Professional Skills for Physicists (PHYS 690)

Mon 0900 PHYS 221

Instructor: Dr. Michael Hayden **TA:**none
Office: PHYS 218 Phone: 5-3199 **Office Hours:** come by anytime, please!

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). You must also create a conference style poster based on your talk that is similar to those on the walls outside the research labs.

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%
Poster presentation – 10%
Homework – 25%
Participation – 15% (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 2020)

All classes will be held in **PHYS 221 on Mondays at 0900**, unless noted otherwise below.

Date	Topic	Homework Due
Jan 27	Introduction and Overview of class	
Feb 3	Learning/Teaching in Physics	1. writing assignment: Critical review of an article 2. reading assignment: **Science Teaching Reconsidered** http://www.nap.edu/catalog.php?record_id=5287 (read chapters 3-4 carefully, skim chapters 1-2)
Feb 10	Library resources, databases, how to stay current with the literature	
Feb 17	PhD proposals: discussion and example	Article retrieval/review; Literature search
Feb 24	Funding agencies	NSF/AFOSR/ONR/ACS/NASA proposal guides
Mar 2	Research posters: discussion and examples, tour **meet outside PHYS 221**	PhD proposal outlines
Mar 9	Academic integrity – research conduct, authorship	Case studies
Mar 23	Academic integrity – research conduct, authorship	Case studies
Mar 30	Writing your first journal article – which journal?, format, style, voice	Info for authors; readings ACS Reviewer Lab
Apr 6	Career choices – academia, govt, industry? Interview skills	CV
Apr 13	Class presentations	
Apr 20	Class presentations	White paper
Apr 27	Class presentations	Grant proposal budget (tutorial)
May 4	Class presentations	
May 11	Class presentations	Grant proposal