CASE STUDY: LAWRENCE UNIVERSITY

The Setting:

A small nondenominational, liberal arts university with about 1300 students, a quarter of whom are enrolled in the Conservatory of Music but may double major in other disciplines.

The department has 4 tenure line faculty members, a visiting assistant professor, a part-time electronics technician, and a part-time machinist.

The department graduates an average of 10 physics majors each year on a single degree program although some of them also obtain a bachelors degree in music. Approximately 50% of the graduates pursue graduate study in physics.

What Has Been Done:

1. The department offers a fairly traditional, extremely rigorous physics major and is proud of its high standards. Faculty expect students to work very hard and treat them as junior colleagues. Faculty maintain an open door policy for helping students and clearly view undergraduate education as their core mission.

2. The department has developed signature programs in laser and computational physics, and is developing signature programs in surface physics and non-neutral plasmas.

   A signature program is first a teaching program but has especially well-equipped laboratories and ties to faculty research so that it generates specialty courses, promotes student-faculty interactions, increases departmental pride, and supports student projects. They also help to recruit students.

3. The department works hard to attract to Lawrence talented high school students who are already inclined to major in physics.

   The department holds an annual weekend workshop for high school seniors with strong interest in physics. The faculty select 26-30 participants from 50 or so applicants to attend a spring workshop with all expenses, including air fare, paid by Lawrence. Each participant is hosted by a Lawrence physics major and spends a day in the signature program laboratories. Approximately 30% of the attendees matriculate.

4. The department involves students in departmental affairs as contributors to curricular discussions, as participants in interviewing candidates for positions and entertaining visitors, and as laboratory assistants and help session leaders for introductory courses.
The department holds twice-weekly teas, an annual picnic and an annual weekend retreat. Students have 24/7 access to a student common room, labs for student research and the Computational Laboratory.

There is a chapter of the SPS, a Sir Isaac Newton Society and a Women of Physics club.

5. The faculty strongly encourage student involvement in research by recommending a capstone experience for their majors and encouraging them to spend a summer either at Lawrence working with a faculty member or in a REU program elsewhere.

6. The department has developed several courses to introduce non-majors to physics, some of which have laboratory components and some of which are oversubscribed.

7. The department currently offers an optional course in Computational Tools in Physics, but students generally lack time to participate in this course. The department is currently changing the second year mechanics course to include computational methods. In addition, they are developing a signature program in surface physics and enhancing the programs in laser physics and computational physics with a $400,000 grant from the Keck Foundation and an additional $157,000 in matching funds from Lawrence University.

**Indicators of Success:**

1. The department graduates an average of 10 physics majors per year.

2. Since 1987, the department has received almost $2.5 million in external funding from Research Corporation, NSF, the Sloan Foundation, the Keck Foundation, and others.

3. Morale among students is very high, and students frequently expressed satisfaction with their relationships with faculty and fellow students as well as the preparation they were receiving for future graduate study or careers in physics.

4. Since 1991, GRE scores of graduates have risen appreciably, and many graduates receive awards such as NSF graduate fellowships, Clare Boothe Luce scholarships, a Rhodes scholarship, and a Hertz scholarship.

5. The department retains almost every major attracted into its program.

6. The sense of community that the physics department creates and the excellence of its program are well respected by other science faculty and the administration at Lawrence.
**Keys to Making the Changes:**

1. In the mid 1980’s, two faculty members became dissatisfied with the department’s record in graduating an average of 5 majors per year. These individuals played leading roles in revitalizing the physics program at Lawrence.

2. The President of Lawrence University has strongly supported changes in the physics program. The University has provided nearly one million dollars in matching funds to support the department’s development and search for external funds.

3. The Research Corporation has provided the department with two external faculty consultants as well as advice from leaders of the Research Corporation to assist the President of the University and the department in making changes.

4. Students are expected to work hard in physics, but their interests are protected as members of the physics family. For example, faculty offices are smaller than offices in the other sciences so that there is room for a student study room/lounge in the corridor with the faculty offices.

5. Faculty view undergraduate education as their core mission and emphasize the view that an undergraduate physics program is much more than curriculum.

**For More Information Contact:**

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