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TO: Digvir Jayas
President and Vice Chancellor

DATE: January 2, 2025

FROM: Lynn Kennedy
Chair, Academic Quality Assurance Committee

RE: Chemistry Program Academic Quality Assurance Review

In accordance with the U of L *Academic Quality Assurance Policy and Process*, the Academic Quality Assurance Committee approved the review of the Chemistry Program at its December 10, 2024, meeting.

The Self Study Committee for this review was comprised of Peter Dibble (Program Review Coordinator), Paul Hayes, and Ying Zheng.

The review produced 4 documents:

1. Self Study Report. Written by the Self Study Committee. Received February 29, 2024.
2. External Review Report. Written by (names of reviewers and institutions from) based on a site visit (dates of visit). Received June 24, 2024.
3. Program Response. Written by the Self Study Committee. Received October 2, 2024.
4. Dean's Response. Written by Matt Letts, Dean of the Faculty of Arts and Science. Received November 20, 2024.

Self Study Report

The Self Study Report asked for External Reviewer feedback on several areas:

Teaching

- Are we allocating our human resources effectively?
- In the view of the external reviewers, is the current allocation of our teaching resources appropriate, or should we seek to rebalance our teaching portfolio? To put it another way, is our current allocation of human resources to various teaching activities offering students the best possible experience within our available resources?
- Of course, resources allocated to teaching activities also have an impact on our ability to provide appropriate work assignments. Does our current allocation of human resources strike the appropriate balance between teaching and research?
- Do we allocate appropriate teaching credit (as coordination) for those who train and oversee work performed by graduate student TAs (both large 1st and 2nd year courses (typically Instructors) and small 3rd and 4th year courses (typically Professors who do not receive any such credit)?
- Could we better coordinate/standardize the support we provide graduate student TAs? Do we provide appropriately developed resources to our graduate student TAs?
- Do we allocate sufficient TA support to the delivery of lectures (in the form of grading, exam invigilation, creating homework questions, providing in-class support for learning activities, answering student questions outside of class, etc.)?
- Currently, we do not receive teaching credit/recognition for supervising undergraduate research-based
- Independent Studies students or graduate students – should we advocate the Dean of Arts and Science to change this policy, and if so, what model would you suggest?

Research

- While taking into account the size of our institution, how is our research performance within the context of the national profile?
- Are our two research institutes, C-CRAFT and ARRTI, appropriate and appropriately resourced? Are they positioned to have an impact on the Canadian and international research scene?
- Is our current teaching load of 4 courses/year appropriate for chemistry faculty members with active, externally-funded research programs?

The Undergraduate Experience

- Are there areas in which we offer little or no instruction and in which we could reasonably be expected to offer courses?
- Are there other aspects of our curriculum that need to be reconsidered?
- How do our undergraduate labs compare to those offered elsewhere? Are they modern and do they make appropriate use of available facilities and equipment?
- Are there areas of our lab curriculum we should particularly target for revision?

- Are there additional supports we should put in place to ensure our chemistry students succeed?
- Should we make any changes to encourage more students to choose chemistry as their major?
- Do we offer a sufficient number of regularized courses offered in the traditional sub-disciplines of chemistry (two in each organic, inorganic, physical and analytical)?
- Is the frequency, breadth, and diversity of our seminars appropriate?
- Do our students receive sufficient training to prepare them for chemistry-related careers?

Outreach

- The Department has been involved in a range of outreach activities. The Chem Guys (two of our Instructors) went on the road to high schools to do demonstrations and there were also University based events, such as summer camps. Let's Talk Science also hosts students at hands-on events. We consider these activities important for recruiting students to study science and to consider our institution for enrollment. Over the years, the safety requirements for such events have become extremely onerous; accordingly, we have curtailed some of this activity. What has your experience been in this respect?

Financial Resources and Facilities

- The cost of Independent Studies and Honours Thesis courses is currently borne by researchers. In your experience, is this typical? If not, what is a typical arrangement for funding for-credit undergraduate research experience courses?
- What mechanisms would you normally expect to see in place to fund routine research equipment maintenance?
- The NMR Facility has a manager and a technician, and the Core Facilities also has a manager. The Department has one Instructor whose duties include looking after equipment and glassblowing. The Faculty of Arts and Science used to have one electrical/electronics technician and one machinist, but these positions were eliminated. Do we have adequate technical support for the amount and variety of equipment in the Department of Chemistry?
- For a university of the size of the U of L, is technical support best organized at the Department or at the Faculty level?
- Should we consider other models for maintaining and repairing research and teaching equipment?

