

MICROBIOLOGY AND IMMUNOLOGY, MASTER OF SCIENCE (M.S.) WITH A CONCENTRATION IN ORAL BIOLOGY

Program goals

The oral biology concentration in the M.S. in Microbiology and Immunology is a two-year program with students completing one year of formal course work before conducting an original research project under the supervision of a faculty adviser and culminating in an oral defense of their thesis. Curricula and research opportunities will be individually tailored for one of three possible career paths: admission into a D.D.S program, admission into a Ph.D. program or applying for a position in a health sciences research laboratory.

Students will gain a broad knowledge base that is essential for understanding biomedical disease and will gain in-depth knowledge in the area of their independent research with opportunities in the fields of cancer, microbiology and immunology, tissue engineering, health disparities, and clinical dentistry.

Student learning outcomes

1. Problem-solving skills: Degree candidates will demonstrate an appropriate level of skill in the identification and selection of meaningful problems to be addressed in bioscience research, including the ability to defend said identifications and to design and develop appropriate methods to solve said problems as measured by rubric.
2. General knowledge of sciences: Degree candidates will demonstrate an appropriate level of knowledge of the current elements of the biosciences as related to disciplinary specialization and a more detailed understanding of the individual area of scholarship, including an appropriate familiarity with the research literature and the ability to evaluate and critique publications as measured by rubric.
3. Communication skills: Degree candidates will demonstrate that an appropriate level of oral, written and visual communication skills have been acquired as measured by rubric.
4. Experimental design: Degree candidates will demonstrate the achievement of an appropriate level of competence in the ability to appraise, modify and/or create, and implement experimental protocols and to design and develop experiments as measured by rubric.
5. Oral biology: Degree candidates will demonstrate an appropriate level of knowledge of oral health research and in research that crosses disciplines and fosters the ability of the students to view oral health research questions from a broad perspective.

VCU Graduate Bulletin, VCU Graduate School and general academic policies and regulations for all graduate students in all graduate programs

The VCU Graduate Bulletin website documents the official admission and academic rules and regulations that govern graduate education for all

graduate programs at the university. These policies are established by the graduate faculty of the university through their elected representatives to the University Graduate Council.

It is the responsibility of all graduate students, both on- and off-campus, to be familiar with the VCU Graduate Bulletin as well as the **Graduate School website** and academic regulations in individual school and department publications and on program websites. However, in all cases, the official policies and procedures of the University Graduate Council, as published on the VCU Graduate Bulletin and Graduate School websites, take precedence over individual program policies and guidelines.

Visit the academic regulations section for additional information on academic regulations for graduate students.

Degree candidacy requirements

A graduate student admitted to a program or concentration requiring a final research project, work of art, thesis or dissertation, must qualify for continuing master's or doctoral status according to the degree candidacy requirements of the student's graduate program. Admission to degree candidacy, if applicable, is a formal statement by the graduate student's faculty regarding the student's academic achievements and the student's readiness to proceed to the final research phase of the degree program.

Graduate students and program directors should refer to the following degree candidacy policy as published in the VCU Graduate Bulletin for complete information and instructions.

Visit the academic regulations section for additional information on degree candidacy requirements.

Graduation requirements

As graduate students approach the end of their academic programs and the final semester of matriculation, they must make formal application to graduate. No degrees will be conferred until the application to graduate has been finalized.

Graduate students and program directors should refer to the following graduation requirements as published in the Graduate Bulletin for a complete list of instructions and a graduation checklist.

Visit the academic regulations section for additional information on graduation requirements.

Other information

School of Medicine graduate program policies

The School of Medicine provides policies applicable to all programs administratively housed in the school. Information on **master's programs** is available elsewhere in this chapter of the Graduate Bulletin.

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Admission requirements

Degree:	Semester(s) of entry:	Deadline dates:	Test requirements:
M.S.	Fall	Applications received prior to Jan 15 given priority consideration	GRE, DAT or MCAT

Applicants to the M.S. in Microbiology and Immunology with a concentration in oral biology must meet all general admission requirements of the VCU Graduate School (<http://bulletin.vcu.edu/graduate/study/admission-graduate-study/admission-requirements/>).

1. Applicants must have earned or expect a baccalaureate or equivalent degree and must have demonstrated a superior knowledge of biology, chemistry, physics and mathematics.
2. Laboratory experience is strongly recommended.
3. The GRE, DAT or MCAT is required, as are letters of recommendation and a letter summarizing the applicant's goals.
4. Foreign applicants who do not use English as their native language must take the Test of English as a Foreign Language examination.

Degree requirements

The Department of Microbiology and Immunology has an outstanding faculty with diverse research interests that include cell and molecular biology, molecular genetics, molecular pathogenesis, bacteriology, immunology, immunotoxicology, virology, parasitology, mycology and oncology. The goal of the graduate program is to prepare students to become creative problem-solvers and leaders in scientific research.

The research experience is complemented with excellent course offerings, seminar programs, teaching opportunities, presentations at scientific meetings and writing scientific papers. Graduate students acquire a wide range of research experience in the first year through exposure to a variety of research laboratories and investigators. The student chooses a research adviser and then carries out an original, guided research project under the direction of the adviser. The project falls under the review of a graduate advisory committee and a written thesis is defended in a final oral examination.

M.S. students select their permanent advisers after three rotations completed during the first year of study. Research projects will be based on ongoing research in laboratories of the selected permanent adviser. The GAC is developed by the student and adviser. The M.S. student and the GAC will formulate a suitable curriculum of study based on the student's area of research interest.

In addition to the general VCU Graduate School graduation requirements (<http://bulletin.vcu.edu/academic-regs/grad/graduation-info/>), students in the M.S. degree program must complete all course requirements below. Additional hours may be completed for the M.S. degree. A cumulative GPA of 3.0 (with no more than six credit hours of a C grade) is required to maintain satisfactory academic progress.

An M.S. student performs a public presentation or defense of their thesis to their GAC, but the defense is open to all faculty members, students and staff. The GAC examines the student's fundamental knowledge of their research project and the disciplines encompassed by the student's thesis research.

Course requirements

Course	Title	Hours
Required core courses		
MICR 505	Immunobiology	3
MICR 515	Principles of Molecular Microbiology	3
MICR 607	Techniques in Molecular Biology and Genetics	2
MICR 608	Introduction to Microbiology and Immunology Research I	4

MICR 609	Introduction to Microbiology and Immunology Research II	4
MICR 690	Microbiology Research Seminar (taken each fall and spring semester; minimum four credits)	4
IBMS 600	Laboratory Safety	1
OVPR 601	Scientific Integrity	1
Concentration courses		
Select at least seven credits from the following:		7
DENS 524	Evidence-based Dentistry and Critical Thinking I	
DENS 619	Evidence-based Dentistry and Critical Thinking II	
HGEN 631	Advanced Dental Genetics	
MICR 513	Infection and Immunity (Dentistry)	
OCMB 701	An Introduction to Oral Biology	
OCMB 702	Oral Pathogenesis	
OCMB 704	Oral Biology Seminar Series (Up to 2 credits)	
Thesis research		
OCMB 705	Oral Biology Directed Research	12
Total Hours		41

The minimum number of graduate credit hours required for this degree is 41.

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Program website: philipsinstitute.vcu.edu/postgraduate/microbiology
(<https://philipsinstitute.vcu.edu/postgraduate/microbiology/>)