

Department of Physics and Astronomy Final Assessment Report & Implementation Plan

Faculty / Affiliated University College	Faculty of Science
Degrees Offered	Bachelor of Science (BSc)
Modules Reviewed	Honors Specialization, Specialization and Major in Physics; Honors Specialization, Specialization and Major in Astrophysics; Honors Specialization, Specialization and Major in Medical Physics; Honors Specialization in Integrated Science with Physics
External Consultants	Dr. Sharon Morsink, Associate Professor, Department of Physics, University of Alberta Dr. Joanne O'Meara, Professor, Associate Chair (undergraduate), Department of Physics, University of Guelph
Internal Reviewer	Dr. Joseph Michalski, Associate Academic Dean, King's University College at Western
Date of Site Visit	March 25-26, 2019
Evaluation	Good Quality
Approval Dates	SUPR-U: June 10, 2019 SCAPA: September 11, 2019 Senate:
Year of Next Review	2026-27

Executive Summary

The external reviewers, Dr. Sharon Morsink and Dr. Joanne O'Meara, conducted a two-day site visit on March 25-26, 2019 to examine the undergraduate programs in the Department of Physics and Astronomy. The team met individually the first morning with the Vice-Provost (Academic Programs), the Department Chair, the current and former Undergraduate Chair, and two faculty representatives from the Western Integrated Science Program. The team then had lunch with several undergraduate students before a series of 30-minute, afternoon meetings with the following groups: 1) second-year instructors; 2) upper-year instructors; 3) first-year instructors; 4) the administrative staff; 5) Associate Librarian and Associate Chief Librarian; and 6) the Associate Academic Dean, Faculty of Science. The second day, March 26, involved a meeting with the Vice-Provost (Academic Planning, Policy & Faculty), coffee with several Teaching Assistants, and a joint meeting with the Undergraduate Chair of Medical

The Department offers three main programs—Physics, Astrophysics, and Medical Physics—and a fourth HSP involving Integrated Science with Physics. The reviewers and the Department's

First, a consensus emerged with respect to the program's innovative instruction, as well as direct experience in working with faculty supervisors. These include a range of high-impact learning opportunities, such as MakerSpace, support for PhUnC, study abroad opportunities, group projects in senior-level courses, and the student-organized Physics Undergraduate Conference. As the reviewers noted, "Students and faculty spoke positively about these opportunities and experiences (that are) enabled by the high faculty-student ratios in this academic unit." Indeed, the recent graduates overwhelmingly (95%) "would recommend Western to a friend," confirming an extremely high level of course and program satisfaction.

A second related strength involves the program's focus on analytic and experimental background preparation for graduate school or research-industry-field work opportunities. Each student in the program has an opportunity during their undergraduate studies to work on one or more major research programs, including the approximately 30 students from Western (and other universities) working with faculty over the summer months. In addition, the weekly Fusion Pizza journal club with graduate students and faculty affords opportunities to learn more about research presentations, while faculty members provide mentoring in scientific literacy and presentation skills. The Department has two strategic projects designated to increase undergraduate enrollment in upper-year courses to a minimum of 22 students each (Freedom22) and to increase the matriculation of Canadian Graduate students (CanGRAD).

A third strength clearly involves an intentional sense of developing a community and inclusion, especially among the growing proportion of female students. The fact that many of the faculty are women contributes to the overall gender balance. The reviewers and faculty alike have lauded the enhanced physical space and building renovations that allow for much greater daily, meaningful interaction. The department further maintains an active social media presence via Facebook, Twitter, and LinkedIn, as well as inviting alumni to speak in seminars and at March Break Open House. The Department offers additional participatory incentives through the First Year Physics Summer Prize Internship and the Elizabeth Lair Prize Lecture, while introducing faculty mentoring of the PASA executive to enhance the quality and consistency of their events.

Yet another strength consists of the fact that the scholarship and research activities of the undergraduate students continue to be well-supported, through the faculty, the infrastructure and lab spaces, and library services. The framework for support and the more general efforts to socialize students into the professional

gender balance has increased too, with roughly one-third female students across the seminars. Finally, the Department services upwards of 2,000 students in undergraduate programs in Engineering, Medical Sciences, and the Faculty of Science in general.

Other Opportunities for Program Improvement and Enhancement

In considering the range of program offerings and resources, the reviewers have recommended an amended model with four main streams to help “level the playing field” for students entering the program with different preparatory backgrounds (e.g., high school physics or calculus, or the lack thereof):

1. Physics 1028/1029 - either Life Sciences or

- € Enhanced connections between in-course students and alumni
- € Continued support for students in pursuing research opportunities abroad
- € Consideration of the J-TUPP recommendations for concrete steps to address career preparedness

Implementation Plan

The Implementation Plan provides a summary of the recommendations that require action and/or follow-up. The Department Chair, in consultation with the Dean of the Faculty will be responsible for monitoring the Implementation Plan. The details of progress made will be presented in the Deans' Annual Report and filed in the Office of the Vice-Provost (Academic).

Recommendation	Proposed Action and Follow-up	Responsibility	Timeline
Enhance high-impact learning opportunities	<ul style="list-style-type: none"> € Establish connections between MakerSpace and the curriculum at the 3rd and 4th years € Explore other experiential learning opportunities such as 4000-level thesis courses and internship 		
Restructure selected curriculum features	<ul style="list-style-type: none"> € Encourage growth of double majors € Rejuvenate materials science stream in collaboration with engineering 		
Review first year course offerings	<ul style="list-style-type: none"> € Reevaluate alternate models for first-year students with varied backgrounds 		
Review senior-level course offerings	<ul style="list-style-type: none"> € Reexamine role of second-year core with respect to learning outcomes, recruitment and retention 		
Enhance career preparedness and	<ul style="list-style-type: none"> € Ensure more chances for alumni to meet 		

enhance connections with alumni	and interact with students in programs € Continue to develop “soft skills” € Offer more internship and/or study abroad options		
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