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WHO DO I ASK ABOUT…?

| M.S. degree requirements, course selection | Cheong-Hee Chang, Heidi Thompson               |
| Course registration, graduate student forms | Heidi Thompson                                |
| Keys, building access                      | Bonnie Clark,                                 |
| Departmental computers, projectors, microphone, pointer | Bonnie Clark, office staff          |
| Graduate Studies matters                   | Eric Martens, Cheong-Hee Chang               |
| Reimbursements (travel, entertainment)      | Bonnie Clark, Sheryl Smith                   |
| Scheduling meeting rooms                   | Heidi Thompson, esp. for committee meetings and dissertation (or Bonnie Clark for other meetings) |
| Issues with personal computer for research activities | msishelp@umich.edu                         |

GENERAL INFORMATION
The M/I Department has instituted a M.S. degree program through the Rackham School of Graduate Studies. M.S. students are admitted directly to the M/I Department.

This handbook outlines the steps necessary to complete the requirements for the M.S. in the Microbiology and Immunology Department.

COURSE SELECTION
Objectives for the M/I curriculum
1) Provide flexibility and efficiency for integrating coursework and dissertation research while providing a solid foundation in the core concepts in microbiology and immunology.
2) Maximize curriculum possibilities for each student by customizing coursework that builds on pre-graduate education.
3) Facilitate transition from PIBS into Microbiology and Immunology.

The Rackham Graduate School requires students to complete a minimum of 18 credits of graded coursework while at the Ann Arbor Campus to achieve candidacy. Students should register for at least 9 credits each fall and winter term as precandidates; Rackham requires 9 hours to be considered full-time study. Rackham does not have a concern/upper limit for credits per term until ~15 credits.
1. Basic core coursework:

Microbiology & Immunology M.S. Program

Additional information can be found at http://www.med.umich.edu/microbio/masters/

DEGREE OPTIONS

Non-Research Option: Recognizing that some students who enroll in the Microbiology and Immunology Master’s Degree program may not be preparing for careers in research, or may decide to pursue other directions after an initial term of research, students can complete the degree with 28 credits whether or not research is included, provided other degree requirements are satisfied. Students intending to pursue the non-research master’s degree in Microbiology and Immunology should design a plan of study in consultation with the Master’s Advisor, and this plan will be kept in the student’s departmental file. Completing their approved personalized plan of study will be a requirement for each student who wishes to receive the Master’s degree.

Research Option: Performing laboratory research is not a requirement of the Masters of Science in Microbiology and Immunology. However, in keeping with departmental strength in research and the value of research experience for students, all Master’s students interested in research are encouraged to pursue it. The program will facilitate research opportunities for all enrolled in the Master’s Degree program. Research Track Master’s students will not perform research rotations, but will enter mutually agreed-upon relationships with Microbiology and Immunology faculty research mentors prior to enrolling in research credit for the terms in which research will be performed. The student and research mentor will make arrangements for requisite safety coursework and will discuss expectations (generally 5-6 hours/week per research credit) prior to the start of research. In addition to providing a letter grade, the faculty member will provide a written evaluation for the student’s departmental file, to be discussed and signed by the student, at the end of each term.

Thesis Option: Matriculated students who have maintained an overall B+ average and intend to pursue at least two terms of laboratory research can opt to write a research-based thesis as part of their master’s degree. They will defend their thesis to their thesis advisor and two additional committee members. Upon successful defense of the thesis, the Microbiology & Immunology program will then ensure that the student’s degree is awarded with a designation indicating that they defended a thesis.

Internship Option: Students who have maintained a B+ average, and who have completed MICRBIOL 504 Cellular Biotechnology and at least 3 credits of MICRBIOL 599 Research, are eligible to perform a term of detached study or summer internship doing laboratory research in an industrial setting, upon approval from the Master’s Program Advisor. Because internship/detached study placement options are limited and the host institution has the final say in whether or not they will accept a trainee, this option may not be available to all matriculates. The internship option can be pursued by master’s students completing either the Research or the Non-Research options of study described above.

SUMMARY OF COURSE REQUIREMENTS

The minimal requirements for the Masters of Science in Microbiology and Immunology program are 28 credits as follows:

16 credits in Microbiology and Immunology at the 400 level or above
4 credits of approved graduate level cognate coursework
1 credit in statistics
7 additional credits, in M&I and/or approved cognate areas

All time, residency, and transfer of credit requirements will be in accordance with existing Rackham rules. Consistent with Rackham policies, coursework must be completed with a B- or better. There are no teaching or foreign language requirements.
NON-THESIS OPTION

Detailed Course Requirements
Satisfaction of entry requirements in biochemistry, molecular genetics, and cell biology prior to Matriculation or by remediation as soon as possible after enrollment in the master’s degree program, from the following courses or alternates approved by the Master’s Program Advisor.

