

**REPORT OF THE ACADEMIC PLANNING COMMITTEE  
TO THE June 2015 SENATE**

**FOR INFORMATION**

**RECOMMENDATIONS OF ACAPLAN FOLLOWING THE QUALITY ASSURANCE -  
CYCLICAL PROGRAM REVIEW OF PROGRAMS  
IN CHEMISTRY AND BIOCHEMISTRY AT LAURENTIAN UNIVERSITY**

**Final Assessment Report & Implementation Plan**

In accordance with the Laurentian University's Institutional Quality Assurance Process (IQAP), the Final Assessment Report has been prepared to provide a synthesis of the external evaluation and Laurentian's response and action plan. This report identifies the significant strengths of the program, opportunities for program improvement and enhancement, and sets out and prioritizes the recommendations that have been selected for implementation.

The report includes an Implementation Plan that identifies who will be responsible for approving the recommendations set out in the Final Assessment Report; who will be responsible for providing any resources made necessary by those recommendations; any changes in organization, policy or governance that will be necessary to meet the recommendations; who will be responsible for acting on those recommendations; and timelines for acting on and monitoring the implementation of those recommendations.

**SUMMARY OF THE CYCLICAL PROGRAM REVIEW OF THE DEPARTMENT OF  
CHEMISTRY AND BIOCHEMISTRY**

**Programs under review** (reproduced from the Unit's IQAP document)

In English:

- Bachelor of Science (General) in Chemistry (3 yr)
- Bachelor of Science in Chemistry (4 yr) (CSC accredited)
- Bachelor of Science in Pharmaceutical Chemistry (4 yr)
- Bachelor of Science in Biochemistry (4 yr)

- Major in Chemistry (42 Cr.)
- Major in Biochemistry (42 Cr.)

- Minor in Chemistry (24 Cr.)
- Minor in Biochemistry (24 Cr.)

- Streams (for students in a 4-year Program)
- Industrial Chemistry, Geochemistry, Material Chemistry, and Environmental Chemistry

En Français

- Baccalauréat ès sciences (général) en chimie pharmaceutique (3 ans)
- Baccalauréat ès sciences en biochimie option biotechnologie (4 ans)

Majeure en Biochimie (42 Cr.)  
Mineure en Biochimie (24 Cr.)

M.Sc. in Chemical Sciences.

### **1. Self-assessment report**

The Chemistry and Biochemistry Department provided a self-appraisal document for their Programs as a part of the Institutional Quality Assurance Process (IQAP), in 2013. The Document was submitted to the University in December 2013. The document was sent out to two external reviewers, who were invited at Laurentian for the site visit on September 24 and 25, 2014. The external reviewers sent their report in October 2014, which was commented by the Unit and subsequently by the Dean, in January 2015.

The self-assessment report by the Unit consisted of a 239-page document, comprising of the assessment itself in the first 63 pages, followed in appendix by course outlines (syllabus) of the courses offered by the Unit in 2012-13. The self-assessment report included the usual items, i.e., an introduction with objectives, mission statement and learning outcomes; the Faculty; the physical resources; data on student enrolment and graduation rates; Program regulations and courses. They have included a “walk-through” section on the appropriateness of the courses in both 4-year Programs in Chemistry, and Biochemistry. Surprisingly, there was a 6-page section on the concerns raised from previous reviews (2004 and 2009) and actions taken. It was noted that innovative features (less than ½ page), planning (2¼ pages) and areas requiring improvement (¼ page) took a very small portion of the report. The course outlines, in appendix, were generally complete but lacked uniformity.

