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Programs

Handbook
for Graduate Studies
in Microbiology



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This handbook was prepared by the Graduate Studies Committee and approved by the faculty. It is intended to supplement, **NOT** replace, the official Handbook of the Graduate School.

Microbiology Graduate Studies Handbook
Department of Microbiology, Miami University, Oxford, Ohio
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INTRODUCTION

The Department of Microbiology offers research-based graduate programs leading to the Master's and Doctoral degrees. Opportunities are provided for students to pursue research and to engage in graduate-level course work in a broad variety of disciplines in microbiology. The goal of these experiences is to prepare students for professional careers in teaching and/or research.

The Master's degree program is intended to provide students with formal course training in the fundamental disciplines of microbiology, and an opportunity to pursue a research project leading to a thesis, normally to be completed in the second year of study. Students completing this degree may continue study for the doctoral degree.

The Doctoral degree program is intended to be a rigorous academic experience in which the student's knowledge in the discipline is expanded by advanced graduate-level course work, and the completion of an original research project leading to a dissertation. A student may enter doctoral studies after completion of a Master's degree in an appropriate discipline, or with a baccalaureate after completion of 30 credit hours within our Master's program.

The following requirements and procedures of the department are supplemental to the published requirements of the Graduate School. Final responsibility for compliance with the formal procedures required for the Master's or Doctoral degree rests with the student.

ADMISSION TO THE PROGRAM

Admission to the graduate program is competitive, and based on an evaluation of each applicant by the Graduate Admissions Committee of the department, provisional acceptance by the potential advisor, and final approval by the departmental faculty. Selection will be based on (a) scholastic record in undergraduate and graduate courses; (b) a written statement of professional goals, area of research interest, and the reasons for wanting to enter our program; (c) three letters of recommendation from persons familiar with the student's academic performance (formal letters may not be required for internal candidates); (d) scores on the Graduate Record Examination; and (e) TOEFL scores for international students. Candidates may be asked for an interview by the Graduate Admissions Committee and the potential advisor.

GRADUATE ASSISTANTSHIPS AND TEACHING ASSOCIATESHIPS

Graduate Assistantships and Teaching Associateships are awarded to those applicants having potential to contribute to the instruction and preparation of materials in microbiology laboratory courses. The award is made on the basis of the student's academic record, Graduate Record Examination scores, TOEFL scores, letters of recommendation, and previous experience in laboratory courses or research. When appropriate, a personal interview with the student is also recommended. The Graduate Admissions Committee, after reviewing the credentials of each student, will recommend qualified candidates to the faculty. Approval by a majority of the faculty will be required for awarding each Assistantship or Associateship. Students entering with a baccalaureate will be appointed to Graduate Assistantships. Students accepted into the doctoral program will be appointed as a Teaching Associates (TA).

Each student may apply for renewal of the award for the subsequent years in residence. Decision for renewal will be made by a majority of the faculty based on the student/course evaluations of teaching performance, and evaluation by the faculty member directing the course in which the student assisted.

REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN MICROBIOLOGY

1. **Course Requirements.** The degree of Master of Science in Microbiology requires a minimum of 30 semester hours in graduate credits. Students must complete or demonstrate proficiency in four courses which must be chosen, one each from groups I-IV listed below:

<p>I. Infection and Immunity Pathogenic Microbiology (MBI 505), Immunology Principles (MBI 514), Immunology Principles and Practice (MBI 515), or Medical Mycology (MBI 535)</p>
<p>II. Physiology and Ecology Microbial Physiology (MBI 525) or Microbial Ecology (MBI 575)</p>
<p>III. Genetics and Molecular Biology Microbial Genetics (MBI 545), Advanced Molecular Biology (MBI 605), or Bioinformatics (MBI 585)</p>
<p>IV. Virology and Cell Biology Virology (MBI 564), Advanced Cell Biology (MBI 606), or Bacterial Cell Biology (MBI 595)</p>
<p>V. Electives Biochemistry (CHM 533), Electron Microscopy (BOT 481/482 or 481/483), Biological Instrumentation (MBI 524), Microbial and Molecular Genetics Lab (MBI 565), Statistics (STA 671, IES 612, or STA 573/576), Biological Science Education (BOT 688), or others</p>

Master's students must also fulfill the following requirements:

- a minimum of four hours of didactic courses (600 level or above)
- Graduate Seminar (MBI 690) every semester.

