

GRADUATE PROGRAM IN MICROBIOLOGY

Graduate Student Handbook*

2023 Edition

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PREFACE

The University of Iowa General Catalog (<https://registrar.uiowa.edu/general-catalog>) and the Manual of Rules and Regulations of the Graduate College (<http://www.grad.uiowa.edu/graduate-college-manual>) contain useful information about requirements for advanced degrees at the University. Since regulations and practices vary among departments, this handbook provides specific information about graduate student training in the Graduate Program in Microbiology. The handbook is organized into the following major sections:

- I. The Graduate Program in Microbiology
- II. Detailed Description of Ph.D. Program Activities and Requirements
- III. Ph.D. Thesis Research
- IV. Master of Science (M.S.) Degree
- V. Performance in Teaching
- VI. Facilities, Equipment, and Logistical Matters

There is also an Appendix containing a suggested graduate training timetable and copies of various report forms.

I. THE GRADUATE PROGRAM IN MICROBIOLOGY

A. Introduction

1. Training and Degrees Offered: The Graduate Program in Microbiology offers research training for the Doctor of Philosophy (Ph.D.) and Master of Science (M.S.). Students are typically admitted for Ph.D. training without the necessity of also writing a MS thesis. However, the M.S. can be a degree objective, a tool for improving writing skills, or a terminal degree for Ph.D. candidates who do not fulfill all of the demands required for the Ph.D. degree. Both degrees require the writing and defending of a thesis on a research topic. The objectives of the Graduate Program in Microbiology are to facilitate the education of students so that they:

- a. gain basic information about microbiology and immunology, and become experts in specific areas of microbiology and immunology,
- b. become technically able to investigate new problems and successfully acquire knowledge about new problems, and
- c. can communicate acquired knowledge to peers in the field.

Specific areas included in the program are: immunology, bacterial genetics and physiology, pathogenic bacteriology, host-microbe interactions, virology, parasitology, and bioinformatics. Several of these areas involve interdisciplinary training within and outside the Department, so that students receive a broad background of information during their course of study.

- 2. Requirements for the Ph.D. Degree:** To achieve the Ph.D. degree, a student must:
- a. successfully complete the necessary course, rotation, and teaching requirements,
 - b. pass the comprehensive examination,
 - c. demonstrate research ability and write a dissertation,
 - d. present a research seminar before the faculty, and satisfactorily defend the dissertation research before the student's Ph.D. Committee, and
 - e. be a first author on a peer-reviewed research article accepted for publication, article must be accepted prior to scheduling the dissertation defense.
- 3. Student Teaching:** Since students are expected to become qualified in the teaching of microbiological topics, all students will serve as teaching assistants for at least part of two semesters during their graduate training. Students are typically placed in general courses for which all are expected to have academic competence. In some cases students will be assigned to specialized courses for which they have special aptitude and training. Graduate teaching assistant duties range from teaching laboratory sections in general courses, preparing laboratories in advanced courses, grading of examinations, and in special cases, presenting formal lectures. All teaching activities are evaluated and a report/evaluation may be added to the student's file (see page 21 and Form C, page 41).
- 4. Expectations and Performance during the First Year:** As established by the Graduate College and the Graduate Program in Microbiology, all Ph.D. students must maintain a minimum grade point average of 3.0 to continue study in the Ph.D. program (see page 9). An average of <3.0 will result in the student being placed on academic probation. If the probation status is not resolved within 6 s.h. the student will be dropped from the Microbiology Ph.D. program. Students that have been dropped may petition for completing a M.S. degree provided they have a mentor to support them.

All first-year students are required to satisfactorily complete three rotations. With prior permission from the DGS, two of these rotations may be in the same laboratory. Students

entering with an M.S. degree or in the M.D./Ph.D. program can petition the Graduate Advisory Committee (GAC) to do only two rotations. The opportunity to study in a particular laboratory, either as a rotation or as part of a degree research project, is a privilege that needs to be taken seriously. Rotating students are expected to keep regular and reliable schedules, and to be working in the laboratory between classes. Rotation evaluations are made by the mentor and an unsatisfactory rotation report can result in a "U" (unsatisfactory) grade in MICR:7261. Unsatisfactory performance in one or more rotations can lead to dismissal from the program.

B. Advisory Services for Graduate Students: The Director of Graduate Studies (DGS) will help incoming students plan a program of study for the first year, taking into account the student's background and scientific interests. To facilitate this process, it is important that new students arrive on campus at least one week before classes begin to attend an *Orientation Session* and meet with the DGS. The DGS will serve as the student's official advisor until the student selects a Ph.D. advisor. Prior to the *Orientation Session*, incoming students should familiarize themselves with the range of research interests of the departmental faculty. This information is available on the Departmental Website <http://www.medicine.uiowa.edu/microbiology>. Students are encouraged to meet and become acquainted with faculty members and their research. This usually takes place by discussion sessions with faculty.

It is also permissible for first year students to be advised by Departmental faculty rather than the DGS. In such cases, the student must inform the DGS of the faculty member providing this service. While the DGS no longer serves as the student's official advisor after the first year, the DGS and the GAC remain the major advisory body throughout the graduate program. All progress and exam reports are monitored by this advisory body.

C. Financial Assistance: Financial assistance is available to students in the form of research stipends, tuition, and fees. Graduate students are required to maintain satisfactory performance, as determined by the student's Ph.D. committee and the DGS, to continue receiving financial support. Evaluation of student performance will be based on coursework, research, and teaching.

The Graduate Program in Microbiology limits the length of financial assistance to 5 years. Students must apply to the DGS for extension of this time limit. Students with research stipends are not permitted to work for financial support outside the Department unless they have specifically received such permission from their Research Advisor and their Ph.D. Advisory Committee. Such requests for permission must be made in writing, along with a rationale for the request, to the Advisor and Committee. A copy of the request, and the action taken by the Advisor and Committee, will be placed in the student's file.

D. Health Insurance: Health insurance is offered through the University. All incoming students will receive a letter describing this program and the options available. Arrangements for health insurance are made through the University Benefits office, not the Department of Microbiology and Immunology.

II. DETAILED DESCRIPTION OF PH.D PROGRAM ACTIVITIES AND REQUIREMENTS

A. Overview of Requirements for the Ph.D. degree

1. Complete the necessary course, rotation and teaching requirements.
2. Pass the Comprehensive Examination.
3. Demonstrate research ability culminating in:
 - a. a written dissertation
 - b. a formal seminar on the research
 - c. a satisfactory defense of the dissertation before the Ph.D. (Thesis) Committee

- d. at least one first author research publication in a peer-reviewed journal

B. Course and Semester Hour Requirements

1. **Rationale for coursework:** Lecture-based courses (didactic) are designed to fill in large bodies of needed information in the student's repertoire. Students entering the graduate program from major colleges and universities with certain degrees (e.g. microbiology, biochemistry, and cell and molecular biology) should require few additional didactic courses in graduate school (see 3, below). Students from small colleges with limited opportunities for advanced courses may be advised to enroll in courses that would normally be taken by University of Iowa undergraduates. It is the goal of the program to help students transition from the undergraduate didactic approach to the Socratic approach in graduate training as soon as possible. Although an encyclopedic background of information can be valuable, success in graduate school and science is largely based on mastery of the scientific method as an essential learning process. Consistent with that philosophy, performance evaluations in a Ph.D. program are based on the preparation and defense of the Comprehensive Examination Proposal and Ph.D. research accomplishments.
2. **Semester hour requirements:**
 - a. Graduation requirement. Graduate students normally register for 15 semester hours of credit each fall and spring semester for the first four semesters but are not required to register during the summer. Students will accumulate additional semester hour credits because of their need to: (a) maintain their enrollment, (b) enroll in required seminar courses, e.g., Graduate Student Research Seminar MICR:7263, and (c) enroll in special courses recommended by the student's Ph.D. (Thesis) Committee. The total semester hour requirement required to graduate is 72 s.h. and includes credits earned in courses, research, seminars, and special topics. Students typically initiate the Comprehensive Examination process before they have accumulated 72s.h.
 - b. Minimum course requirements. A minimum of 12 s.h. of credit in graduate level courses (for which letter grades are given) are required for a Ph.D. Credits received for research (Graduate Research in Microbiology MICR:7261), seminars, undergraduate courses, and courses graded "Unsatisfactory/Satisfactory", do not count toward the minimum requirement. Graduate level courses may be taken at Iowa or elsewhere and accepted toward fulfilling the graduate program requirements. Decisions on whether to accept credits earned at other institutions are made by the Graduate Advisory Committee.
3. **Course Levels:**
 - a. Graduate versus Undergraduate Courses. Graduate level courses are distinguished from undergraduate courses by number. Some classes may contain both graduate and undergraduates enrolled under different course numbers, e.g. MICR:3159 versus MICR:6259. Students enrolled in graduate level courses have additional requirements in the courses, such as discussions of primary literature or the preparation of mini-research proposals. None of the courses included in the undergraduate curriculum fulfill the 12 s.h. For example, a graduate student who has not taken biochemistry as an undergraduate could be required to take Biochemistry and Molecular Biology I and II (BIOC:3120 and BIOC:3130), but these courses *could not* be used to fulfill the 12 s.h. for the graduate program.
 - b. Interdisciplinary and Non-Microbiology Courses. A number of Interdisciplinary Training Programs operate on campus and their course listings are given in the University General Catalog. The graduate level course requirements can be fulfilled by taking some graduate level courses in interdisciplinary programs outside the department.