- MCDB 415 (3 CR) Microbial Genetics
  - BIOLCHEM 515 (3 CR) Introductory Biochemistry
  - CDB 530 (3 CR) – Cell Biology OR MCDB 428 (4 CR) – Cell Biology

- Coursework in Microbiology and Immunology, from three areas:
  - **Microbial Pathogenesis:** at least three credits from among:
    - MICRBIOL 405 (3 CR) Introduction to Infectious Disease
    - MICRBIOL 607 (2 CR) Microbial Pathogenesis
    - MICRBIOL 615 (2 CR) Viral Pathogenesis
  - **Immunology:** three credits from among:
    - MICRBIOL 440 (3 CR) Immunology
    - MICRBIOL 640 (3 CR) Molecular and Cellular Immunology (with permission)
  - **Electives:** at least three additional 400-level or above credits in M&I courses, including but not limited to additional courses from the above, plus:
    - MICRBIOL 430 (3 CR) Symbiosis
    - MICRBIOL 460 (3 CR) Eukaryotic Microbiology
    - MICRBIOL 553 (3 CR) Cancer Biology

- Master’s degree students must enroll in and attend:
  - MICRBIOL 812 (1 CR) Student Seminars in M&I

- Statistics, at least one credit:
  - BIOINF 525 Foundations of Bioinformatics and Systems Biology; (Introduction to Statistics (1 CR module))
  - BIOSTAT 503 (4 CR) Introductory Biostatistics
  - BIOSTAT 553 (3 CR) Applied Biostatistics
  - BIOSTAT 646 (3 CR) Data Analysis in Molecular Biology

- Electives, at least 4 credits outside of M&I are required at the 400 level or above, from the following approved list or that are approved by the Master’s Program Advisor.
  - BIOINF 525 (1-3 CR; 3 1-CR modules) Foundations of Bioinformatics and Systems Biology
  - *Bioinformatics on the Web,*
  - *Introduction to Statistics,*
  - *Bioinformatics & Systems Biology*
  - BIOSTAT 503 (4 CR) Introductory Biostatistics
  - BIOSTAT 553 (3 CR) Applied Biostatistics
  - CANBIOL 554 Translational Cancer Biol
  - CDB 530 (3 CR) – Cell Biology
  - CHEMBIO 501 (3 CR) Chemical Biology
  - EPID 600 (3 CR) Introduction to Epidemiology
  - PIBS 505 (2 CR) Teaching in the Sciences
  - PIBS 507 (2 CR) Introduction to Translational Research
  - PUB POL 650 (3 CR) Intro to Science and Technology Policy Analysis
  - PATH 581 (3 CR) Tissue, Cellular and Molecular Basis of Disease

- Electives to a total of 28 credits. Can be drawn from any of the approved courses above, additional research credits, or other courses at the 400 level or above that are approved by the Master’s Advisor.
**Generic curriculum, Non-thesis Option**

- **First Year Fall:** 8 credits
  - MICRBIOL 405 (3 CR) Introduction to Infectious Disease
  - PHYSIOL 510 (4 CR) Systems and Integrative Physiology
  - MICRBIOL 812 (1 CR) Student Seminars in M&I

- **First Year Winter:** 8 credits
  - MICRBIOL 440 (3 CR) Immunology
  - MICRBIOL 430 (3 CR) Microbiol Symbiosis
  - BIOINF 525 (1 CR module) Foundations of Bioinformatics
    *Introduction to Statistics,
  - MICRBIOL 812 (1 CR) Student Seminars in M&I

- **Second Year Fall:** 9 credits
  - MICRBIOL 615 (2 CR) Viral Pathogenesis
  - MICRBIOL 553 (3 CR) Cancer Biology
  - PUB POL 650 (3 CR) Intro to Science and Technology Policy Analysis
  - MICRBIOL 812 (1 CR) Student Seminars in M&I

- **Second Year Winter:** 8 credits
  - MICRBIOL 607 (2 CR) Microbial Pathogenesis
  - BIOSTAT 553 (3 CR) Applied Biostatistics
  - PIBS 505 (2 CR) Teaching in Sciences
  - MICRBIOL 812 (1 CR) Student Seminars in M&I

**THESIS OPTION**

**Detailed Course Requirements**
Matriculated students who have maintained an overall B+ average and intend to pursue at least two terms of laboratory research can opt to write a research-based thesis as part of their master’s degree by the following procedure. The requirements for the thesis option include those for the non-thesis option and include additional coursework and research requirements.

- **Additional coursework:**
  - Research responsibility
    - MICRBIOL 599 (1-8 CR) Graduate Research
    - PIBS 503 (1 CR) Research responsibilities and ethics
    - Two semesters of laboratory research with at least two credits per semester

- **Thesis**
  - At least two months before the start of the student’s final term in the master’s degree program, the student must:
    - Identify a member of the M&I training faculty willing to serve as their thesis advisor and two additional faculty willing to serve as readers. Devise a plan for a suitable research project, generally to be based on the Student’s ongoing research performed in the thesis mentor’s laboratory. Gain ratification of a one-page outline of the plan from the thesis advisor and readers, and submit the plan to the M&I Graduate Studies Committee for approval.