In MBI 690, the student is required to give a research seminar only once per year. Instead of giving a second seminar during the year, the students must take a literature-intensive course (MBI 650, MBI 750, or MBI 500-level courses that include a journal club) in which they present research from the primary literature (first-year students may be excused from this requirement their first semester if their 500 level courses do not include a journal club). MBI 690 may be taken credit/no credit, or optionally, for a regular grade during semesters in which the student presents their research.

Additional course work may be recommended by the student's major advisor or the Thesis Committee. Courses from Group V are not required by the department, but students should note that courses such as Biochemistry and Statistics may be fundamental to their discipline of study and they may therefore be requested to take these courses by their thesis committee. Students and their committees are also urged to consider the benefits of taking education, instrumentation, and/or techniques courses that may enhance their career and research goals. A student must have a scholastic average of 3.0 in all course work to be eligible for a graduate degree in microbiology.

2. **Laboratory Rotations and Choice of Major Advisor.** During the first month of residence the research interests of the faculty will be formally presented to the students, and following the presentations each student will choose three research programs through which he or she will rotate for **two weeks in each** (for a total of one hour MBI 710 credit). The Director of Graduate Studies will arrange the dates of the rotations with the faculty. The student will then select a thesis advisor after consultation with the appropriate faculty member, the Director of Graduate Studies and the

Department Chair. A student will be accepted into a research program only with the consent of the appropriate faculty member. A faculty member may decide not to accept a student for reasons that do not reflect on the student, for example, limitations of laboratory space or facilities. The advisor should be selected before the end of the student's first semester in residence, and the Director of Graduate Studies and Department Chair should be immediately notified of the selection.

3. **Preparation and Presentation of Thesis Proposal.** The student will write a brief research proposal (no more than 10 double-spaced pages in a font with no more than 12 characters per inch) and present it orally for approval by a Thesis Committee **no later than the end of Summer Term III following the first academic year**. The Thesis Committee will be composed of three departmental faculty members (with an optional member from another department) and the membership will be determined by the student in consultation with the advisor.
4. **Thesis Committee Meetings.** The committee will meet with the student within six months of the presentation of the Thesis Proposal in order to monitor progress and provide advice. The student will provide a two-page summary outlining progress made to date, and future directions for the research project. The student will give a 15-minute presentation of research data and the meeting should last no longer than one hour. The committee will help determine when the student is ready to write the thesis. A written record of the committee's recommendations and the project's future directions will be generated by the student and the advisor, signed by all the members of the Thesis Committee, and placed in the student's file in the departmental office.
5. **Thesis Defense.** All students are required to present themselves for a final oral thesis defense following a formal presentation of their research. The defense will be held **at least one week in advance of the final date for thesis approval by the Graduate School**. The penultimate draft of the thesis will be submitted to the Reader **no later than 30 calendar days before the date of the defense**. The Reader will review the penultimate draft once, before returning it (**within 15 calendar days**) to the student and the major advisor for their consideration of the suggested revisions. The final draft must be in the hands of the other members of the Thesis Committee no later than **seven calendar days before the date of the defense**. The date, time and place of the defense will be posted in the departmental office at that time. Any additional revisions suggested by the committee at the Defense will be implemented at the discretion of the advisor and the student.

Students unable to comply with these time requirements will have their graduations deferred until the following semester.

6. **Required Form.** The form required by the Graduate School, [GS FORM D-6: Certificate for Awarding the Master's Degree](#), must be signed by the members of the Thesis Committee and submitted to the Dean of the Graduate School **at least 10 working days before Commencement**. A copy of the form is included in Appendix I; the pdf version should be obtained from <http://www.units.muohio.edu/gradschool/>.

