MOLECULAR MICROBIOLOGY & IMMUNOLOGY, PHD

Introduction

The goal of the MMI doctoral program is to train independent scientists to take leading roles in advancing our understanding of the cellular and molecular mechanisms that drive infectious and immune diseases. The specific goals listed below are designed to foster ingenuity, creativity and critical thinking in students that will enable them to recognize and solve key problems in infectious and immunological diseases of public health importance.

A majority of the content of the MMI PhD Student Guidebook can also be found at School’s resources page – see https://my.jhsph.edu/offices-and-services/student-affairs/resources/. In addition, MMI PhD Student Guidebook contains other practical information that is included for your convenience and consideration.

Program Requirements

Course location and modality is found on the BSPH website (https://publichealth.jhu.edu/academics/course-directory/coursesection-numbers-explained/).

There are several levels of requirements for the completion of your degree program: those set by the school, by the department, by the Thesis Advisory Committee (TAC), and by the thesis adviser. The degree requirements established by the School are contained in Policy and Procedure Memoranda available at the Bloomberg School of Public Health (https://my.jhsph.edu/).

School procedures, information and forms can be found on the Bloomberg School of Public Health website (https://my.jhsph.edu/).

The requirements for MMI are explained in this Student Guidebook. A student’s thesis adviser with participation of the Thesis Advisory Committee (TAC) generally will set requirements regarding the preparation for, and completion of, the thesis or dissertation project.

Advisers

Each student is assigned an MMI faculty member who will serve as their initial Academic Adviser during the first year of training. The Academic Adviser assists the student in navigating the first year by advising on the selection of appropriate courses, providing information concerning school and departmental policies, etc. The Academic Adviser is a temporary appointment and is typically replaced by the Thesis Adviser at some point during the first academic year. A student who wishes to change their Academic Adviser should contact the Student Coordinator, who will consult the GPC.

Selection of a Thesis Adviser takes place after completion of laboratory rotations (see below), generally prior to June 1. After discussion with the prospective thesis adviser, the student should submit to the Student Coordinator a completed Thesis Adviser Selection form (available on the Departmental portal, https://my.jhsph.edu/sites/MMI/academic-forms/default.aspx signed by the prospective adviser, for approval by the department Chair.

Note that MMI graduate students must perform thesis research in the laboratory of a faculty member who holds a primary appointment in MMI or in the laboratory of a JHU faculty member who holds a joint appointment in MMI and is designated as a trainer on a MMI training grant. Requests for thesis advisers other than these will not be approved.

Every effort will be made to accommodate a student’s request to work with a specific faculty member for their thesis research. However, the department cannot guarantee that a student will be able to work in the laboratory that is selected as a first choice. In the event that a student’s first choice cannot be met, an alternative will be arranged in consultation with the student.

Thesis Advisory Committees (TAC) and Individual Development Plans (IDP)

The Thesis Advisory Committee (TAC) meetings provide a structured opportunity for students to discuss scientific goals, research progress, and issues relevant to their project as well as to adopt an Individual Development Plan (IDP) that will support and monitor your professional and career development. The TAC, which is composed of a customized group of faculty members with expertise in the areas relevant to your research project, meets at least annually through the fourth year of the program and semi-annually thereafter.

Each student is required to form a TAC during their second academic year. The initial TAC meeting should be scheduled by the end of the 4th term of year two and the meeting should take place no later than the end of the first term of year three. Students in their second year and beyond who do not complete the annual TAC meeting including the submission of the TAC/IDP Report will not be allowed to register in the first term of the following academic year. It is the responsibility of the student and their faculty adviser to schedule the annual meetings. The Student Coordinator should be informed of the anticipated date of the TAC meeting when it is scheduled. Note that a long lead time (months) may be needed to find a date when all TAC members are available for the meeting and so it is wise to begin the scheduling process early.

TACs consist of the student’s Thesis Adviser and at least two faculty members with a primary appointment in MMI at the rank of assistant professor or higher. The highest-ranking MMI faculty member, other than the adviser, will serve as the committee chair. TACs can include additional members and participants from other departments/divisions of JHU and from other institutions are welcome. Inclusion and diversity are encouraged on TACs. Committee members should be jointly selected by the student and the thesis adviser.

TAC meetings are conducted in four parts in the following order:

Introduction by the adviser. With the student absent, the adviser should briefly introduce the student (thesis topic, year in the program, background, unusual career circumstances, or other relevant matters) and assess the student’s performance relative to the adviser’s expectations. Factors that may be impeding the student’s progress should be raised and discussed. At the discretion of the TAC, these may be discussed with the student during the meeting.

Review of the student’s progress in the program and professional development, guided by the points listed in Part B of the TAC/IDP and the experiences gained in the programs offered by the JHU Professional Development and Career Office (see page 28). Part B should be completed by the student before the meeting and furnished to the committee members at the meeting. As appropriate, the committee will discuss the student’s responses to the points on the form and offer recommendations, advice, and insights into how the student might best approach their professional goals. Starting in the 3rd year special attention will be focused on the completion of the first author paper
requirement. At the end of this discussion, the TAC Chair will summarize this discussion and note action items on the form. It is recognized that career goals evolve, and it is the intent that TAC/IDP reports will reflect, facilitate, and potentially guide that evolution, not constrain it. At the end of this discussion, the TAC/IDP form is signed by the committee and the student and returned to the Student Coordinator.

**Discussion of the scientific aspects of the student's project**, beginning with a concise presentation by the student that summarizes the current status of the research project, research accomplishments during the previous year, and an outline of research plans for the coming year. The scientific discussion is intended to provide fresh perspectives on the project, overall guidance, potential technical solutions to difficulties that have arisen, and access to expertise in varied fields. This part of the TAC meeting will be summarized at the end of the discussion by the TAC Chair in Part A of the Thesis Advisory Committee and Individual Development Plan (TAC/IDP) Report form, available on the MMI portal. https://my.jhsph.edu/sites/MMI/academic-forms/default.aspx

**Discussion with the student in the absence of the adviser.** At the conclusion of the discussion of the IDP, the adviser will leave the meeting to give the student an opportunity to evaluate the status of his project, the relationship with the adviser or the lab generally, and to identify measures that would enhance their educational and professional experience. Substantive issues that are revealed should be summarized in a confidential e-mail from the TAC Chair to the GPC c/o the Student Coordinator. The TAC chair should also inform the adviser of matters that arose, unless the student specifies that the discussion remain confidential.

**Annual Evaluation of Progress, Performance, and Mentoring**

The principal element in the training and guidance of graduate students is the interaction with their Thesis Adviser. Such mentoring commonly occurs on an ongoing basis involving frequent informal discussions, lab meetings, etc. However, a formal mechanism of evaluation of performance and of satisfaction of both the adviser and student is valuable in many cases. Annual progress, performance, and mentoring meetings between each student and their mentor guided by the Annual Evaluation of Progress, Performance, and Mentoring (AEPPM) form ensures that such formal performance and satisfaction discussions occur in MMI. Once per year, a month prior to the TAC meeting, each student is required to complete this document (available on the MMI departmental portal), and to discuss it with their Thesis Adviser. Following that discussion, the form, signed by student and Thesis Adviser should be returned to the Student Coordinator. The signed form must be turned in prior to the TAC meeting. Completed forms are reviewed by the GPC with the object of identifying developing problems. This mechanism is intended to foster frank discussions between student and adviser and will be of value only if the student's answers and the adviser's responses during the following discussions are honest. Note: A GPC committee member will be added to the TAC starting in year 5 if graduation is not scheduled.

**Laboratory Rotations**

Rotation periods broaden a student's knowledge of laboratory techniques and skills, provide exposure to a variety of research areas, help in selecting a laboratory for thesis research, provide an opportunity for interaction with several faculty members, and develop the ability to carry out a research project. During a laboratory rotation, a student will be given a specific research problem of limited scope as their rotation exercise. At the end of the laboratory rotation term, the student will give a short oral presentation on the project at the Research Forum in Molecular Microbiology and Immunology (see below). Students are encouraged to discuss expectations (time and effort spent, etc.) with the rotation supervisor early in the rotation.

