Master of Science (MSc) in Microbiology and Immunology
New Option: One-Year Project and Course Based MSc

OVERVIEW OF THE NEW OPTION

The Department of Microbiology and Immunology introduces a new option (Microbiology and Immunology Project and Course-Based Master of Science Program) in the existing Microbiology and Immunology Master of Science (MSc) program. The new option is a non-thesis degree based on an advanced research project and formal coursework. The duration of the Project and Course Based MSc is one year (May 1 – April 30). Project and Course Based MSc students do not receive a stipend and are responsible for their own tuition costs.

LEARNING OBJECTIVES OF THE NEW OPTION

The core goal of the project and course-based MSc program in Microbiology & Immunology is to teach critical thinking skills, problem-solving skills, and hands-on skills in state-of-the-art biomedical research methods, by immersing students in the culture of Microbiology & Immunology. This will be accomplished in part by having students take formal courses, but most importantly by working with faculty mentors in a research laboratory setting. There is a consensus among education experts that learning is best performed hands-on, rather than in a classroom. A recent bulletin from the Canadian Association of University Teachers wrote "Just as coaching requires individual attention, education at its core requires one mind engaging with another in real time: listening, understanding, correcting, modeling, suggesting, prodding, denying, affirming, critiquing thoughts and their expressions" ("Don’t Confuse Technology with Teaching", Canadian Association of University Teachers Bulletin, October 2012). Dr. David Vogt of the University of British Columbia Masters of Education Technology program was recently quoted as follows: “The average individual can expect to change careers half a dozen times before they retire. Therefore we need students who are able to embrace change, who are highly versatile learners in a continuous way and who are very confident across a variety of disciplines. What you want to do is immerse them in the culture of a discipline. How do experts pursue this field? The content becomes almost irrelevant” (“Classroom of 2020: The future is very different than you think”, The Globe & Mail, October 22, 2012).

ADVANTAGES OF THE NEW OPTION FOR STUDENTS

The proposed new Master of Science option has a number of potential advantages for students, including:
1) Completion of an MSc degree in 12 months allows students to more quickly reach their career objectives.
2) Additional students currently not granted entrance to the MSc program can be accommodated by the increased capacity generated by the new program.
3) Student completing this option are eligible to enroll in our PhD program, and are effectively "fast-tracked".
4) Students tend to achieve learning outcomes more effectively in accelerated programs due to improved engagement and focus.
5) Students gain a deeper and longer-lasting understanding of knowledge when given in a compressed time frame.
6) Students have access to a unique Scientific Communications course that emphasizes communications and interview skills that are key to professional careers.
7) The close association of candidates with their supervisors and advisory committee members provides students with access to the detailed and informative reference letters that are necessary for admission to professional school.

Although a number of universities in the US offer project or course based MSc degrees, the new Project and Course Based option is unique. After graduating with an honours BMSc degree, students are able to obtain an MSc degree with one additional year of study.

The choice to enter either the Project and Course Based MSc option or the traditional 2-year MSc Thesis degree must be indicated upon application to the program. After acceptance, students are not allowed to switch between the traditional 2-year MSc degree and the Project and Course Based MSc option, due to course and milestone incompatibilities. Project and Course Based MSc graduates wishing to pursue an advanced research career upon completion of their Project and Course Based MSc option are eligible to apply for entry to the Microbiology and Immunology PhD program.
OPTION DETAILS

The Project and Course Based MSc option is only available to students completing an undergraduate honours thesis research project in year 4 of Western’s BMSc program. Project based students commence their graduate studies in May, immediately following completion of their Honours BMSc degree. Ideally, Project and Course Based MSc students should remain working under the same supervisor for their undergraduate research thesis project. Students do not receive a stipend and are responsible for their own tuition costs. The Project and Course Based MSc is non-thesis based, but students write a report based on their advanced research project and have a complement of formal course work. All requirements for the Project and Course Based MSc option will be completed by the end of the following April. The diagram below summarizes the timelines and milestones of the Project and Course Based MSc option.