- c. Considerations in Coursework Enrollment. First year students with limited background may need to enroll in a full year of undergraduate biochemistry (BIOC:3120 and BIOC:3130) at The University of Iowa. Students with previous graduate experience may wish to enroll in more advanced courses offered as modular courses during the first and second semester.
- d. Partial List of Courses. Listed below are the major courses available to first- and second-year students.

<u>Graduate Courses in Microbiology</u>	<u>Course No.</u>	<u>s.h.</u>	<u>Semester</u>
Graduate Immunology and Human Disease	MICR:6247	4	Fall
Exp Approaches to Molecular Microbiology	MICR:6255	2	Fall
Introduction to Grant Writing	MICR:6265	2	Fall
Graduate Viruses and Human Disease	MICR:6267	4	Fall
Graduate Bacterial Genetics and Physiology	MICR:6270	3	Fall
Advanced Topics in Immunology	MICR:7207	3	Fall
Topics in Virology Literature	MICR:7265	1	Fall & Spring
Graduate Student Research Seminar	MICR:7263	1	Fall & Spring
Graduate Immunology	MICR:6201	3	Spring
Biology and Pathogenesis of Viruses	MICR:6268	2	Spring
Biology of Bacteria & Interactions with the Host	MICR:6310	2	Spring
Graduate Bacteria and Human Disease	MICR:6259	3	Spring
Graduate Eukaryotic Pathogens & Human Disease	MICR:6240	2	Spring
Graduate Research in Microbiology	MICR:7261	arr.	All semesters
Scholarly Integrity & Responsible Conduct of Research	BMED:7270	na	Fall & Spring

4. **Guidance in Course Selection:** The selection of courses is determined by student interests and recommendations from the DGS, the Ph.D. advisor, and the Ph.D. Thesis Committee. The Comprehensive Examination Committee may also offer guidance, especially if deficiencies in training are noted. The DGS assists first year students in course selection in the week prior to the start of classes.

Sample Curricula for First Year Students

Sample A. Interest in Bacterial Pathogenesis/Physiology/Genetics

Fall Semester

Grad Bacterial Genetics & Phys	3 s.h.
Exp Approaches to Mol Micro	2 s.h.
Grad Student Research Seminar	1 s.h.
Grad Research	x s.h.

Spring Semester

Grad Bacteria and Human Dis	3 s.h.
Grad Student Research Seminar	1 s.h.
Bio. Bacteria & Inter. w/ Host	2 s.h.
Graduate Research	x s.h.

Sample B. Interest in Virology

Fall Semester

Grad Viruses & Human Disease	4 s.h.
Exp Approaches to Mol Micro	2 s.h.
Grad Immunology & Human Dis	4 s.h.
Grad Student Research Seminar	1 s.h.
Grad Research	x s.h.

Spring Semester

Biol & Pathogenesis of Viruses	2 s.h.
Modular Courses	1-3 s.h.
Grad Student Research Seminar	1 s.h.
Grad Immunology	3 s.h.
Grad Research	x s.h.

Sample C. Interest in Immunology

Fall Semester

Grad Immunology & Human Dis	4 s.h.
Modular Courses	1-3 s.h.
Exp Approaches to Mol Micro	2 s.h.
Grad Student Research Seminar	1 s.h.
Grad Research	x s.h.

Spring Semester

Grad Immunology	3 s.h.
Modular Courses	1-3 s.h.
Grad Student Research Seminar	1 s.h.
Grad Research	x s.h.

5. **Academic Performance:** All students in the Graduate Program in Microbiology must maintain a GPA of at least 3.0. If the GPA falls below 3.0 based on a minimum of at least 6 semester hours of GRADED (A, B, C, D, F) coursework the student will be placed on academic probation. Students have the next six semester hours of GRADED (A, B, C, D, F) coursework to raise their GPA to 3.0 or above. In the meantime, such students will be assigned an unsatisfactory status. Students who fail to raise their GPA to 3.0 may switch to the Master of Science Degree Program (see page 20) provided their GPA is at least 2.8. All records are maintained in the student's file and are available for review by faculty.
6. **Enrollment/Registration Procedure:** At the beginning of the registration period, ALL graduate students can register on-line after meeting with the Director of Graduate Studies to discuss plans for the coming semester. Students will not be able to register/enroll for coursework without prior authorization of the Director of Graduate Studies. Registration can be completed using MyUI on the University Website. In the case of MICR:7261 (Graduate Research in Microbiology), which is the course number used for rotations in the first year and for Ph.D. research later, section numbers are required. Students enrolling in MICR:7261 should use the faculty code of the DGS. After selection of a laboratory, students use the faculty code of their Ph.D. advisor.

The University of Iowa has a drop/add policy that allows students to drop their registration for a particular course and/or add additional courses. These changes require a form that must be signed by the instructors involved and the faculty advisor. For all first-year students, the DGS is the faculty advisor. There is a deadline for dropping or adding courses. These dates are published on the University Calendar.

C. Laboratory Research Rotations

1. **Rationale for Rotations:** The Ph.D. in Microbiology is a degree given for mastery in conducting scientific research. Research training begins in year one when students spend ~12 weeks conducting research in each of three laboratories. Rotations are the primary mechanism for matching students and faculty mentors for a thesis project that typically takes about 4 years to complete. Rotations are designed to:
- facilitate the transition from undergraduate to graduate education.
 - expose students to the breadth of research in the department.
 - provide training in specific laboratory techniques.
 - help students identify mentors, lab environments and research projects that are a good fit for them.
 - help faculty identify students who are a good fit for their lab.
2. **The timetable for the 2020-2021 rotations** is as follows:
First Rotation: August 22 – November 11
Second Rotation: November 14 - February 10
Third Rotation: February 13– May 5
Thesis advisors are selected the week of May 8th after completion of all rotations.

3. Selection of a Rotation Laboratory

- a. Incoming students can familiarize themselves with the research of various faculty by:
 - consulting the Departmental Website (www.medicine.uiowa.edu/microbiology),
 - personal interviews with faculty members at the time of recruitment or after admission
 - conversations with senior level graduate students in the program.
- b. Students arrange their three rotations during the first year. Following admission to the Microbiology Graduate Program, and prior to arriving at The University of Iowa at the beginning of the academic year, an incoming student may contact faculty members (e.g., by email and/or telephone) to arrange for their first rotation.
- c. When meeting with a professor to discuss the possibility of doing a rotation, students should ask about potential projects and whether that faculty member expects to take a new graduate student in the spring. Conversely, students should expect faculty to ask about the student's interests and research experience. Be prepared to make the most of these important conversations!
- d. Rotations are approximately 12 weeks in length, although extensions may be granted under special circumstances. The reason for this restriction is to allow an orderly exchange of rotation students since few faculty members can accommodate two rotating students at the same time.
- e. Because the overarching goal of rotations is to match each student with a faculty mentor for a thesis project, students should (with rare exceptions) only rotate through laboratories that are likely to accept new graduate students the following Spring. ***Students need to ask this important question during their discussion with potential rotation mentors.*** Under special circumstances, a rotation may be done primarily with the goal of learning about a discipline without further training aspiration.
- f. Placement of students into laboratories for pursuit of a Ph.D. or M.S. degree involves a matching process that takes several factors into account. First and foremost is the interest of the student. But faculty interests and resources are important too. The willingness of a faculty member to serve as the student's mentor will depend in part on the student's performance during their rotations. The Rotation Report (Form A, page 31) allows the faculty member to officially indicate their willingness to accept a student. It is essential that students make every effort to demonstrate curiosity, drive and aptitude during their rotations, especially in the case of popular laboratories that might have three rotators but resources to support only one new student at the end of the year. Other important considerations include the student's performance in didactic courses, whether those courses are well-aligned with the focus of the laboratory, and whether the mentor has funds, bench space and time to support and mentor a new student trainee. [Note that during year one student stipends are paid by the institution, but when students join a laboratory for a thesis project the faculty mentor assumes this cost, in addition to the cost of supplies for the research project.]
- g. With permission of the Director of Graduate Studies (DGS), students may rotate in the same lab twice. The DGS will consider whether any other students are hoping to rotate in or join that lab and whether getting an early start on the thesis project outweighs the potential educational benefit of rotating in a different laboratory. Second rotations in the same lab will generally only be allowed in the Spring rotation period.

4. Rotation Evaluation

- a. Since the Ph.D. program in Microbiology is a research degree, student performance during rotations is perhaps the most reliable indicator/predictor of a student's potential. For this reason, rotations are evaluated by the research mentor in a serious manner.
- b. At the conclusion of each rotation, Form A (page 31) is to be completed and sent to the DGS, who reviews the evaluation and places it in the student's file. ***The mentor is required to review the evaluation with the student during an exit interview.***
- c. An important aspect of the evaluation is whether the mentor would accept the rotating

student as a graduate student. Be advised that any such **“acceptance” at this stage is hypothetical** in so far as there will still be unknowns, such changes in funding and the interests of other students who might rotate in that lab in the future. Nevertheless, it is useful for students to know at the end of their rotation whether they are in the running to join that laboratory. Note that students can also express an interest in joining a laboratory without that being a commitment. For example, a student might like their first rotation only to discover they like their second rotation even more.

