

**Bachelor of Science, Biology**  
**Update on Unit Response to External Reviewers' Report & Action Plan**  
**Programs Being Reviewed: BSc and BA Programs**  
**Completed by: Bruce McKay, Chair of Biology**  
**Approved by Dean: Maria DeRosa, February 23, 2023**

**Note: This document is made available for public posting on the Vice- Provost's website.**

**\*\*\* Denotes items that SQAPC would like the unit to pay particular attention to based on their past review of the original action item.**

External Reviewer Recommendation	Original Action Item	Owner & Timeline	Progress Update June 2022	Will the action described require calendar changes? (Y or N)
1. Keep working on the culture of pedagogical awareness. (Opportunity). The monthly meetings are great, a genuine interest on the part of a number of faculty and staff in the SoTL will pay off in the long run. They will need continued support and encouragement because these are long term goals that can impact the entire department and possibly beyond.	Monthly teaching conversations	Mullally  Ongoing	Dr. Martha Mullally has a Bachelor of Education and her postdoctoral work was in Science Education. She is our Biology Teaching Mentor and was recently awarded a Carleton University Chair in Teaching Innovation. Martha has held monthly conversations about teaching for several years. These have focused largely on EDI in the classroom sessions in the past year. This initiative has had a positive impact on pedagogical approaches and inclusive teaching in courses and greater consideration for pedagogy and EDI in recent faculty recruitments.	N
2. Keep working on finding the right balance between content and skills based LOs. (Opportunity). There is still a need for proper assessment of certain LOs (reflection is needed to establish soft skills).	a. Form Assessment Team  b. Assessment Team meets and discusses assessment	Assessment Team  Assessment Team  March 2019	The Learning Outcome Assessment (LOA) team - was formed to address the recommendations of the CPR related to learning outcomes. Following an initial meeting with Naomi C and Owen R (Chair), it was felt that some of the recommendations were simply unworkable from an administrative perspective e.g. re-arranging all program course requirements and progression according to LO maps; and as such, it was suggested that we identify issues raised in the CPR that we could directly address to improve our departmental program offerings. The last of these issues to be brought to the Curriculum Committee concerns the opportunities	N

			for our students to develop their scientific writing skills. The LOA final report was received midsummer.	
<p>3. Students feel overwhelmed during their 1<sup>st</sup>- and 2<sup>nd</sup>-years of the program due to the perceived workload. (Weakness).</p> <p>Many of their required courses have accompanying labs, many have weekly assignments, and there is no coordination across courses to stagger due dates or focus on shared learning outcomes.</p>	<p>a. Revising first-year labs</p> <p>b. Coordination of first- and second-year assignments with courses from other units</p>	<p>a. Benchmarking implementation team - Ongoing</p> <p>b. Within department: first- and second-year profs communicate; between units: Dean's office (Cappuccino) to facilitate mid-term exam coordination between units. – August 2019</p>	<p>a. Efforts have been made to streamline 1<sup>st</sup> year labs. Due to the pandemic and reduced capacity, this fall is the first running of the revised plan.</p> <p>b. Midterms were online for the past 2 years, often with flexibility in timing. Instructors of 1<sup>st</sup> and 2<sup>nd</sup> year courses discuss schedules. We should receive feedback throughout the term.</p>	N (or possible minor changes to descriptions)
<p>4. The graduate student TAs would like better training in how to fill the role of Teaching Assistant. Key points that could be addressed were: basic professionalism, first aid, marking, and conflict resolution.</p> <p><i>Note: Not a formal recommendation, was added by unit based on text in External Reviewers' Report.</i></p>	<p>Look into of requiring a course or workshop in Teaching/Mentoring for all grads in our MSc and PhD programs</p>	<p>Grad Studies Committee and Mullally.</p> <p>Sept 2019 Begin discussions (further action depends on coordination with U Ottawa colleagues, and the results of graduate program cyclical review)</p>	<p>In addition to their compulsory compliance training, TAs have access to pedagogical training through teaching and learning services. There are many opportunities including a <i>Certificate in Teaching Assistants Skills</i>. Graduate TAs are informed of these opportunities but they aren't compulsory. Compulsory, course-specific training is provided by instructors and lab coordinators. Course/lab meetings occur weekly for large multi-section courses.</p>	N
<p>5. Work on developing better survey of graduates. (Opportunity). This would answer a number of the unknowns regarding the program, such as: are the B.Sc with Concentrations providing the intended impact for the students? Why is the attrition rate higher than other units on campus? Working with data will allow the Faculty and Department to develop better answers to these questions.</p>	<p>a. New survey of upper-year students</p> <p>b. Develop method to survey graduates &amp; maintain database of graduates</p> <p>Resources: Faculty time</p>	<p>a. Rowland and Recruitment &amp; Retention Committee - already developed and ready for distribution</p> <p>b. Recruitment &amp; Retention Committee – March 2019</p>	<p>a. We did run the survey but there was a poor response rate. The data was statistically questionable. We did receive some valuable comments. Now we are considering how to get better more comprehensive feedback from students.</p> <p>b. This survey has been problematic. We don't have access to alumni contact information.</p>	N

