from idea to technical plan to budget and references

*Job search* – CV, cover letters, reference letters, where, how, and when to look, expectations

## Homework

There will be homework for most weeks, ranging from finding articles in the library to giving an oral presentation to the class or writing a full grant proposal.

## Presentations

Each student will be required to give a 15-minute oral, PowerPoint presentation in a style similar to those you have seen in the Dept seminar series. The topic **must** be related to your thesis research and must be **original** (i.e., your own ideas and results).

## Grant Proposal (white paper)

Each student must write a research proposal in the form required by the National Science Foundation (NSF). The proposal should include all the parts required for submission to the NSF but the technical section will be limited to 3 pages, single spaced. This proposal should be based on your PhD proposal.

## Grading

Oral presentation – 25%

Homework – 25%

Participation – 25% (If you miss more than one class, or if you are late consistently or if you are late for any of the presentations, you will need to repeat the course.)

Grant proposal – 25%

The course is Pass/Fail. You must score > 80% to pass.

PHYS 690 (Spring 2022)

Date	Topic	Homework Due
Jan 30	no class	
Feb 6	<p>Introductions and Overview of class</p> <p>Learning / Teaching in Physics</p>	<p>1. writing assignment: Critical review of an article</p> <p>2. reading assignment:  <b>Science Teaching Reconsidered</b>  <a href="https://www.nap.edu/catalog/5287/science-teaching-reconsidered-a-handbook">https://www.nap.edu/catalog/5287/science-teaching-reconsidered-a-handbook</a>                      (read chapters 3-4 carefully, skim chapters 1-2)</p>
Feb 13	Library resources, databases, how to stay current with the literature	
Feb 20	PhD proposals: discussion and example	Article retrieval/review; Literature search
Feb 27	Funding agencies	NSF/AFOSR/ONR/ACS/NASA proposal guides Grant proposal budget (tutorial)
Mar 6		PhD proposal outlines
Mar 13	Academic integrity – research conduct, authorship	Case studies
Mar 27	No Class (Graduate student visit day)	Case studies
Apr 3	Academic integrity – research conduct, authorship	Case studies
Apr 10	Writing your first journal article – which journal? format, style, voice	Info for authors; readings <a href="#">ACS Reviewer Lab</a>
Apr 17	Career choices – academia, govt, industry? Interview skills	CV
Apr 24	Class presentations	
May 1	Class presentations	
May 8	Class presentations	
May 15	Class presentations	Grant proposal due