The body of the report noted several strengths of the Chemistry Program:

Undergraduate Teaching Strengths

- 1st and 2nd-year programs are in good shape (36% enrollment growth in last 7 years). 3rd and 4th-year classes for Chemistry majors have grown to a typical size of 10-15 students.
- Standardized course offerings over all sections of 1st and 2nd-year courses.
- Research-based Independent Studies courses.
- Hands-on experience with cutting-edge equipment, such as Benchtop NMR spectrometers for undergraduates, as well as instruments in the Magnetic Resonance and Central Analytical Facilities.

- Increased breadth/depth in senior course offerings (CHEM 4000 / 4010 (includes laboratory component)). 3rd-year chemistry courses are once again being offered every year.
- Large number of Teaching Fellows and Teaching Award recipients.
- Large interactive real-life Periodic Table engages public and students of all levels.
- New lab space and new lecture halls (Science Commons). We now have dedicated lab space for 3rd and 4th year labs.
- Outreach programs: Destination Exploration, Chem Days (New), iGEM- Brings in students to U of L, Let's Talk Science, The Chem Guys, Clubs – ACID:BASE, UCS, GSSC.
- Medium size of institution and ample direct interaction with Instructors and Professors.
- Interactions with industrial partners, such as Blue Sky Analytical Labs and Flexahopper Plastics.

Infrastructure/Research Strengths

- Chemistry instrumentation, both teaching and research, is excellent.
 - Synthetic chemists, breadth of research expertise.
 - Strong undergraduate to PhD recruitment.
 - Three research chairs
 - High percentage of well-funded NSERC-funded researchers
 - Many national and international recognitions/awards
 - Excellent representation on NSERC Committees.
 - C-CRAFT, ARRTI research institutes.
- Financial services now allow for revenue generation, which is used for instrument maintenance and repairs. Science Stores has created efficiencies and cut cost for some items. Minimal internal charges for equipment use.
- Core facilities: Magnetic Resonance Facility, Science Commons contains a substantial number of large fume hoods (excellent ventilation in teaching and research labs), Quality of equipment generally; addition of polymer characterization suite (DSC, TGA, powder X-ray diffraction, etc.), Central Analytical Facility.
 - Addition of Core Facility manager; new support position in MR center.
- Quantity and quality of research space; shared lab space has created communities of graduate students.
- Industrial Partners (Blue Sky Analytical Labs, Flexahopper Plastics) can provide access to new equipment via grants that require an industrial partner.

The following weaknesses and challenges were mentioned in the body of the report:

Teaching

- Extremely low number of Faculty Members (only one) who identify as women.
- No analytical chemist.
- No funding or teaching credit for Independent Studies or Honours Theses.

- No teaching credit for supervising graduate students.
- Seminars are infrequent and irregular.
- Co-op, B.Sc./B.Ed. and B.Sc./B.Mgt. underutilized.
- Concerns about covering our teaching program/replacement of retirees and those seconded to senior administration.
- Specific CHEM 4000 and 4010 courses are offered irregularly, which makes planning difficult for students.

Infrastructure

- Maintenance of equipment.
- Loss of capital renewal program.
- No mechanism or system in place to repair or replace equipment.
- No technical support in electronics/fabrication.
- Lack of clear process for scientific software licenses.

Research

- Difficulty recruiting graduate students, particularly domestic students.
- Lack of breadth, particularly in the area of analytical chemistry.
- Lack of financial and technical support for equipment. Lack of IT support for Linux and HPC resources.
- Teaching load is higher than at our competitors. Faculty Member burnout.
- U of L is not always thought of as a comprehensive University.
- International student recruitment/screening/training. High tuition costs for international students.
- Lack of faculty members who specialize in materials, polymer, and analytical chemistry
- No funding available for external examiners to participate in M.Sc. or Ph.D. defenses in person.
- Lack of substantial financial support for seminar series.