Doctoral students are required to rotate through at least three (3) laboratories of faculty members who hold primary appointments in MMI or who are designated as members of the MMI training faculty. MMI ScM students who matriculate to the PhD program are required to complete a total of 3 rotations over the course of both programs. These rotations must be in different departmental laboratories.

Each laboratory rotation lasts about 8 weeks. The rotation starting and ending dates are listed in the table below. Because laboratory rotations do not correspond to standard academic terms, **students should register for PH.260.851 Laboratory Rotations during the second, third, and fourth terms**.

### 2022-2023 MMI Laboratory Rotation Schedule

<table>
<thead>
<tr>
<th>Rotation Period</th>
<th>Dates</th>
<th>Register in Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>11/8/22 - 1/20/23</td>
<td>2</td>
</tr>
<tr>
<td>Second</td>
<td>1/23/23 - 3/17/23</td>
<td>3</td>
</tr>
<tr>
<td>Third</td>
<td>3/27/23 – 5/19/23</td>
<td>4</td>
</tr>
</tbody>
</table>

The selection of laboratories for rotations is the responsibility of the student. Students (with the assistance of their academic adviser) should identify potential laboratories for their rotations and consult with the faculty members in charge of these laboratories to arrange a rotation for a particular academic term.

Students may conduct rotations in addition to the three required to explore other laboratories or to learn particular laboratory techniques or skills. These extra rotations may be conducted in departmental laboratories or in labs outside the MMI training faculty. Because PhD students must conduct thesis research in a laboratory within MMI or in the laboratory of a designated MMI trainer, rotations outside such labs should not be considered a means for identifying potential thesis research laboratories.

It is expected that substantial time will be spent in the laboratory during each rotation. It is critical that the student and rotation supervisor discuss this issue and reach an agreement on their mutual expectations. In the case of questions on this point, seek the advice of the MMI Ombuds, the GPC chair or any MMI faculty member.

At the conclusion of each rotation, the student and the rotation supervisor will complete a rotation report that will be turned in to the student coordinator. A copy of the form can be found on the MMI portal. https://my.jhsph.edu/sites/MMI/academic-forms/default.aspx

**NOTE:** Animal protocols; radiation licenses; pathogen, and recombinant DNA registrations. Any rotating student who participates in animal experiments must be added to the appropriate animal protocol before beginning work. While it is the responsibility of the Principe Investigator (PI) of the protocol, working with the PI prior to the start of the rotation to make sure that you are included on the protocol(s) will prevent costly delays. Students also must complete online animal research training and must enroll in the Animal Exposure Surveillance Program prior to beginning work. Students must also be added to radiation licenses, pathogen registration and recombinant DNA registration, and human IRBs by the PI as required. In general, training in procedures is required for work with these agents or human samples.
Once the POE has been passed (see pages 23-24), the student needs to complete a Thesis Research Documentation Form that will be sent from the Dean's Office, which must be filled out within 6 months of passing the POE. It is the student's responsibility to ensure that the necessary research approvals are obtained (either IRB for human subjects research or ACUC for animal research) on the appropriate approved protocol(s). Retroactive research approval for research involving human subjects and/or animals cannot, under any circumstance, be granted. Failure to obtain research approval will prevent a student from publishing their thesis/dissertation.

MMI guidelines request that 1st year PhD students choose a research adviser by no later than June 1st, to ensure that any payroll change deadlines are met.

**Research Forum and Laboratory Rotation Presentations**

Ph.D. students are required to give oral presentation of their research. During the first year, the student will present the results of their rotation projects. These oral presentations will be delivered during weekly Departmental Research Forum. Rotation presentations are 20 minutes long and thesis research presentations are 30 minutes long. Suggested organization of presentations:

1. Introduction - Present the background and rationale of the work and outline the working hypothesis.
2. Experimental Design - Describe the overall experimental approach.
3. Results/Discussion - Results should be presented in an organized, meaningful and comprehensible manner.
4. Summary/Conclusion - Provide a short summary of the results and give an indication of future research directions.

An evaluation form (available from the departmental web portal and the TA) will be completed by two students and two faculty and returned to the student to provide constructive comments to improve future presentations.

Course location and modality is found on the BSPH website (https://publichealth.jhu.edu/academics/course-directory/coursesection-numbers-explained/).

**Required Courses**

All MMI required courses must be passed with a grade of A or B. Students not meeting that standard must repeat the relevant course(s) and pass with an A or B. A student who earns a grade below that threshold in a course that meets a core requirement must, at the next opportunity, make a second attempt to complete the core course by repeating the same course or by completing another course that has been approved by the GPC Chair. A grade below the threshold on the second attempt may be grounds for dismissal and must be reported to the School's Committee on Academic Standards.

First year students must register for 16-22 credits each term. Students in their 2nd year and beyond should register for a maximum of 16 credits. First year students should register for PH.260.851 Laboratory Rotations in terms 2, 3 and 4. (See Laboratory Rotations (p. 2), above).

The required core curriculum necessitates that each student takes:

- Principles of Immunology I & II and the companion courses Topics in Immunology I & II.
- Course work in 3 out of the 4 areas that focus on microbial biology and pathogenesis – Fundamentals of Virology, Pathogenesis of Bacterial Infections, Biology of Parasitology and Vector Biology & Vector Borne Disease.
- Two molecular and cell biology courses taught at the School of Medicine – Molecular Biology & Genomics; Cell Structure & Dynamics
- Two courses from the R3 menu of offerings (indicated by an * below) (scroll down for a full list).
- Cells-to-Society Learning Objectives (see below)

In addition, students are required to register for Research Forum in MMI (Monday noon research presentations) and Seminars in Research in MMI (Thursday departmental noon seminar) each term.

Outlined below is an example of a representative curriculum taken in the first and second years of the program. Depending on interests and background, the details of a student's specific curriculum can vary from the prototype outlined below. Consult your academic adviser prior to registering for courses.

**NOTE: Students in the R^3IM Track – go to R^3IM Required Courses below.**

### Requirements for General PhD Program

#### First-Year Course Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH.550.860</td>
<td>Academic &amp; Research Ethics at BSPH</td>
<td>0</td>
</tr>
<tr>
<td>PH.260.623</td>
<td>Fundamental Virology</td>
<td>4</td>
</tr>
<tr>
<td>PH.260.607</td>
<td>Methods in life sciences, literature and practice</td>
<td>2</td>
</tr>
<tr>
<td>PH.260.611</td>
<td>Principles of Immunology I</td>
<td>4</td>
</tr>
<tr>
<td>PH.260.801</td>
<td>Topics in Immunology I</td>
<td>1</td>
</tr>
<tr>
<td>PH.260.700</td>
<td>How Do We Know? - Theory and Practice of Science</td>
<td>3</td>
</tr>
</tbody>
</table>

(See R3 Course Offerings for a full list)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH.552.6XX</td>
<td>Cells-to-Society (p. 4)</td>
<td>Varies</td>
</tr>
<tr>
<td>PH.260.821</td>
<td>Research Forum in Molecular Microbiology and Immunology</td>
<td>1</td>
</tr>
<tr>
<td>PH.260.822</td>
<td>Seminars in Research in Molecular Microbiology and Immunology</td>
<td>1</td>
</tr>
</tbody>
</table>

**Credits** 16

#### Second Term

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH.260.635</td>
<td>Biology of Parasitism</td>
<td>5</td>
</tr>
<tr>
<td>PH.260.612</td>
<td>Principles of Immunology II</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.802</td>
<td>Topics in Immunology II</td>
<td>1</td>
</tr>
<tr>
<td>ME.260.709</td>
<td>Molecular Biology and Genomics (Molecular Biology and Genomics)</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.607</td>
<td>Methods in life sciences, literature and practice</td>
<td>2</td>
</tr>
<tr>
<td>PH.260.701</td>
<td>Anatomy of Scientific Error</td>
<td>3</td>
</tr>
</tbody>
</table>

(See R3 Course Offerings for a full list)
Each of the C2S mini-courses will be offered several times each year, course (see right-hand column in table below).