### **2. Team review and external reviewers**

The Review Team consisted of two external reviewers, two Laurentian University Faculty members (one in the Faculty of Science, Engineering and Architecture, one in a different Faculty), two students. The external reviewers were Drs. Céline Guéguen (CRC chair in aquatic sciences and biogeochemistry, Trent University) and Hélène-Marie Thérien (Dept. of medical biology, UQTR - Université du Québec à Trois-Rivières). The two internal Faculty members were Drs. Clarence Virtue (Physics) and Carol Stos (Modern Languages), and the two students were Jesse Gasparetto (Undergraduate) and Alexandrine Martel (Graduate). The choice of the two external reviewers was very appropriate: they were at the two ends of the spectrum in their academic careers, in two similarly sized universities and representing the two pillars of chemistry and biochemistry. During their 2-day visit, they have done the standard evaluation, i.e., interviews with key administrators, students, faculty members, cross-appointees, librarian, advisors, plus staff and technologists. They visited the undergraduate teaching laboratories, one research lab, and the Library.

The Review Team examined the unit’s brief and reported on the evaluation criteria, namely the objectives of the Programs, the admission requirements, the curriculum, the teaching assessment, the resources and quality indicators. Although the Document applies mostly to the Undergraduate degree, they made a brief assessment of the Graduate Program. Their overall assessment was that

the Program was of “good quality”.

The report from the external examiners noted the mission on bilingualism, and that the Program is well-suited to train high quality personnel, with rigorous teaching on theory and hands-on training. They noted that the Department contributes to programs listed in the strategic directions of the University. They also welcomed the addition of new renovated labs, planned for 2015, starting 2015-16. The reviewers made a list of 29 recommendations, some of which were combined in this document. In addition to these recommendations, points (positive and for improvements) can be extracted from both their assessment and the self-study guide.

### **3. Strengths and opportunities for improvement**

Strengths:

- The reviewers stated that the Program was of “good quality”
- Level of satisfaction by the students
- Admission of students at higher levels (internally and at other institutions)
- Contributions from cross-appointees, which add richness to the Program, especially that strong links are established with NOSM, the regional hospital
- High enrolment and strong training at lower levels (1<sup>st</sup> and 2<sup>nd</sup> year); inclusion of chemistry in the foundation in most disciplines in Science and Engineering
- Scholarships for students (free note: one of the best garnished Programs in the institution)
- Appropriate assessment of the students
- Most faculty members are active in research, and are bilingual
- Young technologists effectively manage large numbers of students at lower levels

Opportunities for improvement (recommendation number in brackets)

- Maintain curriculum in French (#1)
- Pursue accreditation for the Biochemistry Program (#2)
- Rationalize course offerings (#4, 28)
- Standardize syllabi forms (#8)
- Harmonize offerings with other units, and include needs of other departments (Biomedical, Forensics, Engineering, Environment) (#9, 10)
- Improve training in analytical chemistry with newer equipment and facilities (#11, 20)
- Consolidate biochemistry and related courses, especially cell biology (#12), advanced cell biology (#13), DNA (#14), enzyme (#15), review experimental biochemistry (#17), Likewise, the Unit mentioned the need for “systems biology”, molecular cellular biology, enzymology and protein structure.
- Boost human resources: Faculty, technologist (#19)
- Establish a formula for team teaching and with cross-appointees (#19)
- Put in place a plan for replacing obsolete equipment and create centralized facility (#20, 21)
- Find quality space for students, instead of labs (#22)
- Clean-up the Web page for the degree options, majors, minors, certificates, and what these mean (#23, 24)
- Review reasons for low enrolment in the Program, and remedy for the situation (#25);

- Address the long time to graduate (Graduate students) (#27)
- Seriously consider co-op or placement (#29)

Opportunities for improvement (ongoing at the time this report is written)

- Renovation of teaching labs and infrastructure (not mentioned in the report; in progress)
- Consolidation of instrument labs (#21, 22)
- New budget from the Dean and administration, which can be used for equipment
- Review admission requirements to include chemistry and math courses (#3)
- Coordinate course offerings with other departments and the Registrar (#5, 6, 7)

Items without relevance

- Include BIOL 2105 as a possible optional course (#16) – this course is already listed as an option
- Ensure all exams are available in both languages (#18) – this has always been in place
- Coordinate course offerings with other departments (#5) – this is already current practice
- Involve the Registrar’s office in the building up of the timetable (#6) – this is already current practice (#6)
- Involve the Registrar’s office in the verification of the prerequisites (#7) – this is not part of the Unit’s mandate

