

GUIDE TO MASTER'S DEGREE **Department of Microbiology and Immunology**

The Microbiology and Immunology Department offers a Master's degree program for two groups of students:

1. The Special Master's Program is for research technicians in the department who pursue a M.S. degree as a part-time student while continuing to work as a full-time employee.
2. Students who originally entered the Ph.D. program and who have decided that they do not wish to complete the requirements for a Ph.D. may choose to enter the Master's track and complete the requirements for a M.S. degree.

Departmental Master's Degree requirements are the same for the two groups of students. The Graduate School requirements and the specific departmental requirements for the M.S. degree are described below.

A. Graduate School Requirements for a M.S. degree:

1. At least 30 semester hours of graduate credit, with at least 24 hours in graduate courses, and at least 3 hours of Master's Thesis. 6 hours of credit can be transferred from the Extension Division, in partial satisfaction of the 30 hour requirement.
2. Two semesters of residence credit, which can be accumulated in part-time study.

9 hours = 1 semester of residence credit; 6-8 hours give 1/2 semester of residence credit; 3-5 hours give 1/4 semester of residence credit. Thus, if a part-time student took 3 credits of coursework every semester, it would take 8 semesters to accumulate the two semesters of residence credit (8 semesters x 1/4 residence credits per semester = 2 residence credits). In order to complete the program in the target time of three years or less, it will be necessary for a part-time student to register for at least 6 credits for at least 2 semesters. Full-time students will have satisfied this requirement at the end of the first year of graduate study.
3. Written or oral comprehensive exam.
4. There is a five-year time limit for completion of all degree requirements.

B. Specific Departmental Requirements for the M.S. Degree:

The requirements for a Department of Microbiology & Immunology M.S. degree closely follow all requirements for a Ph.D. degree, with the following exceptions:

- MCRO795 is not required

- The minimum seminar attendance requirement is lower.
- There is no Teaching Assistant requirement.
- The preliminary examination format is substantially different.
- There is no minimum publication requirement.
- The scope (but not the quality) of thesis research expected is less for the M.S. than for the Ph.D.

In general, any changes in requirements, procedures, expectations, etc. made for Ph.D. students will also apply to M.S. students.

1. **Courses.** A minimum of six graduate level courses, at least two of which must be seminar/tutorials. At least one of the seminar/tutorials must be MCRO710, MCRO711, or MCRO712. To qualify for seminar/tutorial credit, another course must be 700 series or higher, based on discussion of the primary literature, and approved by the Graduate Student Advisor. MCRO901 (Research in Microbiology) does not qualify as one of the six courses for fulfilling this requirement.
2. **Seminars.** Students will take MCRO702 each semester. To pass, the student must attend at least one-third of the weekly departmental and student seminars. Students are expected to give an annual student seminar, starting in their second year in the program.
3. **Preliminary examination.** A two-day written exam with essay-type questions; the student may choose beforehand whether the exam will be closed- or open-book, and the questions are designed accordingly. The exam is taken when the student has completed all or most of the planned course work, at a specific time chosen by the student, with approval from the research advisor. The questions are drawn from areas covered by the course work the student has taken and from his or her area of research. The student's advisor will be responsible for soliciting questions from the members of the thesis committee and for assembling the exam (detailed instructions for the comprehensive exam are contained in the document entitled "Frequently Asked Questions about the Comprehensive Exam for Students Pursuing a Master's degree in Microbiology and Immunology", available from Michelle Hightower or Bob Bourret). Generally, each committee member writes two questions designed to be answered in approximately 2-3 hours of thinking and writing, and the student must answer at least one of the two questions from each committee member. An exam for a student with a four-member committee will usually contain eight questions; the student will be required to answer four, or possibly five, of the questions. Committee members grade the answers to the questions that they wrote, using a scale of H, P+, P, P-, L, or F. A student who does not pass the written preliminary exam may take it a second time, after waiting at least three months. If the student does not pass the exam on the second attempt, the student will not be eligible to continue in the program.

Passing either the written or oral Ph.D. preliminary examination can be used to fulfill the M.S. preliminary examination requirement. However, one preliminary examination cannot be counted toward two degrees. Therefore, a student who

switches degree intent from Ph.D. to M.S. should take the M.S. specific preliminary examination if he or she wishes to preserve the option to return to the Ph.D. track.

