

CS290 as a case study for a new model of SEAS TF Training

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About CS290

Course description

This is a reading and discussion-based seminar designed for entering Computer Science Ph.D. students. This course prepares students to manage the difficult and often undiscussed challenges of Ph.D. programs through sessions on:

1. Research skill building (e.g. paper reading, communication)
2. Soft skill building (e.g. managing advising relationships, supporting your peers)
3. Academic culture (e.g. mental health in academia, power dynamics in scientific communities)
4. Research and professional-oriented discussions

CS290 is a 2-semester course that is required for all entering CS-PhD students, designed to teach the “hidden-curriculum” of graduate school, prepare students for success, and build community within the cohort

Topics covered

Fall:

- How to skim a research paper
- How to do a literature search
- Fellowships?
- How to read a theory paper
- Verbal & written communication
- Unhealthy self-expectations
- Self-organization and time management
- Advising relationships
- Academic culture

Spring:

- General audience communication
- Professional ethics
- Power dynamics
- Effective research practices
- Diversity, equity, and inclusion
- The paper review process
- Mental health in academia
- **Intro to teaching**
- Life after the PhD
- How to craft a research agenda

Teaching training

There were 2 class sessions on teaching.

Week 1. Workshop at the Bok Center Learning Lab, introduction to visual aids in teaching.

Week 2. Pedagogy fellow facilitated a brief discussion on “who are Harvard Undergraduates?” and a video of a TF teaching an intro CS course, followed by microteaching. Pre-work included reading Crimson class of 2027 statistics article, watching teaching video, and preparing for microteaching. Students were specifically instructed to teach to a second year undergraduate CS course.

Key takeaways.

1. The course’s community building efforts made microteaching especially effective. Students were very comfortable giving each other constructive feedback and their shared familiarity with computer science topics allowed feedback to be uniquely discipline-specific.
2. At least two more weeks dedicated to teaching being beneficial. In particular, the opportunity for a second microteaching session would help students learn from feedback given during the first session.
3. Low attendance for week 2 (possibly due to student being particularly busy at the end of the spring semester). Spreading out teaching weeks or moving teaching to a different part of the semester could help with this.
4. Based on student engagement, the Bok workshop appeared to be an effective introduction and warm up.

Implementing a CS290-like course for other SEAS areas

List of SEAS areas & total students

Applied mathematics – 38 PhD students
Applied physics – 114 PhD students
Computer science – 155 PhD students
Engineering sciences – 207 PhD students

- Bioengineering
- Electrical engineering
- Environmental science & engineering
- Materials science & mechanical engineering
- Quantum science & engineering



Based on these distributions, I propose **two courses**: one for applied math & applied physics G1s, and one for engineering science G1s.

Open question: the interdisciplinary nature of SEAS means that dividing along program areas may not work well for all students. How can we accommodate students who may feel more “at home” in fields other than their program area?

Proposed teaching curriculum

I propose that each of these courses includes at least four-weeks of teaching training, in addition to covering many of the other same topics as CS290. Below are proposed plans for each of these four weeks. I suggest two weeks in the fall and two weeks in the spring, or all four weeks in the spring.

Week 1: Introduction. No prep work required. Ice breaker to get students comfortable thinking about teaching, in the form of non-academic microteaching & feedback.

Week 2: Who are your students? Prep work: read latest Crimson new student survey, watch a teaching video, and prepare microteaching. Discussion on what to expect when Tf’ing undergraduates at Harvard and the first academic microteaching activity.

Week 3: Assignments & grading. Prep work: reading on Bloom’s Taxonomy. Discussion on writing & grading assignments, guided by Blooms’ Taxonomy.

Week 4: Final microteaching. Prep work: revise your microteaching from Week 2. Final microteaching activity, incorporating feedback from week 2, and debrief.



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