RECOMMENDED TIME-LINE FOR COMPLETION OF M.S. DEGREE

Fall

- Students enter Program as GAs.
- GAs must register for at least 10 (but no more than 14) graduate credit hours, including Graduate Seminar (Advanced Cell Biology, Biochemistry I, Immunology, Medical Mycology, Microbial Physiology, and Microbial Genetics are usually offered in the Fall Semester).
- Attend Faculty Research Presentations and perform Laboratory Rotations (three).

December:

- Students choose Major Advisor, and notify the Director of Graduate Studies and the Department Chair

Spring

- GAs must register for at least 10 (but no more than 14) graduate credit hours, including Graduate Seminar (Advanced Molecular Biology, Biochemistry II, Pathogenic Microbiology, Microbial Ecology and Virology are usually offered in the Spring Semester).

Summer I

- GAs must register for 12 graduate credit hours.

Summer III

- Discuss plan of study with Thesis Committee. Complete [plan of study checklist](#) and submit to the chair of the Graduate Advancement Committee.
- Prepare and present a Thesis Proposal to the Thesis Committee for its approval, by no later than the last week of Summer Term III.

Fall

- GAs must register for at least 10 (but no more than 14) graduate credit hours, including Graduate Seminar.

Spring

- GAs must register for at least 10 (but no more than 14) graduate credit hours, including Graduate Seminar.

January/February:

- Meet with Thesis Committee for Progress Report.

Summer I

- GAs must register for at least 12 graduate credit hours.

Summer III

July:

- Schedule Thesis Defense date with committee, have completed final draft to committee members **seven calendar days before the defense**. Post notice of defense in the departmental office.
 - [GS FORM D-6](#) sent to the graduate school **at least 10 working days** prior to commencement

August: Graduate

REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN MICROBIOLOGY

- 1. Course Requirements.** The degree of Doctor of Philosophy in Microbiology requires a minimum of 60 semester hours in graduate credits beyond the M.S. degree or its equivalent (30 semester hours).

Doctoral students must also fulfill the following requirements:

- a minimum of nine hours of didactic courses (600 level or above)
- Graduate Seminar (MBI 690) or Molecular Biology Seminar (MBI 650) every semester

In MBI 690, the student is required to give a research seminar only once per year. Instead of giving a second seminar during the year, the student must take a literature-intensive course (MBI 650, MBI 750, or MBI 500-level courses that include a journal club) in which they present research from the primary literature (first-year students may be excused from this requirement their first semester if their 500 level courses do not include a journal club). MBI 690 may be taken credit/no credit, or optionally, for a regular grade during semesters in which the student presents their research.

Additional course work may be recommended by the student's major advisor or the Dissertation Committee. Courses from Group V are not required by the department, but students should note that courses such as Biochemistry and Statistics may be fundamental to their discipline of study and they may therefore be requested to take these courses by their thesis/dissertation committee. Students and their committees are also urged to consider the benefits of taking education, instrumentation, and/or techniques courses that may enhance their career and research goals. A student must have a scholastic average of 3.0 in all course work to be eligible for a graduate degree in microbiology.

Students entering with a baccalaureate degree must complete courses as stated for the M.S. degree program as part of the 30-hour requirement to meet the equivalency of the M.S. degree (see page 3).

- 2. Laboratory Rotations, Choice of Major Advisor, and Establishment of the Dissertation Committee.** During the first month of residence the research interests of the faculty will be formally presented to the students, and following the presentations each student will choose three research programs through which he or she will rotate for two weeks in each (for a total of one hour MBI 710 credit). The Director of Graduate Studies will arrange the dates of the rotations with the faculty. The student will then select a major advisor (Dissertation Director), after consultation with the appropriate faculty member, the Director of Graduate Studies and the Department Chair. A student will be accepted into a research program only with the consent of the appropriate faculty member. A faculty member may decide not to accept a student for reasons that do not reflect on the student, for example, limitations of laboratory space or facilities. The major advisor (Dissertation Director) should be selected before the end of the student's first semester in residence, and the Director of Graduate Studies and the Department Chair should be immediately notified of the selection.