- d. The student's performance on rotations will be noted by the DGS. A letter will be filed and sent to the student in cases where major problems (deficiencies) are indicated. This information is available only to the faculty and, of course, the student.

5. **Matriculation into a Lab for Dissertation Research.** Neither students nor faculty members are allowed to divulge their choices until after completion of all three rotations. Students will rank their choice of lab while faculty will rank their choice of student, usually based on their rotation experience. Not every student or faculty member will get their first priority. Disputed issues will be resolved by the Department Chair and the GAC.

If after three rotations a student is unable to find a mentor, he/she can petition the GAC for the opportunity to do a fourth rotation. To petition, the student must have identified a mentor for the fourth rotation, and this mentor must be willing to accept the student if the rotation is judged satisfactory. The fourth rotation would typically be done immediately following the third rotation.

Students will be allowed a maximum of four rotations. If a student cannot find a mentor who will support them after four rotations, he/she may still petition the GAC to switch to a M.S. program, again with the provision that a mentor is available to accept and support them. **Students unable to find a laboratory that will accept them will be terminated from both the Ph.D. and M.S. degree programs.**

D. Seminars, Journal Clubs, and Lab Research Meetings

1. **Seminars:** Regular seminar programs are offered in Microbiology on a weekly basis. **All graduate students and faculty are expected to attend.**

Attendance of all students is required in Graduate Student Research Seminar (MICR:7263) and the Department of Microbiology and Immunology weekly seminar. Each week during the Fall and Spring semesters, a graduate student will present his/her research to other Microbiology graduate students in MICR:7263. ALL students enrolled in the Microbiology Ph.D. program MUST attend the seminars presented by individual students in the Program when such a student defends his/her thesis research.

Various subdisciplines have their own seminar programs that may be relevant to Microbiology. These include the Immunology Seminar Program, Genetics Seminar Program, Biology Seminar Program, Bacterial Interest Group Meeting, ID Faculty and Fellows Conference, and Anatomy and Cell Biology Seminar Program. There are also many other seminars offered through the College of Medicine, e.g., Pathology Seminar and Biochemistry Seminar, as well as programs in other colleges of the University, e.g., Chemistry Colloquium. When relevant issues are involved, students are encouraged to attend seminars outside their own department.

2. **Journal Clubs:** Various discipline-related journal clubs meet regularly. All graduate students are encouraged to affiliate themselves with a journal club and to become a regular participant.

- 3. Lab Research Meetings:** Most laboratories have a weekly lab research meeting.

E. Faculty Committees for Training Graduate Students

- 1. Mentor:** Upon matriculation into the lab of a Microbiology and Immunology Faculty member (primary or secondary), the Principal Investigator of that lab becomes the students Ph.D. Advisor.
- 2. Role of the Ph.D. Advisor:** The Ph.D. Advisor will be responsible for the day-to-day advice and guidance in the technical and intellectual aspects of the scholarly pursuit of the Ph.D. degree. The Advisor will play the major role in directing the student's Ph.D. research. Important input is also provided by the entire Ph.D. Committee.
- 3. Composition of the Ph.D. Committee:** The Ph.D. Advisor and the student will select a Ph.D. Committee (also referred to as the Thesis Committee) prior to completion of the third semester of graduate study. The Ph.D. Advisor will serve as the Chair of the Ph.D. (Thesis) Committee.

The Ph.D. (Thesis) Committee must be composed of at least five members of the graduate faculty at The University of Iowa. For the final examination, one member of the committee must be a member of the graduate faculty from outside the Department of Microbiology and Immunology. The outside member may NOT be a primary faculty member of another department with a secondary (joint) appointment in Microbiology. Those individuals are considered departmental faculty for this purpose. Therefore, four of the five committee members must hold either a primary or secondary faculty appointment in Microbiology, and at least one of these four members must be a primary faculty member in the Department of Microbiology and Immunology. Departments may request the graduate dean's permission to replace one of the five members by a recognized scholar of professorial rank from another academic institution. Upon recommendation by the DGS, the graduate dean may also appoint additional qualified persons (not necessarily of the graduate faculty; see "optional member" on Form B, page 32) to serve as voting members of the Ph.D. Committee. In all cases where a potential member is from outside UI, the committee chair must first request and receive permission from the graduate college dean to include that person on the thesis committee.

- 4. Role of the Ph.D. Committee:** The Ph.D. Committee is the source of intellectual and research guidance for students. The Committee functions are to:
 - annually review student's progress in research and overall performance,
 - review the Annual Progress Report/Individual Development Plan (APR/IDP)
 - meet for additional special sessions to review the student's progress,
 - make recommendations to the Department Chair regarding the means and basis for continuance of the student's stipend,
 - assist in the guidance and technical aspects of the student's research
 - judge the merit of the dissertation, final research seminar, final oral defense of the thesis research, and the overall fulfillment of the requirements for the Ph.D. degree.
- 5. Composition of the Comprehensive Examination Committee:** The Comprehensive Examination Committee will consist of the Ph.D. Committee but with the Ph.D. Advisor replaced by another faculty member. The Ph.D. Advisor shall not be present for either discussions of the Specific Aims page or for the examination itself.
- 6. Role of the Comprehensive Examination Committee Chair:** The Chair for the Comprehensive Exam Committee will be selected from the ranks of the Comprehensive

Exam Committee. Except under special circumstances, faculty members who are neither primary nor secondary faculty of the Department of Microbiology and Immunology *should not* be asked to become the Comprehensive Exam Chair. The Chair for the Comprehensive Exam Committee must then notify the departmental administration and the DGS of the committee make-up and of the designated Comprehensive Exam Chair. All subsequent correspondence regarding the Comprehensive Exam will be with this Chair.

The Comprehensive Exam Chair (hereafter called Chair) will receive the student's Specific Aims page and assure that it is distributed to the other three faculty members. Thereafter a decision should be made among the four regular committee members regarding selection of a fifth committee member. Since selection of the fifth member (or additional members) may depend on the nature of the proposal, the regular members need to review the Specific Aims page prior to selecting the fifth member. *Three-fifths of the committee must be Departmental members (primary or secondary appointees).*

In addition, the Chair will organize the activities of the Committee and assure that the appropriate collegiate documentation is completed and filed with the Department and Graduate College prior to the examination. **The Chair will notify the Departmental Administrative Associate concerning the time/date of the exam.** The Chair should keep the Ph.D. Advisor apprised of the student's progress at each stage of the examination process and upon its conclusion. After a positive committee decision has been made and the Report on Doctoral Comprehensive Examination has been signed and returned to the departmental office, the role of the Chair is complete.

- 7. Mandatory Annual Meeting:** Students are required to meet with the Ph.D. Committee at least once per year and file an Annual Progress Report/Individual Development Plan (APR/IDP) (Form B, page 32-38). The student is responsible for arranging the date, time, and location of the meeting, and notifying the committee members. One week prior to the meeting, students must provide each Ph.D. committee member with a copy of the APR/IDP with sections 1-3 completed (see below). Students typically make an oral presentation and the Committee provides comments and suggestions. Although it is recommended that the entire Committee meet, business can be conducted with four members as long as the fifth or additional members are polled to vote on critical decisions. The purpose of these meetings is both advisory and judgmental. The **advisory function** includes suggestions from committee members regarding experimental procedures or alternative directions for the research. Collegial sharing of ideas, techniques, lab equipment, and time is encouraged. The **judgmental role** of the Committee involves determining whether the student's research is proceeding on schedule. If the research is not progressing towards a publication, the Committee must decide whether the student's performance is inadequate or whether the experimental design or procedures used are inadequate. Decisions and evaluations by the Committee must be distilled by the Ph.D. Advisor in section 4 of the **APR/IDP** (Form B) and communicated to the student.

First year students typically do not schedule a meeting in year 1.

Second year students schedule a Comprehensive Examination Committee meeting Early January of the second year. The first Ph.D. committee meeting will typically occur in the fall semester of year 3.

Third year students and beyond are required to schedule annual meetings at least once every 12 months.

Although only one annual meeting is officially required, students nearing the end of their

study may require 2-3 meetings/year with their Ph.D. Committee. Historically, students with infrequent Committee meetings have a protracted tenure.

Students are not allowed to provide food or beverages at committee meetings, comprehensive examinations, and thesis defenses.

8. Annual Progress Report/Individual Development Plan (APR/IDP). An APR/IDP (Form B) must be completed at least once every 12 months for students entering year 2 and beyond. The APR/IDP consists of four sections:

- a. Student progress towards fulfilling general graduation requirements (to be completed by the student)
- b. Student self-assessment of skills (to be completed by the student)
- c. Student research progress and development (to be completed by the student and Ph.D. advisor)
- d. Ph.D. Committee evaluation of student Progress (to be completed by the Ph.D. advisor and Ph.D. committee.)

Reprints of manuscripts may also be provided as evidence of progress.