Proposed timeline for accelerated MSc program

Program starts May 1st and ends April 30th.
Students are enrolled in 5 courses:
9050Y* - Infection and Immunity, which runs October-November
9150A* - Effective Scientific Communications, which runs throughout September
9210Y* - Seminar Course, which runs from October-April
9700L - Critical Review of the Literature and Survey, which runs from May-July
9800Y - Advanced Research Project, which runs from May-April
*indicates courses with shared content with students enrolled in the conventional 2-Year MSc program

Abbreviations:
AC - Advisory Committee
(comprised of supervisor, steering committee member and one additional faculty member)
Project and Course Based MSc students will take the following required courses:

MICROIMM 9800Y (Research Project 1yrMSc)
MICROIMM 9700L (Literature Review 1yrMSc)
MICROIMM 9050Y* (Infection and Immunity 1yrMSc)
MICROIMM 9150A* (Scientific Comm 1yrMSc)
MICROIMM 9210Y* (Seminar course 1yrMSc)

*indicates courses with shared content with students enrolled in the conventional 2-Year MSc program

Course Descriptions:

1) MICROIMM 9800Y (Research Project 1yrMSc):
Calendar description: Students will perform an advanced research project in the laboratory and under the close supervision of a faculty mentor. In most cases this project will build on the research project performed as a fourth year honours thesis student. The advanced research project will require a written proposal due no later than June 1, two meetings with an advisory committee, and a final report not exceeding 40 pages (not including references) due the following April 15.

Detailed description: During May the student initiates work on the advanced research project as well as writes a 5-page NSERC-style research proposal due June 1st. This proposal is presented to the advisory committee at a meeting to take place no later than July 1. The proposal and presentation is graded by the advisory committee and is worth 20% of the final grade of this course. A second meeting with the advisory committee to measure progress is required by December 15. No grade is assigned for this meeting, since the intention of this meeting is to help keep the student on track for completion by April 31st of the following year. Next, a draft Materials and Methods section is due March 1st and is graded by the research supervisor and worth 10% of the course grade. The final report containing introduction, hypothesis, methods, results, and discussion is due April 15. The length of the final report should not exceed 30-40 pages (not including references). The two additional members of the advisory committee assign a grade for the report and this comprises 45% of the course mark. The final 25% of the grade is based on an assessment of the student’s effort and productivity by the research advisor.

2) MICROIMM 9700L (Literature Review 1yrMSc)
Calendar description: A survey of the literature not exceeding 20 pages (not including references) relevant to the topic of the Advanced Research Project will be due August 1. This written survey is intended to form the basis of the introduction component of the final research report of the Advanced Research Project Course.

Detailed description: A survey of the literature relevant to the topic of the Advanced Research Project will be due August 1. The length of the survey will be between 15-20 pages, including figures, but not references. A formal lecture on how to approach and write a literature survey will be included at the beginning of the term. This survey will be graded by the advisory committee. This written work is intended to form the basis of the introduction component of the final research report of the Advanced Research Project Course.
Course. The project is anticipated to evolve over time in light of the data obtained, so that regular update of the literature review will be necessary to produce the introduction of the final research report. Therefore, this first literature review is not overlapping with the final report preparation but represents a training exercise that will facilitate completion of the report in a timely manner.

3) MICROIMM 9050Y* (Infection and Immunity 1yrMSc)
Calendar description: This course provides a comprehensive introduction to infection and immunity and an exposure to cutting-edge technologies and their application in infection and immunity (e.g., bioinformatics, genomics, proteomics, imaging, statistics, microscopy, transgenics, animal gene knockouts, flow cytometry, quantitative PCR, etc.). The final grade is based on a combination of the evaluation of weekly exercises and a written final exam covering the entire course content.

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4) MICROIMM 9150Y* (Scientific Communication 1yrMSc):
Calendar description: This course is offered in the autumn semester and typically runs throughout September. Topics covered in this course include scientific writing skills, how to prepare and present posters and oral presentations, how to prepare for job interviews, library and research skills, how to communicate with the public, supervisory, project management and interpersonal skills, and research ethics. This course is graded either pass or fail.

5) MICROIMM 9210Y* (Seminar course 1yrMSc):
Calendar description: Project and Course Based MSc students will present two oral seminars during the autumn and winter semesters. At the first seminar, to be presented in October, students should outline project goals, hypothesis, and research progress to date. The final student seminar will be presented at the very end of April and is an oral presentation of the candidate’s final written report. Each seminar will be worth 50% of the grade of this course.

Detailed description: Project and Course Based MSc students present two oral seminars during the autumn and winter semesters. At the first seminar, to be presented in October, students should outline project goals, hypothesis, and research progress to date. This seminar is integrated into the regular 9200Y seminar series and is presented to the entire department including graduate students. The final student seminar is presented at the very end of April and is an oral presentation of the candidate’s final written report. This seminar will be presented at a dedicated event attended by other Project and Course Based MSc students. Each seminar is worth 50% of the grade of this course. To ensure
consistency in the marking, only members of the Project and Course Based MSc steering committee assign grades for both seminars.

