

MICROBIOLOGY AND IMMUNOLOGY (MS)

Master of Science in Microbiology and Immunology (MBIOMS)

Unit: School of Medicine (<http://louisville.edu/medicine/>) (GM)
 Department: Microbiology and Immunology (<http://louisville.edu/medicine/departments/microbiology/>)
 Program Website (<http://louisville.edu/medicine/departments/microbiology/degrees/>)
 Academic Plan Code(s): MBIOMS

Program Information

The Department of Microbiology and Immunology, in the School of Medicine, offers a program of study leading to the degree of Master of Science. The MS program includes training in a broad range of research areas using state-of-the-art immunological, microbiological, and molecular technologies.

Diversity and Inclusion Statement

Our Department strives to foster and sustain an environment of inclusiveness that empowers us all to achieve our highest potential without fear of prejudice or bias. We commit ourselves to building an exemplary educational community that offers a nurturing and challenging intellectual climate, a respect for the spectrum of human diversity, and a genuine understanding of the many differences- including race, ethnicity, gender, socio-economic status, national origin, sexual orientation, disability, and religion that enrich a vibrant metropolitan research university. We expect every member of our academic family to embrace the underlying values of this vision and to demonstrate a strong commitment to attracting, retaining, and supporting students, faculty, and staff who reflect the diversity of our larger society.

Admission Requirements

For admission to the MS program, the applicant must have attained a BS or BA degree with a minimum grade-point average of 3.0 (on a 4.0 point scale). All applicants accepted into the master's program must be self-supporting, as financial assistance is not available.

In addition, the following should be submitted online (<http://louisville.edu/graduate/apply/>) directly to the Graduate School, Graduate Admissions:

- A completed application form and application fee
- The TOEFL (when applicable)
- Three letters of recommendation
- A brief statement of purpose describing interests and career goals
- A current resume or curriculum vitae
- A letter of scientific support from a Department of Microbiology and Immunology faculty member (faculty agreement to mentor student in lab)
- Official transcripts of all undergraduate and graduate course work (submitted to the Graduate School)

The applicant must meet the other general requirements of the Graduate School as outlined in the Application and Admission section (<http://catalog.louisville.edu/graduate/application-admission/>) of this catalog. The application deadline is March 1 each year. Submission prior to March

1 is strongly encouraged in order to ensure that all required materials (especially letters of reference) are received by the deadline.

The applicant is expected to have completed the following undergraduate courses prior to admission to the graduate program: Introductory biology, Organic chemistry, Physics, introductory calculus, and Biochemistry.

Prospective students may be invited for a personal interview with members of the admissions committee and departmental faculty as part of the application process.

Program Requirements Thesis Option

Code	Title	Hours
Coursework Requirements		
MBIO 601 or MBIO 602	Molecular Microbiology (2 credits) ¹ Immunology	3
MBIO 606	Seminar	1
MBIO 610	Methods and Analysis in the Biomedical Sciences	2
MBIO 619	Research	1-12
BIOC 630	Responsible Conduct of Research: Survival Skills and Research Ethics	1
BIOC 662	Biomedical Research Data Analysis Methods	1
BIOC 667	Cell Biology	3
BIOC 668	Molecular Biology	4
Electives²		
MBIO 601	Molecular Microbiology ¹	2
MBIO 602	Immunology ¹	3
MBIO 604	General Virology	1
MBIO 611	Learning Theories & Instructional Strategies in Science Education	2
MBIO 620	Tumor Immunity and Inflammation	1
MBIO 621	Advanced Immunology: Innate and Adaptive Immunity	2
MBIO 622	Immunity to Microbes and Tumor	2
MBIO 624	Immunity to Pathogenic and Commensal Microbes	1
MBIO 687	Microbial Pathogenesis	2
BIOC 670	Biomedical Genetics and Genomics	3-5
Minimum Total Hours		32-34

¹ If MBIO 601 is taken as a Required Course then MBIO 602 can be taken as an elective. Likewise, if MBIO 602 is taken as a Required Course then MBIO 601 can be taken as an elective.

² Additional courses outside of the department can be taken as electives in consultation with the research advisor and director of graduate studies.

Research Advisor and Project

Students in the MS thesis option program are required to obtain a Research Advisor before being admitted to the program. Students should form a Thesis Committee and decide upon a research project early in the second semester of graduate study. The student, in consultation with her/his Advisor, should form a Thesis Committee of at least three faculty members. The Thesis Committee will consist of two graduate faculty members with primary appointments in the Department of Microbiology and Immunology and a third graduate faculty member with primary status in another department. One of the two faculty

members with primary appointments in the Department of Microbiology and Immunology will serve as Co-Advisor, if the Research Advisor does not have a primary appointment in the Department of Microbiology and Immunology. The Thesis Committee may consist of more than three faculty members, however a majority of the faculty on the Thesis Committee must have primary appointments in the Department of Microbiology and Immunology. Selection of the Research Advisor and formation of the Thesis Committee must be approved by the Associate Dean for Graduate Education in the School of Medicine.