This is a School-level requirement of all degree programs.

These 12 mini-courses must be completed by the end of the first academic year.

Code | Title | Credits
--- | --- | ---
PH.552.601 | Foundational Principles of Public Health | 0.5
PH.552.602 | The Role of Quantitative Methods in Public Health (or take any of the following courses: 140.611-12 (term 1 and 2) or 140.615-16 (term 3 and 4) or 260.705 (term 3 or term 4)) | 0.5
PH.552.603 | The Role of Qualitative Methods and Science in Describing and Assessing a Population's Health (or take 260.700 (term 1 or term 3)) | 0.5
PH.552.604 | Causes and Trends in Morbidity and Mortality (or take 260.600 (summer, credit in term 1) or 260.844 (term 2 or term 4)) | 0.5
PH.552.605 | The Science of Primary Secondary and Tertiary Prevention in Population Health | 0.5
PH.552.606 | The Critical Importance of Evidence in Advancing Public Health Knowledge (or take 260.700 (term 1 or term 3)) | 0.5
PH.552.607 | Essentials of Environmental Health | 0.5
PH.552.608 | Biologic, Genetic and Infectious Bases of Human Disease (or take 260.600.81 in summer (credit in term 1)) | 0.5
PH.552.609 | Psychological and Behavioral Factors That Affect A Population's Health | 0.5
PH.552.610 | The Social Determinants of Health | 0.5
PH.552.611 | Globalization and Population Health (or take 260.844 (term 2 or term 4)) | 0.5
PH.552.612 | Essentials of One Health | 0.5

Total Credits | 6

**Second-Year Course Requirements**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH.550.600</td>
<td>Living Science Ethics - Responsible Conduct of Research</td>
<td>1</td>
</tr>
<tr>
<td>PH.260.820</td>
<td>Thesis Research Molecular Microbiology and Immunology (Variable credits)</td>
<td>1 - 22</td>
</tr>
<tr>
<td>PH.260.821</td>
<td>Research Forum in Molecular Microbiology and Immunology</td>
<td>1</td>
</tr>
<tr>
<td>PH.260.822</td>
<td>Seminars in Research in Molecular Microbiology and Immunology</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Credits</td>
<td>4 - 25</td>
</tr>
</tbody>
</table>

**Electives**

PhD students are strongly advised to take at least one departmental advanced course during each of the third and fourth terms of their first year. The specific courses taken should be chosen after discussion between the student and their adviser. Generally, these courses will include at least one in the area in which the student expects to conduct their thesis research.

**Cells-to-Society Requirements for All Degree Programs**

The Council on Education for Public Health (CEPH) requires didactic coursework covering and assessing 12 CEPH-defined Introductory Public Health Knowledge Learning Objectives. It is important to emphasize that this is a School-level requirement of all degree programs.

The School’s Committee on Academic Standards approved 12 online, 0.5 credit, mini-courses, graded S/U (satisfactory/unsatisfactory) that will cover each of the 12 Learning Objectives (see table below). Each of the mini-courses consists of 3-5, 30-40 minute presentations with an accompanying assessment. Note: Certain learning objective can be fulfilled by taking a course that covers this material instead of the mini-course (see right-hand column in table below).

Each of the C2S mini-courses will be offered several times each year, starting in the summer term. The 2022-2023 schedule is here: https://publichealth.jhu.edu/academics/course-directory/schedule-of-cells-to-society-course-offerings/
Research (550.600, 1st term) or Research Ethics and Integrity (306.665, students must take Living Science Ethics – Responsible Conduct of Ethics (550.860.82) in the first term they are enrolled. Additionally, PhD students must complete the online course Academic and Research Ethics (306.665, 1st term) or Research Ethics and Integrity (306.665, 3rd term.) These courses are usually taken during the second year and must be taken prior to taking the Preliminary Oral Exam (POE.)

**All doctoral degree candidates are required to take coursework in biostatistics. The recommended biostatistics course is 140.615 Statistics for Laboratory Scientists I. Other courses that fulfill the requirement include: PH.140.638 Analysis of Biological Sequences (3 credits), PH.140.688 Statistics for Genomics (3 credits) 140.611/612 Statistical Reasoning in Public Health I & 2 and 140.621/622 Statistical Methods in Public Health I & 2.**

### R3 Course Offerings – Online (.81) and blended (.60) R3 courses by Term

#### First Term
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH.260.700</td>
<td>How Do We Know? - Theory and Practice of Science</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.704</td>
<td>Critical Dissection of the Scientific Literature: Taking the Scalpel to Journal Articles</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.707</td>
<td>Evidence-Based Teaching in the Biomedical and Health Sciences: Foundations</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.713</td>
<td>R3 Writing Seminar for Graduate Students</td>
<td>1</td>
</tr>
<tr>
<td>PH.260.720</td>
<td>Communications Primer for the Public Health Sciences</td>
<td>1</td>
</tr>
</tbody>
</table>

#### Second Term
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH.260.701</td>
<td>Anatomy of Scientific Error</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.708</td>
<td>Evidence-Based Teaching in the Biomedical and Health Sciences – Practice</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.710</td>
<td>Communication Practice for Health Science Professionals</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.713</td>
<td>R3 Writing Seminar for Graduate Students</td>
<td>1</td>
</tr>
<tr>
<td>PH.260.715</td>
<td>Unleash Your Writing Superpower: Crafting Clear, Concise and Persuasive Prose</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.720</td>
<td>Communications Primer for the Public Health Sciences</td>
<td>1</td>
</tr>
</tbody>
</table>

#### Third Term
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH.260.700</td>
<td>How Do We Know? - Theory and Practice of Science</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.704</td>
<td>Critical Dissection of the Scientific Literature: Taking the Scalpel to Journal Articles</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.705</td>
<td>Fundamentals of Quantitative Reasoning in the Biomedical and Health Sciences</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.713</td>
<td>R3 Writing Seminar for Graduate Students</td>
<td>1</td>
</tr>
<tr>
<td>PH.260.720</td>
<td>Communications Primer for the Public Health Sciences</td>
<td>1</td>
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#### Fourth Term
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PH.260.701</td>
<td>Anatomy of Scientific Error</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.705</td>
<td>Fundamentals of Quantitative Reasoning in the Biomedical and Health Sciences</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.710</td>
<td>Communication Practice for Health Science Professionals</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.713</td>
<td>R3 Writing Seminar for Graduate Students</td>
<td>1</td>
</tr>
<tr>
<td>PH.260.812</td>
<td>The Performance of Leadership: Foundations</td>
<td>2</td>
</tr>
<tr>
<td>PH.260.844</td>
<td>Causation</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.848</td>
<td>Community-Based Practice Through Civic Engagement</td>
<td>2</td>
</tr>
</tbody>
</table>

### Credits

| Total Credits | 19-107 |

1. All doctoral degree candidates are required to take one course in biostatistics. The recommended biostatistics course is PH.140.615 Statistics for Laboratory Scientists I. Other courses that fulfill the requirement include: PH.140.638 Analysis of Biological Sequences (3 credits), PH.140.688 Statistics for Genomics (3 credits)140.611/612 Statistical Reasoning in Public Health I & 2 and 140.621/622 Statistical Methods in Public Health I & 2.