Recommendations from the body of the report:

- Workload concerns continue to be a serious issue, particularly with respect to competing on the national level. Between administrative appointments and retirements, we are now down three full faculty members. Over the last decade, we have managed to cover such deficiencies in teaching, but without additional resources, we cannot maintain our program and research output – it simply is not sustainable.
- It is imperative that our researchers have the necessary time to devote to those activities and an obvious starting point would be to provide teaching credit/recognition for supervising graduate and Independent Studies students. Inflation has stretched stagnant grants to the breaking point. We can no longer afford to use our external research funds to cover the costs of Independent Studies and Honours Thesis projects. The lack of a minimum graduate student stipend, as well

as increasingly higher offers from other institutions is making it incredibly difficult for us to provide competitive packages and recruit the best students. track record of success in this regard.

External Review Report

The External Review Report contained ten (10) recommendations for improving the Chemistry program:

- The University of Lethbridge should consider the possibility of creating a Faculty of Science.
- The complement of tenured/tenure-track professors in Chemistry should be increased to ten within three years and diversity considerations should be forefront.
- The Department should work with the Senior Administration to determine how the supervision of graduate students can be appropriately recognized at the University of Lethbridge.
- The number of administrative and technical support staff in Chemistry should be increased to five within three years and immediate attention should be given to the appointment of an instructor with expertise in analytical chemistry.
- Relieving the instructors of their many technical and administrative roles would allow them to focus on developing innovative laboratory programs and to participate fully in the academic programs of the Department.
- The job descriptions and titles of the instructors should be revised as additional technical and administrative support staff are appointed.
- The Faculty of Arts and Science should create a Safety Compliance Officer, or equivalent, position.
- As the Department of Chemistry and Biochemistry grows, it is important to keep faculty members in close proximity in order to build upon the excellent collaborative and collegial atmosphere within the Department.
- The Department must work towards developing an equitable solution to their Independent Studies courses that includes recognition for faculty member participation and student experience and evaluation.
- The Department should develop a training program for TAs that includes specific course training, EDI training, safety training and resource guides as a minimum.

The following, taken from the report, note the challenges discussed:

- “In relation to the teaching and research productivity of the Department, the number of administrative and technical support staff is likely the lowest among comparable departments in Canada.”
- “[The Chemistry faculty] are exceptionally productive researchers, but they struggle to meet the range of topics required for CSC accreditation, especially with respect to analytical chemistry. Additionally, several members of the Department have moved into senior administrative roles with reduced to no teaching load, recognizing excellence in leadership yet leaving significant gaps within the Department.”
- “The students we interviewed indicated that there is a need for more upper level courses in several areas including analytical and organic chemistry. We also learned that students think there are not

enough opportunities for research experience at the undergraduate level, despite the availability of Independent Studies (IS) courses and the option of doing an Honours thesis. They also indicated that they felt they were not receiving enough training in analytical chemistry specifically readying them for industrial-based careers.”

- “We learned that the job descriptions of the instructors include many responsibilities beyond teaching chemistry. There is a long list of administrative and technical activities that have been assigned to the instructors. They also contribute to the very significant outreach programs of the Department. The job descriptions of the instructors are antiquated and should be reviewed as new technical and administrative support positions are added to the Department.”
- “One instructor is partially responsible for ensuring safety protocols are up to date, while researchers are accountable for compliance in the chemistry research spaces. The shared model of research space makes this particularly challenging. For instance, one professor has taken it upon himself to always ensure that the fume hood sashes are properly used. The instructors should not be required to prepare routine solutions for undergraduate laboratories and provide technical services that would normally be handled by technical staff.”
- “We learned that the Department and students rely heavily on Independent Studies (IS) courses to ensure that students have the required number of chemistry credits to graduate and to fill major gaps in upper level courses. Faculty members are volunteering their time for these IS courses, and this work is not recognized as part of their teaching loads. Students felt that they were not equitably offered and that there is no consistency in the evaluation of IS courses. The University of Lethbridge program with its heavy emphasis on Independent Studies (IS) courses and research opportunities excels at preparing undergraduates for graduate studies but is weak in terms of its offering of advanced courses due to the small number of professors.”

