



# Microbiology and Molecular Genetics Graduate Program Guidelines

To provide an environment of scholarship, integrity, and research and teaching excellence that will assist students in acquiring the knowledge and skills necessary to excel as professional scientists and educators.

## Overview

The Microbiology and Molecular Genetics Graduate Programs (MS and PhD) strive to admit academically strong students and educate them for a successful career in science. To achieve these goals, both didactic course work and a publishable, peer-reviewed research component are required for graduation.

## Admission

Admissions are made through the OSU Graduate College with referral to the Microbiology & Molecular Genetics Department. The OSU Graduate College guidelines are to be followed for admissions. The Microbiology & Molecular Genetics Department accepts applications until January 15th of each year, and all admissions are made for the Fall semester. To be considered and ranked for admission, we study applicants' GPAs (undergraduate and/or Master's), GRE scores, and recommendation letters (at least 3). Offers of acceptance are made in April, and students are to be present to join the Graduate Program in August. International students need to submit a TOEFL and, upon arrival, pass the ITA and TELP tests. New students will receive a Departmental Assistantship until they are accepted into a suitable research program.

## MS and PhD Requirements

### A. Prior to Choosing a Thesis Advisor

1. In the first semester, the graduate coordinator, along with the graduate committee members, will determine the classes that students are to enroll in. Once an advisor has been chosen, the course and research plans are to be decided with the advisor.
2. Students are required to choose an advisor by the conclusion of their first semester. Students are expected to interact with various faculty members of the department and explore the possibility of joining their laboratory of interest. Joining a research group is an important milestone, and any delay will negatively impact the overall progress of the student.
3. At the end of the semester, students convene with potential faculty, indicating them as scientific advisors. The collaborative agreement between a student and an advisor needs to be forwarded to the Graduate Coordinator.

### B. After Choosing a Thesis Advisor

1. All students must formulate a thesis committee (see timetable for MS and PhD thesis committees below). For Master's students, the committee must have at least 3 members, a majority of whom should be members of the Graduate Faculty in Microbiology (excluding Adjunct Faculty). For PhD students, the committee must have at least 5 members, with at least one member from outside the department of Microbiology and Molecular Genetics. Once a student has established a

thesis/dissertation committee, they are required to meet with 1 their committee at least once every calendar year. Students are strongly encouraged to schedule such meetings during one of the following four time blocks: Dead week of the Fall semester, dead week of the Spring semester, last week before classes start in the Spring semester, and last week before classes start in the Fall semester.

2. It is the student's responsibility to arrange these meetings. Committee members are strongly encouraged to collectively discuss the research progress of the student and if needed, recommend to the student's advisor a letter grade for research courses (MICR 5000 or MICR 6000). The committee will receive an updated copy of the MS/PhD. calendar/checklist, as well as a research and coursework update from the graduate student prior to each meeting. Following each committee meeting, the student and their mentor will prepare the student's goals and a brief summary of the discussion sections of the Thesis/Dissertation Committee Meeting Report form. This prepared form will then be made available for each thesis/dissertation committee member to sign/edit. Committee members will note on the form whether the student's coursework has been satisfactory (S) or unsatisfactory (U) and whether their research progress has been satisfactory (RS) or unsatisfactory (RU), and sign their name. This form will be attached to the completed copy of the checklist, and a copy sent to the student and to the Graduate Program Committee within one week following the meeting.
3. If the progress of any student is deemed unsatisfactory in either coursework or research progress by a majority of the thesis/dissertation committee, the student shall be placed on probationary status. The Graduate Program Committee will then notify the student of their probationary status in writing. Should the student's coursework or research progress be deemed unsatisfactory at the next committee meeting by a majority of the thesis/dissertation committee members, the student will be dismissed from the program. This decision will require a written notification to be made to the student by the committee within 2 weeks of the committee meeting.

