

CURRICULUM REVIEW REPORT

FACULTY OF SCIENCE

DEPARTMENT OF BIOLOGICAL SCIENCES

2022-2023

Acknowledgements

We acknowledge this work took place on the traditional territories of the peoples of Treaty 7, which include the Blackfoot Confederacy (comprised of the Siksika, the Piikani, and the Kainai First Nations), the Tsuut'ina First Nation, and the Stoney Nakoda (including the Chiniki, Bearspaw, and Goodstoney First Nations). The City of Calgary is also home to the Métis Nation of Alberta (Districts 5 and 6).

The University of Calgary is situated on land Northwest of where the Bow River meets the Elbow River, a site traditionally known as Moh'kins'tsis to the Blackfoot, Wichîspa to the Stoney Nakoda, and Guts'ists'i to the Tsuut'ina. On this land and in this place, we strive to learn together, walk together, and grow together "in a good way."

Curriculum Review Team

All members of the Department of Biological Sciences were part of the Curriculum Review Team. Review Team members were involved throughout the curriculum review process.

Unit Lead:

Dr. Wendy Benoit (Associate Dean – Teaching, Learning, Student Engagement)

Program Lead:

Dr. Dave Hansen (Department Head – Department of Biological Sciences)

Review Lead:

Dr. Mindi Summers (Associate Professor – Teaching)

Biological Sciences Curriculum Review Committee:

Austin Ashbaugh (Graduate Student)

Dr. Brianne Burkinshaw (Assistant Professor – Teaching)

Dr. Ariane Cantin (Assistant Professor – Teaching)

Tabitha Festa (Graduate Student)

Dr. Paul Galpern (Associate Professor)

Louise Hahn (Biological Sciences Technician)

Dr. Elizabeth Polvi (Assistant Professor – Teaching)

Dr. Eve Robinson (Assistant Professor – Teaching)

Aphra Sutherland (Graduate Student)

EXECUTIVE SUMMARY

Program Overview

The Department of Biological Sciences is a community of scholars who share a commitment to insightful, innovative, and integrative research in diverse areas of life sciences. From biomolecules to the biosphere, our teaching and research strives to develop future leaders in basic and applied biological sciences through excellence in our undergraduate and graduate programs.

Our department supports five undergraduate programs:

- A general Biological Sciences (BISI) program with three new, optional concentrations (Biodiversity & Conservation, Evolution & Genetics, and Biotechnology).
- Four specialty programs: Biochemistry (BCEM), Cellular, Molecular, and Microbial Biology (CMMB), Plant Biology (PLBI), and Zoology (ZOOL).

A fifth specialty program, Ecology (ECOL) is currently suspended as part of developing the three new BISI concentrations.

All undergraduate programs have an Honours stream open to students with strong academic credentials, which includes completion of a two-term honours research project. Students can additionally complete the Science Internship Program (SIP), where they can engage in 8 to 16 consecutive months of paid industry-based experiences. Students in our programs can also explore embedded certificates, minors, additional majors, study abroad programs, and attend our field schools (the Bamfield Marine Science Centre and the Biogeoscience Institute in Kananaskis Country) as part of their learning experience.

Our programs align with institutional and faculty goals, priorities, and strategies. These include the University of Calgary's Eyes High Strategy (2017-2022), the Academic Plan (2018-2023), the Research Plan (2018-2023), the Experiential Learning Plan (2020-2025), *ii' taa'poh'to'p*, the Faculty of Science's Strategic Plan (2017-2022), the Faculty of Science's Grand Challenges, and ongoing teaching and learning priorities.

2022-2023 Curriculum Review

Our 2022-2023 curriculum review prioritized collaboration by engaging faculty, staff, and students across the department, the Faculty of Science, and the broader university.

The departmental curriculum review was led by the Review Lead, who organized an interdisciplinary curriculum committee composed of 10 faculty, staff, and current students.¹ Faculty and staff in the department also participated in the curriculum review through departmental meetings, online surveys, course mapping, and speciality program-specific meetings.² Current undergraduate students were invited to engage in the curriculum review through an online survey³ and two one-hour focus groups.⁴

¹ The committee met nine times from August 2022 – April 2023. Undergraduate student representatives were invited to join and contribute.

² Six departmental meetings were held (30–45-minute sessions/meeting). Each speciality program engaged in a minimum of two meetings (8 meetings total).

³ **890 respondents**; representing **~60% of total student headcount** in Fall 2022.

⁴ **39 students** participated in the focus groups.

The Review Lead met regularly with the Unit Lead and the Review Leads for other departments in the Faculty of Science throughout the curriculum review process. The Review Lead also engaged in additional conversations with experts in the Taylor Institute for Teaching and Learning, the Office of Institutional Analysis, the Biological Sciences subject librarian, Career Services, the Faculty of Science Internship Program team, and an Educational Consultant in Sustainability.

