

PHYS 6160: Teaching Introductory Physics - A Practicum
Syllabus
Professor Stephen Sekula
FALL 2020

Contents

Goals of this Course	1
Course Information	2
Course Topics	3
Attendance	4
Assignments (“Homework”)	4
Exams	5
Assessment and Grading	5
University Honor Code	6
Disability Accommodations	7
University Policy on Religious Observance	7
Excused Absences for University Extracurricular Activities	7
Student Academic Success Programs	7

Goals of this Course

This course is intended to introduce graduate students to the foundational skills and approaches in the modern physics education environment. Instruction in the class will be tied closely to the introductory physics cooperative problem-solving sessions (henceforth referred to as “Co-Op Sessions”). Students will learn to...

1. Understand the methods and applicability of the best researched physics teaching techniques;
2. Craft problem-solving approaches and then demonstrate physics problem solving approaches to undergraduates;
3. Engage undergraduates in a team-based problem-solving environment;
4. Improve their performance in the classroom environment (e.g. speaking, writing, and interaction/communication skills) through problem solving demonstrations with peer/instructor review and feedback;
5. Engage professionally with undergraduates.

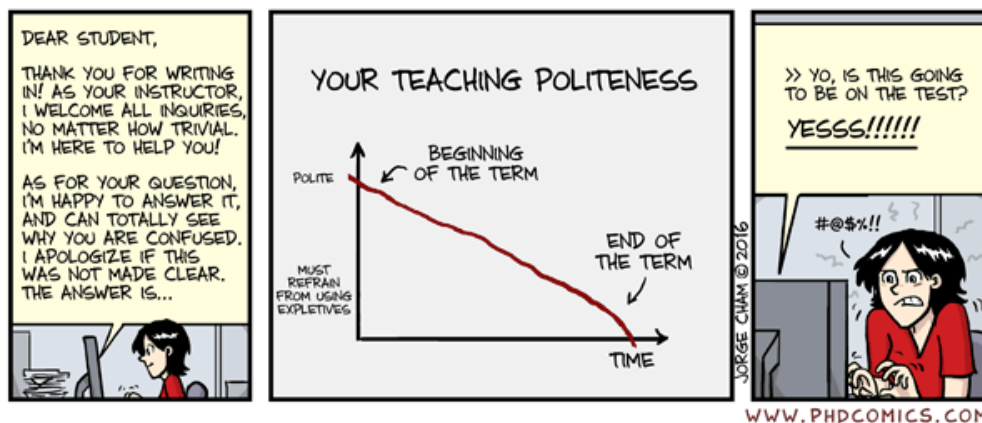


Figure 1: Teaching is an extremely difficult process, for both the instructor and the students. As part of this course, you will learn to define professional behavior inside and outside the classroom and develop strategies to maintain professionalism over the course of your instruction duties. Image copyright Jorge Cham.

Course Information

When/Where?	The course is held virtually via Zoom , Mondays from 11:00-11:50am (US Central Time). The Canvas site for this course has the Zoom link: https://smu.instructure.com/courses/79155
Instructor	Professor Stephen Sekula Office: Fondren Science 39 Phone: (214)-768-7832 E-mail: ssekula@smu.edu Facebook: stephensekula Twitter: drsekula