## Required Coursework

### A. MS Degree

Requirements for the MS degree at Oklahoma State University are 30 credit hours. This includes thesis research for which a minimum of 10 credit hours will be given as MICRO 5000. A minimum of 17 additional hours must be taken at the 5000 level or above. Of these hours, 11 must have MICRO prefixes and be non-zero ending. At least 6 additional hours of coursework at the 5000 level or above can include courses with major and non-major prefixes (also non-zero ending). An additional 3 hours of zero-ending courses are required, 2 hours from Journal Club (MICR6120) and 1 hour from the microbiology seminar series (MICR5160). The student's thesis committee must approve any deviations from these requirements. See Table 1.

**Table 1.** Hours required for an MS Degree in Microbiology and Molecular Genetics

Course Type	Minimum # Hours Required for MS Degree	Maximum Hours Allowed Toward Degree
MICR 5000 <sup>1</sup>	10	20
MICR Prefix 5000 and Above (non-zero ending) <sup>2</sup>	11	N/A
MICR and Other <sup>1</sup> prefix <sup>2</sup>	6	N/A
MICR 6120 <sup>3</sup>	2	N/A
MICR 5160 <sup>4</sup>	1	N/A

Total	30	N/A
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<sup>1</sup> Thesis hours may include MICR and prefixes from other departments on campus as long as they are 5000 and above (non-zero ending) and approved by the thesis committee. See the suggested list below.

<sup>2</sup> 4000-level courses where graduate credit is/was given by this (previously) and other departments must be approved by the student's graduate committee.

<sup>3</sup> Microbiology Seminar. Students enrolling in this class must present a seminar in the semester of enrollment. It is expected to be enrolled in this course during the student's 5th or 6th semester and present every two calendar years.

<sup>4</sup> Current topics in Microbiology (Journal Club). Students enrolling in this class must present a journal article in the semester of enrollment.

New students for the Master of Science degree may enter with an advisor/lab designated and immediately commence their research. Undecided new MS students will be given one semester to choose an advisor and are required to start their research no later than the beginning of the 2<sup>nd</sup> semester. Both the graduate student and their new mentor in writing should promptly notify the graduate coordinator of this decision. Students failing to do so will be ineligible for teaching assistantships within the department, and the Graduate Program Committee will be notified. Change of advisor after the initial choice will be possible only by mutual consent or by petitioning the Departmental Graduate Faculty.

Master's degree students are required to (a) convene a thesis committee and (b) submit a plan of study by the end of the fall semester in their second year. Also, the students must submit an outline of the research to be undertaken for the MS degree to their thesis committee within 6 months of the establishment of their thesis committee.

## B. PhD Degree

1. Requirements for the PhD degree at Oklahoma State University are 90 credit hours for students entering with a bachelor's degree. This includes thesis research, for which a minimum of 45 credit hours will be given as MICRO 6000. A minimum of 29 hours of coursework must be taken at the 5000 level or above. Of these hours, 14 must have MICRO prefixes and be non-zero ending. At least 9 additional hours of coursework at the 5000 level or above can include courses with major and non-major prefixes (also non-zero ending). An additional 6 hours of zero-ending courses are required, 4 hrs from Journal Club (MICR6120) and 2 hours from the microbiology seminar series (MICR5160). See Table 2. The student's dissertation committee must approve any proposed deviations from these requirements.
2. For those students entering with a 3-year B.S. degree plus a Master's degree, 90 credit hours are required for completion of the PhD degree. However, up to 9 credit hours from their Master's degree may be applied toward non-zero ending graduate-level courses within the PhD program (see Table 2). The decision to accept or deny graduate credit in these cases will be made by the student's dissertation committee. All other course expectations remain the same. The student's graduate committee must approve any proposed deviations from these requirements.

**Table 2.** Hours required for a PhD Degree in Microbiology and Molecular Genetics

Course Type	Minimum # Hours Required for PhD Degree	Maximum Hours Allowed Toward Degree
MICR 6000	51	72
MICR Prefix 5000 and Above (non-zero ending) <sup>1</sup>	11	N/A
MICR and Other <sup>2</sup> Prefix <sup>1</sup> (non-zero ending)	6	N/A

MICR 6120 <sup>3</sup>	4	N/A
MICR 5160 <sup>4</sup>	2	N/A
Other hrs <sup>5</sup>	16	
<b>Total</b>	<b>90</b>	<b>N/A</b>

<sup>1</sup> 4000 level courses where graduate credit is/was given by this (previously) and other departments must be approved by the student's graduate committee.