An updated APR/IDP is required at least every 12 months until completion of the Ph.D. defense. The Ph.D. Advisor is responsible for submitting a completed copy of the APR/IDP to the DGS after each Ph.D. committee meeting. The APR/IDP will be placed in the student's file. This is very important in cases of grievances or any other situations in which a "paper trail" is valuable.

Students who fail to complete an APR/IDP updated within the past 12 months and signed by each Ph.D. committee member will receive a grade of Incomplete (I) for MICR:7261. Failure to comply can also jeopardize the student's stipend and opportunity to remain in the program.

9. Role of the Director of Graduate Studies (DGS): The DGS will coordinate the yearly assessments of student's progress and submit a Plan of Study for second year students following completion of the comprehensive examination. The DGS will receive all APR/IDPs and monitor Ph.D. Committee activity through evaluation of the written report. Students who are delinquent in fulfilling scheduled demands must petition the DGS for an extension. The DGS will receive all student requests for extensions and waivers and bring the written requests to the attention of the GAC for action.

F. The Comprehensive Examination Protocol

- 1. The Purpose of the Comprehensive Examination:** Since the Ph.D. is a research degree, the major objective of the graduate program is to train students in application of the scientific method to solve scientific problems. A student's ability to apply the scientific method involves preparation of and defending a research proposal, and is evaluated the Comprehensive Examination Committee. The format of this proposal follows the guidelines of an NIH R21-style proposal.
- 2. Timetable for Completing the Exam:** Students may take the Comprehensive Examination as they approach the accumulation of 72 s.h., but no later than the second semester of the second year. The timetable for completion of the Comprehensive Examination is outlined below. **Failure to meet this deadline will constitute an initial failure of the Comprehensive Exam (see below).** Requests for extensions must be made by the student

to the DGS. Decisions concerning extensions will be made by the DGS in consultation with the GAC and the Chair of the Department.

3. The Comprehensive Examination Process: The process involves the following steps and timetable:

Step I. Summer/Fall

Ph.D. Advisor and the student select a Ph.D. Committee by October 1st.

Ph.D. Advisor and/or student identify 4-6 papers that the student would benefit from reading carefully, most likely because these papers are related to the student's thesis project, although that is not a requirement. The student will read the papers and use them to develop a research proposal that is distinct from the student's actual thesis project. **Mentor involvement in the process is limited to selection of the 4-6 papers and no further communication/discussions pertaining to the Comprehensive Examination should occur between the student and the mentor.**

Step II. January 1-20

Student schedules and meets with PhD Committee. One week in advance of the meeting the student should provide each committee member with the 4-6 papers that will serve as the general topic of the comprehensive exam

Meeting Objectives

- Student summarize progress to date on PhD research and future goals.
- PI is dismissed from the meeting.
- Student briefly presents proposed topic for the comprehensive exam.
- Committee decides whether the proposed topic is acceptable and sufficiently distinct from the student's dissertation project.
- Committee selects Chair for the Comprehensive Exam Committee.
- Committee may identify a faculty member to replace the PhD mentor on the Comprehensive Exam Committee or defer that decision pending review of the Specific Aims page.

Step III. One month following the date of the PhD committee meeting (February 1-20)

Student submits Specific Aims page to Comprehensive Exam Committee Chair, who will distribute it to the exam committee members.

Step IV. Within 2 weeks of receiving the Specific Aims page, the Chair of the Comprehensive Exam Committee will provide the student with written comments from the committee and one of three potential outcomes:

- a. Student is approved to write the Comprehensive Exam Proposal
- b. Student is requested to submit a revised Specific Aims page to the Chair of the Comprehensive Exam Committee within two weeks. The revision is to be based on the written comments from the exam committee*
- c. Student is asked to schedule a meeting to discuss the Specific Aims page, and is requested to submit a revised Specific Aims page to the Chair of the Comprehensive Exam Committee within two weeks of the meeting date. The revision is to be based on both the written and oral comments of the exam committee*

* for outcomes b and c the process returns to Step IV. A Specific Aims page that is deemed unsatisfactory a second time constitutes a failure of the first attempt.

Upon approval of the Specific Aims page the student schedules a meeting for the Comprehensive Examination Defense, ~7 weeks from the Specific Aims page approval date

Step V. Student submits Comprehensive Exam Proposal to the Chair of the Comprehensive Exam Committee within 5 weeks of the Specific Aims page approval date

Step VI. Student defends the Comprehensive Exam Proposal ~2 weeks after submission of the proposal. Following a successful defense of the proposal, a Comprehensive Examination Report will be filed with the Graduate College.

- 4. Specific Aims Page Preparation and Submission:** A Specific Aims page for the proposed research will be prepared by the student and submitted to the Comprehensive Exam Chair on or before the first day of the Spring semester (fourth semester in the program) (Figure 1, page 19). ***It is vitally important that the student demonstrates independence during the preparation of the Specific Aims page. After the general topic of the proposal has been selected the student shall have no further discussions with the PhD Advisor about the exam.*** Careful reading and thoughtful preparation by the student will facilitate the Committee's review of the proposal. The following Specific Aims page guidelines should be followed:
- i. Should not be more than 1 single-spaced page, including tables and figures but excluding citations.
 - ii. Should use Arial font size of 11 with 0.5" margins.
 - iii. Should summarize the research problem, state a hypothesis, state the aims, and summarize the impact on the field should the aims be completed as envisioned.
 - iv. Failure to follow these guidelines can in itself result in rejection of the abstract.

5. Preparation of the Comprehensive Examination Proposal

a. General Guidelines

- i. The font and margin sizes should be as for the abstract. Citation lists can be extra.
- ii. The proposal must be entirely written in the student's words and all sources of information acknowledged. The problem and the proposed solution must represent original thought by the student. Plagiarism will not be tolerated.
- iii. The student should apply information from courses, seminars, journal articles and research experience to compose a technical solution to the research problem of the proposal.
- iv. The student may consult faculty about methods and other technical information, but not regarding hypotheses or experimental design. *Under no circumstances is a student to give his/her proposal to any faculty member for evaluation or proofreading.*
- v. Students are encouraged to use peer groups for advice, proofreading, and service on mock comps defenses. Only trainees (i.e., fellow graduate students and post-docs) may serve in that capacity. Associate Faculty members, Research Scientists, and Research Associates are not considered trainees and cannot serve as a member of the peer group.

- b. Scope of the Student Proposal:** Students are often uncertain of how ambitious to make their proposals, and proposals have varied in the amount of research proposed from one well-controlled experiment to projects that would keep a medium-sized lab busy for ten years. The first approach is much too narrow and does not require the student to understand and apply multiple approaches and techniques. The second approach is too broad and results in a written proposal that is necessarily short of detail. **You should propose a project that would keep two well-trained, full-time**

investigators busy for about two years. Such a project would probably produce two to three publications.

c. **Composition of the Student Proposal**

The submitted proposal should consist of 7 pages + references in the style of an NIH R21 grant. Examples of funded R21 applications can be found at the NIH website:

<https://www.niaid.nih.gov/grants-contracts/sample-applications#r21>

Page 1 is the Specific Aims page that was approved by the committee. Some minor editing of the Specific Aims page is to be expected because plans are apt to change when you expand your ideas into a full-length proposal. However, significant deviations from the approved Specific Aims page, such as changing the scope of the aims, should be discussed with Chair of the Comprehensive Examination Committee and may not be allowed. It is especially important to talk to the Chair if you discover that the plans you outlined in your Specific Aims page will not work as intended.

Pages 2-7 are the research proposal and should consist of the following sections (adapted from NIH descriptions).

- i. **Background.** The scientific premise is the knowledge upon which you are basing your hypothesis and aims. In a philosophical context, a premise is assumed to be true for the purpose of an argument upon which a conclusion is drawn. In science, however, the validity and accuracy of previous findings cannot necessarily be assumed as true. Instead, you are expected to evaluate the strengths and weaknesses of the evidence you are using as the basis (or premise) of your proposed research. In other words, make it clear that you considered the strengths and weaknesses of the existing literature and/or your own unpublished data when developing your hypothesis.
 - ii. **Significance.** The Significance section should include information that describes *why* your research question(s) is important and the positive benefits of your planned research. Emphasize the importance of the question being asked as it relates to health or new knowledge. The Significance section must clearly convey what is currently known, what remains to be discovered, and who will benefit from that discovery.
 - iii. **Innovation.** Describes how the application challenges and seeks to shift current research or paradigms by utilizing novel theoretical concepts, approaches or methodologies, instrumentation, or interventions.
 - iv. **Approach.** Describes the overall strategy, methodology, and analyses in a well-reasoned and appropriate manner to accomplish the Specific Aims. The approach may contain preliminary data to support the premise or establish feasibility. The approach section should also identify potential problems, alternative strategies, and benchmarks for success.
- d. **Protocol for the Proposal Defense.** The proposal defense meeting usually starts with a short closed-door review of the student's academic and research history. The student is then invited into the room and will present the proposal starting with background, significance, rationale, and a detailed description of the specific aims, most likely making use of PowerPoint slides. The examination will continue with questions on the proposal and global issues that test the student's general knowledge of microbiology. It is not unusual for the examination to end prior to the student completing the entire presentation of the aims. The meeting ends in a closed-door session for an examination committee discussion of the qualities of the proposal, the defense of the proposal, and an analysis of the breadth and depth of knowledge of microbiology. This discussion culminates in a committee vote.
- e. **Outcomes of the Comprehensive Examination.** There are only three allowable outcomes of a comprehensive examination; **Satisfactory**, **Reservation**, or **Unsatisfactory**. Only one of these outcomes is to be used when describing the outcome of an examination. Hybrid

outcomes such as “Pass with Reservation” or “Satisfactory with Reservation” are misleading and unacceptable.

