

CASE STUDY: HARVARD UNIVERSITY

The Setting:

Leading research university generally ranked among the top 2 or 3 nationally. Physics Department has 40 full-time faculty members, a Director of the Physics Laboratories, a Director of the High Energy Physics Laboratory, a Head Tutor (Director of Undergraduate Studies), an Instructional Laboratory Associate in Physics and 27 Administrative and Support Staff. The department has outstanding and well-funded research programs and a distinguished graduate program.



The Physics Department graduates 50-60 majors (called concentrators) a year. 40-50% of graduates go to graduate school in physics or a closely related field. The remainder pursue a wide range of careers including medical school, law school or business school as well as immediate employment.

25% of concentrators are women; 5% black, 20% Asian, and 6% Latino.

What Has Been Done:

1. Concentrators are required to take a relatively small number of courses relative to other science concentrations at Harvard.

The concentration is flexible, and the physics department gives formal recognition to the connections between physics and other disciplines. For example, a combined physics and chemistry concentration, a program of the Physics Department, draws 10-15 students each year. There are other joint concentrations such as Physics-Mathematics, Physics-Astronomy and Physics-History of Science that are done frequently.

2. The faculty are enthusiastic about both undergraduate students and physics.

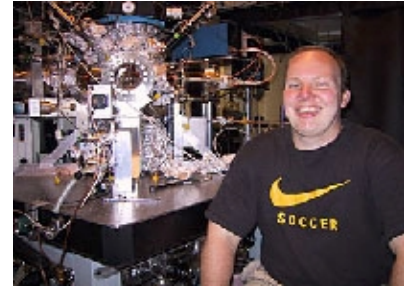
All faculty teach in the undergraduate program although not every year. They take pride in their teaching and continually develop new materials and courses such as the honors introductory course for very well-prepared students. Service courses and core courses to meet the science requirements of non-science students are considered important as well as courses for majors.

The chair stresses the importance of excellent teaching to all new faculty. Many faculty take advantage the services offered by Harvard's Bok Center for Teaching and Learning to improve their teaching. Graduate student TAs take a two-day training session from the center followed by sessions of micro-teaching and video taping.

Many undergraduates participate in research through an independent research course that allows up to two semester courses credit for participating in independent research supervised by faculty members. The department supports a number of students to do independent research during the summer. 5-10 undergraduates work as TAs helping with large undergraduate sections.

1. The department establishes a community of physics students.

The active SPS chapter organizes a “buddy” system that teams first-year students with upper division concentrators, produces a booklet of advice for new concentrators, organizes lunches and picnics for students and professors, and sponsors weekly “Cool Physics” sessions where a student talks about research. SPS surveyed physics concentrators and shared results with the department. Its officers meet with the chair and Head Tutor to discuss issues of importance to undergraduates.



There are many other opportunities for faculty-student interactions, both formal and informal. These activities include study nights, lunches, dinners, weekly presentations by faculty of their research, the Physics Answer Center organized by the graduate students, and undergraduate participation in an annual “puppet show” where graduate students “roast” the faculty members. The physics undergraduates consider themselves active members of a lively physics community.

2. The department insures that all students receive careful advising.

The Head Tutor meets individually with all students choosing to enter the concentration to discuss their interests and course plans. She then assigns each student to a member of the faculty who will act as mentor/academic advisor throughout the student’s career in the department. The Head Tutor also remains available for any student needing advice. She checks to see that students complete requirements and are aware of other opportunities.

Indicators of Success:

1. Harvard is one of the leading producers of physics graduates at the bachelors level in the nation.
2. Undergraduates clearly take pride in belonging to a lively, close-knit community. SPS events draw both concentrators and friends of concentrators so that mailings go to 500 students.
3. Three physics faculty have recently won Harvard’s Levinson Teaching Prize.

Keys to Making the Changes:

1. The department has a good sense of the capabilities and aspirations of Harvard students and designs a challenging program to meet their expectations. At the same time, the department recognizes that students often have wide-ranging academic interests and career goals and has a concentrators program that is unusually flexible in course requirements with a number of varied options.
2. The department fosters excellence in undergraduate teaching by means of direct comments from the chair, the availability of the services of the Bok Center for Teaching and Learning, and department-wide discussions of the undergraduate program at faculty meetings.
3. The department encourages and supports a number of informal interactions among faculty and undergraduates. The culture of the department is that of a lively intellectual community of which undergraduates are important members.
4. The department chairs have played a leadership role in re-enforcing the importance of good undergraduate teaching and keeping a focus on evaluating and rethinking the undergraduate program.
5. The department supports the activities of a lively SPS chapter and uses it to encourage undergraduate input into its undergraduate program.



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