The following, taken from the report, note the opportunities discussed:

- “Over time the qualifications of the instructors have tended to increase. Three hold Ph.D. degrees from major universities and two are M.Sc. graduates of the University of Lethbridge. Given their qualifications and the abundance of other work they are doing, they should be relieved of some of their technical and administrative responsibilities, given more responsibility for the delivery of the courses, and allowed time for introducing new experiments in the laboratory programs.”
- “We learned that students felt that the content of some lab experiments could be updated to match the state-of-art facilities. The current complement of instructors are highly qualified to develop and improve the content of courses and labs at the first and second year levels.”

Program Response

In their Program Response, the Self Study Committee addressed the recommendations from the External Review Report:

<p>1. <i>The University of Lethbridge should consider the possibility of creating a Faculty of Science.</i></p>	<p>The prospect of forming a Faculty of Science was raised during the restructuring exercise and there was broad support among the Department of Chemistry and Biochemistry. Unfortunately, this discussion was derailed by job action, and in particular, by widespread complaints about the restructuring process in the wider University community. We strongly believe, however, that it is worth initiating such discussions within the science departments, an action that the reviewers clearly think this would be a positive development.</p>
<p>2. <i>The complement of tenured/tenure-track professors in Chemistry should be increased to ten within three years and diversity considerations should be forefront.</i></p>	<p>One of the problems with the current model of our Faculty of Arts and Science is that the science departments never have an opportunity to discuss important issues that pertain principally to the sciences: funding matters (particularly with NSERC), workload, graduate student supervision and funding, technical support, more control of our programs, etc.</p> <p>It is necessary to point out that while the Department of Chemistry and Biochemistry has grown substantially over the years, that growth has been almost exclusively on the biochemistry side to support the biochemistry program. In 2006, the Department had eight active chemistry professors, excluding those with senior administrator roles; now we have only six and are hiring a seventh. This shrinking has occurred despite an increase of more than 50% in yearly undergraduate chemistry credits provided over this period. This limits our ability to deliver a top-quality undergraduate program – our students have (rightfully) complained about both a lack of 4000 level course offerings and an insufficient number of opportunities for research-based Independent Studies. These and other issues have severely impacted workload, which is discussed below.</p>
<p>3. <i>The Department should work with the Senior Administration to determine how the supervision of graduate students can be appropriately recognized at the University of Lethbridge.</i></p>	<p>The Faculty of Arts and Science equates workload with teaching load. The reviewers point out that Chemistry faculty members spend a great deal of time, effort and research funds supporting the graduate and undergraduate programs (e.g. Independent Studies, Honours Theses, Applied Studied). In Arts and Science, >80% of these activities take place in the sciences. In Chemistry, faculty members directly train their students in the hands-on techniques associated with their research area. This is an extremely time-consuming endeavour that includes equipment maintenance, ordering of chemicals and supplies, creating and maintaining inventories, developing and ensuring standard operating procedures, overseeing all aspects of chemical safety and much more. We receive absolutely no credit for this effort, which is an obvious inequity when compared to those who do not participate in such activities. The reviewers recommend that this inequity be addressed; something that would be more easily dealt with in a Faculty of Science.</p>
<p>4. <i>The number of administrative and technical support staff in Chemistry should be increased to five within three years and immediate attention should be given to the appointment of an</i></p>	<p>Some progress has already been made with respect to these recommendations (4 and 5). For example, there has been an increase in the number of technicians who work in the Central Analytical Facility. While such positions do peripherally support chemistry teaching and research, they are responsible for meeting the needs of all science departments, and as such, we still need department-specific support. Currently, a chemistry instructor is responsible for all aspects of the purchasing and maintenance of instruments</p>

