

CALIFORNIA STATE UNIVERSITY, HAYWARD

DESIGNATION CODE: 99-00 CAPR 8

DATE SUBMITTED: May 4, 2000

TO: The Academic Senate

FROM: The Committee on Academic Planning and Resources

SUBJECT: Five-year Program Review for Department of Physics

ACTION

REQUESTED: That the Academic Senate Approve the CAPR Program Review of the Bachelor of Science Program in Physics

BACKGROUND INFORMATION:

On April 20, 2000, CAPR met with Dr. Charlie Harper, Chair of the Physics Department, to discuss the five-year program review of the Department of Physics. On February 21, 2000, the Department of Physics was visited and reviewed by Dr. Randall Knight, Professor of Physics at Cal Poly San Luis Obispo. The visitor's report, prepared by Dr. Knight, as well as the Five Year Review and Plan prepared by the Department of Physics and a response report prepared by Dr. Harper, were submitted to CAPR for the purposes of this review.

PROGRAM REVIEW AND PROGRAM RESPONSE

The Department of Physics offers a Bachelor of Science degree in Physics that is designed to provide preparation for graduate study as well as training for employment, high school teaching, and research. Although the number of physics majors is small (8), the Department has already begun to see increases in enrollment and expects further changes in enrollment in the near future. These changes have occurred primarily due to the recent implementation of the Industrial Engineering program at CSUH, and the requirements for physics courses for students in this major. With plans for development of a Computer Engineering program in the near future that would also require students to take courses in physics, the Physics faculty see themselves at an important crossroad. Future enrollment projections for certain upper-division courses look promising and should help to ensure that these courses are offered on a regular basis.

As strengths of the Physics program, the reviewer particularly notes the harmonious relationships among staff, faculty and students, the close interactions the faculty have with the physics majors, and the unusually strong outreach efforts of the Department. Nevertheless, the reviewer strongly pointed out the need for curricular revision in the Department of Physics. The curriculum in physics, as determined by the reviewer from class syllabi and interviews with the faculty and students, is "traditional and conservative". Despite the assurance from the Chair that 99% of the physics classes in the U.S. are taught in a manner similar to those at CSUH, the reviewer strongly recommends radical rethinking of the curriculum for the physics major here. In particular, the reviewer suggests that the curriculum should change focus away from preparation for graduate study and toward preparation for jobs in high-tech industries. With revision of the curriculum, the reviewer feels that students will be encouraged to pursue bachelor's degrees in physics because they will more clearly see the link between physics and employment opportunities. Further curricular revisions suggested by the reviewer include decreasing the amount of material that is covered in the courses, increasing the emphasis on active learning,

developing new courses in applied and modern topics, revising the sequencing of some of the upper-division courses, and establishment of a Physics Advisory Committee from nearby high-tech industries.

In response, the Chair noted that the Department is exploring the possibility of setting up an advisory committee and has begun to experiment with new teaching techniques. In addition, faculty are planning to increase hands-on approaches to teaching including the development of a workshop approach to the General Physics (1001,2,3) series. Also being considered by the faculty are revisions of some upper-division courses including the development of a new Capstone course, all with a view toward providing physics majors with a more applied focus.

One area not clearly addressed by the Chair was the recommendation by the reviewer that at least two faculty members a year attend the American Association of Physics Teachers meetings to encourage faculty to consider more effective means of physics instruction. CAPR would like to strongly encourage the Department of Physics to request travel funds annually from the Dean of the School of Science for one to two faculty to attend these important meetings.

CAPR recommends approval of the five-year review and recommends continuation of the Bachelor of Science program in Physics without modification, but with a strong recommendation that the Department seriously consider the reviewer's recommendations for broad curricular revision.