#### 4. Unit and Dean’s replies to the consultant’s recommendations

REPLIES OF THE DEPARTMENT AND THE  
DEAN TO THE REVIEWER’S REPORT OF THE  
PROGRAMS OFFERED BY THE DEPARTMENT OF  
CHEMISTRY AND BIOCHEMISTRY

Following the visit and report of the two reviewers Drs Céline Guéguen from Trent University and Hélène-Marie Thérien from Université du Québec à Trois-Rivières, a total of 29 recommendations were made for the maintenance and improvement of all our programs. Each of the recommendations made by the external reviewers (*in italic*) is followed by the Department comments (DEPT) then the Dean’s comments where applicable.

#### RECOMMENDATIONS

*At Laurentian, the Department of Chemistry and Biochemistry plays a key role in offering programs such as Chemistry, Biochemistry and Chemical Sciences that are of great actual societal relevance as well as participating in the academic training in numerous neighbouring fields. Although these programs are all of good quality, we make the following recommendations for their maintenance and improvement.*

*1. Maintain the curriculum in French at least for the two first years and, if possible, for the mandatory courses of the third and fourth years.*

*2.*

**DEPT: The department’s plan is to offer the “Biochimie-option biotechnologie” program (re- harmonize it with the program in “Biochemistry”, see recommendation**

**#9) in French and certainly maintain the first two years of all CHMI courses in French. We strongly feel that to maintain and grow the programs offered in French, the required courses offered by other departments must also be provided in French (e.g. PHYS 1006/1007).**

DEAN: The Department should look within to see what needs to be improved in order to recruit and retain students to its French (and English) programs. The Department in recent past used to have a healthy enrolment in its French program. The reasons for this drop in student interest needs to be analyzed, explained, and addressed. Harmonizing both E and F programs in Biochemistry might be one of the steps. Outreach activities geared to high schools students and explaining the discipline and future employment in the large first year CHMI course might help attracting more students to choose the discipline.

*3. Obtain the CSC accreditation of the Biochemistry program.*

**DEPT: Our specialized program in Chemistry is due for the CSC accreditation in 2015. We will make application for the accreditation of the specialized programs in Biochemistry (both in French and English) at that time.**

DEAN: Obtaining accreditation for all the programs offered by the Department would give them more credibility and could attract more students. This exercise could also point to some program deficiencies that would need to be addressed (see for example recommendations 10 to 15).

*4. Modify the admission requirements to include 12U Chemistry and 12U Calculus instead 2 Sciences or 1 Science + Math.*

**DEPT: At present, the program prerequisites stipulated in the Laurentian University view book for 2015 for our programs are 4U English or Français, 4U Advanced Functions, two 4U sciences or one 4U science + one 4U math and 2 other 4U courses, as is the case for most of the undergraduate science programs offered at Laurentian. The discussion of high school prerequisites for science programs should probably be discussed at the Faculty level. Each program could possibly make recommendations as to which 4U Science and Math courses are most pertinent. The department will study the admissions requirements for similar programs at other universities before suggesting changes. We are cognizant that our prerequisites must be in line with those of similar programs to remain competitive within the university and the province. We will review all other documents pertaining to admission requirements as well as the website to make sure that the information is consistent. We offer CHMI 1041 to students lacking 4U chemistry bringing them to the appropriate level to study university level chemistry.**

DEAN: High school admission requirement needs to be reviewed by all programs in the sciences. However, it would be helpful and it does make sense to explicitly mandate that the 4U chemistry course be required for all chemistry/biochemistry programs. Students will come better prepared instead of asking them to take the remedy course CHMI 1041 in first year, which might deter some students from joining the program because of the extra delay.

