Chemistry Program Review

Faculty of Science

Dean's Summary

Submitted by:
Dr. Lucy Lee, Dean of the Faculty of Science

Accepted by:
Senate in September 2015
Academic Planning and Priorities Committee in June 2015

The Program Review Committee of the Chemistry Department has reviewed the report of the External Review Committee. Overall, the document is fair and balanced, identifying the major issues our department faces, and offering several reasonable recommendations. We will review their findings, respond to their recommendations, and correct a few minor omissions or errors that surfaced in their report.

Areas of agreement:

The committee correctly identified several problem areas, focussing on the followinx The need to hire an analytical chemist to pr
analytical chemistry courses, thereby provi
x The need for more diversity in the upper le
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completely. Unfortunately, the number of sections of organic that can be offered are limited by the lab size, the number of special glassware kits we have, and our lab technician support.

It must be noted that offering Organic Chemistry in the new Chilliwack CEP lab is not a viable option. The new lab does not have the equipment or required plumbing to run organic chemistry, and we have estimated that to retrofit the lab and purchase additional glassware and/or equipment could cost in the range of $60,000. Also, our lab technician support at CEP is shared with Biology. Therefore, it would seem most sensible to focus and future resources that might come available on the Abbotsford campus.

Recommendation 1.4: That there be no Automatic Cancellation of Low-enrolled Upper-level Courses.

As mentioned in the report, this is more of a student perception than a reality, in that we have only had to cancel a couple of sections due to low enrollment over the past 6 years. However, there have been numerous semesters where specific courses were "threatened," when they had few students enrolled, and this unease about whether courses would run was felt by the student body. Unfortunately, Chemistry, along with other challenging disciplines, will always have a few upper level courses that only attract the most dedicated students, usually those in the Major program; and that is precisely why such courses must run. Fortunately, most of our upper-level courses have seen enrollment increases in the past few years. We attribute this to reserving seats for majors and minors, to spill-over from Biology students who cannot always get into their own courses, and to increased research options available to students in the department. But we feel very strongly that these key courses populated often by a handful of majors must run. The option of converting the course to a directed studies course is not appealing to faculty, as the workload, though reduced due to less grading is still very significant. Perhaps some other mechanism, such as reduced workload credit for very low-enrolled classes, could be implemented to give faculty more options to choose from.

Recommendation 1.5: That the department offer an Honors Program which would include a Research Component.

This is an idea we have been considering for some time, and will develop a proposal over the next year. The department currently has four research-active faculty, and thus could accommodate a number of honors students per year quite easily. Such an option would make the degree more attractive and be of benefit to students who wish to pursue graduate studies.

Recommendation 1.6: Develop a Molecular Modeling Program

The committee recognized the key role played by a faculty member and his molecular modeling lab in fostering student research within the department. We have recognized for years that a majority of our Majors spent time doing research with this faculty member, and this was one of the reasons we have worked very hard to develop a more comprehensive research climate in the department over the past 9 years. The faculty member is leading the development of a Modeling Major that will involve contributions from Math and Physics and CIS as well, and we will support and assist this effort.

Recommendation 1.7: That there be decoupling of upper-level labs and lectures. And also that thought be given to rationalizing and streamlining upper-level lab experiments.

We began this process with the inorganic chemistry upper-level courses about a year ago. We plan to restructure the organic courses in a similar manner. In addition, the quantum chemistry and physical chemistry courses will be restructured to fit into the Molecular Modeling Major. These changes should result in cost savings, and improve scheduling options.

Recommendation 1.8: That a Masters degree in Integrated Science and Technology be developed.

This is being developed by a working group struck by the Dean of Science.

Recommendation 1.9: The committee affirms the use of problem-based learning.

While all instructors utilize problem-solving in their classrooms and labs, we have not formally adopted the problem-based learning approach as a department, nor do we have faculty who have restructured their courses to utilize this approach. One of our faculty has expressed a desire to explore this mode of instruction, and the department would certainly support such an experiment and examine the results with interest.

