

Department of Chemistry & Biochemistry

The report is written to comment on our progress since the last report in the following categories:

- (1) enrolment pressures and delivery of our internal and external service requirements,
- (2) senior undergraduate program delivery;
- (3) graduate student completion times; and
- (4) Replacement of the 300 MHz NMR update

Items taken from the unit review report are noted in italics. Departmental responses and additional notes follow each of these items.

(1) Enrolment pressures and delivery of our internal and external service requirements

- a. *There has been substantial growth in the number of students in service courses over 20% in the past 5 years and even more (over 200%) during the past 10 years. “extraordinarily high service load for a department of a modest size. Impact of the growth needs to be addressed*

Update for fall 2019 (since last report) for high enrolment 1st and 2nd year courses –courses such as CHEM104, CHEM140, BIOC 220 were at our maximum enrolment. These courses also have a lab requirement which is at our maximum for capacity. The change in requirements in the faculty of Engineering and Applied Science requirements have lead to a small decrease in enrolment (estimated around 30 students) for CHEM140, but we are anticipated that there will be a similar increase in enrolment in CHEM105 during the winter semester. This change has made it feasible for us to add an additional lab section for CHEM241 (organic chemistry II) to accommodate the increase in enrolment which has continued from prior years. CHEM241 is in addition to CHEM241 as a core requirement of our chemistry and biochemistry programs it is a course requirement for the pre-pharmacy students so we have seen increased pressure over the last several years. BIOC220 enrolment has also been set to maximum enrolment for the classroom and lab availability and has continued to be strong in fall 2019. This increase in enrolment has continued to other BIOC courses including BIOC321 (required course for BIOC majors) in the fall with enrolment increasing from 16 to 30.

CHEM140, CHEM104 are also taught in the winter semester.

| Course | Fall 2018 | Fall 2019 |
|---------|-----------|-----------|
| CHEM100 | 91 | 148 |
| CHEM104 | 408 | 433 |
| CHEM140 | 156 | 139 |
| CHEM241 | 57 | 75 |
| BIOC220 | 138 | 129 |
| BIOC321 | 16 | 30 |

See graphical representations of longer term trends in Appendix

The lab capacity is currently at its maximum in the fall semester to accommodate all CHEM and BIOC course requirements.

- b. *Regarding the current size of the Department of Chemistry & Biochemistry, any reduction in its size can severely damage its teaching and research ability*

The department has completed a successful search for the CRC Tier 2 candidate in biochemistry. Dr. Omar El-Halfawy submitted both his nomination application for a CRC chair and his CFI application in October, 2019 and the department looks forward to his arrive conditional on successful nomination as a CRC chair.

The department has initiated its search for an assistant professor in chemistry in an NMR research related area. The interviews for 3 short-listed candidates are currently in process of arranging schedule and are planned to be Dec 2-3, Dec 9-10, and Dec 12-13, 2019. The candidates research areas cover the areas of organic chemistry or physical chemistry and upon completion of the search the department will adjust its teaching assignments to reflect the new candidates expertise.

These new faculty members are expected to start teaching by winter 2021 at the latest which will ease the pressures on coverage for course and demand for sessional instructors.

- c. *The Department has taken a number of steps to accommodate the increased teaching workload, but it appears that the demands on staff are high and the available resources are stretched to the limit*

We continue to be at our limit of delivery for our current faculty and laboratory instructor complement and lab space availability. *The department is managing the increased enrolment through balancing enrolment in some courses such as CHEM104 and CHEM140 between the fall and winter semesters. With additional support from the new faculty these pressures should be more manageable by 2021. In addition to this the department has still created new initiatives such as lab recitation for CHEM104 and team taught teaching at the CHEM/BIOC4xx/8xx level.*

- d. *TA support needs to be increased within our budget*

The department appreciates the additional support for TAs that was provide this semester above our budget to allow us to cover enrolment demands in our courses with continued increasing enrolment.

If there is need for increased enrolment we will need to also increase our laboratory instructor complement. This semester we have a sessional laboratory instructor covering some sections of general and organic chemistry to accommodate a leave request. We have changed lab assignments taught by most lab instructors this semester on short notice to accommodate the leave request and this has also enabled us to do some cross-training of course content.