<sup>2</sup> These hours may include MICR and prefixes from other departments on campus, as long as they are 5000 and above (non-zero ending) and approved.

<sup>3</sup> Current topics in Microbiology (Journal Club). Students enrolling in this class must present a journal article the semester of enrollment.

<sup>4</sup> Microbiology Seminar. Students enrolling in this class must present a seminar the semester of enrollment.

<sup>5</sup> These may include zero and non-zero ending courses, MICR, or other, as the student's graduate committee sees fit.

3. Students entering with a 4-year bachelor's degree and a master's degree must complete 60 credit hours for the PhD degree at Oklahoma State University. Table 3 outlines their degree requirements.

**Table 3.** Hours required for a PhD Degree for Students entering with a 4-year BS degree plus an MS

<b>Course Type</b>	<b>Minimum # Hours Required for MS Degree</b>	<b>Maximum Hours Allowed Toward Degree</b>
MICR 6000	40	N/A
MICR Prefix 5000 and Above (non-zero ending) <sup>1</sup>	9	N/A
MICR and Other <sup>2</sup> Prefix <sup>1</sup>	6	N/A
MICR 6120 <sup>3</sup>	2	N/A
MICR 5160 <sup>4</sup>	1	N/A
<b>Total</b>	<b>60</b>	<b>N/A</b>

<sup>1</sup> 4000 level courses where graduate credit is/was given by this (previously) and other departments must be approved by the student's graduate committee.

<sup>2</sup> These hours may include MICR and prefixes from other departments on campus, as long as they are 5000 and above (non-zero ending) and approved.

<sup>3</sup> Current topics in Microbiology (Journal Club). Students enrolling in this class must present a journal article the semester of enrollment.

<sup>4</sup> Microbiology Seminar. Students enrolling in this class must present a seminar the semester of enrollment.

4. Doctoral students are required to:
  - a. Convene a dissertation committee and
  - b. Submit a plan of study by the end of the fall semester in their second year.

Also, students must submit an outline of the research to be undertaken for the PhD degree within 12 months of establishing the dissertation committee. Members of the Graduate Faculty in Microbiology (excluding Adjunct Faculty) must compose a majority of the advisory committee for any student receiving a graduate degree in microbiology. The department requires continued maintenance of a GPA of 3.0 or better. MS students earning a C or worse, or any PhD student who earns two grades that are C or worse, will be placed on academic probation for the remainder of their graduate program. Students on academic probation who earn a C or lower will be dropped from the program.

## Qualifying Exam

PhD students applying for candidacy must pass a qualifying examination. This examination should be taken during their third year in the program. The purpose of the doctoral qualifying examination is to establish that

the student's breadth and depth of understanding in the field of microbiology, as well as their ability to think analytically and develop hypothesis-based Research ideas, are sufficient for recommendation to advance to the status of PhD candidate. All students must abide by the proposed timeline for undertaking the qualifying exam. Failure to complete the general exam by the end of the third year may result in penalties that will be decided by the departmental graduate committee.

## **The Written Proposal (Part A)**

Students will develop three topics that are not on his/her current research project. These three topics will be presented to the student's committee members. Each topic will be presented as a single-page document that broadly encompasses a background, goals, hypotheses, and general approaches to tackle goals/hypotheses. No specific format is required for such a document. The committee will choose one of the topics for the development of a full research proposal. The student will then prepare a hypothesis-based full proposal in NSF or NIH format (the body of which should be eight single-spaced pages, including abstract and figures/tables, but excluding references) on the chosen topic. The student will submit this proposal to their graduate committee within 12 weeks of the topic being chosen. Students must supply their committee with the completed proposal at least 7 days prior to defending the proposal orally before the committee. This proposal represents the written portion of the qualifying examination.