Second year and beyond, PhD students should continue to register for a minimum of 16 credits per term, including courses (if any),

- 1 credit for PH.260.821 Research Forum in Molecular Microbiology and Immunology,
- 1 credit for PH.260.822 Seminars in Research in Molecular Microbiology and Immunology, and
- 1 credit for PH.260.820 Thesis Research Molecular Microbiology and Immunology.

PhD students must also register for summer term:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH.260.829</td>
<td>Summer Thesis Research</td>
<td>12</td>
</tr>
</tbody>
</table>

### Total Credits

| Total Credits | 12     |

### Additional Course Requirements

PhD students must complete the online course Academic and Research Ethics (550.860.82) in the first term they are enrolled. Additionally, PhD students must take Living Science Ethics – Responsible Conduct of Research (550.600, 1st term) or Research Ethics and Integrity (306.665, 3rd term.) These courses are usually taken during the second year and must be taken prior to taking the Preliminary Oral Exam (POE.)
Distribution Requirement
The School requires Ph.D. students to complete a minimum of 18 credits in formal courses outside their own department with no fewer than nine (9) of these credits taken in the Bloomberg School of Public Health. All 18 credits must be taken for a grade (Pass/Fail is not acceptable). Credits earned for Molecular Biology and Genomics and Cell Structure and Dynamics count toward the required credits outside of MMI, as do credits earned for biostatistics. Credits for Academic and Research Ethics, Responsible Conduct of Research and Cells to Society are counted as separate School requirements and are not included in the 18-credit requirement.

Academic Performance and Academic Probation
Doctoral students are required to maintain a 3.0 grade point average and, as noted above, complete required courses with a grade of B or better. Students who do not comply with these and other academic requirements may be placed on Academic Probation by the Graduate Program Committee. Formal notification of Academic Probation generally will be accompanied by conditions that the student must fulfill in order to be returned to good academic standing. Students who fail to meet those conditions may be dismissed from the program.

Winter and Summer Institute Courses
Tuition for these courses is charged separately by the School of Public Health Registrar and is not covered by tuition paid during the academic year. Students wishing to take any of these courses may do so at their own expense.

Certificate Programs
There are several certificate programs offered by the School in specific areas of public health that have fewer course requirements than do formal degree programs. Certificate programs are focused academic training programs designed to appeal to students seeking targeted education in a specific area of public health. Educational objectives, admission requirements, courses of study, and other information are provided for each certificate program and can be found at https://publichealth.jhu.edu/academics/academic-programs/certificate-programs/ (https://publichealth.jhu.edu/academics/academic-programs/certificate-programs/)

Teaching Assistant
Teaching Assistant positions provide students with an opportunity to develop their teaching and interpersonal skills, to work professionally with faculty and fellow students, and to contribute service to the Department.

Policy: All PhD students are required to serve as TA for one course, preferably during the second year of the program. Only MMI courses may be used to fulfill this requirement.

TA Training: Students are required to complete the TA training during their first year in the program. The TA training course is offered twice per year-July-December and January-June. The academic program administrator will verify the student has completed the training prior to starting a TA position.

Compensation: A student will become eligible for TA compensation after they have satisfied the TA requirement. Completion of the requirement will be noted on the IDP/TAC form and eligibility for compensation will be noted on the departmental TA request form.

Additional Opportunities:
Gordis Teaching Fellowship
Teaching Academy- Preparing Future Faculty Program

R3IM Track - Required Courses
All MMI required courses must be passed with a grade of A or B. Students not meeting that standard must repeat the relevant course(s) and pass with an A or B. A student who earns a grade below that threshold in a course that meets a core requirement must, at the next opportunity, make a second attempt to complete the core course by repeating the same course or by completing another course that has been approved by the GPC Chair. A grade below the threshold on the second attempt may be grounds for dismissal and must be reported to the School’s Committee on Academic Standards.

First year students must register for 16-22 credits each term. Students in their 2nd year and beyond should register for a maximum of 16 credits.

First year students should register for 260.851 Laboratory Rotation in terms 2, 3 and 4. (See Laboratory Rotations table).

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>PH.550.860</td>
<td>Academic &amp; Research Ethics at BSPH</td>
</tr>
<tr>
<td>PH.260.600</td>
<td>Introduction to the Biomedical Sciences</td>
</tr>
<tr>
<td>PH.260.700</td>
<td>How Do We Know? - Theory and Practice of Science</td>
</tr>
<tr>
<td>PH.260.611</td>
<td>Principles of Immunology I</td>
</tr>
<tr>
<td>PH.260.801</td>
<td>Topics in Immunology I</td>
</tr>
<tr>
<td>PH.260.607</td>
<td>Methods in life sciences, literature and practice</td>
</tr>
<tr>
<td>PH.552.6XX</td>
<td>Cells-to-Society (p. 4)</td>
</tr>
<tr>
<td>PH.260.821</td>
<td>Research Forum in Molecular Microbiology and Immunology</td>
</tr>
<tr>
<td>PH.260.822</td>
<td>Seminars in Research in Molecular Microbiology and Immunology</td>
</tr>
</tbody>
</table>

Choose 2 of the courses listed below:
| PH.260.623 | Fundamental Virology |
| PH.120.602 | Concepts of Molecular Biology |
| PH.260.636 | Evolution of Infectious Disease |
| PH.260.707 | Evidence-Based Teaching in the Biomedical and Health Sciences: Foundations |
| PH.260.713 | R3 Writing Seminar for Graduate Students |

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH.260.701</td>
<td>Anatomy of Scientific Error</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.612</td>
<td>Principles of Immunology II</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.802</td>
<td>Topics in Immunology II</td>
<td>1</td>
</tr>
<tr>
<td>PH.260.710</td>
<td>Communication Practice for Health Science Professionals</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.607</td>
<td>Methods in life sciences, literature and practice</td>
<td>2</td>
</tr>
<tr>
<td>PH.260.851</td>
<td>Laboratory Rotations</td>
<td>4 - 8</td>
</tr>
</tbody>
</table>

First Term
Credits 0

First Year Summer Term
Introduction to Online Learning: https://courseplus.jhu.edu/core/index.cfm/go/course.home/cid/90 (https://courseplus.jhu.edu/core/index.cfm/go/course.home/cid/90/)(non-credit)

Credits 16

Second Term
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH.552.6XX</td>
<td>Cells-to-Society (p. 4)</td>
<td>Varies</td>
</tr>
<tr>
<td>PH.260.821</td>
<td>Research Forum in Molecular Microbiology and Immunology</td>
<td>1</td>
</tr>
<tr>
<td>PH.260.822</td>
<td>Seminars in Research in Molecular Microbiology and Immunology</td>
<td>1</td>
</tr>
</tbody>
</table>

Choose 1 of the courses listed below:

- PH.260.635 Biology of Parasitism
- ME.260.709 Molecular Biology and Genomics (Molecular Biology and Genomics)
- PH.260.710 Communication Practice for Health Science Professionals
- PH.260.844 Causation
- PH.260.715 Unleash Your Writing Superpower: Crafting Clear, Concise and Persuasive Prose
- PH.260.713 R3 Writing Seminar for Graduate Students
- PH.260.709 Evidence-Based Mentoring
- PH.187.632 Molecular Toxicology
- PH.140.638 Analysis of Biological Sequences
- PH.223.662 Vaccine Development and Application

**Credits**: 21-25

**Third Term**

- PH.260.705 Fundamentals of Quantitative Reasoning in the Biomedical and Health Sciences (Fundamentals of Quantitative Reasoning in the Biomedical and Health Sciences) | 3
- PH.260.607 Methods in life sciences, literature and practice | 2
- PH.260.851 Laboratory Rotations | 4-8
- PH.552.6XX Cells-to-Society (p. 4) | 1
- PH.260.821 Research Forum in Molecular Microbiology and Immunology | 1
- PH.260.822 Seminars in Research in Molecular Microbiology and Immunology | 1

Choose 2 of the courses listed below:

- PH.260.627 Pathogenesis of Bacterial Infections
- PH.260.650 Vector Biology and Vector-Borne Diseases
- PH.260.655 Malariology
- ME.110.728 Cell Structure and Dynamics (Cell Structure and Dynamics)
- PH.140.615 Statistics for Laboratory Scientists I
- PH.260.704 Critical Dissection of the Scientific Literature: Taking the Scalpel to Journal Articles
- PH.260.713 R3 Writing Seminar for Graduate Students
- PH.221.700 Public Engagement Practices for Scientists (Peps) in International Settings
- PH.306.665 Research Ethics and integrity: U.S. and International Issues

**Credits**: 11-15

**Fourth Term**

- PH.260.844 Causation | 3
- PH.260.851 Laboratory Rotations | 4-8
- PH.552.6XX Cells-to-Society (p. 4) | 1
- PH.260.821 Research Forum in Molecular Microbiology and Immunology | 1

Choose 1 of the courses listed below:

- PH.260.658 Advanced Malariology
- PH.260.710 Communication Malariology
- PH.260.701 Anatomy of Scientific Error
- PH.140.616 Statistics for Laboratory Scientists II
- PH.260.713 R3 Writing Seminar for Graduate Students
- PH.340.618 Epidemiology: the Basics
- PH.120.627 Stem Cells and the Biology of Aging and Disease
- PH.140.688 Statistics For Genomics
- PH.260.848 Community-Based Practice Through Civic Engagement
- PH.187.625 Animals in Research: Law, Policy, and Humane Sciences
- PH.260.812 The Performance of Leadership: Foundations
- PH.223.687 Vaccine Policy Issues

**Credits**: 9-13

**Total Credits**: 57-69

1) First year students must take at least three out of either four microbiology courses: PH.260.623 Fundamental Virology; PH.260.635 Biology of Parasitism; PH.260.627 Pathogenesis of Bacterial Infections; PH.260.650. Vector Biology and Vector Borne Diseases. If of interest, students have the option to take any of the microbiology courses that could not be taken in AY 1 as an AY 2 elective.

2) MMI PhD students are required to take two molecular and cell biology courses taught at the School of Medicine – Molecular Biology & Genomics (ME 260.709); Cell Structure & Dynamics (ME 110.728) could not be taken in AY 1 as an AY 2 elective.

3) 260.701 Anatomy of Scientific Error must be taken during AY 1, either during term 2 or 4, however is recommended during term 2.

4) 260.710 Communications Practice for Health Science Professionals must be taken during AY 1 or AY2, either in term 2 or term 4.

5) 260.844 Causation must be taken in either term 2 or 4 of AY 1, or in term 2 of AY 2, however is recommended in Term 4 or AY1.

6) 260.715 Unleash your Writing Superpower must be taken in either term 2 of AY 1 or AY2.

7) All BSPH doctoral degree candidates are required to take coursework in statistics. To fulfill the statistics requirement for the R3M track, PH.260.705 Fundamentals of Quantitative Reasoning in the Biomedical and Health Sciences, and either PH.140.615/616 Statistics for Laboratory Scientists I and II or PH.140.611/612 Statistical Reasoning in Public Health I and II must be taken in AY 1 or AY 2, respectively.

8) R3M track students are required to take either Evidence-Based Teaching (260.707) or Evidence-Based Mentoring (260.708) in either AY 1 or AY 2.

**Cells-to-Society Requirements for All Degree Programs**

The Council on Education for Public Health (CEPH) requires didactic coursework covering and assessing 12 CEPH-defined Introductory Public
Health Knowledge Learning Objectives. It is important to emphasize that this is a School-level requirement of all degree programs.

The School’s Committee on Academic Standards approved 12 online, 0.5 credit, mini-courses, graded S/U (satisfactory/unsatisfactory) that will cover each of the 12 Learning Objectives (see table below). Each of the mini-courses consists of 3-5, 30-40 minute presentations with an accompanying assessment. Note: Certain learning objective can be fulfilled by taking an MMI course that covers this material instead of the mini-course. See notes in the table, below.

Each of the C2S mini-courses will be offered 2-4 times during the academic year. The current schedule can be found at: https://publichealth.jhu.edu/academics/course-directory/schedule-of-cells-to-society-course-offerings/ (https://publichealth.jhu.edu/academics/course-directory/schedule-of-cells-to-society-course-offerings/)

Please note that for the presentation of these mini-courses each term has been split into a A section covering the first 4 weeks of the term and a B section that covers the second 4 weeks of the term.

These 12 mini-courses must be completed by the end of the first academic year.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH.552.601</td>
<td>Foundational Principles of Public Health (or take 260.700.81 in term 1 or 260.700.60 in term 3)</td>
<td>0.5</td>
</tr>
<tr>
<td>PH.552.602</td>
<td>The Role of Quantitative Methods in Public Health (or take any of the following courses: 140.611-12 (term 1 and 2) or 140.615-16 (term 3 and 4) or 260.708 (term 3 or 4))</td>
<td>0.5</td>
</tr>
<tr>
<td>PH.552.603</td>
<td>The Role of Qualitative Methods and Science in Describing and Assessing a Population’s Health (or take 260.700 (term 1 or term 3))</td>
<td>0.5</td>
</tr>
<tr>
<td>PH.552.604</td>
<td>Causes and Trends in Morbidity and Mortality (or take 260.600 (summer, credit in term 1) or 260.844 (term 2 or term 4))</td>
<td>0.5</td>
</tr>
<tr>
<td>PH.552.605</td>
<td>The Science of Primary Secondary and Tertiary Prevention in Population Health</td>
<td>0.5</td>
</tr>
<tr>
<td>PH.552.606</td>
<td>The Critical Importance of Evidence in Advancing Public Health Knowledge (or take 260.700 (term 1 or term 3))</td>
<td>0.5</td>
</tr>
<tr>
<td>PH.552.607</td>
<td>Essentials of Environmental Health</td>
<td>0.5</td>
</tr>
<tr>
<td>PH.552.608</td>
<td>Biologic, Genetic and Infectious Bases of Human Disease (or take 260.600 in summer (credit in term 1))</td>
<td>0.5</td>
</tr>
<tr>
<td>PH.552.609</td>
<td>Psychological and Behavioral Factors That Affect A Population’s Health</td>
<td>0.5</td>
</tr>
<tr>
<td>PH.552.610</td>
<td>The Social Determinants of Health (or take 260.844 (term 2 or term 4))</td>
<td>0.5</td>
</tr>
<tr>
<td>PH.552.611</td>
<td>Globalization and Population Health</td>
<td>0.5</td>
</tr>
<tr>
<td>PH.552.612</td>
<td>Essentials of One Health</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td><strong>6</strong></td>
</tr>
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<table>
<thead>
<tr>
<th>Second Term</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH.260.820</td>
<td>Thesis Research Molecular Microbiology and Immunology</td>
<td>Variable</td>
</tr>
<tr>
<td>PH.260.821</td>
<td>Research Forum in Molecular Microbiology and Immunology</td>
<td>1</td>
</tr>
<tr>
<td>PH.260.822</td>
<td>Seminars in Research in Molecular Microbiology and Immunology</td>
<td>1</td>
</tr>
</tbody>
</table>

Choose from the list below if requirements have not been met in AY1:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH.140.611</td>
<td>Statistical Reasoning in Public Health I</td>
<td>3</td>
</tr>
<tr>
<td>PH.260.707</td>
<td>Evidence-Based Teaching in the Biomedical and Health Sciences - Practice</td>
<td>5-26</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Third Term</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH.260.820</td>
<td>Thesis Research Molecular Microbiology and Immunology</td>
<td>1 - 22</td>
</tr>
<tr>
<td>PH.260.821</td>
<td>Research Forum in Molecular Microbiology and Immunology</td>
<td>1</td>
</tr>
<tr>
<td>PH.260.822</td>
<td>Seminars in Research in Molecular Microbiology and Immunology</td>
<td>1</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Fourth Term</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH.260.820</td>
<td>Thesis Research Molecular Microbiology and Immunology</td>
<td>1 - 22</td>
</tr>
<tr>
<td>PH.260.821</td>
<td>Research Forum in Molecular Microbiology and Immunology</td>
<td>1</td>
</tr>
<tr>
<td>PH.260.822</td>
<td>Seminars in Research in Molecular Microbiology and Immunology</td>
<td>1</td>
</tr>
</tbody>
</table>

| **Total Credits** | | **14-77** |

Second year and beyond, PhD students should continue to register for a minimum of 16 credits per term, including courses (if any), 1 credit for Research Forum (260.821), 1 credit for Seminars in Research (260.822), and Thesis Research (260.820). PhD students must also register for summer term: 12 credits Summer Thesis Research (260.829).

