

External Review Committee Report

Comprehensive Program Review

Bachelor of Science in Chemistry

Bachelor of Arts in Chemistry

Columbus State University

Submitted: April, 2015

I. Introduction

A. Membership of Outside Committee

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B. Procedure Followed and Information Gathered:

In advance of the campus site visit, the Committee was provided with documentation in support of the Department of Chemistry's self-assessment. This documentation included program overview prepared by Dr. Floyd Jackson (Department Chair) and a detailed program self-study. The self-study included assessments of indicators of program quality and productivity, and summaries of the program's viability and a program improvement plan. A site visit was conducted on Oct. 3, 2014. On that day the committee met with the Department chair (Dr. Floyd Jackson), and toured the classroom and laboratory facilities.

II. Findings of the External Review Committee

a. Assessment of Program Quality

- The Committee's finds that the programs in Chemistry are above average.
- In most areas of evaluation, the assessments were either "above average", "very strong", or "satisfactory".

- Quality of faculty was very strong and their commitment to their students, programs and the University were excellent.
- All of the tenure-track faculty members hold terminal degrees in Chemistry, and all of the part-time and non-tenure track faculty possess either terminal degrees or the required training appropriate for the duties they perform.
- The curriculum compares very favorably with CSU's competitor and aspirant institutions. It provides a broad introduction to the chemical sciences, which is assured by the department's recent achievement of ACS certification. After completing a solid foundation of chemistry in the freshman-sophomore years, students have the opportunity choose from a number of degree options to pursue a degree that best fits their career choice.
- The quality of teaching is very strong, as indicated by the results of an alumni satisfaction questionnaire.
- Surveys of current students suggest an above-average satisfaction rate with course instruction in the data that was presented.
- There is room to improve the faculty adviser-student relationship. Currently an automated system assigns students to an adviser, and the assignments change yearly, not allowing a long-term understanding between the adviser and student.
- The Committee found the B.S. and B.A. in Chemistry to be above average and appropriate for students with a wide range of career goals and interests. In particular, the use of BS tracks in Applied Chemistry, Forensic Chemistry, and ACS Professional Chemistry allow students to rigorously prepare for a wide range of professional chemistry careers, while the B. A. in Secondary Education and Pre-professional Chemistry allow students with interests in teaching or health professions to major in chemistry while preparing for careers that are not directly related to chemistry.
- While space for equipment is somewhat cramped, the department has a reasonable amount of large pieces of technical laboratory equipment such as HPLCs, GCs, and GC-MS, though a large percentage is older models acquired through donations.

b. Recommendations for Improving Program Quality

- Laboratory facilities need to be upgraded to maintain a competitive, quality Chemistry program. Hopefully the new addition to LeNoir Hall will partially alleviate this problem.
- Sufficient funding must be sustained to maintain current equipment and replace older models. Furthermore, if a Biochemistry track is added to the BS degree options, new items of specialty equipment will need to be purchased, such as an ultra-cold (-80°C) freezer, autoclave and other equipment that is required to work with living organisms. While some degree of sharing equipment with the biology department is possible, if the program becomes as successful as hoped, it may not be convenient or even possible to share equipment.
- The Chair has a plan to develop an improved method of assigning students to advisers that should help in developing a longer-term relationship, which is important for student success, and should help with retention, progression and graduation. An additional measure to improve teaching effectiveness includes the development of learning communities for cadres of chemistry majors
- Currently, courses that are primarily service courses (Survey of Chemistry 1 and 2), require a large amount of faculty time. This might be reduced by reduced by offering these courses online, and a plan is in place to do this.

c. Assessment of Program Productivity

- The productivity of the program is satisfactory.
- While the number of graduates per year is slightly lower than comparable institutions, the retention rate is good, as the cost effectiveness is quite good. The department has proposals to increase the number of graduates, some of which are noted above.
- The faculty members are actively engaged in diverse service activities throughout the campus and community while effectively maintaining a heavy teaching load and pursuing research activities.
- The committee noted the numerous possibilities that are available to the students for undergraduate research, and a number of awards that were earned by students. We would recommend that the Department increases participation in presentations at state, regional and national events, as only one award was at such a venue.

