

CALIFORNIA STATE UNIVERSITY, HAYWARD

DESIGNATION CODE: 01-02 CAPR 4

DATE SUBMITTED: April 9, 2002

TO: The Academic Senate

FROM: The Committee on Academic Planning and Resources

SUBJECT: Five-Year Program Review of the Department of Chemistry and Biochemistry

ACTION  
REQUESTED: Approval of the Five-Year Program Review of the Department of Chemistry and Biochemistry

BACKGROUND INFORMATION: Residing in the School of Science, the Department of Chemistry and Biochemistry offers undergraduate programs leading to degrees of B.S. and B.A. in Chemistry, B.S. in Biochemistry, B.A. in Chemistry with a Biochemistry option, and graduate degrees of M.S. in Chemistry, and an M.S. in Chemistry with a Biochemistry option. The Department also offers a B.S. in Environmental Sciences (option in Chemistry), an interdisciplinary degree coordinated with the Departments of Biological Sciences, <sup>Geography and</sup> Environmental Studies, ~~Sciences, Geology, and Physics~~. The B.S. degree in Chemistry is certified by the American Chemical Society (ACS).

On March 7, 2002, the Department Chair Dr. Richard Luibrand, met with CAPR to discuss the Five-Year Review and Strategic Plan. The Department has submitted the following documents to CAPR as part of the 1996-2002 Review:

- \* The Department's 2002 Self-Study
- \* Applications submitted for new tenure-track positions
- \* Outcomes Assessment Document
- \* Academic Performance Review Statistics
- \* The Department's Five -Year Plan
- \* The 2001 External Review, Kenneth L. Marsi
- \* The Department's Response to the External Reviewer's Report

FIVE-YEAR PROGRAM REVIEW (1996-2002)

Since the last review, the Department of Chemistry was changed to the Department of Chemistry and Biochemistry. A new B.S. degree in Biochemistry was introduced in 1998, and now enrolls approximately half of the department's majors. This new degree is not yet accredited with the American Chemical Society, although it meets most of the guidelines set by the ACS. The Department Chair, Dr. Richard Luibrand, is in consultation with the ACS to determine the requirements for accreditation. It should be noted that ACS accreditation is not necessary for this degree to be valid. Four new undergraduate courses were introduced with the biochemistry degree program: Chem 4431 Advanced Biochemistry Laboratory, Chem 4440 Protein Structure, Chem 4450 Nucleic Acid Chemistry, and Chem 4460 Major Organ Biochemistry. The Department also participates in the multidisciplinary degree program in Environmental Sciences, and has developed three new courses for the cluster sequence.

Since the last 5-year review, the Department has lost several of the faculty to retirement. Two new faculty were hired and a search for a third is in progress. The number of tenure track faculty for the 2002-3 academic year is six. The teaching load of the remaining faculty has increased, and each faculty has taught a greater variety of courses. The heavier teaching load has diminished the ability to conduct research; however the Department has made strides in acquiring new state-of-the-art equipment. The Department has acquired new PCs equipped with teaching software, which can be used from the GE cluster to graduate level courses. Although the System-wide FTES in Chemistry have declined since 1996, the Department has not shown a significant decline in FTES.

As a part of a new School of Science program, the Department houses and operates a facility called Remote Access to Instrumentation for Science Education (RAISE). Presently the project offers an ion chromatography system, an atomic absorption spectrophotometer, high performance liquid chromatography, and a gas chromatography-mass spectrophotometer. Using the Internet, students can access these instruments from a location outside of the laboratory. Students at CSUH, local community colleges, and high schools have used these instruments. Several high school presentations using RAISE instruments have won prizes in science fairs.

The faculty has been successful in acquiring outside funding for research including funds from the National Science Foundation, CALFED, and NIH. The faculty continues to participate in professional activities such as chairing sessions at scientific conferences and presenting research papers co-authored with students. Students have won awards for research presentations at the annual CSU Student Research Conference, and the Harrington Award for best M.S. thesis.

#### OUTSIDE REVIEWER'S COMMENTS AND THE DEPARTMENTAL RESPONSE

Dr. Kenneth Marsi, former Chair of the Department of Chemistry and Biochemistry at California State University, Long Beach, completed an onsite evaluation of the Department in April 2001. His report addressed the Department's curriculum, enrollment, faculty resources, and planning for new programs. Dr. Marsi concluded his report with specific recommendations.

Dr. Marsi applauded the Department of Chemistry and Biochemistry (then Department of Chemistry) for providing CSUH with an excellent faculty committed to teaching and improving their courses and departmental programs. He commended the faculty for their availability to the students for tutoring and counseling. Dr. Marsi further commended the Department on its excellent laboratory support staff, and the exceptional organization and maintenance of the departmental stockroom. Dr. Marsi was particularly impressed with departmental innovations in the areas of the Environmental Chemistry Sequence, the Environmental Sciences Option in Chemistry, a course in Combinational Chemistry, the RAISE Project, and the three GE courses developed for the university cluster program. These accomplishments were implemented in spite of the decline in the number of full-time faculty.

Dr. Marsi acknowledged the immediate need for three new faculty members, particularly a biochemist, and suggested that the Department be more aggressive in faculty recruitment. He also recommended that the Department revitalize its undergraduate and graduate research programs in order to be more competitive in attracting new majors. Equipment for conducting research is also a problem. Dr. Marsi suggested that external funding be sought to supplement internal funding for equipment. New equipment could be used to facilitate a more vigorous research program, which would enhance graduate student training. Currently many of the graduate students in the Department are involved in a Plan B non-research thesis. The reviewer also suggested a number of curricular considerations.

The Department stated that it considered the report submitted by Dr. Marsi and had the following responses. The Department concurred with the suggestions regarding the curriculum, including reconsidering instituting a lower-level Physical Chemistry course, reorganizing Chemistry 2200, and incorporating a biochemistry course into its ACS BS degree. The reviewer recognized the need for more faculty and the Department shares this sentiment. The Department has lost a significant number of full time faculty in the last 5 years, and requires more faculty to support its undergraduate and graduate programs.

#### FIVE-YEAR STRATEGIC PLAN (2001-2006)

The Department plans to re-organize its Chemistry 2200 Quantitative Analysis course to incorporate more instrumentation, re-organize its lower-level Physical Chemistry requirement for the B.A. and B.S. Biochemistry majors, and consider ways to become compliant with the guidelines of the ACS to incorporate a biochemistry course for certification of the B.S. Chemistry degree. The Department will also explore new options in the B.A. degree program such as 1) Option in Chemistry Education, 2) Option in Business, 3) Option in Computer Science, and 4) Option in Forensic Chemistry. The Department is also exploring expanding courses in the chemistry minor and introducing courses to increase the student experience with advance techniques of organic structure determination.

The most critical need of the Department is the hiring of more tenure-track (T-T) faculty. The number of T-T faculty has declined from 10 in 1997 to 7 in 2001. The projected number for 2002 is 6. The Department recognizes an immediate need for 2 new T-T faculty. Lack of sufficient faculty could seriously decrease the Department's ability to provide both undergraduate and graduate research, which threatens the Department's ACS accreditation. In line with this need, the Department also requires more equipment and research space for new faculty.

#### CAPR RECOMMENDATION

CAPR recommends approval of the Five-year Program review of the department of Chemistry and Biochemistry, and continuation of the program with modifications outlined by the Department. The next Five-year Review is scheduled in 2005-06.

Materials submitted by the department are available in the Academic Senate Office.