

Implementation Plan

Physics Program

1. Key recommendations of the program faculty resulting from the self-study.
 - The faculty is satisfied that the presentation of a seminar is an effective way for the student to achieve the specifically targeted learning goal.
 - With the small number of students in the major classes we need to accumulate data for a number of years before we will be able to do any statistical analysis of the collected data. We are a very small department, and to perform any meaningful statistical analysis requires more data.
 - It was agreed that a copy of the student's report needs to be kept by the department as a reference for future students.

2. Anticipated student profile in terms of number and type of students over the next seven years.

There are relatively few majors in the Physics program at any one time. The number of majors has been relatively steady since the last Annual Program Review, although there have been some wide statistical variations. It is not expected that the number of majors will change significantly, apart from similar statistical fluctuations.

Student demographics are also not expected to change. The proportion of female students is small, but so is the proportion of female students nationwide. Until the proportion of female students taking advanced math and physical science courses at the high school level increases the pool of qualified female students from which we can draw will remain small.

3. Action steps to be taken in order to achieve each of the recommendations and student enrollments over the next seven years.

Faculty Recommendations. Phys 3320 *Electromagnetism I* and Phys 4530 *Thermodynamics and Statistical Physics* are scheduled to be offered in the Fall of 2008, and Phys 3100 *Classical Mechanics* and Phys 4520 *Quantum Mechanics I* to be offered in the Spring of 2009. To evaluate this objective, we have decided to take the following steps:

- The instructor who is offering the course will identify a few key concepts which the instructor feels students should have grasped by the end of the course in order to pass the course.
- The instructor will assign a percentage of the final exam for questions related to these key concepts.
- We will collect data on student performance for these particular questions for each course.
- We are in the process of developing a unique rubric which will be suitable for all these courses. This rubric will be applied to all the listed courses, as they arise. We will accumulate the data and will form a data base.
- This database will be evaluated on an ongoing basis to ensure that the learning objectives are being achieved.

Student Enrollment

The Physics Program will continue and to expand its outreach activities to try to attract the best possible students that it can. Faculty members are active in visiting local schools at all levels from the Elementary level to the High School level. Community outreach programs such as the Open Observation Nights increase our exposure to the community at large, and we have been successful in attracting students into the major when they take physics classes at the introductory level (principally Phys 2250 and 2260 *General Physics I and II*). It is expected that the majority of our students will come from these activities.

In talking to students, particularly at the High School level, and attempting to ascertain their reasons for not choosing CSU Stanislaus, we have been surprised at the results. As expected the high achievers, with high SAT and AP scores, were also receiving offers from 'big name' schools such as UC Berkeley and Stanford. What we hadn't expected was the financial reason. Although the tuition fees at UC Merced and other schools are higher, the large scholarships that these schools can award make them cheaper to attend than CSU Stanislaus¹. Without the funds to offer similar scholarships we shall need to stress those favorable factors which might counter our financial disadvantage in the eyes of our prospective students.

4. Types of human, fiscal, and physical resources needed to implement recommendations.

Human Resources. The Physics Program has added two new faculty since the last Annual Program Review. One of these positions is the replacement for a faculty member who retired, and the other as a result of the growth of the teaching load, principally in service courses. It is not expected that any new faculty searches will be requested before the next Annual Program Review, unless there is an unanticipated retirement before that date.

Fiscal Resources. All of the Natural Science programs continually struggle with inadequate budgets. The one time influx of funds from the construction of the new science building (Naraghi Hall) has resulted in the program acquiring some badly needed new equipment. However, in the near future funds will be needed to maintain equipment items, to repair items when possible, and to replace items when necessary. (Note: the ongoing funds from the Naraghi Hall fund are specifically designated for faculty research, and cannot but used to support the teaching mission of the science programs.)

Support for faculty research is a critical issue in light of the increasing expectations of research productivity in the Retention, Promotion, and Tenure process. Faculty (especially junior faculty) have access to some release time, typically 3 WTU per year. This is frequently inadequate to allow faculty to establish a research program. Some extra release time has recently been made available, for example through the Naraghi Hall fund. However any one faculty member has to compete with the entire college faculty on a year-to year basis for this resource, when there is insufficient release time available for everyone in the college who needs it. If faculty are to be expected to meet the increased research expectations, then they need to be able to count on adequate release time on a long term basis.

¹ Related to this, almost all of our physics majors work outside of the university to raise the funds needed to continue in school, some of them having to work full time. This in turn means that they have less time outside of class to devote study, grades often suffer, and retention is impacted. The increases in tuition fees in recent years has exacerbated the problems that students face in paying for their education. For those students who do receive scholarships sufficient to cover the increased fees at other schools, CSU Stanislaus can look even less attractive.

Physical Resources. Having recently moved into Naraghi Hall the building resources are expected to be adequate in the period until the next review. However, there is is need for some specific resources within the building. For example, not all of the internet ports were installed, and of those which were installed not all were activated. Adding resources such as this into the laboratory rooms will greatly improve the flexibility of our teaching program, at little expense.