TOPIC	INFORMATION
Office Hours	Where: Zoom When: <ul style="list-style-type: none"> • By appointment only Please try to be courteous and request a meeting in writing at least a few hours before your proposed meeting time to allow for scheduling.
Prerequisite(s)	PHYS 3305 or similar; get permission from the instructor to take the course if you have fulfilled a similar requirement at this or another institution.
Textbook(s)	Readings from the texts and papers below will be provided by the instructor during the semester. <ul style="list-style-type: none"> • “Five Easy Lessons: Strategies for Successful Physics Teaching”. Randall D. Knight. <ul style="list-style-type: none"> – ISBN Number: 0805387021 – ISBN-13: 9780805387025 • “Peer Instruction: Engaging Students One-on-One, All At Once”. Crouch, C.; Watkins, J.; Fagen, A.; Mazur, E. • “Design principles for effective physics instruction: A case from physics and everyday thinking.” Goldberg, F.; Otero, V.; Robinson, S. Published in “Teacher Education in Physics.” • SMU-HEP-19-07: “SMU Introductory Physics: A Teaching Manual.” Stephen Sekula. 2019. • SMU-HEP-19-10: “SMU Honors Physics: A Teaching Manual.” Jodi Cooley, Eric Godat, and Steve Sekula. 2019.

Course Topics

- Primarily, this will be a hands-on “just-in-time teaching” course, where graduate students will first be asked to simply demonstrate the solution to a typical undergraduate introductory physics problem and thus establish a baseline for the comfortability and ability in the teaching environment. Based on this, peers will assess each other based on what they felt worked or not, and the instructor will provide similar feedback. We will identify strengths and provide focus on the perceived weaknesses, to shore those up (thus the “just-in-time” part of the method), while also noting what they did that worked to reinforce positive aspects of their approach. This will result in an iterative process of “lessons learned” with each demonstration and should nudge each student away from their specific weaknesses in the teaching environment and toward mastery of the basic skills needed to teach physics.
- Supplementing this, and allowing the students to think more carefully about what it means to teach physics to new learners and assess their ability to utilize new information while retaining old information, we will employ key readings (books and papers) on modern physics education research. Students

will be encouraged to try ideas they learn from these readings in their own problem solving demonstrations and in their interactions with undergraduates to encourage undergraduate peer-mentoring and nudge their own students toward learning goals.

- Teaching demonstrations, to improve public speaking, and content development will be used as projects to help improve your teaching approaches.



Figure 2: You will learn to skillfully handle common situations that may arise in the teaching environment. Image is copyright Jorge Cham.

Attendance

Attendance is required. If you will miss class, please inform the instructor in advance. Since this course is tied to the introductory physics cooperative problem-solving sessions, you are also required to attend your assigned co-op sessions as part of your teaching assistant duties external to this course.

Assignments (“Homework”)

Homework will take one of a few forms during the semester:

- You will be asked to read material, or watch a video (or both), to prepare you for the next class activity period.
- You will be asked to complete short quizzes on assigned material before class.
- You will be asked to write notes in a discussion board, either before class or to capture discuss after class.
- You will be asked to prepare video or audio files of you teaching a physics concept. These will be uploaded to Canvas for assessment and discussion.
- You will be asked to use lessons from reading, videos, and class to develop experimental course content.



Figure 3: Teaching is more than just standing and addressing your students. It's also about learning to listen to their questions and know when (and when not) to answer directly. Image is copyright Jorge Cham.

Exams

There will be no exams. Assessment is discussed below.

Assessment and Grading

1. **[50% of final grade]** Class discussions and related assignments. Students will be assigned readings, videos, and quizzes on this material. This is to be completed before class. Class periods will be used for discussions. Asynchronous participation is possible by using digital discussion boards to contribute your views and ideas to the discussion. Synchronous participation will be recorded for viewing by the asynchronous participants. Students will be asked to learn about introductory physics courses at SMU, the cooperative problem-solving sessions associated with these courses, teaching pedagogy, applications of pedagogy at SMU, and other related topics and concepts. Application of knowledge will be emphasized, including the use of new pedagogical approaches to create course frameworks, lessons from cooperative problem-solving sessions and other teaching work, video or audio demonstrations of teaching approaches, and capturing of discussion notes in Canvas.
2. **[30% of final grade]** Teaching Journal: Students are not required, as teaching assistants, to keep a written record of their experiences as a teacher. This course requires that its participants keep such a record (a "journal"). This will be done using Canvas, SMU's learning management system. The journal should contain observations from the teaching environment that are useful for classroom discussion, discussion with the instructor, or both. Based on the outcome of the discussion of those observations, strategies for addressing such observations will be provided. The student is expected to document their plan for handling these situations next time and then continue this process going forward. Once the journaling part of the semester begins, the journal will be graded as part of the assessment for the course using a rubric similar to the following:
 - (a) Observations are recorded at least once per teaching session [0-5]
 - (b) A plan of action is developed after each interaction with the instructor over observations [0-5]