Recommendation 1.10: Examine all courses to ensure they are being offered at the proper level and with sufficient rigor.

We do not have a large number of 400-level courses, and are confident that all are being offered at an appropriate level. As mentioned earlier, we are in the process of developing two new 400-level selected topics courses. Thus, now would be a good time to review our upper-level offerings as a department, especially as we will be restructuring several of the 300-level courses as well.

Recommendation 1.11: That an internal curriculum committee be established.

The Department does have a curriculum committee, which fulfills the roles suggested by the external committee.

Recommendation 1.12: Troubleshooting of all classroom lab experiences should take place in the summer.

This is an odd recommendation, as most of our labs have been delivered often enough that troubleshooting is not required. Of course, this is good advice for labs that need altering or for the introduction of new labs, and this would normally be done.

Recommendation 1.13: The chemistry department should seek accreditation of their program with

in the field of environmental chemistry. This would provide the department with an analytical chemist for the first time, allowing us to properly develop courses in this area, and allow us to develop courses that would fit in with the universities interests in environmental issues. The faculty of arts is currently

The Departments and Dean are aware of this problem and the need for instrument replacement funds and further technical support for existing instrumentation. The university should consider reallocation resources to meet this need.

Recommendation 2.8: Further training and certification for lab instructors and lab technicians.

The suggestion that at least one lab technician should have first-aid certification is a good one that will be investigated. This should also be considered for one or more faculty involved in teaching labs, most likely a lab instructor, so that the department would have a back-up person available.

Recommendation 2.9: There should be one individual within the department to whom all lab technicians report.

The two Abbotsford lab technicians divided their workload by consensus, while our Chilliwack lab technician took care of all courses on that campus. Even with the arrival of a third 60% position in Abbotsford, this setup has worked seamlessly with no problems or concerns. We do not see any need for change at present. Also, the lab technicians do report to the Department Head, and there is clear communication between those parties.

Recommendation 2.10: That there be a regular review of job descriptions within the department, particularly for the lab technicians.

This is a reasonable idea, as the lab technician workload has grown over the past few years as we increased the number of organic and inorganic sections. In light of the recommendations for lab technicians to have first-aid training, a formalized review of job descriptions would be in order.

Recommendation 2.11: That the department assistant appointment be moved from a 0.3-time appointment to at least a 0.5-time appointment and assigned only to Chemistry

The Chemistry and Physics departments together have as many students as the Biology department, and thus should have a full-time assistant between them. Increasing the position from 0.3 to 0.5 per department would have several benefits besides providing increased support to the Heads.

3. Facilities and Equipment

Recommendation 3.1: Increase space for faculty and student research.

Like the other science departments, the Chemistry Department suffers from a lack of space for the growing number of research faculty and their student researchers. One short term solution is to move the Student Science Center allowing Chemistry to use the space as an equipment room with additional bench space. This would significantly alleviate pressures and provide more bench space and instrument space. Eventually, the wall separating A373 from A385A (the organic chemistry lab instrument room) could be removed or have a door installed, connecting the two rooms and allowing for efficient use of

recommendation is not possible in the near-term in the current fiscal climate, unless external funding could be obtained. However, this could be put in long-term planning. Another option that is aimed solely at instruction would be to purchase a benchtop NMR, which operates with an electromagnet at much lower frequency (about 60 MHz). This would be much more affordable and not require continued purchase of cryofluids.

Recommendation 3.3: Ensure proper functioning of the glove box.

Recommendation 6.1: That changes be made to the co-op program as it currently exists.

To date, the co-op program has not functioned very well within the faculty of science. This appears to be due to the current structure of the program, and the available job postings in the area of science. The committee recommends giving a faculty release for someone to liase with the co-op office, and for the department to give course credit for co-op placements. The former suggestion has merit, and the latter suggestion could perhaps be implemented.