<i>instructor with expertise in analytical chemistry.</i>	affiliated with our undergraduate programs, in addition to his teaching and other duties. Most recently, a chemistry technician was hired on a 16-month term. The position is responsible for all preparations associated with our large first and second year courses (Chem 1000, 2000, 1110, 2120, 2500, 2600). This has allowed some of our instructors' time to be reallocated to teaching courses, as suggested by the external reviewers. While the addition of this new position has been a welcome development, it is important to note that if the position is not continued beyond the current term, we will not have the capacity to deliver our program. Thus, we've moved in the correct direction, but we agree with the external reviewers that much remains to be done on this front.
5. <i>Relieving the instructors of their many technical and administrative roles would allow them to focus on developing innovative laboratory programs and to participate fully in the academic programs of the Department.</i>	Refer to the response to recommendation 4.
6. <i>The job descriptions and titles of the instructors should be revised as additional technical and administrative support staff are appointed.</i>	We have several Instructors who have duties that are not strictly instructional. One instructor is responsible for undergraduate equipment maintenance and glassblowing. Another instructor manages the Magnetic Resonance facility and has other duties with respect to the Science Operations. The language in the current Academic Staff Collective Agreement that pertains to Instructors does not take these kinds of duties into account. This will make career progress complicated for people in these positions. We also have Instructors whose primary role is lecturing. The ongoing negotiations regarding the introduction of Teaching Professors will likely pertain to these colleagues.
7. <i>The Faculty of Arts and Science should create a Safety Compliance Officer, or equivalent, position.</i>	Recent retirements have created a vacuum in the OH&S that needs to be filled. Our understanding is that the Associate Director Central Stores and Internal Compliance will be taking on some safety-related matters and we look forward to working with them in that regard. With that said, we would prefer to have a Safety Compliance Officer who is a chemistry professor in our department. Such a role would be both important and time-consuming, and as such, would necessarily require teaching relief (one course would likely be reasonable).
8. <i>As the Department of Chemistry and Biochemistry grows, it is important to keep faculty members in close proximity in order to build upon the excellent collaborative and collegial atmosphere within the Department.</i>	The building limits what we can do to keep faculty proximate. As it stands, the theoretical and computational chemists are together (Floor 9, Section 4) and the synthetic chemists are together (Floor 8, Section 4).
9. <i>The Department must work towards developing an equitable solution to their Independent Studies courses</i>	Refer to the response to recommendation 3.

that includes recognition for faculty member participation and student experience and evaluation.

10. *The Department should develop a training program for TAs that includes specific course training, EDI training, safety training and resource guides as a minimum.*

An instructor in chemistry introduced a TA training program several years ago. It was highly successful and eventually taken over by the Teaching Centre. At issue, however, is the fact that much of the training specific to our laboratories was lost when these courses became generic across the entire University. The lack of specific safety training for our TAs is a gap we should fill. Unfortunately, TA hours have been cut repeatedly over several years and it is questionable whether or not we could compel students to attend training beyond the TA hour limits set by the Graduate Students Association Collective Agreement. The department will look into what possibilities for training might be possible.

Dean's Response

The Dean of the Faculty of Arts and Science responded to the ten (10) recommendations from the External Review Report:

1. *The University of Lethbridge should consider the possibility of creating a Faculty of Science.*

This recommendation extends well beyond the scope of an Academic Quality Assurance review for an individual program. The University of Lethbridge recently went through a substantial faculty restructuring exercise, in consultation with various units on campus, in the context of major reductions to the Provincial Operating Grant and landed on relatively minor adjustments and the maintenance of an intact Faculty of Arts & Science. That decision was supported by a wide majority of Arts & Science departments, but not Chemistry & Biochemistry. We are always interested in receiving viewpoints from departments on optimal organization of the academy, for recommendation to the Provost.

A related message raised by the Department committee was the possibility of the Dean's Office organizing meetings with all the Science Chairs, because of some of the unique considerations relevant to these fields. The Dean would be willing to organize meetings with Chairs of the three domains of the Faculty of Arts & Science to address this sub-recommendation.

2. *The complement of tenured/tenure-track professors in Chemistry should be increased to ten within three years and diversity considerations should be forefront.*

It is helpful to have this expert vision for the ideal number of faculty members for a strong and comprehensive Chemistry program in a university of our size and type, but this recommendation would depend on currently unavailable resources at our institution. In the absence of significant restructuring across the Faculty and University, major revenue generation, or substantive increase in the Provincial Operating Grant, it is not presently feasible to expect growth positions (as much as this would be desired by faculty, students and the administration). The Department is skilfully searching for a tenure-track Assistant Professor in experimental chemistry, which may or may not land in the noted primary area of deficiency (analytical chemistry). The Dean's Office will continue to include the next priority area in Chemistry, as identified by the Department Chair, in future position requests.