- (c) The student records observations and writes their plan of action adhering to the rules of high-quality written English communication [0-5]
- (d) The student provides summaries and assessments of previous plans of action to inform future decision-making in the classroom environment [0-5]

Again, “0” means the student was significantly deficient in this category (e.g. never records observations), a “5” means they have no discernable deficiencies, and scores in between mean there is at least 1 (“4”), 2 (“3”), etc. deficiencies. The scoring on the stages of journal is easily translated to a letter grade. The journalling activity will begin after week 7 of this course.

3. [20% of final grade] Teaching presentation demonstrations (10%) and a final project involving the crafting of an activity for one of our introductory physics courses (10%).

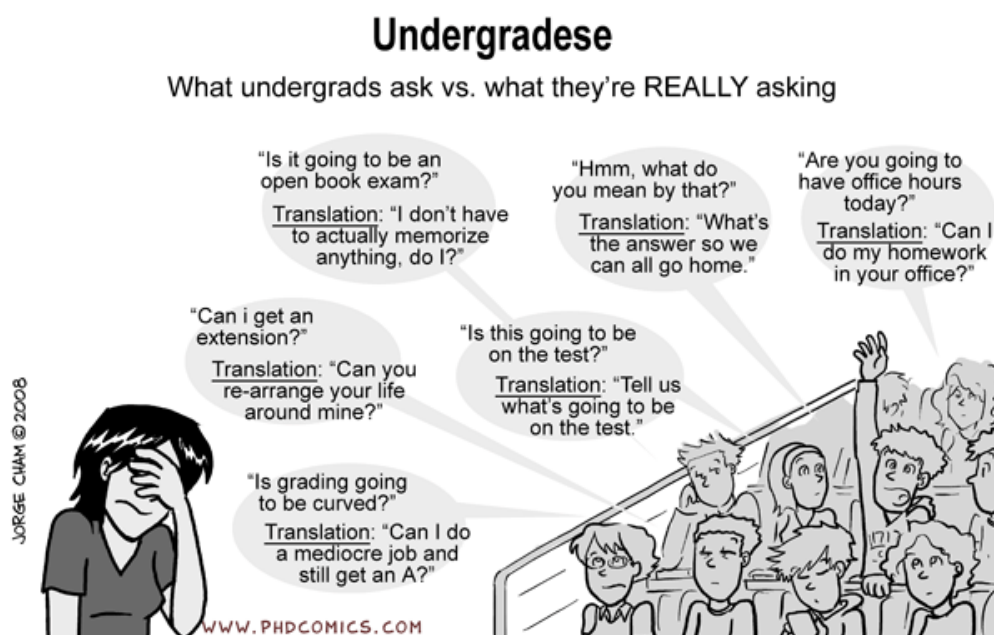


Figure 4: Undergraduates often ask questions that are not representative of the true question. You must learn to engage with them to find out what are the real issues in a class, and respond to those issues professionally. Their evaluations of you will be based on hidden assumptions that they make when interacting with you inside and outside the classroom, and you need to be ready for that. Image is copyright Jorge Cham.

University Honor Code

The student honor code can be found on page 32 of the student handbook¹. All students will be expected to adhere to it. Any student found cheating or plagiarizing another’s work will be given a zero for that work

¹<http://www.smu.edu/StudentAffairs/StudentLife/StudentHandbook>

and a complaint will be filed through the Vice President for Student Affairs Office. If you are uncertain of the definition of plagiarism as it regards independent works of mathematical and physical computation, documentation, and demonstration, it is your responsibility to speak with the instructor and understand these rules.