  - At least three weeks before the student’s final term ends, the student must provide the thesis advisor and readers with the final version of a research-based master’s thesis, written in the general style and depth of a scientific paper. Within ten days, these individuals will evaluate the thesis and the research mentor’s evaluations of the student’s progress, and will make a recommendation of pass or no pass. Recommendations will be recorded on the Master’s Thesis form. This form may be obtained at the end
Provided all course credits and other degree requirements have been satisfied, the student master's thesis will either be awarded if the recommendation was pass, or the student will be awarded a non-thesis master’s degree, using either the Research Track or the Non-Research Track described below, as decided by the Program Advisor in consultation with the faculty who evaluated the thesis.

The M&I program will then ensure that the student’s degree is awarded with the correct notation regarding whether or not a thesis was completed. In practice, the student should notify the Master’s Program Advisor and Thesis Advisor of any changes in intention to complete a master's thesis whenever such changes arise. Any deviations from this policy for evaluating a master’s thesis can be made only upon the recommendations of the student’s thesis advisor and the M&I Master’s Program Advisor, and will require approval from the full M&I Graduate Studies Committee.

Generic curriculum, Thesis Option

- First year Fall: 9 credits
  - MICRBIOL 405 (3 CR) Introduction to Infectious Disease
  - BIOSTAT 503 (4 CR) Introductory Biostats
  - MICRBIOL 812 (1 CR) Student Seminars in M&I
  - PIBS 503 [1 CR] Research Responsibility and Ethics

- First year Winter: 9 credits
  - MICRBIOL 440 (3 CR) Immunology
  - PIBS 507 (2 CR) Introduction to Translational Research
  - MICRBIOL 599 (3 CR) Graduate Research
  - MICRBIOL 812 (1 CR) Student Seminars in M&I

- Second Year Fall: 10 credits
  - MICRBIOL 553 (3 CR) Cancer Biology
  - MICRBIOL 615 (2 CR) Viral Pathogenesis
  - MICRBIOL 599 (4 CR) Graduate Research
  - MICRBIOL 812 (1 CR) Student Seminars in M&I

M/I STUDENT SEMINAR (MICRBIOL 812)

Overview
Student seminars are presented Fridays from 12-1 p.m. Second, third, and fourth year students present seminars on their own research. Students work with the research mentor to prepare the talk and practice it formally before the actual presentation. **Students must send out an email to the department ([microbiology@umich.edu](mailto:microbiology@umich.edu)) at least two days in advance with their name, mentor’s name, title of abstract, and abstract.** At the formal seminar, discussion and criticism of the research by the audience are encouraged. Two faculty members evaluate and discuss the presentation with each student at the end of the seminar. Attendance is required for all students.

DEPARTMENTAL SEMINARS
Microbiology & Immunology seminars normally start at 12:00 noon on Thursdays. All faculty and graduate students should consider attendance at the departmental seminar to be mandatory. The seminar series is held at great expense to the department and features cutting-edge work in microbiology and immunology. For your own professional development and as a courtesy to the speakers and hosts please make it a habit to attend the seminars. The schedule is listed on the M/I website [https://medicine.umich.edu/dept/microbiology-immunology/seminars](https://medicine.umich.edu/dept/microbiology-immunology/seminars). The Biomedical Science Weekly Calendar lists other seminars of interest; note that you can subscribe to receive this calendar by email. [http://www.med.umich.edu/medschool/research/calendars/currentweekly.htm](http://www.med.umich.edu/medschool/research/calendars/currentweekly.htm)
support. Since progress towards completion of dissertation studies is normally directly related to the amount of time devoted worked in the lab, it is highly recommended that students enrolled in classes take advantage of time off from classes to make progress in the laboratory.

Computer Assistance: msishelp@umich.edu

MICROBIOLOGY & IMMUNOLOGY MASTERS PROGRAM 2015-2016
Contact: Heidi Thompson for all questions and concerns

Staff representative:
Heidi Thompson heiditho@umich.edu 734-763-3532

Faculty representative:
Cheong-Hee Chang heechang@umich.edu
Name: _____________________________

Master’s Program in Microbiology and Immunology
Thesis Submission/confirmation

This report is to be completed by the members of the thesis advisory committee within 10 days of post-defense, reviewed and signed by the student.

Please return completed form to Heidi Thompson: 5641 Med Sci II or pdf/email: heiditho@umich.edu

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1. Student has made acceptable progress

2. The conclusions drawn from the research are supported by the data.

3. The Thesis submitted is appropriate for a Master’s degree in Microbiology and Immunology.

4. The research presented is in a state suitable for publication.

5. The student is finished with the research toward their Masters degree in Microbiology and Immunology

The following research aims have been accomplished:

Discussion summary of student’s milestones, goals, and future career plans:

Signed: ____________________________________ Thesis Advisor

__________________________________________ Committee Member

__________________________________________ Committee Member

__________________________________________ Committee Member

__________________________________________ Committee Member

I have read and agree with this progress report.

__________________________________________ Student

_____________________________ Date