**DIFFERENTIATION BETWEEN THE TWO MSc OPTIONS**

The proposed new course and project based MSc option differs from the conventional 2-year MSc stream in the following ways. **First,** the program incorporates a tightly defined, high-intensity research project of a fixed one-year duration, based on a foundation of prior undergraduate achievement. This approach also allows for the possibility of working on team projects. The conventional MSc stream is an open ended, multi-year thesis based project in an area that may be unfamiliar to the candidate, as well as the supervisor. **Second,** the program culminates with the writing of a project report that is shorter than a conventional thesis and is examined by a committee without a formal thesis defense. **Third,** the program has courses with additional material not available to conventional two-year MSc thesis students. In particular, the Scientific Communication course (9150 instead of 9100 for conventional MSc thesis students) includes sections on project management skills, lab management skills, and job interview skills. These sessions are not available to conventional MSc thesis students. **Fourth,** students completing the Project and Course Based MSc option obtain a numerical grade for their Advanced Research Project. This numerical grade differentiates the Project and Course Based MSc option from the traditional 2-year MSc Thesis degree, which does not assign a grade. **Fifth,** unlike conventional MSc students, participation in a journal club is not mandatory for the one year Project and Course Based option.

**LISTING OF FACULTY MEMBERS IN THE PROGRAM**

The advanced research project will be undertaken under the supervision of a faculty member of the Graduate Program in Microbiology and Immunology who will act as the chief advisor (see list below). The project supervisor is expected to be the same as for the students’ undergraduate Honours thesis project. Under special circumstances permission may be granted for a student to change research supervisor.

Upon starting the program, and in consultation with his/her supervisor, the student will choose an advisory committee consisting of the supervisor, one Project and Course Based MSc steering committee member, and one additional member of the Graduate Program in Microbiology and Immunology or suitable faculty member from another department.

Project and Course Based MSc students will be required to have two advisory committee meetings; the first to take place no later than July 1 and the second to take place no later than November 15 of the year entering the program.

The incorporation of two advisory committee meetings per year and the numerous milestones described above will ensure timely completion of the requirements for the Project and Course Based MSc. Satisfactory completion of each requirement will be required for student advancement in this program.
a) Primary members: tenured or tenure-track core faculty members whose graduate involvement is primarily in the graduate program under review.

1. Dr. Stephen Barr, Assistant Professor, Microbiology & Immunology
2. Dr. Ewa Cairns, Professor, Medicine and Microbiology & Immunology
3. Dr. Carole Creuzenet, Associate Professor, Microbiology & Immunology
4. Dr. Greg Dekaban, Professor, Microbiology & Immunology
5. Dr. Jimmy Dikeakos, Assistant Professor, Microbiology & Immunology
6. Dr. Rodney DeKoter, Associate Professor, Microbiology & Immunology
7. Dr. Lakshman Gunaratnam, Assistant Professor, Microbiology & Immunology
8. Dr. Mansour Haeryfar, Associate Professor, Microbiology & Immunology
9. Dr. Bryan Heit, Assistant Professor, Microbiology & Immunology
10. Dr. David Heinrichs, Professor, Microbiology & Immunology
11. Dr. Anthony Jevnikar, Professor, Microbiology & Immunology
12. Dr. Yong Kang, Professor, Microbiology & Immunology
13. Dr. Steven Kerfoot, Assistant Professor, Microbiology & Immunology
14. Dr. Sung Kim, Associate Professor, Microbiology & Immunology
15. Dr. Susan Koval, Associate Professor, Microbiology & Immunology
16. Dr. Tom Linn, Associate Professor, Microbiology & Immunology
17. Dr. John McCormick, Associate Professor, Microbiology & Immunology
18. Dr. Martin McGavin, Associate Professor, Microbiology & Immunology
19. Dr. Joe Mymryk, Professor, Microbiology & Immunology
20. Dr. Gregor Reid, Professor, Microbiology & Immunology
21. Dr. Alp Sener, Assistant Professor, Microbiology & Immunology
22. Dr. Bhagi Singh, Professor, Microbiology & Immunology
23. Dr. Kelly Summers, Assistant Professor, Microbiology & Immunology

b) Secondary members: faculty members with cross-appointment to the graduate program under review.

1. Dr. Ze-Chun Yu, Assistant Professor, Southern Crop Protection & Food Research Centre, Agriculture Canada
2. Dr. James Koropatnick, Professor, London Regional Cancer Program
3. Dr. Tina Mele, Assistant Professor, Department of Surgery