Disability Accommodations

Students needing academic accommodations for a disability must first register with Disability Accommodations & Success Strategies (DASS). Students can call 214-768-1470 or visit <http://www.smu.edu/Provost/SASP/DASS> to begin the process. Once approved and registered, students will submit a DASS Accommodation Letter to faculty through the electronic portal DASS Link and then communicate directly with each instructor to make appropriate arrangements. Please note that accommodations are not retroactive and require advance notice to implement.

University Policy on Religious Observance

Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester, and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence. (<https://www.smu.edu/StudentAffairs/Chaplain/ReligiousHolidays>).

Excused Absences for University Extracurricular Activities

Students participating in an officially sanctioned, scheduled University extracurricular activity should be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation. It is the responsibility of the student to make arrangements with the instructor prior to any missed scheduled examination or other missed assignment for making up the work. (See 2020-2021 SMU Undergraduate Catalog under “Enrollment and Academic Records/Excused Absences.”)

Student Academic Success Programs

Students needing assistance with writing assignments for SMU courses may schedule an appointment with the Writing Center through Canvas. Students wishing support with subject-specific tutoring or success strategies should contact SASP, Loyd All Sports Center, Suite 202; 214-768-3648; <https://www.smu.edu/sasp>.

Accommodations for pregnant and parenting students

Under Title IX students who are pregnant or parenting may request academic adjustments by contacting Elsie Johnson (elsiej@smu.edu) in the Office of the Dean of Students, or by calling 214-768-4564. Students seeking assistance must schedule an appointment with their professors as early as possible, present a letter from the Office of the Dean of Students, and make appropriate arrangements. Please note that academic adjustments are not retroactive and, when feasible, require advance notice to implement.

Covid-19 Attendance Statement

Students who are experiencing COVID-19 symptoms or who have been notified through contact tracing of potential exposure and need to self-quarantine or isolate must follow the protocols laid out in SMU's Contact Tracing Protocol. To ensure academic continuity, students in these situations will not be penalized and will be provided appropriate modifications to assignments, deadlines, and testing. Please also note that SMUFlex classes might, in rare circumstances, go remote for two-week periods to accommodate COVID-related issues. To ensure these necessary accommodations, affected students must:

- Provide as much advance notification as possible to the instructor about a change in circumstances. Students must notify their instructor about a potential absence as well as plans for a return to class. For cases in which students test positive for COVID-19, they should fill out a CCC form at this link.
- Communicate promptly with the instructor to establish, as necessary, alternative assignments and/or changes to deadlines and exams. Students are then responsible for meeting the expectations laid out in these alternative arrangements.
- Continue participation in class via Zoom, as health circumstances permit. Attend class regularly, when not in a situation outlined above, in accordance with safety measures laid out by SMU CAN in the Pledge to Protect (including wearing masks, maintaining social distancing, and cleaning personal space after class). In-person participation in SMUFlex classes is required on students' assigned red/blue rotation days except in cases when students are experiencing illness, are in self-quarantine or in isolation.
- Students facing multiple or extended COVID-19-related absences or illness can work with the Office of the Dean of Students to consider options such as fully remote learning or medical withdrawal.

This policy, aligned with the SMU Honor Code and the SMU Pledge to Protect, relies on mutual trust and respect between students and faculty to ensure safety, academic integrity, and instructional continuity.

Statement regarding the “campus carry” law

In accordance with Texas Senate Bill 11, also known as the “campus carry” law, following consultation with entire University community SMU determined to remain a weapons-free campus. Specifically, SMU prohibits possession of weapons (either openly or in a concealed manner) on campus. For more information, please see: http://www.smu.edu/BusinessFinance/Police/Weapons_Policy.