R3 certificate requirement for support on the Molecular and Cellular Basis of Infectious Diseases (MCBID) T32 training grant

The MCBID T32 training grant typically has slots open each year to support MMI PhD students. PhD students who are working in the laboratory of a training grant preceptor can apply for up to two years of training grant support. To receive support, students must commit to completing the R3 certificate program as described in the link.
Written & Oral Exams

DEPARTMENTAL COMPREHENSIVE EXAMINATION (PHD COMPS)
The School requires a departmentally-administered written comprehensive examination for students in doctoral degree programs. In MMI, the comprehensive examination is intended to test the student’s grasp of basic factual material necessary for PhD-level research in molecular microbiology and immunology and their ability to integrate the information obtained in the several disciplines of departmental interest. The examination also assesses each student’s ability to identify important scientific problems and to formulate hypotheses and plausible experimental approaches to testing those hypotheses.

The MMI comprehensive exam is given at the end of the first year and has a written and an oral component. The written component of the exam takes the form of a critical review of the literature on a currently active topic relevant to first-year coursework. The review should be limited in scope, but a thorough, scholarly exploration of the topic area. Included should be a discussion of the public health and scientific significance of the topic, a critical analysis of the current state of knowledge in the field including important unanswered questions, a discussion of potential experimental approaches to address those questions, and their implications for future research. The student’s written review will be evaluated by a Comprehensive Exam Committee (CEC) of three MMI faculty, with the student’s Academic Adviser serving as CEC Chair, and will be defended in an oral examination administered by the same CEC.

This is an examination. Thus, the written review must be the student’s own work. However, students must select the review topic in consultation with the Academic Adviser and will receive their CEC’s comments on their outline/description (see below). Additionally, students are encouraged to discuss their original ideas, concepts, experimental approaches, etc. with advisers, faculty and colleagues at whatever length. Members of the CEC will not evaluate the written review before submission. The GPC suggests that students hold at least three substantive meetings with their adviser(s); prior to topic selection, before finalization of the outline/description, and during preparation of the review/exam document.

Summary of the Comprehensive Examination Process

- Select a topic relevant to first-year coursework in consultation and with the approval of your academic adviser.
- Submit an email stating the topic, cc’d to the academic adviser, to the Student Coordinator.
- The GPC will appoint a CEC of three MMI faculty members. The student’s Academic Adviser serves as the Chair of the CEC.
- Submit an outline or brief description of your topic (about 1 page) to your CEC and to the Student Coordinator. The CEC will comment on the proposed content and organization of the review. If necessary, your adviser will assist in revision of the outline.
- Provide copies of the finished review (4000-5000 words, double spaced, 11 pt font) to each CEC member and to the Student Coordinator. The CEC will grade the review.
- Arrange an oral exam - you are responsible for setting the date and time, subject to CEC member availability.
- Present a 15-minute overview of the written exam document and answer general knowledge questions asked by the CEC. CEC members will grade the oral exam.

Written Component

The written review will be graded Pass/Conditional Pass/Fail in its entirety on criteria that include:

- Significance to the field
- Quality of the literature review, including inclusion of primary literature, depth and synthesis of the review, and inclusion of recent literature
- Quality of critical analysis of the state of the field
- Clarity and precision of writing
- Quality of assessment of future research directions

CEC members will grade the review, meet to discuss the critiques and determine the outcome, and the Chair, on behalf of the CEC, will inform the student of a Pass, Conditional Pass, or Fail. A Conditional Pass constitutes minor revisions that the CEC has decided would help the student improve the quality of the written document, but that does not preclude progression to the oral component.

A Fail that requires a substantial revision to the document before the student can proceed to the oral component. The CEC will document the areas that need revision and, in consultation with the student, set a timeline for providing the revised document to the CEC for assessment. The revised document will be due at least two weeks prior to the rescheduled oral examination date. If the revised document does not receive a unanimous grade of Pass from the CEC, this will constitute a second failure of the written portion of the Comprehensive Examination and will trigger a meeting of the GPC to consider the student’s dismissal from the PhD program.

Oral Component

The oral exam will consist of a brief (10-15 minute) oral summary of the review topic, followed by questions from the committee. Students are strongly encouraged to use PowerPoint, Keynote, or similar software in presenting their summary. During the exam, questions will address topics both related to and outside the immediate subject area of the proposal to assess the student’s breadth of understanding of material presented in required coursework, departmental seminars, and research forum. The oral exam will be one to two hours long. The student is responsible for reserving a room for the exam (the Student Coordinator can assist if needed.)

Scoring of Oral Component

After the oral exam, the committee will meet in private to determine an outcome. Possible outcomes are Pass, Conditional Pass, or Fail. The committee will impose specific conditions upon students who receive
a Conditional Pass and will specify a timetable and mechanism for satisfying the condition. The outcome of the oral component will be reported to the Student Coordinator by the adviser by e-mail.

A student who passed the written component in their first try, but fails the oral defense must repeat the oral defense within a time frame specified by the committee. The student should meet with each committee member to discuss the areas that need improvement before scheduling a second oral exam.

The following framework should be used in evaluating the oral defense:

- 20% of emphasis: Summary.
- 30% of emphasis: Discussion of questions posed by committee specific to the review, including
  - Explanation of why this topic was selected from subject matter
  - Demonstration of knowledge of concepts and terms used
  - Demonstration of understanding of experimental evidence discussed
- 50% of emphasis: Discussion of questions extending beyond immediate subject areas to other fields in microbiology and immunology. (Remember, this is a Comprehensive Exam.)

Outcome of the comprehensive exam. Each student has two attempts to pass their comprehensive exam. A failure on either the written or the oral component, constitutes failure of the comprehensive exam. A total of two determinations of ‘fail’, on either the written, the oral, or a combination of the components, constitutes failure of the exam and may result in dismissal from the PhD program. For example, a student who passes the written component after two tries but then fails the oral defense may be dismissed from the Ph.D. program.

Preliminary Oral Examination

Note: PH.550.600 Living Science Ethics - Responsible Conduct of Research and the 552.6XX Cells-to-Society series must be completed before taking the POE.

The purpose of the preliminary oral examination (POE), an exam required by the University for all PhD candidates, is to determine whether the student has the depth and breadth of scientific and technical knowledge to undertake dissertation research. Examiners will be concerned with the student’s reasoning ability; depth and breadth of knowledge; and ability to develop and conduct research leading to a completed thesis or dissertation. The POE is conducted by a committee of examiners usually selected by the student’s adviser according to eligibility rules set by the university (link below). Note that the student’s adviser, or co-adviser of record, is NOT a member of the POE committee. Diversity and inclusion are encouraged on the POE and any student who would like to include a faculty member from outside of the University, including faculty members from groups underrepresented in the biomedical sciences, on the POE voting committee, may do so by having their adviser seek appointment of the outside faculty member to a Senior Associate position at the BSPH. Appointment as a Senior Associate must be requested in a letter by the Department Chair in a nomination letter to the Dean, for vote by the School’s Advising Board. A copy of the external faculty member’s CV (in BSPH CV format) must be included.