3. *The Department should work with the Senior Administration to determine how the*

This recommendation extends beyond the Chemistry program and has been a recurrent topic of discussion. Both undergraduate and graduate teaching are expected in the Faculty of Arts & Science, with a standard assigned

supervision of graduate students can be appropriately recognized at the University of Lethbridge.

courseload in the professoriate set at four courses per year (reduced from five in 2001 to allow for graduate supervision), plus supervision of graduate students and independent studies. We recognize that the external reviewers commented that there is more teaching demanded from Chemistry faculty at the University of Lethbridge than at other institutions and that this can be important for research productivity and grant acquisition. However, this seems to be a typical actual load for a Chemistry program in a research-intensive university and relatively low for universities of our type and size, thanks to the success of our faculty members' research programs.

Graduate mentorship and supervision of independent and applied studies are expected to be accounted for when faculty members and chairs declare percentage workload allocations to teaching, with the approval of the Dean, and they are also accounted for in performance scoring within teaching (for mentorship and supervision activities), research (for disseminated outputs involving students and supervisors) and sometimes service (when faculty members take on certain research and graduate studies-related service roles).

The Dean's Office is open to discussing a new model across the Faculty that accounts for graduate supervision and independent studies, and some discussions have already taken place in this direction. This is beyond the scope of the AQA review in Chemistry in that this would need to involve discussions with Chairs of all units and wide consultation of faculty members.

It is worth noting that the review recommended *more* required courses in the Major, and also indicated that students want *more* opportunities for research experience at the undergraduate level. The latter information was surprising because the University of Lethbridge is known for its experiential learning through undergraduate student involvement in faculty research, independent studies and coops and is perhaps unmatched in per capita undergraduate involvement in publishable research. The Department of Chemistry & Biochemistry is a leader in this regard, with outstanding symposia inclusive of undergraduate and graduate students. Without a significant infusion of resources, enhancing either the number of required classroom / laboratory courses or the number of independent studies to address these recommendations may be laudable goals, but would complicate the concerns around teaching load and credit for supervisory activity while reliably delivering the Chemistry program.

4. *The number of administrative and technical support staff in Chemistry should be increased to five within three years and immediate attention should be given to the appointment of an instructor with expertise in analytical chemistry.*

The Faculty of Arts & Science currently does not have the resources to grow the number of administrative and technical support staff positions in Chemistry to this degree. To receive such resources would require us to secure positions through position requests in a challenging environment with similar pressures in many departments and programs. If the Chemistry & Biochemistry department identifies a priority need for an Instructor of analytical chemistry, this would also need to be included in our annual staffing plan, recognizing, of course, that there are no guarantees in the difficult financial environment currently facing Alberta universities.

We recognize that there are Instructors currently providing technical services that could, in some cases, more appropriately be carried out by technical staff. Some changes have already been made to begin to address this situation. For example, after a period of lesser than normal technician

	<p>availability in the post-pandemic return, Science Operations has grown significantly, and investments by ORIS and revenue from our Core Research Facilities model have resulted in the improvement of technical services provided beyond academic staff. Also, during the past year, we have established lab stewards, including a term position in Chemistry. We hope we can find resources to continue to gradually improve in this regard, freeing up more teaching capacity from our Instructors, but this needs to be achieved with cost neutrality.</p>
<p>5. <i>Relieving the instructors of their many technical and administrative roles would allow them to focus on developing innovative laboratory programs and to participate fully in the academic programs of the Department.</i></p>	<p>Refer to the response to recommendation 4.</p>
<p>6. <i>The job descriptions and titles of the instructors should be revised as additional technical and administrative support staff are appointed.</i></p>	<p>Refer to the response to recommendation 4.</p>
<p>7. <i>The Faculty of Arts and Science should create a Safety Compliance Officer, or equivalent, position.</i></p>	<p>The Faculty of Arts & Science is deeply committed to laboratory safety, has made this a key priority, and is thankful for the excellent efforts of the Department of Chemistry & Biochemistry in this regard. This is also an institutional responsibility involving Facilities through Campus Safety and the Office of the Vice-President Research. Campus Safety is in the midst of some organizational change, with a responsibility to work with faculty to ensure laboratory safety.</p> <p>In Arts & Science, the Director of Science Operations coordinates with Campus Safety and in consultation with faculty member colleagues and staff, to provide assistance with science laboratory and field safety programming. Certain Science Operations staff serve in safety-related roles, such as serving as the alternate for Campus Safety staff for radiation safety and biosafety, leading NMR safety etc., with primary oversight for safety coming from Facilities and the OVPR. We support Campus Safety, departments and Science Operations in their efforts to provide appropriate training and SOPs to ensure the safety of students, faculty and staff at the University.</p>
<p>8. <i>As the Department of Chemistry and Biochemistry grows, it is important to keep faculty members in close proximity in order to build upon the excellent collaborative and collegial atmosphere within the Department.</i></p>	<p>The Science Commons affords large, shared, open and well-equipped spaces for interaction among scientists. Based on the research needs (dry-lab vs. wet-lab work) the Chemists are located on two different floors in close proximity and have been arranged to maximize research collaboration. If any changes to the organization of space use are desired, please contact the Associate Dean holding the Space portfolio.</p>
<p>9. <i>The Department must work towards developing an equitable solution to their</i></p>	<p>Refer to the response to recommendation 3.</p>