Satisfactory. The student has passed the exam and continues with research to satisfy the dissertation requirement of the Ph.D. degree.

Reservation. The Graduate College Manual of Rules and Regulation outlines the criteria for allocating a Reservation status following a comprehensive exam. A vote of "Reservations" should only be used when a faculty member feels that the deficiencies displayed by the student were modest and can be readily rectified. In the event of a report with two or more votes of "Reservations," the Committee with specify in the examination report form what actions the student must take to correct any deficiencies and how much time the student has to do so. This report will be submitted to the student, the thesis advisor, the Department Head, and the Graduate College. The language describing the actions must be specific. For instance, if additional course work is required, a list of suitable courses must be presented. If the candidate needs to rewrite his or her research prospectus, the deficient areas must be identified, etc. If the candidate satisfies the required actions in the specified period of time, the appropriate departmental executive will send a written report to the Graduate College indicating the date for which the examining committee considers the actions to have been satisfied. Upon approval of the Dean of the Graduate College, the comprehensive exam will be recorded as "Satisfactory" as of that date. If the student does not complete the assigned task on time, or if the work is not of sufficient quality, the appropriate departmental executive will send a written report to the Graduate College indicating that fact. Upon approval of the Dean of the Graduate College, the comprehensive exam will be recorded as "Unsatisfactory" as of that date. The candidate will not be admitted to the final oral examination of the dissertation until a grade of "Satisfactory" has been recorded for the comprehensive exam.

When the outcome is a Reservation the following verbiage should be included in the letter to the student: “To be clear, a Reservation is neither a Satisfactory nor an Unsatisfactory performance. Rather, it is an opportunity for you to correct the deficiencies noted by the Examination Committee (outlined below) during the comprehensive examination. A decision will then be made by the committee as to whether the reservation is to be removed and whether the outcome of the comprehensive examination is Satisfactory or Unsatisfactory”

Unsatisfactory. Two or more “unsatisfactory” votes either on the initial proposal or upon evaluation of a revision, render the overall Committee report unsatisfactory. In the latter case, it would mean the "reservation" had not been satisfied. Both constitute a failure. The Manual of Rules and Regulations of the Graduate College specify that the student may be allowed re-examination, but this re-examination is entirely at the discretion of the Comprehensive Examination Committee. If the Committee decides not to permit re-examination, the student will be terminated from the Ph.D. Program. If the Committee decides to re-examine the student, this examination may not be scheduled prior to 4 months, and no later than 6 months, after the initial examination. This is usually a re-examination of the same proposal although the Committee can recommend that an entirely new proposal be written and defended. In cases of re-examination, the student has one more chance to successfully pass the exam. If re-examination occurs, failure on this attempt under options c or d (above) will require the Committee to specify that the student switch to a master’s degree program or be dismissed from the graduate program. Note: Failure on the first attempt does not allow faculty to propose pursuance of an M.S. degree. This choice is up to the student, not the faculty. If the second attempt also results in failure, the student must either leave the program or make an application to the DGS to enter the M.S. program (see page 20).

III. PH.D. THESIS RESEARCH

A. General: The Graduate Training Timetable (page 28) indicates that following the first four semesters of graduate school, nearly all of the remaining time in the program is spent doing laboratory research. In other words, following the successful completion of the Comprehensive Exam, the Ph.D. Candidate is expected to devote >90% of his/her time to completion of his/her Ph.D. research. Ph.D. research is credited by enrollment in MICR:7261 and by using the section identification code of the Advisor. The minimum number of semester hour (s.h.) credits required for the Ph.D. is 72. The student's research is evaluated on a day-to-day basis by his/her Advisor (mentor) and on a regular basis by the Ph.D. (Thesis) Committee. Many Committees meet twice yearly although the mandatory requirement is once per year. As indicated above, an APR/IDP is filed as a direct result of the required meeting.

The length of time that a student remains in the program depends on the rate of progress made by the student. The current average tenure of a graduate student is approximately 5 years.

The written Ph.D. thesis must meet certain standards established by the Graduate College. The final thesis will contain numerous chapters, some of which may also have been published in peer-reviewed journals during the student's tenure as a graduate student.

B. Regular Checkpoints on Student Progress: The Ph.D. Committee will review the student's intellectual and research progress. The Committee will make certain that the highest level of ethical conduct is demonstrated at all times during the course of study. The student will submit APR/IDP to each member of the Ph.D. Committee and DGS, and to the departmental office. The one exception to this will be the year in which the student is taking the Comprehensive Exam. Reports in years 3, 4 and 5 may contain excerpts from manuscripts and posters. Reprints of manuscripts may be provided as evidence of progress. Following submission, a meeting of the Ph.D. (Thesis) Committee is convened.

Only one APR/IDP is officially required per year, but students nearing the end of their study typically require 2-4 meetings/year with their Ph.D. Thesis Committee. Historically, students whose Committee seldom meets also have a protracted tenure. **The Student/Ph.D. Advisor is responsible for submitting an APR/IDP after each Ph.D. committee meeting.** APR/IDPs are placed in the student's file. This is very important in cases of grievances or any other situations in which a "paper trail" is valuable.

C. Ph.D. Dissertation Preparation and Defense: To be awarded the Ph.D. degree, a candidate must satisfactorily write a scientific documentation of the research conducted and defend the work before the respective Ph.D. Thesis Committee. The procedure to be followed by the student regarding the thesis/dissertation preparation and defense is outlined below:

1. The student's research progress should be presented orally to members of the Committee. This will often be accomplished in the yearly (or more frequent) meetings of the Ph.D. (Thesis) Committee and the subsequent Progress Reports filed with the Director of Graduate Studies. Eventually the Committee will advise the student to begin writing the thesis/dissertation. Each semester the Graduate College establishes deadlines for the first deposit and final deposit of theses. These deadlines must be met to fulfill graduation requirements.
2. The student's Advisor will monitor the progress of the writing. The style of the document must conform to the thesis guidelines established by the Graduate College (www.grad.uiowa.edu/). It is recommended that a draft of the introduction (Chapter 1) be approved by the thesis committee prior to scheduling the thesis defense.

3. Collaborative research projects require extra attention when preparing your thesis. All Figure, Table, and Diagram Legends should include the names of individuals that contributed to generation of that information.
4. Instances in which 2 or more PhD students make equal contributions to a manuscript (e.g., dual first authors both wishing to include the manuscript as an internal chapter in the dissertation), require an acknowledgement section that clearly itemizes the contributions of others. While it is common practice to include published papers in the thesis with only moderate editing in the case of dual authorship these chapters should be written to focus on the work done by the student with the co-authors work provided as needed and with attribution. **No two students should have identical chapters in their theses.**
5. The student distributes the completed thesis to the Committee at least two weeks before the scheduled date of the final defense.
6. The Ph.D. student will present a public seminar on the dissertation research. All graduate students and faculty in the Department will be encouraged to attend. The seminar will be followed by a defense of the dissertation before the student's Ph.D. Committee. The public seminar shall not precede the defense by more than one month and is generally held the same day.
7. The defense of the thesis will proceed in a manner similar to the proposal defense of the Comprehensive Examination. At this point in training, the student is expected to be an expert in the chosen field of research. Failure to demonstrate an outstanding level of expertise in the dissertation and in the experimentation conducted to answer the research problem(s) will be judged by the Committee to be a failed dissertation examination. The Graduate College states that two unsatisfactory votes will make a Committee report unsatisfactory. The forms prepared by the Departmental Administrator are taken to the thesis defense. The Chair of the Ph.D. Committee (Advisor) will gather the signatures from the Committee members at the conclusion of the defense. The forms will be returned to the Administrator who will send all appropriate materials to the Graduate College. If the candidate fails the defense, he/she must wait until the next semester for re-examination and will have this single re-examination opportunity to adequately demonstrate a mastery of the research topic and the experimental procedures.
8. A stipulation may be attached to an otherwise successful defense. The Committee may suggest further corrections to the document before final acceptance. This requires no re-defense, but the committee will not sign the Certificate of Approval page of the thesis until the corrections have been made. The final, corrected copies of the document must be submitted to the Graduate College per their deadline.
9. In addition to the copies required by the Graduate College, the student will present one final copy of the document to the Department for the permanent library file, at least one copy to the student's Advisor, and to members of the Committee per their request. Expenses associated with making copies of the document for the Committee and College are the responsibility of the student.

D. Publication Requirements for Ph.D. Students: Graduate students must have at least one peer-reviewed, first author research paper in press (or published) before defending their thesis. The Journal must be indexed on Pubmed in order to qualify. Completion of this requirement will be monitored by the Ph.D. Thesis Committee. In exceptional circumstances, a student's Ph.D. Thesis Committee may petition the Graduate Advisory Committee for exemption from this

requirement.