The POE must be scheduled by February 1 and completed by March 31 in the student’s second year. If a committee/date is not set by February 1, the GPC will assume the responsibility for committee assignment and scheduling of the student’s POE. The GPC’s decisions will be made with input from the adviser if offered, but to simplify scheduling, the GPC will not feel obligated to honor requests for certain examiners or dates. The student is responsible for arranging for a room for the exam.

The PPM describing the preliminary oral exam process can be found here: https://my.jhsph.edu/Resources/PoliciesProcedures/ppm/PolicyProcedureMemoranda/Academic_Programs_03_Doctor_Of_Philosophy_Degree_071717.pdf

Please note that the POE form must be submitted to the School of Public Health Registrar’s Office at least one month prior to the exam.

At least two weeks prior to the scheduled date of the exam, the student should make their Grant Writing Course proposal available to the committee members. This is for background purposes and the proposal will not be evaluated as part of the exam by committee members, nor will the examination be confined to topics related to the proposal.

Conduct of the Exam

The student’s adviser does not participate in the student’s POE. However, in the student’s absence, the adviser will provide a brief overview of the student’s research progress to the committee prior to the start of the POE.

The student may prepare a short talk (5 min) based on their proposal and/or their anticipated research project to serve as an introduction to the examination. If a presentation is made, students are strongly encouraged to make use of PowerPoint, Keynote, or similar presentation software.

Exams last 1 to 2 hours. After the exam, a form indicating the outcome (Pass, Conditional Pass, or Fail) will be filled out by the examiners and returned to the School of Public Health Registrar. It is suggested that the POE Committee Chair inform the student’s PI of issues that arose in the course of the exam. In particular, if the outcome of the exam is a Conditional Pass or Failure, the advisor will require this information to assist the student in correcting deficiencies.

Requirement for a Conditional Pass includes demonstration of a limited deficiency in a specific area. Examples of acceptable requirements that can be used to fulfill a Conditional Pass include:

1. Reading assigned literature in the area of deficiency and writing a review paper to serve as an introduction to the examination.
2. Reading assigned literature in the area of deficiency and writing a review paper to serve as an introduction to the examination.

Requirements for a Fail includes demonstration of a significant deficiency in two or more areas. Receipt of a Fail requires retaking the POE. A student who receives a Fail on a POE will be granted one additional try to pass the POE. Two Fails on the POE will result in termination from the PhD program.

After the completion of the preliminary oral exam, PhD students will be required to complete a “Thesis Documentation Form.” Melissa Cooke in the Dean’s Office collects these forms. Final oral work will not be processed unless this form is on file with the Dean’s Office.

MMI F31 Proposal Requirement

Success in obtaining independent funding for research is an essential element of most scientific careers. Therefore, as part of their training, each MMI PhD student is required to submit a grant proposal for funding by outside agencies. It is anticipated that most proposals will be for NIH
F31 grants, but similar applications to NSF or other governmental or non-governmental organizations will also fulfill the requirement.

The grant application must be submitted by the end of the summer term (late August) in the student’s second year, for example, on the F31 NIH submission deadlines of April 8th or August 8th.

Proposals will generally be written on the student’s thesis project (or anticipated thesis project) and should be prepared in close cooperation of the student’s PI. Additionally, each student must obtain written critiques of a draft of the proposal from two different MMI faculty members apart from the PI prior to submission. Since students will have formed Thesis Advisory Committees (TACs) by that time, it is suggested that members of the TAC be identified as reviews. Proposal drafts should be submitted to these reviewers at least one month before the application is due at the School’s Office or Research Administration (ORA) or to the sponsoring organization. Note that for many applications (for example, NIH applications), the ORA deadline is several days before the sponsor’s due date.

Students must notify the Student Coordinator of grant application submissions by completing a form available from the MMI portal. TACs will record submissions on the TAC report form. https://my.jhsph.edu/sites/MMI/academic-forms/default.aspx

Publication Requirement
Publication is an essential component of training for a research career and a strong publication record as a graduate student is of great benefit to the trainee, the laboratory, and the program. Therefore, each PhD student in MMI is required to have published or submitted for publication in a peer-reviewed journal one or more first-author manuscripts prior to the date of the Final Oral Examination. Publication plans should be discussed as part of the IDP portion of each TAC meeting, and the TAC must indicate on the TAC Report Form whether the student is making satisfactory progress toward publication. If not, the TAC must provide a written recommendation for steps to be followed to expedite publication. Students must notify the Student Coordinator of first author publications by completing the First Author Form available from the MMI departmental portal. https://my.jhsph.edu/sites/MMI/academic-forms/default.aspx. Submission of the First Author Form is required before the student’s paperwork can be submitted to schedule their final defense.

Final Oral Exam
The PhD thesis/dissertation is the culminating product of a student’s PhD studies and provides a permanent record of a student’s intellectual contribution to the field. Unlike published papers that might result from the same work, the thesis both requires and provides opportunity for the student to creatively place their work in the broadest possible context, explore implications, and speculate on where the future of the field lies. Preparation of a thesis requires the greatest care both in thought and execution.

Most students find that writing a dissertation requires much more time and effort than expected. For that reason, students are encouraged to write as they go, rather than wait for the final few weeks of their graduate careers. Students are also encouraged to work closely with their advisers on thesis organization, scope, and content. To facilitate these recommendations, the Department requires a student to submit a draft of each of the components of the thesis to their adviser at least eight weeks prior to the Final Oral Examination (thesis defense) date, and to submit a final draft of the complete thesis to the readers at least four weeks prior to that date. Readers will provide comments on the thesis at or before the Final Oral Examination and may require that changes be made prior to approval.

The Committee of Thesis Readers conducts the Final Oral Examination and ultimately must approve the thesis. Diversity and inclusion are encouraged for the Final Oral Exam and any student who would like to include a faculty member from outside of the University, including faculty members from groups underrepresented in the biomedical sciences, on the Final Oral Exam voting committee, may do so by having their adviser seek appointment of the outside faculty member to a Senior Associate position at the BSPH. Appointment as a Senior Associate must be requested in a letter by the Department Chair in a nomination letter to the Dean, for vote by the School’s Advisory Board. A copy of the external faculty member’s CV (in BSPH CV format) must be included.

School-wide policies and deadlines governing the selection of readers, conduct of the oral examination, and approval of the written thesis are available from the School of Public Health Registrar’s office and online: https://my.jhsph.edu/Resources/PoliciesProcedures/ppm/PolicyProcedureMemoranda/Academic_Programs_03_Doctor_Of_Philosophy_Degree_071717.pdf.

Note: The Appointment of Thesis Readers and Final Orals Form must be submitted to the School of Public Health Registrar’s Office for processing at least one month prior to the scheduled exam.

Comprehensive information for doctoral students including timelines, guidelines, exam and graduation information for doctoral students, including Thesis Reader Appointment forms can be found here: https://my.jhsph.edu/Offices/StudentAffairs/RecordsRegistration/DoctoralCandidateInfo/Pages/default.aspx

Details of the required format of a PhD thesis are available at: https://www.library.jhu.edu/library-services/electronic-theses-dissertations/

For dissertations that contain published work, suitably modified versions of the published manuscripts may be used as chapters, with careful attribution of the work of co-authors. In general, because the depth of the introductions and discussions of published papers are not sufficient for thesis use, and additional introductory and summary chapters will be required in the thesis.