*5. Rationalize and plan the course offerings on a 2-3 year cycle so that all students have the chance to follow the stream of specialization they have initially chosen.*

**DEPT:** It is already done for the course offerings in the Chemistry and Biochemistry programs. However, we will have to find a more effective means of communicating this information to the students. For the more recent program offerings in Chemistry, e.g., the option in pharmaceutical chemistry, the course offerings now need to be included in our planning. This will become more important as the number of students progressing through the program increases. The planning will be facilitated with students now having to declare their program upon entry into the university. Finally, we will continue to encourage the students to consult one of the academic advisors at least once a year as they progress in their degree.

*DEAN:* I agree with the recommendation and the steps proposed by the Department to implement it.

*6. Coordinate the course offerings with other departments to schedule mandatory courses and avoid time conflicts.*

**DEPT:** A faculty-wide committee with representatives from all departments and programs requiring mandatory science courses meet every year to review the core timetable. The committee makes sure that there are no course conflicts. However, conflicts sometimes arise between mandatory courses and elective courses. These are more difficult to avoid because it is difficult to predict students' choices.

*7. Involve the Registrar's Office in the building up of the time-table and in its publication on the Web site.*

**DEPT:** We agree.

*8. Involve the Registrar's Office in the verification of the prerequisites as part of the on-line course registration.*

**DEPT:** We met with the registrar. Apart from first year chemistry, most prerequisites can be controlled by the registrar's office. We subsequently had a discussion with the admissions office and the possibility of verifying if students have 4U chemistry will be investigated. Ideally it would be beneficial if the 4U courses taken by the student were easily accessible by the registration system so that first year course prerequisites could be respected.

*DEAN:* I completely agree with the recommendation and the Department's response.

*9. Standardize the syllabi forms.*

**DEPT:** We are open to the use of a standardized form for all syllabi. However, we feel that the success of the initiative requires that a template be developed and accepted

**at the faculty level.**

DEAN: A common course syllabus template for the whole Faculty is presently being explored. This is particularly important for accredited programs, as it is something being demanded now by the accreditation teams.

*10. Harmonize the program of Biochemistry with that of Biochimie-option biotechnology to offer the same formation in French and in English*

**DEPT: The discussion we had with the reviewers was rather to modify the “Biochimie option biotechnologie” so that it mirrors the “Biochemistry” program. We are certainly willing to do it and we will prepare the modifications in 2015. We are confident that the harmonization of the two programs in French and English will bring more students to the French program, in addition to provide more flexibility in course offering.**

DEAN: See comments for recommendation 1.

*11. Develop, possibly in partnership with the Engineering Department, a course in Polymer Sciences.*

**DEPT: We agree with this recommendation and we will discuss it with Dr. Zhibin Ye from the Bharti School of Engineering who is a polymer chemist and who is also cross-appointed to our department. However, it is important to keep in mind that Dr. XX is a CRC with a reduced teaching load attributed by his School.**

*12. Improve the training in Analytical Chemistry with newer equipment and up-to-date facilities (i.e. air handling)*

**DEPT: Our students receive a good training in analytical chemistry with a large hands-on component. However, we are in agreement that equipment renewal and the modernization of our facilities is critically important for the training of our students on modern instruments. The problem of poor ventilation and the need for air conditioned facilities has been brought to the attention of the administration on several occasions. It is important to note that the faculty equipment budget over the last years has been either minuscule or inexistent. Fortunately, a small equipment budget was recently re-introduced. However, the amount available to our department is still insufficient to enable us to maintain our current equipment and to acquire new instruments.**

DEAN: The equipment budget that has been reinstated to the Faculty this year has been used mainly for buying small instruments or maintaining existing ones. A bigger fund would be needed in order to replace old equipment with modern ones. The proposed centralization of equipment might alleviate some of the problems.