Curriculum Review Highlights

The 2022-2023 curriculum review produced the following highlights:

- Creation of a new department model of ***engagement, conversation, and collaboration*** among faculty, staff, and students in program-level teaching and learning.
 - The interdisciplinary curriculum review committee included faculty, staff, and students.¹
 - We collaborated as a department² and reached consensus in creating guiding questions, program-level learning outcomes, and our action plan.
 - We mapped 89 courses to our program learning outcomes.
 - Undergraduate students were invited to provide feedback through an online survey and focus groups.^{3,4}
 - Undergraduate students also expressed considerable interest in being more involved in future curriculum design and community building within programs.
 - We created a shared online repository for curriculum documents and databases to facilitate future conversations and collaborations.
- Developing a new, ***future-focused framework*** for our programs that emphasizes experiential learning, a quantitative 'spine', ii' taa'poh'to'p, and improving equity, diversity, inclusion, and access across our programs.
 - 90% of surveyed students agreed that at least one of our majors or concentrations aligns with their interests. This survey also highlighted a need to simplify program structures and improve program advising to better support students.
 - We created a set of updated program-level learning outcomes aligned with disciplinary and transferrable skills that have been identified as most critical for our current students and their future career success.
 - Students identified a need for support in articulating their skills, experiences, and learning in career scenarios (e.g., resumes, interviews).
 - Two clear goals for all programs in the Department of Biological Sciences as part of this new framework are:
 - Each student completes at least one authentic experiential learning course as independent or course-based research and/or community-engaged learning.
 - Developing a quantitative/data science 'spine' connecting all our programs.
 - We adopted a commitment to advancing ii' taa'poh'to'p and improving equity, diversity, inclusion, and access across our courses and programs.
 - Our plan is to prioritize community building in our courses and programs to meet the needs of undergraduate students in developing meaningful connections and building community.

ACTION PLAN

Our 2022-2023 curriculum review prioritized the following **five key recommendations**. Over the next four years, the department will support their implementation by convening committees and working groups specific to each item. A full action plan and timeline are available in the Appendix.

RECOMMENDATION 1: Integrate Career Readiness into our Programs (Fall 2023 – Ongoing)

The Outreach Committee will take a leadership role in finding partnerships to support and develop student career readiness, including the facilitation of connections with alumni and the Faculty of Science's Internship team. The committee is tasked with exploring ways to introduce life design thinking and career readiness skills into our courses, compiling and sharing resources for courses (e.g., career panels and spotlight presentations), and tracking student participation in career opportunities (e.g., the Science Internship Program, career fairs) on campus. The Committee will consult with and support Faculty-level initiatives for students to develop wrap-around skills (e.g., new faculty wide courses).

RECOMMENDATION 2: Design a Quantitative Spine (2023 – 2027)

A Quantitative/Data Science working group will explore how to expand BIOL 315 (Quantitative Biology I) to serve students in all programs. As part of this work, the team will identify opportunities to scaffold quantitative data-related learning outcomes for each year of the program and redesign both third and fourth-year courses to better emphasize quantitative/data science skills. The working group plans to apply for two University of Calgary Teaching and Learning grants to support the redesign of courses and the assessment associated with these updates (2024 and 2026).

RECOMMENDATION 3: Update our First and Second Year BioCore (2023 – 2027)

A BioCore Update working group will conduct a literature review and environmental scan of high impact and effective teaching practices, with a specific focus on teaching practices that build community and student workload. This working group will partner with students to integrate their ideas and recommendations into the BioCore update(s). This working group will complete training in the Scholarship of Teaching and Learning (SoTL), in addition to applying for a University of Calgary Teaching and Learning grant (2025) to support their ongoing work.

RECOMMENDATION 4: Provide an Authentic Experiential Capstone to all Students (2024 – 2027)

A Capstone/Research working group will review existing capstone offerings and clearly define the requirements for a capstone course in the Department of Biological Sciences. The working group plans to present current and potential models for capstone experiences to the department to identify opportunities for additional or redesigned capstones. The working group will develop clear plans for advertising and communicating experiential opportunities to students. Additionally, this group will consider student workload associated with capstones, and identify funding opportunities to help pilot and/or support existing capstone experiences.

RECOMMENDATION 5: Build Community while Continually Updating and Improving our Program (Ongoing)

The Associate Head (Undergraduate), Assistant Head (Undergraduate), and the Undergraduate Programs Curriculum Committee (UPPC) will track action plan progress to regularly update the department. Program chairs will lead community building efforts and review student advising materials. The UPPC plans to identify any program bottlenecks, including important pre-requisite courses, review workload expectations across programs, and support instructors in updating course-level learning outcomes. Quality assurance evaluations (e.g., yearly student surveys, student focus groups) will provide recommendations for improvements to programs and course offerings.

The Assistant Head (Undergraduate) will work to build community and capacity among instructors via informal mentoring, the creation/maintenance of a shared online database for teaching and learning resources, and by supporting training for instructors. Similarly, the Associate Head (Undergraduate) will support the Biological Sciences Student Association (BSSA) in student-led efforts to build community in the program and improve the student experience.

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