Independent Studies courses that includes recognition for faculty member participation and student experience and evaluation.

10. *The Department should develop a training program for TAs that includes specific course training, EDI training, safety training and resource guides as a minimum.*

The Teaching Centre provides training for graduate student assistants and other HQP interested in teaching through its IMPACT program. This is a relatively small time commitment that will benefit any GTA and the program includes some of the elements identified as in need (e. g., course delivery, EDI). In addition to the IMPACT program, the Teaching Centre works with academic staff, including the current Board of Governors Teaching Chair, who is a member of the Department of Chemistry & Biochemistry, to deliver Instructional Skills Workshops (ISWs). The current Teaching Chair has done some lab-specific GTA training in the past and has led ISWs. I suggest that the need for laboratory-focused teaching be brought forth to the Teaching Centre to explore whether there is capacity for such specialized training. Professional development opportunities are also available through SGS. Lastly, there are teaching-focused sessions offered by the Teaching Centre on occasion, including the annual SPARK conference, suitable for both academic staff and HQP.

Consulting the External Reviewer Recommendations, the Program Response, and Dean Letts, the Academic Quality Assurance Committee made the following 4 (four) recommendations for action which the Program must report on in 1 and 3 years:

1. The Faculty of Arts and Science Dean's Office will discuss the formation of a Science Council with the Science Chairs in the faculty to serve as a consultative body in matters of particular pertinence to the Sciences.
2. The Chemistry Program will work collaboratively with the Teaching Centre and the Safety Compliance Officer to discuss the feasibility and best options (ensuring both safety and cost effectiveness) for providing lab specific training for graduate students and early career professionals.
3. The Chemistry Program will complete an assessment of current curriculum in collaboration with the Dean's Office, to consider:
 - a. Whether existing courses can be refreshed or updated to take advantage of the facilities in the Science Commons building.
 - b. Whether existing course offerings can be streamlined or increased flexibility added to ensure quality while also reflecting current resource realities.
 - c. Whether there is a more equitable solution to the offering of Independent Studies, Honors Thesis, and Applied Studies courses that includes recognition for faculty member participation and student experience and evaluation, while also considering whether other curriculum changes are necessary, as per (b) above, to support possible solutions.
 - d. To identify, in collaboration with Career Bridge, ways to connect students to WIL opportunities and industry.

4. The Chemistry Program will work with the Vice-Provost Accessibility, Belonging, and Community to ensure compliance with the principles of the University of Lethbridge Strategic Plan addressing all aspects of inclusion and belonging within the program.

The Academic Quality Assurance Committee is satisfied that the Chemistry program academic quality assurance review has followed the U of L's academic quality assurance process appropriately, and acknowledges the successful completion of the review.

Sincerely,

A handwritten signature in black ink, appearing to read "L. Kennedy", with a horizontal line underneath.

Dr. Lynn Kennedy
Chair, Academic Quality Assurance Committee
Chair and Associate Professor, Department of History and Religion

cc Michelle Helstein, PhD.
Provost & Vice-President (Academic)