Students should arrange to have a Dissertation Committee meeting during Summer I following their first academic year. The purpose of this meeting will be to review the student's current and planned coursework, and will give the Dissertation Committee the opportunity to suggest courses to appropriately train the student for their research project and prepare for the comprehensive exam. The composition of the Dissertation Committee will be determined by the student in consultation with the major advisor. The Dissertation Committee must include the student's major advisor, three additional

faculty members from the department, and a Graduate School representative from outside the department. The major advisor will be the chair of the Dissertation Committee.

- 3. Comprehensive Examinations.** All Ph.D. candidates will complete a total of 22 hours of course work at the graduate level (500 or above) including six hours at the 600/700 level before taking their comprehensive examinations. The comprehensive exam consists of both written and oral components. The written component includes the Written Comprehensive Exam (WCE), and a grant proposal written by the student on a topic different from his/her dissertation research. The student will defend this proposal during the Oral Comprehensive Exam (OCE). A timeline for completion of the comprehensive exam and further explanation of each component is given below:

Time-Line for Comprehensive Exams

During Summer I, but no later than the 3rd week of the Fall semester	Dissertation committee meeting Choose chair for the OCE Pre-proposal approved for OCE Complete GS form D-1 and submit to grad school
5th week of the Fall semester (Saturday)	Written Comprehensive Exam
6th week of the Fall semester (Friday)	Scores on written questions returned
11th week of the Fall semester	Proposal submitted to committee
13th week of the Fall semester (before Thanksgiving break)	Oral Comprehensive Exam Complete GS form D-2 and submit to grad school

Dissertation Committee meeting and approval of the student's pre-proposal for the OCE. Students will convene a meeting of their Dissertation Committee, preferably during the summer prior to the fall semester during which the comprehensive exam will be taken, but no later than the 3rd week of that semester. The chair of the OCE will be selected from the departmental committee members other than the major advisor, and the choice is subject to approval by the Director of Graduate Studies. **It is the responsibility of the student to verify the availability of the selected Graduate School Representative, to complete GS Form D-1 and submit it to the Dean of the Graduate School** (with copies to each of the members of the committee) **following this meeting.** Students and their Committee members will discuss a pre-proposal for the grant proposal they expect to write and then defend during the OCE. Students are expected to go through the process of defining and developing an investigative approach for a novel research problem outside the purview of their previous research experience. Therefore the topic chosen should be different from their own (including undergraduate or master's research as well as their current dissertation research) or their advisor's research, and should be different from topics the student has extensively researched for other grant proposals or research intensive papers written for specific classes. In addition, the student should choose an organism different from the one used in his or her research, and the approach to the

investigation must also be different. Prior to the pre-proposal meeting, students should discuss potential topics with their committee members to identify an appropriate topic. Ultimately, the committee shall decide whether the proposed investigation is different enough from the student's current and previous research experience to be considered independent. Students should prepare a 2-3 page pre-proposal for their committee that includes a brief summary of the rationale and background information for the proposal, a statement of the hypothesis to be tested, and two to three specific aims that will be addressed in the proposal. This pre-proposal should be given to each committee member at least one week prior to the meeting during which the committee will decide whether to approve the topic and specific aims (Summer I - 3rd week of Fall semester). Students are encouraged to consider carefully the rationale and logic for each specific aim, as well as the possible results and interpretations of the planned experiments when they prepare to discuss the pre-proposal with their committee.

Written Comprehensive Exam (WCE). The purpose of the WCE is to determine if the student has an adequate knowledge and understanding of the science of microbiology in general and of those specialty areas that relate to his or her research interests and activities. Although a general knowledge of microbiology and associated disciplines will be required, the purpose of the examination shall be to challenge the ability of the student to marshal facts and arguments, to support or formulate hypotheses, or to pursue experimentally a phenomenon or observation. These thought-provoking, problem-solving types of questions are most appropriate for evaluating and fostering the necessary qualities of a doctoral candidate. The student's course work and seminar/journal club participation will have prepared him or her for meeting the requirements of the examination in regard to general knowledge.

