### Microbiology and Immunology

Courses offered by the Department of Microbiology and Immunology are listed under the subject code MI on the Stanford Bulletin’s ExploreCourses website.

#### Graduate Programs in Microbiology and Immunology

The Department of Microbiology and Immunology offers a program of training leading to the Ph.D. degree, as well as research training, courses, and seminars for medical students and postdoctoral fellows. Research interests focus on two broad areas: host-parasite interactions, and the function of the immune system. Laboratories investigate mechanisms of pathogenesis and the physiology of viruses, bacteria, and protozoan parasites, as well as the lymphocyte function in antigen recognition, immune response, and autoimmunity.

#### Master of Science

A regular M.S. program is not offered, although this degree is awarded under special circumstances. Candidates for master's degrees are expected to have completed the preliminary requirements for the B.S. degree, or the equivalent. In addition, the candidate is expected to complete 45 quarter units of work related to microbiology; at least 25 of these units should concern research devoted to a thesis. The thesis must be approved by the student's committee.

#### Doctor of Philosophy in Microbiology and Immunology

University requirements for the Ph.D. are described in the "Graduate Degrees (http://exploredegrees.stanford.edu/graduatedegrees)" section of this bulletin.

#### Application, Admission, and Financial Aid

Students seeking admissions to the Microbiology and Immunology Ph.D program typically have an undergraduate major in biological sciences, but majors from other areas are acceptable if the applicant has sufficient coursework or interest in the field. Information for prospective students can be found on the Stanford Biosciences (https://biosciences.stanford.edu/prospective-students) website. Applications should be submitted at the Office of Graduate Admissions (http://gradadmissions.stanford.edu) website. The GRE is not required to apply for the Ph.D degree in Microbiology and Immunology.

In the absence of independent fellowship support, entering predoctoral students are fully supported with a stipend and tuition award. Highly qualified applicants may be honored by a nomination for a Stanford Graduate Fellowship. Successful applicants have been competitive for predoctoral fellowships such as those from the National Science Foundation.

#### Program for Graduate Study

The Ph.D. degree requires course work and independent research demonstrating an individual’s creative, scholastic, and intellectual abilities. On entering the department, students meet an advisory faculty member; together they design a timetable for completion of the degree requirements. Typically, this consists of first identifying gaps in the student's undergraduate education and determining courses that should be taken. Then, a tentative plan is made for two to four lab rotations (one rotation per quarter). During the first year of graduate study in the department, each student also takes seven upper-level (200-series) courses.

<table>
<thead>
<tr>
<th>Course requirements:</th>
<th>Units</th>
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<tbody>
<tr>
<td>BIOS 200</td>
<td>Foundations in Experimental Biology</td>
</tr>
<tr>
<td>BIO 214</td>
<td>Advanced Cell Biology</td>
</tr>
<tr>
<td>MED 255</td>
<td>The Responsible Conduct of Research</td>
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<tr>
<td>MI 210</td>
<td>Advanced Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites</td>
</tr>
<tr>
<td>MI 215</td>
<td>Principles of Biological Technologies</td>
</tr>
<tr>
<td>MI 250</td>
<td>Frontiers in Microbiology and Immunology (Taken once in the first year and once in the second year for a total of 2 units.)</td>
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<tr>
<th>Recommended course:</th>
<th>Units</th>
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<tr>
<td>BIO 230</td>
<td>Molecular and Cellular Immunology</td>
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#### One elective from the following:

<table>
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<tr>
<th>Course</th>
<th>Units</th>
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<tbody>
<tr>
<td>DBIO 210</td>
<td>Developmental Biology</td>
</tr>
<tr>
<td>CSB 210</td>
<td>Cell Signaling</td>
</tr>
<tr>
<td>CSB 220</td>
<td>Chemistry of Biological Processes</td>
</tr>
<tr>
<td>GENE 205</td>
<td>Advanced Genetics</td>
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<tr>
<td>IMMUNOL 202</td>
<td>Advanced Immunology II</td>
</tr>
<tr>
<td>MCP 256</td>
<td>How Cells Work: Energetics, Compartments, and Coupling in Cell Biology</td>
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<tr>
<td>MI 221</td>
<td>Gut Microbiota in Health and Disease</td>
</tr>
<tr>
<td>SBIO 241</td>
<td>Biological Macromolecules</td>
</tr>
<tr>
<td>STATS 141</td>
<td>Biostatistics</td>
</tr>
</tbody>
</table>

Prior approval from the student’s adviser and department graduate program director is required for courses not from the elective list.

In Autumn Quarter of the second year, each student defends orally a formal research proposal on a topic outside the intended thesis project. This qualifying examination proposal is due to the graduate program steering committee by September 1. In Spring Quarter of the second year, a research proposal based on the student’s own thesis topic is defended to the thesis committee. The written thesis proposal is due May 1 and the oral defense is presented and completed by the end of the Spring Quarter. Based on successful performance on these proposals, the student is admitted to candidacy. Teaching experience and training are also part of the graduate curriculum. Graduate students are required to act as teaching assistants for one course. In addition, first- and second-year graduate students are required to participate in a bi-weekly journal club. Additional information on program requirements can be found on the Microbiology and Immunology (http://med.stanford.edu/microimmuno.html) web site.

#### Graduate Advising Expectations

The Department of Microbiology and Immunology is committed to providing academic advising in support of graduate student scholarly and professional development. When most effective, this advising relationship entails collaborative and sustained engagement by both the adviser and the advisee. As a best practice, advising expectations should be periodically discussed and reviewed to ensure mutual understanding. Both the adviser and the advisee are expected to maintain professionalism and integrity.

Faculty advisers guide students in key areas such as selecting courses, designing and conducting research, developing teaching pedagogy, navigating policies and degree requirements, and exploring academic opportunities and professional pathways.

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**Books:**
- Biological Macromolecules
- How Cells Work: Energetics, Compartments, and Coupling in Cell Biology
- The Responsible Conduct of Research
- Advanced Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites
- Principles of Biological Technologies
- Developmental Biology
- Cell Signaling
- Chemistry of Biological Processes
- Advanced Genetics
- Advanced Immunology II
- Gut Microbiota in Health and Disease
- Biological Macromolecules
- Biostatistics
- Foundations in Experimental Biology
- Advanced Cell Biology
- The Responsible Conduct of Research
- Advanced Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites
- Principles of Biological Technologies
- Frontiers in Microbiology and Immunology
Graduate students are active contributors to the advising relationship, proactively seeking academic and professional guidance and taking responsibility for informing themselves of policies and degree requirements for their graduate program.

Additional information about the department’s policy on graduate advising can be found on the Microbiology and Immunology (http://med.stanford.edu/microimmuno.html) web site. For a statement of University policy on graduate advising, see the “Graduate Advising (http://exploredegrees.stanford.edu/graduatedegrees/#advisingandcredentialstext)” section of this bulletin.

Emeriti: (Professors) Hugh O. McDevitt, Edward S. Mocarski

Chair: David Schneider

Associate Chair: Peter Sarnow

Director of Graduate Studies: Justin Sonnenburg


Professor (Teaching): Robert D. Siegel

Associate Professors: Jan Carette, Shirit Einav, Justin Sonnenburg

Assistant Professors: Paul Bollyky, Dylan Dodd, Elizabeth Egan, Juliana Idoyaga, Prasanna Jagannathan, Taia Wang, Ellen Yeh

Institute for Immunity, Transplantation and Infection

Director, Human Immune Monitoring Center and Professor (Research): Holden Maecker