The enrolment in the biochemistry program has also increased over the last several years particularly with the changes in medical school requirements and we are at our maximum capacity in lab instructor and space availability.

e. Addressing Student Retention

As noted in our last report our department has started in fall 2019 a change to the lab for CHEM104 with a required lab recitation component for all students. Students take a lab in one week of every two and in the alternating week do lab recitation in groups which involves students doing problem exercises (see syllabus in appendix). It is still early in the semester but current indications suggest this is improving student success and work habits. We have partially managed the TA needs by reducing the number of TAs used for marking assignments in the lecture (to approximately 50% of prior years). The lab recitation in fall 2019 has been lead and coordinated by Dr. Stephen Cheng and Dr. Lynn Mihichuk who have also provided training to graduate students on conducting group problem solving exercises with undergraduate students. We are planning to continue with the lab recitation for CHEM104 in the winter semester with a sessional lab instructor providing the coordination (we have 5 lab section in winter) and then will further evaluate whether to continue with this approach.

(f) Departmental Action –Our greatest need to deal with both program delivery needs, service needs to other departments and faculties.

- i. We are also anticipating retirements in the upcoming years of faculty members in areas of both chemistry and biochemistry. As noted in the unit review any reduction in faculty complement will severely damage our ability to meet requirements for internal and external service requirements. Our faculty complement currently consists of 4 biochemistry faculty members, 7 chemistry faculty members, and 5 laboratory instructors (1 term position), 1 technician, and 1 administrative assistant. It is very difficult to find sessionals with suitable background for our upper level chemistry & biochemistry classes which makes it challenging to accommodate increasing enrolments and leave requests, but we have been managing our needs.
- ii. Shared laboratory LB320 with Biology and other options are still under consideration do deal with potential enrolment growth beyond fall 2019. In winter 2020 the faculty of biology has accommodated our request to offer one lab section of inorganic chemistry (CHEM230) in LB320 which allows us to ease pressures in other laboratories. We thank the department of biology for providing us this opportunity. In the fall semester the department fully utilizes this room for laboratory requirements. In fall 2019 we also conducted the lab recitation in LB320.

(2) senior undergraduate program delivery

As noted in the unit review report “ Due to the high teaching load to 1st and 2nd year courses the department has limitations in offering senior courses on a regular basis. Notable disadvantage for undergraduate students”

–our senior program would benefit from some structural changes to strengthen our availability of offerings within our limitations of faculty complement.

Response:

With our size of our faculty complement it has been challenging to address needs for changes at the 4xx level, and we are currently at the minimum in offers required to meet student program requirements due to our high internal and external service requirements at the 1st and 2nd year level.

Senior course and graduate courses were highlighted as a limitation and to address we started team taught courses in winter 2019 semester. We continued with this approach for both fall 2019 and winter 2020. We have scheduled one team taught course in chemistry and one in biochemistry each semester which has allowed most faculty to teach this new course style. We will continue to evaluate the use of team taught courses over several more semesters and have discussed this on a regular basis at our department meetings. To date the BIOX4xx class has had no interest from graduate students to take the BIOC8xx class, while the CHEM4xx/8xx class has had enrolment from both undergraduate and graduate students. We are anticipating that some graduate students will take the BIOC8xx class in the winter 2020 semester.

Our department currently does not have the faculty complement to support teaching separate CHEM8xx level courses and has recommended no change at current time while we evaluate team-taught courses. The department still has some need to teach some CHEM4xx/8xx reading classes for those students without the pre-requisite requirements in the final year of study.

(3) graduate student completion times

Time to Completion of graduate students and writing requirements within the graduate program. With an eye to streamlining the number of literature, proposal, and presentation exercises required.

- The department has started the new recommended timeline to completion in fall 2019 for students that started their program in summer 2019 or fall 2019. See attachment for new recommended timeline for graduate students. The department Head and graduate co-coordinator meet with each student individually and go through program requirements and address questions of new graduate students. The timeline for completion is also discussed with the supervisor prior to meeting with the new graduate students.
- The department Head also meets with the graduate students as a group who are currently in the program to discuss the timeline, address questions, and encourage involvement in the

department. We have seen significant progress on completion of progress reports and thesis preparations for students on maintenance status.

- We have re-initiated a journal club for graduate student in fall 2019 which is run by graduate students and a postdoc. This allows students to present in a peer environment (no faculty) and improve their skills. Library skills training for literature review will also be planned on a yearly basis during the journal club time slot.

(4) Replacement of the 300 MHz NMR update

We initially anticipate this replacement needs of the 300 MHz NMR to be completed within a 3 year time window (unit review), however the 300 MHz NMR stopped operating in March 2019 and repair was no longer feasible. The Dean of the Faculty of Science set-up an account to support the budget for replacement of this NMR with a 400 MHz NMR. The NMR has been ordered and anticipated delivery is expected December 10, 2019. We are accommodating the demand for NMR analysis for our teaching labs and research with the aging 500 MHz NMR. The 500 MHz NMR quality of spectra obtained are poor so we are just meeting our minimum requirements but this was the best solution for the current semester until the new 400 MHz NMR is operational. It is anticipated that the 500 MHz will need repair or replacement in near future. We have made several attempts to trouble shoot the repairs on the 500 MHz NMR which to date have not improved the quality of data. With the new Chemistry faculty member with specialization in NMR we anticipate submission of an EOI for CFI Innovation related to the replacement of the 500 MHz NMR which is ~15 years of age. NMR is essential to the delivery of our programs and research of faculty in our department and the Faculty of Engineering and Applied Science. It is considered to be a core piece of infrastructure at all Canadian Universities with a chemistry program.