<p>6. Explore opportunities to establish cohort groups within the Biology undergraduate population. (Opportunity). This could be done within lab sections, and through encouraging additional meet ups throughout the term. This may be another way to aid in student recruitment and retention by cultivating the students' sense of belonging to the Department of Biology. Yet another way to leverage additional communications support.</p>	<p>a. Already put in place for BSc Biology and Biotechnology (2<sup>nd</sup>- , 3<sup>rd</sup>- and 4<sup>th</sup> year common courses); explore possibility for other concentrations</p> <p>b. Analyze data from earlier cohort efforts implemented through the ODS.</p> <p>Resources: Faculty time</p>	<p>a. Recruitment &amp; Retention Committee; Curriculum Committee - ongoing</p> <p>b. Recruitment &amp; Retention Committee – March 2019</p>	<p>Cohorting was discussed but we felt that the size of our department, the number of concentrations and the scale of our service teaching in core courses made this impractical. We recognize the value of social groups and a sense of belonging to retention so we are considering alternative strategies, including social activities. For example, we ran a very successful BBQ in September for incoming and returning students with well-thought out icebreaker activities. We received excellent feedback from faculty and staff.</p>	<p>N</p>
<p>7. Inadequate office support for the undergraduate program administration and poor department-student communications. (Concern).</p>	<p>a. Explore need for additional admin staff or reorganization of staff duties.</p> <p>b. UG chair needs ability to email students</p> <p>c. Area-specialist assistant advisors to support UG chair</p>	<p>a. Rowland/Dawson - July 2019</p> <p>b. Rowland/Dawson – March 2019</p> <p>c. Rowland/Dawson – July 2019</p>	<p>a. We had some challenges maintaining administrative staff. One member of our team has been on long term disability since 2020. We were forced to seek support from casual employees until May 2022. We now have stability in the administrative group and we are making progress.</p> <p>b. The Associate Chair undergraduate studies doesn't have direct access to student emails but works closely with our Undergraduate Program Administrator. This is working well.</p> <p>c. We used area-specialist advisors a few years ago but we found that we were less able to address student concerns and questions in a timely manner. Our Associate Chair and Undergraduate Program Administrator seek area-specific advice from faculty members when warranted.</p>	<p>N</p>
<p>8. Poor quality undergraduate teaching lab space. (Concern). The presence of noisy equipment, uncomfortable, and possibly hazardous furniture, and the remote location with regard to the rest of the department and instructor offices detract from a strong recruitment tool. Students want to attend</p>	<p>a. Replacing outdated furniture</p> <p>b. Student club space (Biology Society) in Tory</p> <p>c. Long-term plan for new Bioscience building near NB &amp; CTTC to house</p>	<p>a. Rowland/Dean in consultation with lab coordinators - We will be replacing outdated furniture and have already obtained quotes. Lab stools will possibly be replaced in</p>	<p>a. We have made upgrades to several undergraduate labs. The largest renovation included new workbenches, counters, cabinets and seating in our first year laboratory. These renovations are ongoing. In the current budget cycle we have a commitment for design costs to update our Cell Biology and Tissue Culture laboratory.</p>	<p>N</p>

<p>Carleton Biology because of the hands-on undergraduate labs, we expect that many are turned off by the experience.</p>	<p>teaching labs and allow future expansion of Department</p>	<p>time for Fall 2019; benches will be replaced in 2020.</p> <p>b. Rowland/Dean - Students have been offered departmental space on a booking basis. It is unlikely that permanent space can be freed up in Tory over the short term for club use.</p> <p>c. Rowland/Dean/Upper Management - Planning to begin in summer 2019</p>	<p>b. Unfortunately, there isn't a space available in Tory. That being said, hybrid work may relieve some space pressures as we emerge from the pandemic.</p> <p>c. This is frequently discussed but so far it hasn't progressed. The pandemic, loss of revenue during the pandemic and with escalating costs are likely to delay any further commitment for a biology building.</p>	
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## Bachelor of Science, Biology