*13. Make the Cell Biology course mandatory for the biochemists.*

**DEPT: We are in agreement with this recommendation and we will discuss its**

**feasibility with the Biology department.**

*14. Develop an advanced course in cell biology that would include biomembranes, cell signaling and cell cycle and reorganize the offering in consequence.*

**DEPT: We agree to revise the course “Biomembranes – Structure and Function” (CHMI 4217) to make it more current and include a section on the cell cycle.**

*15. Develop a laboratory course in DNA technology. (that might also be relevant to Biomedical Biology and Forensic Science).*

**DEPT: We had in the past a lab component for the course of Recombinant DNA Technology (CHMI 4226). It was unfortunately cut because of limited resources and staff.**

*16. Introduce a course in enzymology and protein structure that should be mandatory for the biochemists.*

**DEPT: We are in agreement that the biochemistry students would benefit from a course in enzymology and protein structure. Our limitations in resources make this difficult. We will however consider the possibility of cycling such a course with Recombinant DNA Technology (CHMI 4226).**

*17. Include BIOL-2105 Human Anatomy and Physiology as a possible optional course in the biochemical curriculum.*

**DEPT: It is already an optional course in the biochemistry curriculum.**

*18. Improve the consistency of the formation from cohort to cohort in the course CHMI-3237 Experimental Biochemistry.*

**DEPT: It is important to remember that in this course researchers volunteer to give undergraduate students access to their respective research lab. The volunteers may differ from year to year depending on their availability accounting for the fact that each cohort may not necessarily be exposed to the same experiments. However, the use of research equipment rather than teaching equipment for this course is a conscious decision by the department, as this practice gives students hands-on training on state-of-the-art instrumentation used in today's research world. We are convinced that the experience gained when students are allowed access to research-grade instruments under the supervision of researchers is more important than the precise nature of the experiments they perform.**

*19. For the courses offered in French, ensure that all exams and assignments are in French*

**DEPT: The department is not aware of any situation where students registered in a class offered in French were given exams written in English. In some large classes,**

**on-line assignments (Sapling type) might not be available in French. However, some professors have been able to negotiate access for French-speaking students at lower costs.**

*20. For the administration, acknowledge the needs for input of human resources by*

- at least replacing or compensating the leaves of faculty members*
- evaluating the workload of the technologist staff and allocating the required human resources to satisfy the increased growth in the department*
- hiring rapidly a second faculty electronics technician for the maintenance of the equipment*
- establishing rules so that the teaching of the cross-appointees in the department be recognized as part of their teaching load in their home unit*

**DEPT: We are in complete agreement with the input of human resources for faculty, technologists and an electronic technician. A hiring plan (Attached) has been submitted on several occasions to the Dean. As for the involvement of cross-appointees in teaching, while we would welcome a more active involvement on their part, how their workload is evaluated by their employer and is not under our control.**

*DEAN: A new faculty position in biochemistry has recently been approved and advertised. The extra workload of the technologists is being compensated by overtime and/or in lieu time. The Department needs to show an increase in its programs enrolment in order to justify a new full-time technologist position.*

*I am in total agreement with the hiring of a second faculty wide electronics technician. This is important to alleviate the high demand and the job pressure exerted on the present technician as well as to have a succession plan for this important job.*

*21. For the administration, the faculty and the department, put in place a viable plan for the replacement of obsolete equipment, the acquisition of up-to-date equipment and the creation of a centralized instrumental facility.*

**DEPT: We already have a 5-y plan submitted to the dean's office to replace teaching equipment (Attached). See comment # 11 regarding the equipment budget.**

*DEAN: The current equipment budget is used as much as possible for replacing old equipment and/or maintaining existing ones. A bigger amount is needed as some of the equipments are becoming outdated or obsolete. The proposed centralization of equipment might alleviate some of the problems.*

*22. Include the relocalization of the instrument labs on one floor as part of the undergoing renovation.*

**DEPT: The most urgent part is to find an appropriate space with air conditioned space. It has been brought to our attention that former vice-president Sawyer has been working on a plan to solve this issue and centralize instruments in an appropriate location so that they can be used and maintained properly under adequate supervision.**

DEAN: This has been high on the wish list of the Faculty for quite sometimes. Planning is presently underway for a centralized space for equipment and the Board of Governors has recently approved such a proposal.