- E. Miscellaneous Reports.** Students who present talks or posters at local or national meetings may have a letter documenting this placed in their file. Awards received by students for their presentation or copies of travel awards may be placed in a student's file. These provide additional sources of information for writing recommendation letters for research positions, teaching positions, and postdoctoral awards.

IV. MASTER OF SCIENCE (M.S.) DEGREE

- A. Introduction:** Although the Graduate Program in Microbiology does not recruit students aspiring only for the M.S. degree, those who enter as Ph.D. aspirants may change their final objectives. Alternatively, some students may wish to complete a M.S. degree during the course of obtaining a Ph.D. There is much to be said for this course of action, especially if students feel uncomfortable in moving directly to Ph.D. candidacy. Therefore, the Graduate Program in Microbiology does offer a M.S. degree. In any case, the student must petition the GAC through the DGS if he/she wishes to pursue the M.S. track.

- B. Requirements for the M.S. Degree:** There are differences in three categories between the Ph.D. and M.S. Degree:

1. Semester hour and course requirement
2. Thesis Committee and Comprehensive Examination
3. Research and thesis requirements

The Graduate College requires a minimum of 30 s.h. for a M.S. degree. Of these 30 s.h., not more than 9 s.h. from Graduate Research in Microbiology (MICR:7261) can be counted. This means that an aspirant for the M.S. degree must have at least 21 s.h. of course credits. Unlike the Ph.D. program recommendation of 15 s.h., however, undergraduate courses taken as remedial courses count toward the 21 s.h. minimum requirement.

Students aspiring for the M.S. degree need not pass a Comprehensive Examination. Furthermore, the M.S. Thesis Committee consists only of the Advisor and two other members (three total) versus five for the Ph.D. Committee. One of the Committee members *may be* a faculty member outside of the Department of Microbiology and Immunology. The final examination will follow the format of the Ph.D. defense of dissertation including a seminar.

M.S. research should be accomplished in 1 1/2 to 2 years. Considering that such individuals have used one year for rotations, the normal time for a M.S. degree is 3 years. Typically, a M.S. Research Project is one-third as complex as a Ph.D. Research Project.

- C. Matriculation into the Ph.D. Program:** All graduate students who complete the requirements for the M.S. degree and wish to continue working towards a Ph.D. **MUST** reapply for admission to the Microbiology Graduate Program. Applications will be reviewed by the Chair of the Graduate Admissions Committee, the members of the student's M.S. Thesis Committee, and one additional faculty member.

V. PERFORMANCE IN TEACHING

The Department of Microbiology and Immunology requires that all students participate in the teaching activity of the Department. Teaching effectiveness may be reviewed by the Ph.D. (Thesis) Committee. Each course director must fill out an evaluation form (Form C, page 45) following the participation of each student in the course under direction. These forms may be included in the

student's file and can be used to evaluate the student's performance at the mandatory annual review of the student's performance by the Ph.D. (Thesis) Committee (page 29). Assessing Classroom Environment (ACE) evaluation forms will also be completed by students enrolled in courses that have graduate student assistants. A portfolio of teaching evaluations in a student's file can be extremely valuable in providing recommendations for those Ph.D. graduates applying for positions in which teaching skills are important.

The student evaluation will be directed toward improving teaching effectiveness and may include the recommendation for the student to take additional courses or to assist in specific courses in subsequent years. For example, The University of Iowa offers two tests for students for whom English is a second language: the English Proficiency Exam and the Teaching Assistant (TA) certification evaluation. [All such students are required to take these exams, *regardless* of their TOEFL score.] Depending on the results of these exams, certain English courses can be recommended by the examination administrators and the student's Ph.D. Committee. In the case of a language problem, the Department of Microbiology and Immunology requires that these course recommendations be followed at the rate of one course per semester, until the recommendations are fulfilled or the student passes the TA certification evaluation. The students are re-evaluated automatically at the end of each recommended class.

While English proficiency is important for teaching, teaching skills are not language-dependent and students for whom English is a second language are not singled out as it may appear from the discussion above. Most teaching skills are learned, i.e., the result of experience. Thus, weak performances as a graduate student assistant may lead to the recommendation that the student gain more experience. Courses that offer the possibility for students to deliver lectures or mini-lectures provide a valuable training opportunity. Students are encouraged to deliver such lectures so long as they are evaluated by faculty. In addition, the University offers several workshops to assist in the training of graduate student assistants. They are typically posted on departmental bulletin boards.

Student Teaching Evaluation. Form C (page 41) will be completed by the faculty member that supervises the graduate student assistant. This can be a very important document for students that have completed their training and are applying for positions that require they have teaching duties. ACE evaluation forms are also completed by students enrolled in courses that have graduate student assistants.

VI. FACILITIES, EQUIPMENT, AND LOGISTICAL MATTERS

- A. Teaching and Research Equipment:** The Department has a supply of various types of equipment used for teaching and research in Microbiology and Immunology. The equipment (microscopes, water baths, centrifuges, etc.) used for teaching major classes is not to be moved from the teaching areas without specific permission from the Department Chair or the Course Director. Research equipment is generally available in the core areas where the graduate student is conducting research. Certain pieces of movable equipment (projectors, microscopes, shakers, centrifuges, water baths, etc.) are available in the Department, but permission from the principal investigator in the lab housing the equipment or from the Department Chair is required before equipment is used or moved.

Graduate students and members of the Department are asked to assume responsibility for keeping equipment in first-class working condition. If anyone does not understand, or has any doubt about, the operation of a piece of equipment, please ask for instruction before use. Clean up after using equipment. For example, if tubes were broken in a centrifuge, or cotton plugs were blown from flasks in an autoclave, etc., please clean the equipment before leaving. This is especially critical when radioactivity or pathogenic organisms are involved. If any piece of equipment does not work

properly, or if it has been broken, please report the matter to the principal investigator in the area, to the Department Chair, or the Departmental Office.

B. Travel to Scientific Meetings: If a graduate student presents research results at local or national scientific meetings, the Department may provide partial financial assistance for the necessary travel expenses. Usually, travel to meetings is paid by the mentor or by certain training grants. Students can also apply to the Graduate College and the Dr. Rachel J. Mason Fund for travel awards. The application and guidelines for the Mason Travel Award can be found on the S drive in the Dept Info/Graduate Student Information folder.

C. Departmental Administration

1. Office hours. The office of the Department (Room 3-403) is open from 8:00 AM to 4:30 PM Monday through Friday, except for holidays recognized by the University.
2. Mail. Business mail (journals, etc.) is delivered to the office two times a day, and office staff will sort the material for all personnel in the Department. **It is against University policy to use the office address for unofficial, non-University business such as personal mail, letters, newspapers, non-scientific magazines, credit card bills, etc.**
3. Keys and Identification (ID) Card. Graduate students will be given desk and laboratory space in the various research core areas of the Department. All students will be issued a picture ID card through the University. ID cards can be used for food purchases at University cafeterias, bookstores, and recreation centers. ID cards are initialized to open doors equipped with the Marlock system, i.e., all core doors and the building entrances. Cores are locked after 5:00 PM and before 8:00 AM Monday through Friday. The Bowen Science Building is locked on weekends and from 6:00 PM to 6:30 AM on weekdays. Certain areas (faculty offices, isotope rooms, isolation rooms, storerooms, etc.) require specialized codes or keys, and permission to use these areas must be obtained from the faculty in charge of that particular space.

Keys assigned to graduate students must not be loaned or given to other persons without permission. If keys are lost, the student will be charged for new keys. It is against University regulations for unauthorized persons to have duplicate keys made. All keys are made by the University Key Shop and should be obtained through the Departmental office.

4. Requisitions for Supplies. Supplies for research generally are obtained through or from the faculty research mentor or the principal investigator directing the research.
5. Scheduling Rooms. Scheduling core conference rooms, lectures rooms, or laboratory space in the teaching labs is arranged through the Departmental office staff. It is the responsibility of the users of these rooms to return all books, journals, and computer and projection equipment to their original storage areas and ensure the room is clean for the next user.

D. Radiation and Health Safety

1. Radiation Safety. All users of radioactive materials must complete a yearly training course. There are strict rules regarding the handling of materials and their proper disposal. Students and laboratories not in compliance may lose their license for the use of radioactive materials.
2. Biohazard Safety. The University also has strict guidelines for the handling and disposal of hazardous chemicals such as carcinogens or environmentally unfriendly materials. Students working with human pathogens must complete yearly training. In addition, students who come into direct contact with animals used in experiments must complete the appropriate training programs offered through the Office of Animal Research.

E. Library Services

1. Departmental library. The Department has a small library that contains Ph.D. theses from past graduate students.
2. On-line journals. Numerous journals are available on-line through the University Library web site.
3. Outside libraries. The Hardin Medical Library has most books and journals needed for the study of medicine and microbiology. The Hardin Library Help Desk can acquaint you with the use of the facility.

F. Computers: Nearly all laboratories have multiple computers that can also be used by students. These are linked to various University servers for transfer of scientific data. For example, data obtained from a flow cytometer can be transferred through a server connection to a computer in the student's lab. Most computers also allow Internet access for using on-line journals, databases, and important websites. The system also includes electronic mail and all graduate students are entitled to an address in the University e-mail system. This can be arranged with the Department Administrator. Since website usage is automatically monitored, computers are periodically checked for evidence that they have been used for personal activities or for contacting such things as pornographic websites.