Attachments

1. Recommended Time to Completion Timelines and course sequences for M Sc and Ph D graduate students in the Department of Chemistry & Biochemistry
2. Syllabus for lab recitation for CHEM104
3. Graphs for enrolment trends

PhD:

| Date | Student | Committee | FGSR |
|-----------------------------|---|---|--|
| 1 st year | BIOC/CHEM 8xx BIOC/CHEM 8xx | | |
| End of 1 st year | research proposal due | Committee meeting 1 | FGSR progress report submitted by supervisor |
| 2 nd year | BIOC/CHEM 800 Department Seminar 1 | | |
| End of 2 nd year | Progress Report 1 due | Committee meeting 2 | FGSR progress report submitted by supervisor |
| 3 rd year | BIOC/CHEM 801 | | |
| End of 3 rd year | | | FGSR progress report submitted by supervisor |
| 4 th year | Department Seminar 2 Progress Report 2 due | Committee meeting 3. Approval to write thesis | |
| End of 4 th year | Submit thesis. Defense | Thesis approval. Defense | Thesis approval. Defense |

Note: Students not prepared for Progress Report 2 during the 4th year of their PhD must apply to the Department of Chemistry and Biochemistry Head for a deferral. The length of the deferral will be determined by the Head in consultation with supervisor and student.

MSc:

| Date | Student | Committee | FGSR |
|-----------------------------|---|--|--------------------------|
| 1 st year | BIOC/CHEM 8xx BIOC/CHEM 8xx | | |
| End of 1 st year | progress report 1 due (application for transfer to PhD if applicable) | Committee meeting 1. (approve transfer to PhD if applicable) | |
| 2 nd year | BIOC/CHEM 800 Progress Report 2 Department Seminar | Committee meeting 2. Approval to write thesis | |
| End of 2 nd year | Submit thesis. Defense | Thesis approval. Defense | Thesis approval. Defense |

CHEM 104 Lab Recitation Fall 2019

Contact Information: Dr. Stephen Cheng
Office: RI-316
Phone: 306-337-3290
Email: Stephen.Cheng@uregina.ca

General Information

The mandatory lab recitation is part of the CHEM 104 laboratory. The objective of the lab recitation is to give students the opportunity to acquire study skills and practice chemistry problems to succeed in CHEM 104. The lab recitation sessions start the week of September 16, 2019 in LB-320 and run on the alternate weeks of the laboratory. Before each lab recitation, please review and print out the group exercises for each lab recitation session on UR Courses: **CHEM 104 Lab**. Be sure to bring the group exercise sheet to the lab recitation. In each lab recitation, you will first work in groups to do the group exercises. Then, you will individually do a short quiz containing a few questions similar to the group exercises; you may use the notes taken during the group work to help you do the quizzes. The quizzes will immediately be marked; if you fail the quiz, you will be given a second opportunity with a different set of questions. You may also choose to try the second quiz if you want more practice and/or to get a higher grade.

Grading Scheme

Lab recitation is worth 10% of the CHEM 104 course grade. There are 5 lab recitation sessions and each session is worth 20% of the lab recitation grade or 2% of the course grade. You will be evaluated based on your participation in the group work and your performance in the quizzes. Participation and the quizzes are each worth 50% of the lab recitation grade respectively. Since the lab recitation is part of the laboratory, failing to attend the lab recitation will result in a grade of NP in the course.

Start Time and Attendance

Lab recitation starts at 8:30 am or 2:30 pm **SHARP** depending on your section. Students who arrive late and/or do not participate in the group work will lose marks since you will be evaluated based on your participation in the group work. If you miss the entire group work, you will receive zero mark for participation. Note that participation is worth 50% of each lab recitation session.

If you are unable to attend the lab recitation due to illness or family emergency, you must contact Dr. Cheng **BEFORE** the lab recitation takes place; otherwise, no accommodation will be granted. Please provide official documents such as a doctor's note to support your claim. Accommodations will be made on a case-by-case basis.

If you need to be excused from a future lab recitation for a valid reason (such as playing for a university sport team), please contact Dr. Cheng **at least 2 weeks** in advance to discuss your options.