- There needs to be a serious effort to provide more release time for current faculty members to pursue research. This could be accomplished by, for example, finding funds for a lecturer in the department. Engaging more undergraduates in research will increase retention and progression, even beyond those students directly involved in the research. Additionally, the only way to have a viable M.S. program is to provide research opportunities, and these cannot be developed on the spur of the moment when the grad students arrive. Only a significant, ongoing research program in the department will enable the department to participate fully in the M.S. program.

d. Recommendations for Improving Program Productivity

- As other departments have discovered, it is difficult to precisely assess retention, progression, and graduation rates. Development of a system to track these numbers would be beneficial, particularly if the data allows the department to better understand what slows progress, prevents students from graduating, or causes them to leave the major.
- Productivity of faculty could be increased by offering the Survey of Chemistry classes completely online as proposed, which would allow more efficiency in delivering the course with fewer faculty. Furthermore, offering the forensics and biochemistry tracks could increase the number of majors. Finally, adding the Chemistry track to the M.S. in Natural Sciences program would increase faculty productivity by attracting graduate students that could serve as teaching assistants, freeing faculty for other activities. In addition, graduate students can engage in faculty-supervised research that otherwise would not be pursued by the faculty themselves due to lack of time.
- While offering Forensic Chemistry classes, adding a Biochemistry track to the B.S. program, and adding a Chemistry track to the M.S. in Natural Sciences program would possibly improve the program productivity in a number of ways, it can only be possible with the addition of additional faculty members. We recommend at least two, but optimally three new faculty members would be required to accomplish these goals effectively. With no additional faculty, attempting all of these goals would likely lead to the failure of most or all of them.
- Tenure/tenure-track faculty and program productivity would benefit by reducing teaching loads from the current 12 hours. The cost of these workload reductions could be offset by increasing the use of lecturers, part-time faculty, and future graduate assistants if the Chemistry track is added to the M. S. in Natural Sciences program) to teach freshman classes and supervise lab sections.

- Additional funds should be made available for faculty to travel and present their research at professional conferences. At current levels of support, funds are inadequate to allow travel of faculty to professional meetings that are appropriate for their sub-disciplines.

e. Assessment of Program Viability

- The number of students in the program and the graduation rate of the Chemistry program is on par with similar institutions. Of those students that graduate and can be track, a number have been successful in obtaining employment in a chemistry-related career or admission to graduate school. With the recent attaining of the ACS certification, and the possibility of adding Biochemistry and Forensic Chemistry tracks to the undergraduate program this should only improve. Furthermore, the need for service classes will likely increase in the near term as more students are interested in medically-related careers. With the dedicated faculty in place now, and hopefully more in the future, the committee finds the Chemistry program to be very viable and essential to the function of the university.

f. Recommendations for Improving Program Viability

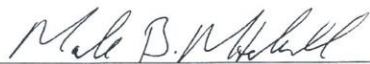
- Retention, progression, and graduation (RPG) rates are low across most USG institutions, including CSU. The retention of the ACS certification should improve this, as students will have confidence that their degrees will be recognized as a rigorous preparation beyond the immediate university setting.
- The expansion of the Survey of Chemistry classes to fully online should free some time for faculty to develop the Forensic and Biochemistry B. S. tracks.
- The Chemistry track in the M.S. of Natural Sciences will improve both student and faculty research and publishing opportunities, while also providing graduate teaching assistants to teach laboratories and free the faculty for research.
- The committee concurs that the hiring of at least two tenure-track faculty and one lecturer would greatly increase viability. This, along with the expansion into LeNoir Hall, is the minimum necessary to achieve the other objectives listed above. Providing these resources will, we believe, make the department very competitive in the region, will help to grow the program by providing increased research opportunities for faculty and students, improve retention and progression in the department, and enable the department to participate in a significant way in the M.S. in Natural Sciences degree program.

III. Final Recommendation of the Review Team

In summary, the external review committee recommends the following:

- Upgrade laboratory facilities and establish a means of updating equipment as necessary
- Allocate adequate funding to ensure that vital laboratory equipment is available and operational
- Add two new tenure-track faculty members with expertise that complements that of existing faculty, and an additional lecturer
- Reduce teaching loads of tenure-track faculty from the current 12 hours per semester
- Develop a tracking system to better assess RPG
- Proceed with development of the new MS Chemistry program, and the B.S. tracks in Forensic Chemistry and Biochemistry
- Increase funds dedicated for faculty travel to professional conferences

Signature Page



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