Because of the diverse nature of Microbiology and our desire for a broadly trained PhD, students will be examined in all four areas of the course groupings (below) in which they have had training. Each student will choose **one MBI course from each of the four course groupings**, and **two additional MBI courses** from any of the four course groupings in which to be examined:

<p>I. Infection and Immunity Pathogenic Microbiology (MBI 505), Immunology (MBI 514), or Medical Mycology (MBI 535)</p>
<p>II. Physiology and Ecology Microbial Physiology (MBI 525) or Microbial Ecology (MBI 575)</p>
<p>III. Genetics and Molecular Biology Microbial Genetics (MBI 545), Advanced Molecular Biology (MBI 605), or Bioinformatics (MBI 585)</p>
<p>IV. Virology and Cell Biology Virology (MBI 564), Advanced Cell Biology (MBI 606), or Bacterial Cell Biology (MBI 595)</p>

This will limit student preparation for the WCE to **no more** than six courses thereby allowing them to focus their efforts and still achieve a reasonable breadth of training.

Faculty members will submit questions to examine students in the courses they have selected. The Graduate Advancement Committee (GAC) will select two questions for each course topic chosen by

the student to prepare the exam. Thus, each student will receive a personalized exam based on the course topics chosen, however, all students who choose to be examined in a topic area will receive the same pair of questions for this topic. Exam questions will address important concepts from the courses the students took to prepare for the examination, and the level of difficulty will be no greater than that experienced by the students in the course. Students will select one question from each pair of questions addressing their chosen topics, and answer those questions on one day (9am-5pm).

The identity of both faculty and students will remain unknown until after the exams are scored. Two faculty members will grade each question on a pass/fail basis, with an 80% score considered equivalent to a passing grade. In the event that faculty members disagree, they will meet and try to arrive at a consensus. If no consensus is achieved, a third faculty member will grade the exam. To pass this portion of the written exam, the student must earn a passing grade on **four** of the questions that were answered.

In the event that the student does not receive a passing grade on at least four questions, he or she will have only one opportunity to be retested, during the following semester, on the deficient topic areas.

Once the student has passed the previous portion of the WCE, he or she will complete the exam by submitting his or her written grant proposal. The grant proposal will follow [Kirschstein-NRSA postdoctoral fellowship guidelines](#), and be prepared on a topic chosen by the student but approved by the student's examination (dissertation) committee. Faculty will be encouraged to make their proposals available to the students as examples. Students may seek advice from other scientists during the preparation of their proposals, but must refrain from seeking specific advice from their dissertation committee members or major professors.

The proposal should be well formulated and presented in sufficient detail that it can be evaluated for both its research training potential and scientific merit. It is to be written entirely by the student. It should include sufficient information to permit an effective review without committee members having to refer to the literature or any previous application. Brevity and clarity in the presentation will be considered indicative of a student's approach and ability to conduct a superior project. Sections (1) through (3) of this proposal are not to exceed 10 pages, including all tables and figures. Follow the format below:

1. Specific Aims

The proposal should be hypothesis driven and contain two to three specific aims that will be developed by the student assuming a 3-year period of funding, and one investigator. State the specific purposes of the research proposal and the hypotheses to be tested.

2. Background and Significance

Sketch briefly the background to the proposal. State concisely the importance of the research described in this application by relating the specific aims to broad, long-term objectives. Include a statement that describes the intellectual merit of the proposed work in the context of what is to be learned.

3. Research Design and Methods

The proposal should describe the rationale for the experiments proposed to test the hypotheses. The research plan should include detailed descriptions of experiments that will test the stated hypotheses and answer the respective questions. The proposal should discuss potential experimental difficulties associated with the experimental approach proposed together with alternative approaches that could achieve the desired aims. The student needs to state what is expected from each specific aim and how the proposed work will move the selected topic forward.

4. Timeline and Budget

Inasmuch as postdoctoral research proposals for fellowships are more limited in scope and budget, prepare an appropriate timeline for the proposed research, and be prepared to defend the need for particularly expensive analyses or items.