G. Grievance Process

Academic complaints generally involve students experiencing difficulty in their academic program, or disputes concerning students' status or progress in their academic programs. Generally, graduate students should bring complaints to **either the Chair or Vice-Chair** of the Department of Microbiology and Immunology or the **DGS**. Depending upon the specific situation, the Chair, Vice Chair or DGS may need to summarize his or her discussions with the other department or college administrators. This will be done without prejudice. Should a grievance ever involve the Chair or Vice-Chair or the DGS, the grievance should be reported to the uninvolved others and the involved member will be excluded from discussions or making decisions regarding the complaint.

If a graduate student feels uncomfortable pursuing a complaint through the department, the complaint may be brought directly to the Graduate College
<https://grad.uiowa.edu/academics/manual/academic-grievance-procedure>.

In addition, the Office of the Ombudsperson provides conflict management and problem solving to the entire campus community. Their services are confidential, neutral, informal, and independent. Appointments are suggested and can be scheduled by phone or by email, ombudsperson@uiowa.edu. Detailed information is available on their website: <https://uiowa.edu/ombuds/>.

Grievances can be submitted in person or in writing to the Chair, the Vice-Chair, or the DGS. The student will meet with one or more of these administrators who will advise the student of possible informal and formal routes to proceed. The student then elects whether first to pursue a complaint using an **informal** process or whether to file a **formal** grievance and to proceed by a more formal process. Students are encouraged to seek resolution via the Informal Academic Complaint Procedure before initiating the Formal Academic Grievance Procedure with the Graduate College.

Informal. The informal process will have either the Chair of the Department of Microbiology and Immunology, the Vice-Chair, or the DGS (or together with the Chair/Vice-Chair) serve as a

mediator. If the student elects the informal process the specifics of the process and outcomes vary based on the situation and the parties involved. They will work diligently to help all parties resolve the complaint in a mutually agreeable fashion. This process may take an indeterminate time. If the student proceeds via the informal process, they can always move a complaint to a more formal process if needed.

Formal. If the student then elects file a formal grievance, the follow procedure should be followed.

A written statement of allegations should be submitted to The Chair of Microbiology and Immunology. Should the chair be involved the complaint should be submitted to the Vice-Chair or DGS. This statement should clearly and completely state the allegation(s), including times, places, and individuals concerned, and must be signed and dated by the complainant. The information provided should form the basis for a thorough investigation of the allegation(s). The statement should also contain a preferred remedy.

The Chair (or Vice-Chair or DGS) will send a copy of the statement of allegations to the involved party. The party will be asked to respond to the allegations within ten working days. If the complainant is dissatisfied with the response, he/she can appeal the decision to the Chair (or Vice-Chair or DGS). The appeal should be a written statement to the Chair (or Vice-Chair or DGS) indicating the basis and facts on which the student believes the response is unsatisfactory and must be filed within 25 working days of the party's response.

Upon an appeal, the Chair (or Vice-Chair or DGS) shall appoint a Grievance Committee for the next step. The Grievance Committee will consist of at least three faculty members from the Department of Microbiology and Immunology (one of whom shall be appointed Committee Chair). The Grievance Committee will review the report of the investigation, request any additional documents that the Committee believes germane to the inquiry, and conduct a hearing to receive any additional testimony the student may wish to present, or the Committee may wish to solicit. The student is encouraged to be accompanied by a witness, observer, or support person.

The first meeting of the Grievance Committee may be convened by either the department Chair, Vice-Chair, or DGS. After that, the Committee will organize its own activities. The Committee may rule on the relevance of information or testimony and otherwise conduct the hearing. The Committee will make a record of the hearing with the permission from the participants. The Grievance Committee will report to the Department Chair on progress at intervals of about ten working days and will ordinarily make a recommendation to the Department Chair within twenty-five working days (excluding break periods between academic sessions).

The Department Chair (or Vice Chair or DGS) may accept or reject the recommendation or may request the Grievance Committee to explore other issues surrounding the grievance.

Appeal to the Graduate College. If the student elects to appeal the formal grievance outcome, the student should contact the Associate Dean for Academic Affairs in the Graduate College.

<https://grad.uiowa.edu/academics/manual/academic-grievance-procedure>.

APPENDIX

Graduate Training Timetable (All Years)

Form A. Lab Rotation Report

Form B. Annual Progress Report/Individual Development Plan (APR/IDP)

Instructions for Microbiology Annual Progress Report and IDP

Form C. Student Teaching Evaluation

Graduate Training Timetable (All Years)

Year One

- a. Pre-enrollment
 - Obtain information about faculty research from departmental web site and communicate with faculty about research rotations prior to arriving in Iowa City.
 - Attend the *Orientation Session* in late August with the DGS, the week before classes begin.
 - Meet with the DGS to arrange a schedule of courses for first semester and a preliminary schedule for the second semester.
 - Enroll for Fall semester courses. Registration forms and student numbers are provided in the Departmental Office. Registration may be done by computer using MyUI (<https://myui.uiowa.edu>).
 - Arrange for starting the first rotation on or before September 1.

- b. Fall Semester
 - Complete necessary coursework.
 - Complete first rotation and review Rotation Report (Form A, page 42) with the laboratory mentor.
 - Plan and begin the second rotation.
 - Attend departmental, interdisciplinary, and other relevant seminars.
 - Participate in discipline-related journal clubs and lab research meetings.
 - Periodically meet with the DGS to keep him/her advised of progress and experiences during the first semester.
 - Meet with DGS for discussion of coursework and Spring semester enrollment.

- c. Spring Semester
 - Complete second semester coursework.
 - Complete second and third rotations and review Rotation Reports (Form A, page 40) with the laboratory mentors.
 - Attend departmental, interdisciplinary, and other seminars.
 - Attend a meeting with the GAC to review first year coursework, rotations, and to discuss the procedures for Summer and Fall semester of the second year.
 - Officially announce your selection of a Ph.D. Advisor **after** completion of all three rotations.
 - Participate in discipline-related journal clubs and lab research meetings.

- d. Summer
 - Enroll in necessary coursework as advised by the DGS and the Ph.D. Advisor.
 - Begin Ph.D. research project.
 - Determine teaching responsibilities for following year (Course Directors usually meet in July to make teaching assignments).

Year Two

- a. Fall Semester
 - The Ph.D. Advisor and the student will select a Ph.D. Committee.
 - Meet with Ph.D. Committee before December 15, and select a Chair for the Comprehensive Examination. Immediately provide the name of the Chair to the Departmental Office and to the DGS.
 - Enroll in any necessary coursework.
 - Continue Ph.D. research.
 - Perform student teaching, if required.
 - Participate in discipline-related journal clubs and lab research meetings.
 - Attend departmental, interdisciplinary, and other seminars.
 - Begin to formulate ideas for the Comprehensive Examination.
- b. Spring Semester
 - Enroll in necessary coursework.
 - Continue Ph.D. research.
 - Perform student teaching, if required.
 - Attend departmental, interdisciplinary, and other seminars.
 - Participate in discipline-related journal clubs and lab research meetings.
 - Complete Comprehensive Examination.
- c. Summer Session
 - Continue Ph.D. research.

Year Three

- a. Fall Semester
 - Continue Ph.D. research.
 - Attend departmental, interdisciplinary, and other seminars.
 - Perform student teaching, if required.
 - Participate in discipline-related journal clubs and lab research meetings.
 - Re-defend revised or new Comprehensive Examination proposal if initial defense during the Spring Semester was unsatisfactory.
- b. Spring Semester
 - Continue Ph.D. research.
 - Perform student teaching, if required.
 - Attend departmental, interdisciplinary, and other seminars.
 - Participate in discipline-related journal clubs and lab research meetings.
- c. Summer Session
 - Continue Ph.D. research.
- d. Annually
 - Submit APR/IDP to Ph.D. Committee and DGS.
 - Mandatory annual meeting with Ph.D. Committee.

Year Four

- a. Fall Semester
 - Continue Ph.D. research.
 - Attend departmental, interdisciplinary, and other seminars.
 - Perform student teaching, if required.
 - Participate in discipline-related journal clubs and lab research meetings.
- b. Spring Semester
 - Continue Ph.D. research.
 - Attend departmental, interdisciplinary, and other seminars.
 - Prepare a written outline of your dissertation.
 - Perform student teaching, if required.
 - Participate in discipline-related journal clubs and lab research meetings.
 - Attend special training sessions on computer-formatted dissertations.
- c. Summer Session
 - Continue Ph.D. research.
 - Begin writing thesis Introduction and Methods.
 - Participate in discipline-related journal clubs and lab research meetings.
- d. Annually
 - Submit APR/IDP to Ph.D. Committee and DGS.
 - Mandatory annual meeting with Ph.D. Committee.