*23. Find a place where undergraduate and graduate students involved in research could work safely when not doing experimentation.*

**DEPT: We agree that there is a need to provide undergraduate and graduate research students a space to work when not doing experimentation. However, the assignment of space is not under our control. At present, students have access to two small rooms, one of which they furnished themselves with old discarded furniture. Repainting and reorganizing these rooms would be a positive step in providing students with a better place to work. We would gladly do this; however, we do not have sufficient funds in our budget to do so. Some graduate students have access to a lockable desk in the main library.**

DEAN: Space has always been an issue. I will be talking to *the Chair* about the possibility of revamping these two rooms.

*24. Rapidly offer a functional website so that current and prospective students be aware of the various programs (including Pharmaceutical Chemistry) and specializations offered by the Department of Chemistry and Biochemistry as well as an up-to-date timetable.*

**DEPT: We are told that the website will be highly functional soon. This is not under our control.**

DEAN: Departments are now starting to be given control over their webpage content. Improvement has been slow but steady.

*25. Develop the website of the department to advertise the expertise of the faculty members and the success of their students.*

**DEPT: Once the faculty of SEA main website has been established (presumably within the next six months), we should be able to gain at least some control over the content and design of our departmental page. When this occurs, we will certainly do our best to advertise and promote our department, our faculty, their research, and the success of our students.**

DEAN: See comment above.

*26. Analyze the reasons of the important withdrawal of students from the honours programs and put in place mechanisms to remedy to the situation.*

**DEPT: It appears that the reviewers did not interpret the numbers presented in Table 4.1 of the document correctly. They were under the impression that the numbers 50 (8) for the biochemistry stream in 2012 represented a decrease from 50 to 8. In**

reality the number 50 is the total number of students that officially registered in the biochemistry program (year 2, 3 and 4) and 8 is the number of students who graduated that same year. However, it is true that the number of students in the “Biochimie – option biotechnologie” remains low. This is why we acknowledge the recommendation of re-harmonizing the French program with the English Biochemistry program.

*27. Analyze the reasons of the too long duration of M.Sc. studies*

**DEPT:** We have also been concerned about the duration of the Chemical Sciences M.Sc. program. Although a number of students do finish after 2 years in the program, there are several that take much longer. It is not always easy to determine why this occurs but it might certainly been explained partially by the fact that some students enter the work force before completing the writing of their thesis.

*28. Promote the transfer of M.Sc. students into Ph.D. programs.*

**DEPT:** This is currently done and nothing prevents students from transferring to one of the PhD programs offered in the Faculty (e.g. Biomolecular Sciences, Material Sciences, Boreal Ecology)

*29. Revisit the course offering at the M.Sc. level so that students be exposed to all potential courses on a two-year cycle.*

**DEPT:** Offering the graduate courses in our program on a two-year cycle would represent approximately 7 graduate courses per year. This does not appear feasible because of limited resources and sabbatical leaves. Each year, we run a survey with graduate students to determine their preferences for the 2<sup>nd</sup> year of their MSc program.

*30. Seriously evaluate the advantages and disadvantages of Co-Op programs before moving forward.*

**DEPT:** The possibility of establishing a Co-op option was only suggested to the reviewers for a new program that was to be proposed in the expansion of the Sudbury campus. It is no longer an option for now.

**DEAN:** Gaining practical experience is always a plus when finding employment after graduation. It's also a way to attract students to our programs. Prospective students at OUF have consistently inquired whether or not a co-op option was available in the sciences.