Essay/thesis writing/editing assistance is offered at both campuses:

- JHMI: Editing Referral Service: http://www.hopkinsmedicine.org/fac_development/researchers/publishing.html#ERS
- JHU: Writing Center: http://krieger.jhu.edu/writingcenter/about/


Official PhD thesis submission to the University is now done electronically. Please review the checklist for specific requirements regarding thesis submission: https://my.jhsph.edu/Offices/StudentAffairs/RecordsRegistration/DoctoralCandidateInfo/Documents/AFTER%20THE%20FINAL%20DEFENSE%20%20Revised%20March%202019.pdf

The department requires one printed copy of the PhD thesis, which will be kept in the Department Library. Students should provide the Student Coordinator with a PDF, and they will have a copy printed for the department.
Final Seminar Presentation
At the conclusion of their dissertation research, students are required to present their work at a formal seminar that is advertised throughout the University and open to the public. This seminar is scheduled in conjunction with the Final Oral Examination.

Time Limits
PhD students must successfully complete all program-specific requirements (such as a dissertation, as detailed in the specific program PPMs) within 7 years. Extensions are possible and must be formally approved by the Committee on Academic Standards.

Program Policies
Vacation/Holiday Policy
Graduate student holiday and vacation schedules traditionally have been flexible to accommodate the varied demands of individual research projects. Guidelines which reflect the Department’s expectations are outlined below. These guidelines are not intended to eliminate flexibility in the scheduling of holidays and vacation, and do not replace any conditions that might be imposed by fellowships/funding agencies.

These guidelines also do not restrict legitimate academic or research activities conducted off campus, such as attendance at scientific meetings and field work. Students are generally entitled to the following holidays and vacation time:

- University holidays
- Spring break
- The period between last day of 2nd term and the first day of winter intersession
- A fortnight vacation in the second and subsequent years as scheduled by arrangement with the adviser.

Graduate students are expected to be present during winter intersession and summer term or as required by their experimental protocols.

Leave of absence
A leave of absence (LOA) is for students who are forced to take a temporary break from their programs of study due to reasons beyond their control, such as illness, military service, financial exigency, or pressing personal reasons justifying an interruption of their graduate studies. A leave of absence is an officially recognized inactive student status that is entered on a student’s academic record. LOA cannot be used by a student working on a thesis who has completed all other degree requirements. LOA is limited to one academic year except for military service. Application for LOA must be made on a form available from Student Coordinator. Please discuss any potential LOA with your mentor and the Student Coordinator. Please review the BSPH Schoolwide Policy (https://e-catalogue.jhu.edu/public-health/policies/academic/academic-leave-absence/).

Parental leave
Graduate students may request parental leave following the adoption or birth of a child. Parental leave applies to either or both parents and includes sixty calendar days of stipend/salary support and health insurance coverage. Parental leave must be requested on a Departmental Paid Leave of Absence form, available from the MMI administration. More detailed information is available here (https://policies.jhu.edu/?event=render&mid=764&pid=32391&fid=policy_32391.pdf&_=0.0023679474985).

Sick Leave
All students receiving a fellowship/stipend from BSPH for full-time study while enrolled in a Master’s or PhD program at the School are entitled to 15 days (three weeks) paid sick leave per year. Days may be used for a student’s own sickness or to care for a family member. Unused days may not be carried over into the following 12-month period and are not payable upon departure. When a student takes sick leave, they should notify their faculty adviser and keep them as up to date as feasible. At its discretion, the department or adviser may require the student to submit verification of the need for sick leave from their healthcare provider to the University Health Service Center for review. Any documents containing a student’s medical information must be kept separate from their academic file. Extended absences (more than two weeks) must be reported by the student and the adviser to the Department Administrator as quickly as possible. If the illness requires an extended absence, the student may apply for a leave of absence.

Policy for MMI PhD Students Changing Thesis Laboratories
MMI PhD students occasionally want to, or have to, change thesis laboratories. In all cases, PhD students must choose to do their thesis research in the laboratory of a faculty member with a primary appointment in MMI, or in the laboratory of a faculty member with a joint appointment in MMI who is also designated as a trainer on an MMI training grant.

Students can request a list of current training faculty who are eligible to accept PhD students from the academic coordinator or the Graduate Program Committee (GPC) chair at any time. To remain in good standing, students should adhere to the following process:

PhD students considering changing thesis laboratories must first schedule a confidential meeting with the departmental ombud to discuss the proposed change. Based on the discussion, the ombud may direct the student to additional resources such as the BSPH Office of Student Life or the university ombuds office.

The student may then consult with faculty members to identify a new thesis laboratory and thesis project. At some point during this process, the student must notify their current adviser of the proposed change with copy of this correspondence also sent to the graduate student coordinator, the department administrator and the chair of the GPC. The student must work with their current adviser in a professional manner to transfer any relevant notes, data, reagents or supplies.

The student and proposed new thesis adviser must then submit the Thesis Adviser Form to the graduate student coordinator for approval by the departmental administrator. In addition to serving as a commitment to advise the student, this form also details the available financial support. Once this form has been approved, the student will be free to pursue thesis research in the new laboratory.

Learning Outcomes
MMI PhD students will:

- Attain an in-depth understanding of the molecular and cellular basis for infectious and immunological diseases through structured course work, informal instruction, mentoring, and firsthand knowledge gained during dissertation research.
- Develop the ability to critically analyze scientific data.
- Learn how to create sound hypotheses and to test hypotheses employing the scientific method.
- Attain a broad understanding of the theory, utility, and limitations of classic and modern scientific approaches and techniques.
- Develop the ability to adapt current methods or to develop a new methodology to address specific scientific problems.
• Acquire the communication skills necessary to effectively report research findings to other scientists as well as to the non-scientific community.
• Gain an appreciation for the tenets of professional and scientific ethics.

The Department’s Graduate Program Committee (GPC) and faculty constantly monitor the components of the MMI graduate program for its effectiveness. Adjustments are made when necessary to maintain an optimal balance of didactic, literature-based, and technical training.

Professional Development
In addition to the commitment to enhancing their scientific knowledge base, critical thinking and research skills, MMI is equally dedicated to students development as a science professionals. Experience teaches that students who start the process of formulating and refining a career plan early in their academic career have a better chance of achieving their goals. In this spirit, MMI requires that starting in their first year each student participate in the structured career and professional development OPTIONS program offered by the Johns Hopkins Professional Development and Career Office (PDCO). This multi-year program is designed to help students identify career objectives and systematically devise and implement a strategic plan to achieve their goals. This plan includes a series of programs - Career Exploration, Career Development, and Career Readiness – that provide opportunities to explore career options, train in and develop valuable professional skill sets, and even gain hands on experience as an intern in their field of interest. In addition, PDCO holds Career Clinics to aid students in preparing winning resumes, CVs, and web pages to prepare them to enter the marketplace. See the PDCO web site for details of the program. https://pdc.med.jhmi.edu/. The progress and direction developed through the PDCO program will be monitored at each Thesis Advisory Committee meeting and documented in each student’s customized Individual Development Plan (IDP).

In addition to the program offered by the PDCO, MMI has academic offerings designed to assist students with professional development such as the required course Scientific Grant Writing (260.625) and the elective Business of Academic Biomedical Research (260.815).

Johns Hopkins Teaching Academy
The Teaching Academy serves as an exceptional graduate and post-doctoral fellow professional development program. The Teaching Academy offers PhD students and post-doctoral fellows, college-level teacher training and academic career preparation opportunities through courses, workshops, teaching practicums, teaching as research fellowship appointments and individual consultation. The Teaching Academy is located in the Center for Educational Resources (CER) in the Garrett Room of the Milton S. Eisenhower Library on the Homewood campus. How to find us: https://cer.jhu.edu/teaching-academy (https://cer.jhu.edu/teaching-academy/).

NOTE: Teaching or outside work: Federal law stipulates a maximum of 19 hours for paid work outside of laboratory thesis work. All paid fellowships, part-time working opportunities and teaching need to be discussed with the student’s primary adviser.

Career Resources
The Career Services Office at the Bloomberg School helps students, alumni, faculty, staff and employers navigate the world of public health jobs. Career Services Office provides valuable resources to assist students in the process. Specifically, the Bloomberg School’s Career Services Office