### Update on Learning Outcomes Assessment Activities

Programs Being Reviewed: BA Programs

Completed by: Iain McKinnell & Bruce McKay

#### 1. Who is responsible for the assessment of program learning outcomes?

- Learning Outcomes Assessment Committee
- Undergraduate/Graduate and/or Curriculum Committee(s)
- All faculty in unit
- Other:

#### 2. Which program learning outcomes have been assessed since the last CPR? (*list the learning outcome statements, or abbreviated versions, below*)

*Specific to the **BA programs** (note, some differences exist between BA Honours and BA General):*

##### Quantitative Skills

- LO1 Designs and conducts original research on a topic in the biological sciences.
- LO2 Searches, summarizes, and critically assesses the primary literature and other information resources to identify gaps in our knowledge, and develops questions and hypotheses to address these gaps
- LO5 Analyzes, interprets and visually presents data using appropriate methods.
- LO6 Performs laboratory and/or field procedures safely and according to current best practices.
- LO10 Effectively collaborates as part of a team in the classroom, laboratory and research environment.

##### Communication Skills

- LO4a Communicates scientific information orally using strategies appropriate for scientific and non-scientific audiences
- LO4b Communicates scientific information in writing using strategies appropriate for scientific and non-scientific audiences

A more general assessment was made of how mastery of all learning outcomes could be evaluated in the BA programs.

#### 3. What methods have been employed to assess the program learning outcomes? (*check all that apply*)

- Reviews of examples of student work
- cuPortfolio
- Student surveys or focus groups
- Faculty retreats or discussion sessions
- Reviews of program curricula and courses (*includes efforts to align course and program learning outcomes*)

Other \_\_\_\_\_

**4. Provide a brief description of the assessment activities undertaken since your last CPR Review.**

**Quantitative Skills**

- CPR identified a lack of quantitative skills in the BA programs. LOA team curriculum analysis noted that BA Biology program students can work through their degree with very little quantitative training.
- Accordingly, BA students now take the BIOL1105 course as a part of their program. This course was designed to try and fill gaps at the introductory and reinforcement levels in experimental design and hypothesis testing, basic statistics, analysis and interpretation of data, and oral presentations.
- Furthermore, first year instructors have met to discuss LOs to ensure that all foundational courses contain some content in statistics or data analysis.

**Communication Skills**

- CPR identified a perceived lack of opportunity for our students to develop and reinforce their scientific writing skills.
- LOA team curriculum and course-based analysis of our existing courses reveals that a number of them already utilize assessments that either focus on, or include scientific writing & literacy.
- Courses have existing LO's that may need to be modified to make room for writing-focused LO's (though note that in many cases they can be adapted in a writing skills context).
- Based on course progression, student exposure to writing skill development could still remain variable.
- 1st and 2nd year courses tend to service other departments significantly, and thus resources directed at this issue will not solely be serving our programs.

**Mastery of LOs**

- CPR indicated a need for more clarity in how we evaluate our biology student's mastery of the LO, typically associated with the capstone courses but also upper year courses (experimental design, oral and written communication, teamwork, judgement, wider communication of science).
- Curriculum and course analysis by the LOA team indicated that students may achieve mastery of some/all of these learning outcomes by stringing together a series of elective courses in which designing and conducting research are integral, but this is not guaranteed.
- The newer BIOL4905 course structure has been designed to directly address mastery of the relevant LOs.
- A new Honours thesis committee has been struck in the department with the intention of revamping the capstone course experience, including the assessment component.

**5. What assessment activities will be undertaken between now and your next CPR? When will these be implemented?**

**Quantitative Skills**

Curriculum committee for department will review the recommendations arising from the LOA team analysis:

- 1) Impose more course work in this area (e.g., STAT 2507), and/or
- 2) Devise an advisory document for students on navigating their choice of courses, emphasizing (among other things) the growing importance of mathematical and statistical methods in biology. The latter has the

advantage of placing the onus on the student: one should be mindful of future career objectives when tailoring a degree program's options.

### **Communication Skills**

Curriculum committee for department will review the recommendations arising from the LOA team analysis:

- 1) The department consider introducing a required course for all biology programs at the first- or second-year level intended to teach scientific writing.
- 2) The department develop an open access resource consisting of a set of easy to implement 'Writing Assessment Modules' that instructors and coordinators can access, adapt, and 'plug in' to their courses as they see fit.

### **Mastery of LOs**

Curriculum committee for department will review the recommendations arising from the LOA team analysis:

- Program requirements be modified to include 1.0 credits from a list of those courses that include mastery of at least two of the program level LOs

Honours thesis committee and LOA team will continue to work on the assessment criteria for the capstone project.

**Department curriculum committee to consider LOA team major recommendation that a complete curriculum mapping be undertaken to identify gaps in training for the 'ideal biologist'.**