5. Literature Cited

List all literature references. Each reference must include the title, names of all authors, book or journal, volume number, page numbers, and year of publication. The reference should be limited to relevant and current literature. While there is no page limitation, it is important to be selective - use only those literature references pertinent to the proposed research.

Students should plan to spend about one month writing the proposal and significant additional time intensively reviewing course work and reviewing appropriate scientific literature that will prepare them for the oral defense of the proposal.

Oral Comprehensive Exam (OCE). The OCE will be an oral defense of the student's written grant proposal to their examination committee. The student is expected to know, at a minimum, the scientific basis of the proposed experiments, but should also be competent to discuss all aspects of the proposed research. The criteria used by the committee to render a decision include an assessment of the candidate's ability to identify an important research problem, knowledge in the chosen area of interest and related areas, ability to design experiments for the solution of the problem and effective communication of these ideas both orally and in writing. The OCE Committee may also choose to revisit questions asked on the student's WCE, particularly if there were any questions not answered in a totally satisfactory manner.

In arriving at a decision, the oral examination committee will evaluate the student's performance on the written proposal, seminar presentation and closed questioning. Three outcomes are possible:

- 1. PASS** - The student is thus admitted to official Ph.D. candidacy.
- 2. NOT PASS** - If the examination committee decides that the student's performance does not merit a passing grade, they must then decide between the following two options.
 - A. DELAY** - If the examination committee can identify a deficiency in the student's performance that is believed to be correctable within a reasonably short period of time, it will attempt to detail, both verbally and in a letter to the student, the nature of the problem(s) and the requirements for successful remediation. A time limit, not to exceed four months, will be set. If, in the opinion of the committee, the student fails to adequately remediate the deficiency in the specified time frame, the student will be recommended for dismissal from

the doctoral program. If the student is judged to have remediated it successfully, the student will then have passed the exam. Situations that may warrant a “DELAY” include: (i) a serious pitfall in an otherwise satisfactory proposal that can be remedied by revision of an experimental design or method of analysis; (ii) the failure to recognize, deal with or interpret a likely alternative outcome(s) of an experiment and its implication; (iii) a poorly written or poorly documented section of the proposal requiring substantial revision; and (iv) the lack of sufficient understanding of a method of data acquisition (e.g. an assay procedure) or analysis (e.g. appropriate statistical method) viewed as a critical component of the research. The “DELAY” should not be used to remedy a serious deficiency in fundamental knowledge that should have been attained by the student through required coursework.

- B. FAIL** - If this decision is reached, no remediation is available and the student will be recommended for dismissal from the doctoral program. The student may continue toward an M.S. degree only if they do not already hold an equivalent M.S. degree.

According to University requirements, there can be no more than one dissenting vote for the student to pass the examination. The department also requires no more than one dissenting vote to fail the examination, or to have the outcome delayed.

Students who fail the OCE may be allowed to retake the OCE once, no earlier than the following semester, and no later than four months from the date of the OCE. The chair of the OCE is responsible for communicating the results of the exam and submitting a completed [GS form D-2](#) form to the chair of the GAC, who will then be responsible for submitting the form to the Graduate School. **The student is, however, responsible for bringing [GS form D-2](#) to the OCE with appropriate information entered.** Students who pass the WCE and the OCE will proceed with the Ph.D. Program. Students who fail the WCE (after two attempts, or pass the WCE but fail the OCE, may petition for entry into the M.S. Program.

Students will be expected to perform their normal teaching and research duties during the weeks preceding the comprehensive examinations.

4. **Preparation and Presentation of Dissertation Prospectus.** After passing the comprehensive exams, the doctoral student will write and submit a research proposal and present it orally for approval by the Dissertation Committee **by no later than the end of the Spring semester of the third academic year.** The format should follow the style of NIH or NSF proposals, and the text should not exceed 10 double-spaced pages.
5. **Dissertation Committee Meetings.** The committee will meet with the student every six months in order to monitor progress and provide advice. The student will provide a two-page summary outlining progress made-to-date, and future directions for the research project. The student will give a 15-minute presentation of research data and the meeting should last no longer than one hour. The committee will help determine when the student is ready to write the dissertation. A written record of the committee’s recommendations and the project’s future directions will be generated by the student and the major advisor, signed by all the members of the Dissertation Committee, and placed in the student’s file in the departmental office.