**LAURENTIAN QUALITY ASSURANCE IMPLEMENTATION PLAN  
FOR THE DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY  
FEBRUARY 2015**

<b>Recommendations of the external reviewers requiring follow-up</b> (recommendation # in brackets)	<b>Proposed follow-up (ACAPLAN)</b>	<b>Responsibility for follow-up</b>	<b>Timeline for addressing recommendations</b>
Maintain the curriculum in French at least for the two first years and, if possible, for the mandatory courses of the third and fourth years (#1)	The Unit should look within their own ranks to prioritize and organize their courses. The Unit should also consider a bilingual degree, and build opportunities for the students to obtain a certificate of bilingualism.	Unit	Fall 2016
Pursue accreditation for the Biochemistry Program (#2)	The Unit will undergo CSC accreditation review in 2015. The unit agrees to apply for accreditation for the Biochemistry degree.	Unit	2015-16
Rationalize and plan course offerings on a 2-3 year cycle (#4, 28)	The Unit should find better ways to communicate the course offerings to the students.	Unit	Fall 2015
Standardize syllabi forms (#8)	The Unit should use a recently adopted template by the Faculty.	Unit	Fall 2015
Harmonize the program of Biochemistry with that of Biochimie-option biotechnology to offer the same formation in French and in English. (#9)	The Unit has already implemented this recommendation by implementing a Program change in the French biochimie.	Unit	Fall 2016 (or after CSC accreditation review, and upon hiring)
Develop a course in Polymer Sciences (#10).	The Unit should decide how important this course, especially for the upcoming CSC accreditation review. If it is important, they should build a case for hiring.	Unit, Dean	

<b>Recommendations of the external reviewers requiring follow-up</b> (recommendation # in brackets)	<b>Proposed follow-up (ACAPLAN)</b>	<b>Responsibility for follow-up</b>	<b>Timeline for addressing recommendations</b>
Improve training in analytical chemistry with newer equipment and facilities (#11, 20)	Unit to decide on discarding obsolete equipment and consolidating equipment in common rooms; Work with the Dean to find appropriate room, and renovate as needed.	Unit, Dean	
Consolidate biochemistry and related courses, especially cell biology (#12), advanced cell biology (#13), DNA (#14), enzyme (#15); and review the delivery style of experimental biochemistry (#17).	This is potentially solved with a new person currently being hired in biochemistry. These opportunities to improve should be submitted as a part of the CSC accreditation review scheduled for 2015.	Unit	Fall 2016 (or after CSC accreditation review, and upon hiring)
Boost human resources: Faculty, technologist (#19)	Replacing departed Faculty members should be done on a case-by-case basis and based on needs. (Unit) Hiring of a second technologist (electronics) has been recognized by the Dean.	Unit, Dean	
Establish a formula for team teaching and with cross-appointees (#19)	Unit, to draw a Table of cross-appointees and their contribution. The Unit should work with the Dean for assigning credit formula.	Unit, Dean	Fall 2015
Put in place a plan for replacing obsolete equipment and create centralized facility (#20, 21)	Unit and Dean to find and assign the room, renovate as needed. Ideally, this should be done with the Campus renovation initiative.	Unit, Dean	Fall 2016
Find quality space for students, instead of labs (#22)	Unit and Dean to find and assign the room, renovate as needed. (include as part of Campus upgrade)	Unit, Dean	

<b>Recommendations of the external reviewers requiring follow-up</b> (recommendation # in brackets)	<b>Proposed follow-up (ACAPLAN)</b>	<b>Responsibility for follow-up</b>	<b>Timeline for addressing recommendations</b>
Clean-up the Web page for the degree options, majors, minors, certificates, and what these mean (#23, 24)	Unit (clean-up the web site); Unit and Dean: to work on an accounting formula for enrolment in minors, majors, certificates, options for proper credit to the Program and student advising.	Unit, Dean	Fall 2015
Review reasons for low enrolment in the Program, and remedy for the situation (#25);	The Unit should undertake a critical self-review of the reasons why enrolment in their Program is low. The CSC accreditation review is a good occasion to undergo this exercise, and they should come up with a solution with a 5-year plan.	Unit	Submit plan in Fall 2016
Address the long time to graduate (Graduate students) (#27)	The Unit should do a self-analysis to solve this issue. For example, the Unit should implement more frequent committee meetings, and rigorously implement it.	Unit	
Seriously consider co-op or placement (#29)	Unit to work with the Dean to include Placements as a part of the degree (a new centralized Co-op office has been proposed)	Unit, Dean	