4. **Thesis committee & chair.** As soon as possible after entering the Master's degree program, the student should choose a thesis committee of four faculty members (including the research advisor). At least three committee members must have faculty appointments in our department. A committee chair, different than the research advisor, should also be chosen. For students in the Special Master's program for departmental employees, it is useful to have an initial meeting with the committee during the first or second semester in the program. Students who were originally planning to pursue a Ph.D. degree but who have decided upon the Master's degree track should meet with the thesis committee shortly after making the decision to complete the requirements for a M.S. degree.
5. **Thesis project approval.** Once the student has defined a thesis research project, he or she writes a brief thesis proposal and then meets with the committee to discuss and defend the planned research. At least one week prior to meeting, provide the thesis committee with a written document of two pages or less describing hypotheses, Specific Aims, and a brief overview of research design, including which parts of research design have been completed. For part-time students in the Special Master's program, this thesis project approval meeting should occur no later than during the third semester in the program. For students who have switched from the Ph.D. program to the M.S. program, it is desirable to have the thesis project approval meeting as soon as possible after forming the thesis committee.
6. **Thesis committee meetings.** Meet at least annually with the thesis committee. Provide the committee with a progress report at least one week prior to each meeting. The report consists of a Specific Aims page followed by a description of progress to date organized by Aim. The report should include any changes in Aims, a summary of key results, plans for future experiments, and the status of any publications.
7. **Thesis research.** The main difference between a Master's thesis project and a doctoral dissertation project is one of scope; the research should be of similar quality and significance in both cases. The goal for the scope of the M.S. thesis project is that it should comprise a body of research that is appropriate for publication as an article in a refereed journal with the student as the first author.
8. **Thesis.** A presentation, written by the student, of the results of the independent research project. It should be a description of a piece of publication-quality research. The goal is for the results of this project to be submitted for publication as all or a major part of a manuscript, with the student as the first author. The thesis will usually consist of multiple chapters: 1) A general Introduction to the project, review of the relevant literature, and discussion of the significance of the work; this chapter will include literature citations. 2) One or more chapters presenting the results of the student's research. Each chapter may be written in

the format of a research paper, with Introduction, Materials and Methods, Results, Discussion, and Literature Cited sections. 3) A short overall Discussion, in which the student considers the work as a whole and discusses such topics as future directions or unanswered questions, is optional, depending on the wishes of the student's advisor and thesis committee. Each chapter in the thesis other than the Introduction and Conclusion must list all actual or planned authors involved in the described research and include a statement specifying the contributions of the student to the project.

9. **Distribution of thesis.** The student's research advisor must be satisfied with the thesis before it can be distributed to the other members of the thesis committee. Committee members must receive the thesis at least one week before the scheduled date for the defense. If a student cannot meet this deadline, the defense will be rescheduled for a time at least one week after the date that the thesis is distributed to committee members.

10. **Private defense and public seminar.** The final M.S. defense will take place in two stages:

First, a private defense in front of the thesis committee. The student should meet with the committee chair beforehand to discuss and agree upon general expectations for a brief initial presentation of no more than 10 slides. The presentation can include a synopsis of dissertation highlights, but should highlight broader or unresolved aspects of the thesis research and facilitate a forward-thinking conversation. The intent of the presentation is to help the committee assess whether or not the student has become a mature scientist. The committee will engage the student by asking questions arising from the presentation, the dissertation, and if applicable, peer reviews of a manuscript used to satisfy the publication requirement but not yet accepted for publication. If the student passes the defense, then all committee members, including the advisor and chair, will sign the appropriate graduate school document. The thesis committee chair will certify (by initialing the final exam form) that the dissertation has been approved for electronic submission at the time of defense if no edits are requested, or after any required edits are completed and approved.

Second, the student will present a public seminar of their research results no sooner than two weeks after their successful private defense. Thesis committee members are encouraged but not required to attend the public seminar. A final grade for Mcro993 will not be submitted until after the required public seminar.

A standard progression through the M.S. program would be expected to take approximately two to three-and-a-half years, depending on whether the student is pursuing studies on a full-time or part-time basis and on the progress of the thesis research project.

For further information about Master's degree requirements, or if you have questions, contact Bob Bourret, Director of Graduate Studies (6108 Marsico Hall; 919-966-2679; bouret@med.unc.edu).