Students can seek general guidance from colleagues in the department and elsewhere. Colleagues (including the major advisor) could provide general feedback to the student within the context of broad scientific discussions on the topic. General (e.g., names of laboratories active in pursuing a specific research topic) but not specific (e.g., a specific link to a methods protocol or a single specific paper) guidance is expected. The level of assistance should be equivalent to that provided to a colleague for whom no co-authorship or acknowledgments are expected. The major advisor is allowed a one-time read of the final proposal, with the general goal of ensuring that the proposal addresses the questions presented in the pre-proposal document and that all major questions and hypotheses are being addressed. Any general deficiencies on these fronts could be provided as feedback to the student. The major advisor should neither engage in a thorough editing process of the proposal nor provide specific scientific or methodological suggestions to improve the submitted proposal.

## **The Oral Defense (Part B)**

The student will be examined for their breadth of knowledge, analytical thinking, communication skills, and the ability to conduct independent research. This represents the oral portion of the qualifying examination. A PowerPoint presentation encompassing the main elements of the proposal is expected. The presentation should enable in-depth engagement of the committee members and facilitate scientific discussions, but it is not meant to be a detailed transcription of every issue presented in the proposal. The length of the oral defense part is left to the discretion of the student and the committee members. Procedure for Appeal: A student failing in the examination will be permitted to retake the examination within the subsequent two months, unless specific agreed-upon arrangements are decided upon by the student's committee. A student failing twice will be automatically dismissed from the program. The student, major advisor, or any member of the committee could request the presence of an independent ad hoc non-voting member in the second oral defense. The ad hoc non-voting member (the graduate coordinator or a Microbiology full professor appointed by the graduate coordinator) will not participate in scientific discussion. The advisor does not cast a vote on the final decision, but rather provides guidance and feedback on any aspect of the process, and could provide a non-binding recommendation on appropriate decisions and future courses of action.

## **Seminars**

Graduate students are to attend all departmental seminars and journal club sessions. Absences from seminars or journal clubs (such as those necessitated by teaching duties), must be excused by the seminar chairman before the seminar. Students are also expected to meet with each outside seminar speaker when provided the opportunity (such as a lunch). Enrollment in MICR 5160 (Seminar) is required for the thesis defense seminar for all graduate students. Students entering the Ph.D. program with only a BS degree are required to enroll in MICR 5160 for a minimum of one additional semester (1 credit hour) to present their thesis work after they advance to candidacy.

## **Publications**

By graduation, all MS students are expected to be the primary author on at least one published/under review/submitted manuscript in a peer-reviewed journal; PhD students are expected to be the primary authors on at least one published and one published/under review/submitted manuscript in peer-reviewed journal(s).

## **Thesis and Final Defense**

All Master's and Ph.D. Candidates must defend their thesis or dissertation in a final examination. The procedure for the final examination will be as follows: A. The student schedules the oral defense at least two weeks before the graduate college graduation deadline, and every effort should be made to submit the final copy of the dissertation to members of the thesis committee two weeks before the scheduled oral defense date. B. The candidate will give a public seminar on his/her research work to inform the scholarly community of the findings and implications of their Thesis/Dissertation. Notice of the seminar will be distributed to all faculty, staff, and graduate students in the Department of Microbiology, the Graduate College, and all appropriate departments at least one week before the examination. Examinations cannot be held unless public notice is given within the University. All members of the student's committee will be present at the seminar, and C. An oral examination conducted by the student's committee in which the student will defend their research findings and thesis or dissertation. It is the expectation of the department that a Master's dissertation will result in at least one scientific publication in a peer-reviewed journal and a Ph.D. thesis in two.

## **Financial Support**

All graduate students must be physically present to be on salary unless involved in pre-approved leave, such as attendance at scientific meetings. If they are absent during the regular semester, their salary will be deducted accordingly. This applies to both teaching and research assistantships. Teaching assistants (TAs) are supervised by the faculty member teaching the course with which the student assists and/or the teaching laboratory coordinator. They must make themselves available for TA meetings, including those held the week prior to the start of classes.

