

Teaching and Learning Physics (Physics 4484/7684)

Fall 2022. 1 credit. S/U grades only.

PHYS 4484/7684 Section 001: Mon. 2:45-4:00 pm, Clark 294B

PHYS 4484/7684 Section 002: Tues. 2:45-4:00 pm, Clark 294B

PHYS 4484/7684 Section 003: Wed. 2:45-4:00 pm, Clark 294B

Instructor: Erik Herman

Office: Clark 406

Office hours: By appointment Zoom or In Person. Please email me: eah229@cornell.edu

This weekly seminar provides undergraduate and graduate students with an introduction to some of the “big ideas” in teaching and learning, as well as to practical skills, techniques, and tactics for facilitating learning, especially in small groups.

Participants read and discuss articles, reflect on their own teaching and learning experiences, discuss common classroom challenges, and engage in collaborative activities that help them become more effective teachers, learners, and communicators. This seminar is especially valuable for those considering teaching physics at some point in their careers, or who want to improve their own physics learning skills.

Text: None. Readings will be provided.

Course learning goals

1. Explain the roles of an effective undergraduate teaching assistant in Cornell physics courses.
2. Reflect on your own teaching and learning and your students' learning in the context of research about education and learning.
3. Describe methods of fostering environments that promote students' learning, especially during collaborative activities.
4. Describe specific tricks and tactics that can be used to enhance learning, especially when teaching to a diverse student population.
5. Try out new instructional strategies introduced in this course with students and revise those strategies based on the experience.
6. List connections between education research and instructional strategies that are used in Cornell physics courses.
7. Develop awareness of the variety of factors that influence learning in the classroom and beyond.

Course topics

Topics to be discussed may include: effective listening, question types and questioning strategies, responding to questions, understanding student reasoning, learning styles, mental models, analogies, preconceptions and conceptual change, memory and learning theory, mindsets for teaching and learning, metacognition, psychological aspects and obstacles to learning, expertise and expert performance, active learning / deliberate practice, qualities of effective teachers, and evaluating teachers.

Course grading

This course is taken on a Satisfactory/Unsatisfactory basis. To receive a Satisfactory, I expect you to: (1) attend and actively participate in at least 11 (out of 14) classes, (2) thoughtfully complete at least 10 (out of 12) readings and reflections, and (3) complete any other special tasks as assigned. If unexpected, extenuating circumstances arise that prevent you from regularly attending class and/or completing assignments, please communicate to me via email as early as possible to work out a plan.

Reading and reflection assignments must be submitted on Canvas by noon on the day that your section meets. If assignments are regularly late, then they will not be counted toward receiving credit. There are no exams for this course.

Course assignments

Everything you need to access for the course is available on the course Canvas site. For each week, **the materials you need and links for turning in your work are in a folder named for that week.**

Readings will be accessed through Canvas via **Perusall**. Perusall lets you make and share comments with other students as you read. It also "scores" your comments using AI, and tracks the quality and number of comments you make. This will help you to read closely and actively, and us to evaluate your participation.

In addition to the comments you make in Perusall, you'll complete a weekly reflection on the readings and your teaching experience in Canvas.

The reflections are intended to help you make sense of the reading and to be a place for you to reflect on your experiences, relate readings with your teaching, and ask questions or raise issues about your teaching experiences. The readings and reflection combined should be less than two hours of work per week. *Please let me know if you are regularly spending more than two hours per week outside of class to complete weekly assignments.*

Aim to answer the following questions in your reading reflections:

1. What was the main purpose of the reading? Why is this important in education?
2. What did you learn from the reading? How will you use what you learned in your teaching? How will you use what you learned in your own learning?
3. Based on the reading and/or your recent experiences, what questions / observations / concerns / etc. do you have about how students learn, how to facilitate students' learning, and/or how to handle situations in your teaching assignment?

Assignments are due at noon on the day that your P4484/7684 section meets. All assignments are submitted via Canvas. If there are technical issues with Canvas, then please email assignments to me by the due date & time.

Accommodations through Student Disability Services

Cornell University is committed to ensuring access to learning opportunities for all students. Student Disability Services (SDS) is the campus office that collaborates with students who have disabilities to provide and/or arrange reasonable accommodations.

- If you are registered with SDS and have a faculty notification letter dated for this semester, please contact me early in the semester to review how the accommodations will be applied in the course. If you have an immediate access need, please see me after class.
- If you have, or think you have, a disability in any area such as, mental health, attention, learning, chronic health, sensory, or physical, please contact the SDS office to arrange a confidential discussion regarding equitable access and reasonable accommodations.
- Students with short-term disabilities, such as a broken arm, can often work with me to minimize classroom barriers. In situations where additional assistance is needed, students should contact the SDS as noted above.
- If you are registered with SDS and have questions or concerns about your accommodations please contact your SDS Counselor.

Student Disability Services is located at Cornell Health Level 5, 110 Ho Plaza, 607-254-4545, sds.cornell.edu.