Evaluation of Student's Progress

The Thesis Committee will meet at least annually to evaluate the student's progress. Students are expected to maintain satisfactory progress in his/her research project each semester. Students may proceed to degree candidacy provided they have successfully maintained an overall and program GPA of 3.0 or higher (with a grade no lower than a B-minus in any MBIO course), Pass grades in all required courses with Pass/Fail (P/F) grading, and successful completion of all required coursework. It is anticipated the student will complete the degree program at the end of the second year of study.

Master's Thesis Examination

Students pursuing the thesis option are required to write and defend a master's degree thesis. The thesis must be a work of sufficient quality to demonstrate the student's ability to participate effectively on a research project. Following preliminary review and approval by the Research Advisor, the thesis should be distributed to the Thesis Committee members, and a written request submitted to the Graduate School, at least two weeks prior to the scheduled date of the final oral exam. The final oral defense/exam will be preceded by a research seminar open to all graduate faculty members, students and other interested persons. The oral exam will be administered by the Thesis Committee. The final copy of the thesis must be submitted as advised by the Graduate School through the ThinkIR repository. The directions on submission will be provided upon review of the thesis by the Graduate School. The signature page within the electronic version must have the names of your committee members typed under the signature line; the signatures cannot be scanned into the document. Submit a signed signature page on white paper, with original signatures or complete the digital/electronic signed signature page, to the Graduate School. Please find the published deadline dates (<https://louisville.edu/graduate/current-students/thesis-dissertation-information/>) by the Graduate School. To satisfactorily pass the thesis defense, a majority of the committee members must approve it.

Guidelines and requirements concerning the thesis and final oral examination are set forth on the Graduate School website (<https://louisville.edu/graduate/current-students/thesis-dissertation-information/>).

Non-Thesis Option

Code	Title	Hours
Coursework Requirements		
MBIO 601 or MBIO 602	Molecular Microbiology ¹ Immunology	2-3
MBIO 606	Seminar (Fall and Spring - 1 Credit Hour each semester)	2
MBIO 610	Methods and Analysis in the Biomedical Sciences	2
BIOC 667	Cell Biology	3

BIOC 668	Molecular Biology	4
Electives²		
Select Courses to Total 18-19 Credit Hours:		
MBIO 601	Molecular Microbiology ¹	2
MBIO 602	Immunology ¹	3
MBIO 604	General Virology	1
MBIO 611	Learning Theories & Instructional Strategies in Science Education	2
MBIO 619	Research	1-12
MBIO 621	Advanced Immunology: Innate and Adaptive Immunity	2
MBIO 622	Immunity to Microbes and Tumor	2
MBIO 623	Scientific Writing and Hypothesis Testing	1
MBIO 687	Microbial Pathogenesis	2
MBIO 689	Microbiota in Health and Disease	2
BIOC 630	Responsible Conduct of Research: Survival Skills and Research Ethics	1
BIOC 645	Advanced Biochemistry I	4
BIOC 662	Biomedical Research Data Analysis Methods	1

Minimum Total Hours 34

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² Additional courses outside of the department can be taken as electives in consultation with the research advisor and graduate program director.

If the student has satisfactorily completed the required courses and total credit hour requirements with an overall and program GPA of 3.0, then the student may register in master's candidacy.

Evaluation of Student's Progress

Students will meet with the associate director of graduate studies at the conclusion of the Year 1 Fall and Year 1 Spring semesters. Students are required to identify a faculty advisor by completion of Year 1. The faculty advisor will provide mentorship through completion of the Program, in particular, completion of the master's final oral examination. Students are expected to maintain satisfactory progress in her/his coursework. Students may proceed to degree candidacy provided they have successfully maintained an overall and program GPA of 3.0 or higher (with a grade no lower than a B-minus in any MBIO course), Pass grades in all required courses with Pass/Fail grading, and successful completion of all required coursework.

Master's Final Oral Examination

Students are required to write either a literature-based research proposal or a literature review and orally defend it to their master's final examination committee. The decision to write a research proposal or literature review will be made between the student and their faculty advisor. The Department of Microbiology and Immunology curriculum committee chair will name the master's final examination committee, which will be comprised of at least three graduate faculty members with at least two members with primary appointments in the Department of Microbiology and Immunology. To satisfactorily pass the master's final exam, a majority of the committee members must approve.