6. **Teaching Experience.** In addition to laboratory teaching responsibilities, each student must teach one semester of an introductory lecture course in microbiology under the supervision of a member of the microbiology faculty.
7. **Dissertation Defense.** Each candidate must demonstrate the ability for independent research by completing an original research project and writing a dissertation based upon that research. The candidate must defend the dissertation before the Dissertation Committee in an open examination following a formal seminar to the department. Two members of the Dissertation Committee will be selected as Readers by the student and the major advisor. The penultimate draft of the dissertation will be submitted to the Readers no later than **30 calendar days before the date of the Dissertation Defense**. The Readers will review the penultimate draft once, before returning it (**within 15 calendar days**) to the student and the major advisor for their consideration of the suggested revisions. The final draft must be in the hands of the other members of the Dissertation Committee no later than **seven calendar days before the date of the Dissertation Defense**. Any additional revisions suggested by the committee at the defense will be implemented at the discretion of the major advisor and the student. The dissertation will be approved by the Dissertation Committee on the basis of its value as an original contribution to a specific discipline of microbiology. Evidence of the originality of this contribution should be provided by presentation of the results at a professional scientific meeting at the national level, and submission of a manuscript for publication in a refereed journal before the defense.
8. **Required Forms.** The following forms are required by the Graduate School for completion of the Doctoral Degree (copies are included in Appendix I; the pdf versions should be obtained from <http://www.units.muohio.edu/gradschool/>):

GS FORM D-1: *Request for Appointment of Doctoral Comprehensive Examination Committee* must be submitted to the Dean of the Graduate School **at least 10 working days before the date of the examination**.

GS FORM D-2: *Results of the Comprehensive Examination for the Doctoral Degree and Application for Candidacy* must be promptly given to the **Chair of the GAC by the chair of the OCE**. The **Chair of the GAC** will then return the form to the Dean of the Graduate School. It is **NOT** the responsibility of the student to return this form, but it **IS** the responsibility of the student to bring the form to the oral comprehensive examination.

GS FORM D-3: *Request for Appointment of Doctoral Final Examination (Dissertation) Committee* must be submitted to the Dean of the Graduate School **at least 10 working days before the date of the oral presentation of the Dissertation Prospectus**.

GS FORM D-4: *Results of Final Examination and Certificate for Awarding the Doctoral Degree* must be returned to the Dean of the Graduate School by the **Chair of the Final Examination (Dissertation) Committee at least 10 working days before Commencement**. It is **NOT** the responsibility of the student to return this form, but it **IS** the responsibility of the student to bring the form to the Dissertation Defense.

Except where noted, it is the student's responsibility to have the forms signed and delivered to the Graduate School at the appropriate times.

TIME-LINE FOR PH.D. DEGREE

Year 1

Fall

- Students enter Program as GAs. Students with M.S. degrees (or equivalent) enter Program as TAs.
- GAs and TAs must register for at least 10 (but no more than 14) graduate credit hours, including Graduate Seminar (Note that Advanced Cell Biology, Biochemistry I, Immunology, Medical Mycology, Microbial Physiology, and Microbial Genetics are usually offered in the Fall Semester).
- Attend Faculty Research Presentations and perform Laboratory Rotations (three).

December 1:

- Students choose Major Advisor, and notify Graduate Studies Director and the Department Chair.

Spring

- GAs and TAs must register for at least 10 (but no more than 14) graduate credit hours, including Graduate Seminar (Advanced Molecular Biology, Microbial Ecology, Biochemistry II, Pathogenic Microbiology, and Virology are usually offered in the Spring Semester)
- Request appointment as TAs for Fall.

