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CURRICULUM REVIEW

BSc in CELLULAR, MOLECULAR AND MICROBIAL  
BIOLOGY (CMBI)

DEPARTMENT OF BIOLOGICAL SCIENCES

EXECUTIVE SUMMARY

DECEMBER 2016

# Overview and Context of the Program

Programs in CMBI at the University of Calgary provide students with a broad perspective on diverse topics, including the function of molecules in bacteria and animal cells, the relationships between cell structure and cell function, the importance of microbes to the environment, industry and disease, and the interactions of microbes with each other and with plant and animal cells. In addition, CMBI programs include instruction on the molecular basis of gene regulation in microbial and animal cells, the biological features of different types of microorganisms, the molecular basis for animal development, the structure of animal cells and the functions of their internal organelles, the molecular basis for cancer and other diseases, the interaction of animal cells with microorganisms and viruses, and the application of recombinant DNA techniques to problems in basic science and biotechnology. In short, CMBI programs include the study of how bacterial cells and animal cells function, and how their functions influence our lives.

The CMBI program is the second largest program in the Department of Biological Sciences. There are a total of 131 CMBI students registered in the fall 2016 semester, which consists of 86 majors and 45 honors. In contrast to majors, honor students are required to complete several courses (CMMB 451, CMMB 530 and CMMB 507.95) that provide extensive research experience and also maintain a minimal GPA of 3.3 in all their courses. Students in the CMBI Programs have the option of specializing in either Molecular Microbial Biology or Molecular Cell Biology. Students specializing in Molecular Microbial Biology take more courses that emphasize microorganisms, whereas those in Molecular Cell Biology concentrate on courses about fungi and animal cells. Neither specialization is required of CMBI students. However, many students find that they are more interested in one specialty than the other, or that specialization serves their career objectives.

# Guiding Questions

The following critical questions and concerns were used to guide the curriculum review process: Questions 1 and 2 were formulated by the Undergraduate Programs Curriculum Committee of the Biological Sciences Department, and approved by Department Council. Questions 3 and 4 are questions asked by all programs in the Faculty of Science.

**1. How well do the BioCore courses prepare students for senior courses in each program?** (The BioCore courses refer to a common set of first- and second-year core courses completed by students in all programs).

**2. In considering courses in each program outside of the BioCore courses: Is course material properly scaffolded throughout the program to best prepare students to meet requirements?** (i.e., to what extent do the content and expectations of later courses build upon the content and expectations of earlier courses?) Are there gaps in the curriculum, in the order in which material is delivered or in the level of expectations as student progress from one course to another?

**3. Are High Impact Practices being used regularly in each program?**

High-Impact Practices (HIPs) share several traits: They generally demand considerable time and effort, facilitate learning outside of the classroom, require meaningful interactions between faculty and students, encourage collaboration with diverse others, and provide frequent and substantive feedback. Examples of HIPs include, but are not limited to:

- Learning community or some other formal program where groups of students take two or more classes together
- Courses that included a community-based project (service-learning)
- Work with a faculty member on a research project
- Internship, co-op, field experience, student teaching, or clinical placement
- Study abroad
- Culminating senior experience (capstone course, senior project or thesis, comprehensive exam, portfolio, etc.)

**4. If HIPs are not being used regularly in each program, what is preventing these practices from being used?**

## Action Plan

To address the guiding questions, data were collected from academic staff's teaching in the CMBI program as well as from both current students and alumni. We also used data from the 2014 National Survey of Student Engagement, as well as data provided by the Office of Institutional Analysis, University of Calgary. The action plan below was developed based on information from those sources, and outlines how the CMBI program will address the findings of this review, to enhance student learning and strengthen the program in the interval between curriculum reviews.

The following chart outlines the recommendations, specific action items, the individual/team responsible, and the timeline for implementation.

<b>Recommendation</b>	<b>Action Item</b>	<b>Who is Responsible?</b>	<b>Due Date</b>
Ensure that all CMBI students enroll in courses that provide training in advanced laboratory skills.	Discuss among faculty of the CMBI program about possible strategies	CMBI Chair, Associate Head of Undergraduate & Department Head	Ongoing
Strengthen experiential learning in eukaryotic cell and development biology courses	Discuss among faculty of the CMBI program about possible strategies	CMBI Chair, Associate Head of Undergraduate & Department Head	Ongoing
Incorporate more bioinformatics and statistics in the CMBI program	Discuss among faculty of the CMBI program about possible strategies	CMBI Chair, Associate Head of Undergraduate & Department Head	Ongoing
Inform CMBI students of career possibilities after graduation.	Host workshop in the Winter semester after the CMBI Open House	CMBI Chair	Ongoing
Promote engagement among students and faculty within the CMBI program	<ul style="list-style-type: none"> <li>• Organize meetings between students and the CMBI chair once per semester to discuss the CMBI program</li> <li>• Organize a year-end social for CMBI students and faculty</li> </ul>	CMBI Chair	Ongoing
Acquire more comprehensive student data on guiding questions for the CMBI program	Create an informative survey designed to be administered in all fourth year CMMB courses	CMBI Chair & Associate Head (Undergraduate)	Ongoing

