Physics 605

Physics Teaching Seminar/Practicum
Spring 2026
1 credit

Instructor: Michael M. Hull (Mike)
Office: 120 Reich
Office Phone: (907) 474-6106
Email: mmhull2@alaska.edu (preferred)

Office Hours:

Monday 4:15-5:00pm

Course Description

Course content:
This course will give science graduate students hands on training in dealing with all aspects of teaching (focused on, but not exclusive to, the Teaching Assistant level and beyond). This will include topics in teaching pedagogy, preparation strategies, student management, time management and learning assessment. The course will be approximately 50% discussion and 50% practical exercises. This course is intended to provide both basic introductory and in-depth science teacher training and guidance at the college level. The methodology discussed will be how to use active learning techniques and when which technique is most appropriate.

Student learning outcomes:
After this course, students will know the basics of good practices in university level active science education, will be able to deliver physics content clearly, both lecture style and in an interactive style, will have a variety of tools for classroom management and student encouragement, and will have extensively discussed and practiced how to be a good science educator/communicator.

The discussions will center upon readings assigned by the instructor from published pedagogical recommendations and/or findings in physics education research. The practical exercises will consist of preparation and presentation of classroom and lab examples, as well as practice of active learning strategies, which will be followed by a time for classmates and the instructor to provide constructive feedback. Every week, time will be reserved for issues that are brought up by the students who are currently teaching so they can be discussed and solutions proposed by the group. Discussion will be an important part of the course.

Course participants will have some input in special topics covered. Potential topics include:

- Teaching pedagogy - including board skills, speaking skills, grading etc. (students will do practice examples of the good and the bad in these areas)
- engaging students, idea behind active learning and other techniques for engaging and facilitating student learning
- Preparation - "Why prepare, I know this material!", effective preparation, introducing material, preparing to teach the concepts, preparing to teach the math

- Time management - Balancing demands, short cuts, using your resource
- Student/classroom management - starting out right, engaging students, respect, dealing with problems and student issues, cheating, being adaptable, using suppor
- Lab preparation and demo development - preparing labs, preparing for the labs, presenting the lab, grading the labs, developing demonstrations for specific topics, reading your audience, encouraging active learning and student participation
- Learning assessment - making quizzes (lab quizzes etc.), grading, encouraging feedback from students, other forms of assessment
- Cross cultural issues - teachers from various cultures and students from various cultures, what's acceptable under cultural differences and what is not, sensitivity to differences
- Ethical issues - plagiarism and other forms of cheating, respect, relationships
- Working with faculty- getting the most from the experience, asking questions
- Personal/Professional balance- Being a student at and an employee of the University

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Prerequisites: Graduate Standing in a Science Discipline or permission of instructor

Materials Needed:

Required Text: Will be posted on Canvas. Candidate readings include:

DeHaan, R. L., 2005*: The Impending Revolution in Undergraduate Science Education,* Journal of Science Education and Technology, Vol. 14, No. 2, 253-269.
Halloun, I. A, and Hestenes, D. 1985*: The initial knowledge state of college physics students,* American Journal of Physics, 53, 11, 1043-1048.
Luft, J.A., Kurdziel, J. P., Roehrig, G. H., and J. Turner, *2004: Growing a Garden Without Water: Graduate Teaching Assistants in Introductory Science Laboratories at a Doctoral/Research University,* Journal of Research in Science Teaching, Vol. 41, No. 3, 211-233.

Lectures: M 2:15 – 4:15 in Room 122 Reich. Building. If you miss the first class, check back here for any changes in schedule.

Assignments: will include reading excerpts from science education text and science education research journal articles as preparation for group discussion and presentation of classroom and lab teaching strategies. Students will also give mock lessons drawing upon these readings. Students will practice teaching in the presence of the instructor and classmates, first in a mock lesson format, and then to real students, at both the high school (for example, at Lathrop High School/ Hutchison High School) and college level (for example, in Physics 211). In the spring semester, we will participate in Science Potpourri for K-12 graders to visit us on a Saturday TBD. **Students will write a statement of teaching philosophy that is at least two pages long and that contains at least three references, two of which are taken from the readings.**

Grading: The course will be graded on a pass/fail basis and the grade will consist of the following components (though we reserve the right to make grade adjustments based on performance trends):

Participation 50 %
Practical exercises, including mock lessons and paper 50 %
Above 65% will be a passing grade.

Attendance:
Since 50% of the grade for this course is determined by participation, attendance of all lectures and practicum meetings is mandatory. If a student must miss class, they should notify the instructor beforehand or as soon as possible. For approved absences, missed participation work will be made up at the instructors' discretion. If a student is absent on a day they are set to present, the presentation will be done at a later class meeting.

Contacting Me: I have office hours as listed above. You can drop by at other times if I'm not busy, or make an appointment.

Special Needs: The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. We will work with the Office of Disabilities Services (203 WHIT, 474-7043) to provide reasonable accommodation to students with disabilities.

COVID-19 statement: Students should keep up-to-date on the university's policies, practices, and mandates related to COVID-19 by regularly checking this website: https://sites.google.com/alaska.edu/coronavirus/uaf/uaf-students?authuser=0Â Further, students are expected to adhere to the university's policies, practices, and mandates and are subject to disciplinary actions if they do not comply.

Plagiarism etc: Plagiarism and cheating are matters of serious concern for students and academic institutions. This is true in this class as well. The UAF Honor Code (or Student Code of Conduct) defines academic standards expected at the University of Alaska Fairbanks which will be followed in this class. (Taken from the UAF plagiarism web site, which has many links with good information about this topic)

Complaints and Concerns: You are always welcome to talk to me about anything, however, if you have a non-subject matter question or concern that cannot be resolved by me, contact the department chair, Dr. Truffer, Physics Department Office, room 102 **Reich**.

Tentative course schedule:

Date	Homework to do **before class**	**During Class**
1/12		Introduction (Fill in this syllabus)
1/26		
2/2		
2/9		
2/16		
2/23		
3/2		
3/16		
3/23		
3/30		
4/6		Guest speaker:
4/13	Rough draft Teaching Statement	Final changes to Phys211 lesson
4/20		
4/27	Final Teaching Statement	What lessons did you learn this past semester?