Priority will be given to the 1st year graduate students who are qualified to serve as teaching assistants. This includes international students who have passed the English exams conducted by the University for this purpose. Teaching assistant eligibility for any given semester will be determined by the graduate committee and will take into consideration multiple factors such as: Research Committee reports, TA performance in previous semesters, the previous number of semesters in which TAs were received, attendance at seminar and journal club, and GPA. The guidelines for the appointment of teaching assistants may temporarily be superseded in case of departmental needs.

Students are discouraged from working more than a total of .50 FTE and must not work over .75 FTE under any circumstances. Students receiving 0.5 FTE or more from the department are not allowed to work outside the department, and the department reserves the right to cancel students' departmental appointments under such circumstances.

OSU will waive the nonresident status and the tuition for graduate students who are enrolled full-time. Requests are to be made to the Graduate College Website or the Microbiology Department.

## **Other General Guidelines**

### **A. English Proficiency**

OSU policy requires all persons for whom English is a second language to demonstrate an acceptable level of spoken English before being employed in an instructionally related capacity. Such employment requires demonstrated English proficiency on the Test of English Language Proficiency (TELP) as determined by OSU. This test may be taken on campus at any of the testing sites provided by the Educational Testing Service. Students failing this exam will be required to enroll in English 0003. In order to serve in an instructionally related capacity, students for whom English is a second language are also required to attend an orientation offered by the English Department. They will then enroll in the SPEAK test administered by the English Department. Once the SPEAK test is passed, students will be allowed to take the ITA exam, which will also be required before receiving a teaching assignment. Students can learn more about these requirements through International Student Services or the English Department.

### **B. Enrollment**

Full-time enrollment for graduate students, as considered by the Office of the Registrar, is considered to be 6 or more credit hours for the fall and spring semesters for students with half-time assistantships. Those holding less than a half-time assistantship must enroll in 9 or more credit hours in the fall and spring. For summer, students with half-time assistantships must enroll in at least 3 credit hours to be considered full-time, while those with less than half-time assistantships must enroll in a minimum of 4 credit hours. For the purpose of receiving monetary assistance through the Office of Student Financial Aid, enrollment status does not take into account assistantship status. Therefore, full-time enrollment consists of 9 or more credit hours in the Fall and Spring semesters and 4 or more credit hours in the Summer term, regardless of assistantship status.

Graduate Assistants must meet minimum enrollment requirements of 6 hours in fall and spring semesters and 3 credit hours in the summer. Graduate students must complete a minimum of 6 credit hours in a 12-month period to be continuously enrolled. Graduate students must maintain continuous enrollment in thesis and/or research hours during the entire research phase of their graduate program. Students must enroll in at least 2 credit hours during the semester in which they take their final examination or meet other requirements. They must also be enrolled in at least 2 credit hours during the semester in which they graduate.

### **C. Academic Integrity**

Professional integrity is essential for the progress of education, academics, and science. There will be no tolerance for academic dishonesty or misconduct, including plagiarism, cheating, or any other form of misconduct. Students may refer to the Academic Dishonesty or Misconduct section in the OSU catalog and the Student Rights and Responsibilities Governing Student Behavior document (available from the Vice President of Student Affairs) for clarification.

#### **D. Graduation Timeline**

All requirements must be completed within the following periods, calculated from the initial Enrollment in the program:

##### **Master's Candidates 7 years, Doctoral Candidates 9 years**

No course on the Plan of Study may be more than 10 years old at the time of graduation. Students must file a diploma application at the beginning of the semester in which they are expecting to graduate. If they fail to graduate during that semester, a new diploma application must be filed.

Students who need to submit a revised plan of study should turn it in at the beginning of the semester of anticipated graduation. Published deadlines for thesis and dissertation submission are strictly enforced. These deadlines and other calendar information can be found at the OSU Graduate College website. A student must submit 4 Final Copies of their thesis or dissertation to the Graduate College.

#### **E. Required Safety Training**

All graduate students must receive quarterly safety training. In addition, all those working in labs must have HazCom training. If students are unable to attend the required safety training seminar each semester, then they must receive other approved safety training. Students should consult with department office personnel or their major advisor for ways to receive alternative training. All graduate students (and all other personnel who work in the department) must receive sexual harassment training. Students should contact the department office personnel in the departmental office to sign up for training.