Year Five

- a. Fall Semester
 - Continue Ph.D. research.
 - Attend departmental, interdisciplinary, and other seminars.
 - Perform student teaching; if year five is the last year of training, there will be no teaching responsibilities.
 - Review dissertation progress with mentor.
 - Participate in discipline-related journal clubs and lab research meetings.
- b. Spring Semester
 - Continue Ph.D. research.
 - Attend departmental, interdisciplinary, and other seminars.
 - Complete first draft of dissertation.
 - Participate in discipline-related journal clubs and lab research meetings.
- c. Summer Session
 - Complete and defend Ph.D. dissertation.
 - Participate in discipline-related journal clubs and lab research meetings.
- d. Annually
 - Submit APR/IDP to Ph.D. Committee and DGS.
 - Mandatory annual meeting with Ph.D. Committee.

Year Six - Special permission only

**FORM A: LAB ROTATION REPORT
Graduate Program in Microbiology**

Student Name _____

Date _____

Rotation Mentor _____

Research Topic _____

Description of Research Topic: _____

Average No. Hr/week = _____

Length of Rotation (weeks) = _____

Student Performance	Performance level:			
	<u>Excellent</u>	<u>Good</u>	<u>Adequate</u>	<u>Inadequate</u>
Knowledge of material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Research expertise at the beginning of the rotation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Research expertise at the end of the rotation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ability to function Independently	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Level of energy in attacking the problem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Level of research potential	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Logistic and financial issues aside, would you accept this student in your laboratory to pursue a Ph.D.? Yes No

Additional Notes: _____

By checking this box, I (the faculty mentor) indicate that I have met with the above-named student and discussed the contents of this Lab Rotation Report. Email a final copy of this report to DGS and give the printed form with signatures to the Microbiology Office.

Signed

Mentor

Student

Form B
Annual Progress Report/Individual Development Plan (APR/IDP)

Red areas to be completed by student

Predoctoral Student:

Date of entry into program:

PhD Advisor:

Latest Revision Date:

GRADUATION REQUIREMENTS

Coursework

- a. Graded courses completed (a minimum of 12 credits is required to graduate)**

Course Number, Name, Grade

Credits

_____ Total graded credits earned

- b. BMED:7270, Principles of Scholarly Integrity (required but no credits earned)**

Section 0001 (date completed):

Section 0002 (date completed):

- c. Credits of non-graded coursework (graduate student seminar, research, etc)**

Number of non-graded credits earned to date:

- d. Total credits earned (72 credits required to graduate)**

Add credits earned from sections a and b:

Comprehensive examination

Committee members:

First committee meeting – (Early January in 2nd year) – actual

date: Date of comprehensive examination:

Outcome of comprehensive examination:

Dissertation committee meetings

Committee members:

List dates of all committee meetings:

Student Self-Assessment of Skills (place a check mark in the column that applies):

Scholarship Skills	Needs Improvement	Competent	Proficient	Expert
Core science knowledge				
Laboratory skills				
Analytical skills				
Responsible conduct of research				
Manuscript writing and preparation				
Grant writing				
Overall productivity				

Professional Skills	Needs Improvement	Competent	Proficient	Expert
Teaching				
Communication				
Management				
Leadership				
Networking				
Teamwork				
Collaboration				
Interview skills				

Blue areas be completed by student and advisor comments in yellow boxes

1. Research / Scholarly Activity in the Past Year (Progress Review)
a. Brief overview of your research project & major accomplishments in the past year (250-300 words):
b. Publications:
c. Patents:
d. Honors/Awards (include fellowships with entire funding periods, grants written/applied for/received, professional society or meeting presentation awards or travel awards, etc.):
e. National or other professional meetings attended (include meeting title, oral or poster presentation):
f. Seminar Presentations (title, department):
g. New areas of research or technical expertise acquired in past year:
1. Advisor comments/suggestions – include guidance if adequate progress is being made; identify strengths and areas needing improvement.
2. Research and Other Training Plans (for the Upcoming Year)
a. Research project goals (brief paragraph):
b. Anticipated publications (indicate projected titles):
c. Anticipated meeting or workshop attendance:
d. Fellowship or other funding applications planned (indicate name of award):

e. Other professional training (course work, teaching activity):
2. Advisor comments – include input on realistic research goals to achieve in a reasonable time frame; include comments on feasibility and prioritizing.
3. Teaching Activity (Progress Review)
a. Oversight of graduate, undergraduate, or summer students (name, academic level, project title):
b. Course lectures (department, course name) or lab sections (section title, supervised/unsupervised):
3. Advisor comments – include guidance to help in identifying teaching opportunities; note if adequate progress is being made; identify strengths and areas needing improvement.
4. Other Professional Activities (Progress Review)
a. Committee or other service activity (indicate if you held an office):
b. Other activities (community, etc.) with professional relevance:
4. Advisor comments – include guidance on collegiality and contributing service while ensuring commitment to scholarly activity.
Part 5. Career Goals (for the Upcoming Year)
a. Current career goal(s):
1)
2)
b. What further research activity or other training is needed before graduation?
c. When do you plan to search for post-doctoral/job search?

5. Advisor comments – discuss career options and offer guidance on networking to assist in achieving his/her goals; identify other contacts who can help in this effort.

Sections below to be completed by Advisor/Dissertation Committee

Date of committee meeting:

Ph.D. Committee Evaluation of Student Progress

Scholarship Skills	Needs Improvement	Competent	Proficient	Expert
Core science knowledge				
Laboratory skills				
Analytical skills				
Responsible conduct of research				
Manuscript writing and preparation				
Grant writing				
Overall productivity				

PhD committee comments on student progress –

Committee Member	Exceptional	Satisfactory	Below Average	Unsatisfactory
1. (Chair).				
2.				
3.				
4.				
5.				
6. (Optional member)				

Instructions for Microbiology Annual Progress Report and IDP

... Students complete areas in red

Step 1. Conduct a Self-Assessment

- Assess your skills, strengths and areas which need development. Formal assessment tools can be helpful.
- Take a realistic look at your current abilities. This is a critical part of career planning. Ask your peers, mentors, family and friends what they see as your strengths and your development needs.
- Outline your long-term career objectives. Ask yourself: – What type of work would I like to be doing?
– Where would I like to be in an organization?
– What is important to me in a career?

Step 2. Survey Opportunities with Mentor

- Identify career opportunities and select from those that interest you.
- Identify developmental needs by comparing current skills and strengths with those needed for your career choice.
- Prioritize your developmental areas and discuss with your mentor how these should be addressed.

Step 3. Write an IDP

The IDP maps out the general path you want to take and helps match skills and strengths to your career choices. It is a changing document, since needs and goals will almost certainly evolve over time as a graduate student. The aim is to build upon current strengths and skills by identifying areas for development and providing a way to address these.

The specific objectives of a typical IDP are to:

- Establish effective benchmarks and target dates for the duration of your graduate training.
- Identify specific skills and strengths that you need to develop (based on discussions with your mentor).
- Define the approaches to obtain the specific skills and strengths (e.g., courses, technical skills, teaching, supervision) together with anticipated time frames.
- Discuss your draft IDP with your mentor.
- Revise the IDP as appropriate (e.g., annually).

Step 4. Implement Your Plan

The plan is just the beginning of the career development process and serves as the road map. Now it's time to take action!

- Put your plan into action.
- Revise and modify the plan as necessary. The plan is not cast in concrete; it must be modified as circumstances and goals change. The challenge of implementation is to remain flexible and open to change.
- Review the plan with your mentor *regularly*. Revise the plan *regularly* on the basis of these

... Advisor and Student work together to complete areas in blue

Step 1. Become familiar with available opportunities

- By virtue of your experience you should already have knowledge of some career opportunities.
- But you may want to familiarize yourself with other career opportunities and trends in job opportunities.
- Refer to sources such as National Research Council reports and *Science* career reviews; see also *Resources: Career Opportunities* at the end of this document.

Step 2. Discuss opportunities with postdoctoral

- This needs to be a private, scheduled meeting distinct from regular research-specific meetings.
- There should be adequate time set aside for an open and honest discussion.

Step 3. Review IDP and help revise

- Provide honest feedback, both positive and negative, to help graduate students set realistic goals.
- Agree on a development plan that will allow graduate students be productive in their research *and* adequately prepare them for their chosen career.

Step 4. Establish regular review of progress

- The mentor should meet at regular intervals with the student to assess progress, expectations and changing goals.
- On at least an annual basis, the mentor should conduct a performance review designed to analyze what has been accomplished and what needs to be done.
- A written review should be included to objectively document accomplishments.

... Advisor and PhD committee complete areas in green

Establish regular review of progress

- On at least an annual basis, the committee should conduct a performance review designed to analyze what has been accomplished and what needs to be done.
- Provide a written review to objectively document accomplishments and plans for upcoming year

FORM C: STUDENT TEACHING EVALUATION

Department of Microbiology and Immunology

Student Name

Date

Course Coordinator

Course

Approximate Number of Students:

Lecture:

Lab:

Duties for the Teaching Assistant:

For Lecture:

For Lab:

Performance level:

Student Performance	Excellent	Good	Adequate	Inadequate
Knowledge of material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preparation of material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lecture performance (NA if none given)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ability to facilitate student learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ability to function independently	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall aid to the course instructor(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional Evaluation Comments:

Suggestions to Improve Performance:

FORM D: PERMISSION TO SCHEDULE DISSERTATION DEFENSE

Department of Microbiology and Immunology

Student Name

Date of last committee meeting

Date of first author research article acceptance

Proposed Defense date

Committee Chair

Committee Members