Summer

- GAs and TAs must register for 12 graduate credit hours (Summer I).
- GAs petition to enter the Ph.D. program and become TAs.
- Students establish and meet with Dissertation Committee to discuss their plan of study. Complete [plan of study checklist](#) and submit to the chair of the GAC.

Year 2

Fall

- TAs must register for at least 10 (but no more than 14) graduate credit hours including Graduate Seminar.

Spring

- TAs must register for at least 10 graduate credit hours, including Graduate Seminar, and for every semester thereafter.

Summer

- TAs must register for 12 graduate credit hours, and for every summer thereafter (Summer I).
- Student meets with Dissertation Committee for approval of pre-proposal (topic and specific aims) for the grant proposal for their Oral Comprehensive Exam. [GS FORM D-1](#) is submitted to the Dean of the Graduate School.
- Students must convey their choice of course topics on which they will be examined during the WCE to the chair of the GAC on or before the start date of Fall classes.

Year 3

Fall

- Doctoral students take their comprehensive exams
- 3rd week:**
 - Deadline for Grant Proposal topic and specific aims approval
- 5th week:**
 - Written Comprehensive Exam
- 6th week:**
 - Scores on written exams will be returned
- 11th week:**
 - Grant Proposal must be submitted to their Examination Committee
- 13th week:**
 - Oral Comprehensive Exam
 - [GS FORM D-2](#) submitted to the Chair of the GAC

Spring

- Meet with Dissertation committee to present Research Prospectus for approval

Year 4 and subsequent

Fall

- Meet with Dissertation Committee, and every six months thereafter

Dissertation Defense

- [GS FORM D-3](#) submitted to the Dean of the Graduate School **at least 10 working days** before date of defense
- submit penultimate draft of dissertation to readers 30 days before the date of defense
- draft returned to student 15 days before the date of the defense
- final draft given to dissertation committee 7 days prior to the date of the defense
- [GS FORM D-4](#) sent to the Dean of the Graduate School by the Chair of the Dissertation Committee **at least 10 working days** before Commencement

FINANCIAL RESPONSIBILITIES OF THE STUDENT

In addition to the fees imposed by the University, the following items will be the financial responsibility of the student:

1. Personal notebooks, texts required for courses and personal computer supplies. [Laboratory notebooks will be supplied by the major advisor.]
2. Typing of thesis or dissertation drafts and final preparation, including the cost of bond paper, laser printing, photocopying and binding. [The cost of photographs and slides of figures and tables in the thesis or dissertation will be covered by the research funds of the major advisor. The cost of binding two copies of the thesis or dissertation - one for the major advisor and one for the departmental library - will be met by the department.]
3. Costs of travel to meetings (in excess of the amount offered by the department).

TERMINATION FROM THE GRADUATE PROGRAM IN MICROBIOLOGY

1. **Academic Performance.** Although prime emphasis in the training of graduate students is placed on research, a student is unlikely to succeed in the Microbiology Graduate Program if he or she is unable to master the basic microbiological disciplines. Accordingly, earning a grade of less than “B-” or “S” in two microbiology courses, or earning a grade lower than “C-” in any course shall be grounds for dismissal from the graduate program.

The student’s performance in formal course work will be reviewed at the end of each semester by the Department Chair. In addition, the GSC will annually review the progress of each student toward completion of the degree. Criteria for determining progress will include satisfactory performance in formal course work and satisfactory progress in directed research evaluated by the student’s major advisor and the members of the Thesis or Dissertation Committees.

2. **Professional Responsibilities.** It is the obligation of each graduate student to meet specific deadlines and to fulfill all requirements for the degree. In addition, all graduate students are expected to share in the responsibility for the care and protection of departmental resources, satisfactory execution of assigned duties, and professional interaction with colleagues.

Should there be any deficiency in, violation of, or failure to comply with the areas described above, it will be reported to GSC members who will, with the student’s major advisor, investigate and evaluate the allegations. The GSC may then recommend appropriate action. If dismissal is recommended, a report will be submitted to the faculty of the department. Dismissal will be effected only after approval by a majority of the faculty. Appeal of the decision to dismiss may be initiated by the student through the departmental Grievance Committee.