DEPARTMENT OF MICROBIOLOGY

GRADUATE STUDIES HANDBOOK 2016-2017

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I. Faculty

	Faculty Member	Phone	Office	Status#
1.	Stephen Abedon	419-755-4343	Mansfield Campus	Graduate Faculty
2.	Brian Ahmer	614-292-1919	710 BRT	Graduate Faculty, Joint Appointment
3.	Birgit Alber	614-247-4413	417A BioSci	Graduate Faculty
4.	Juan Alfonzo	614-292-0004	218 Aronoff	Graduate Faculty
5.	Matthew Anderson	TBD	714 Riffe	Graduate Faculty
6.	Irina Artsimovitch	614-292-6777	270 Aronoff	Graduate Faculty
7.	Charles Bell	614-688-3115	437B Hamilton	Graduate Faculty, Joint Appointment
8.	Ross Dalbey	614-292-2384	580 BioSci	Graduate Faculty, Joint Appointment
9.	Charles Daniels	614-292-4599	428A BioSci	Graduate Faculty
10.	Kurt Fredrick	614-292-6679	286 Aronoff	Graduate Faculty
11.	Venkat Gopalan	614-292-1332	707 BioSci	Graduate Faculty, Joint Appointment
12.	John Gunn	614-292-6036	794 BRT	Graduate Faculty, Joint Appointment
13.	Patrice Hamel	614-292-3817	582 Aronoff	Graduate Faculty, Joint Appointment
14.	Tina Henkin	614-688-3831	904 Riffe	Graduate Faculty
15.	Michael Ibba	614-292-2120	276 Aronoff	Graduate Faculty, Chair
16.	Kou-San Ju	614-292-8847	290 Aronoff	Graduate Faculty
17.	Pravin Kaumaya	614-292-7028	316 Tzagournis	Graduate Faculty, Joint Appointment
18.	Joseph Krzycki	614-292-1578	914 Riffe	Graduate Faculty
19.	Jesse Kwiek	614-292-3256	788 BRT	Graduate Faculty, Joint Appointment
20.	Thomas Magliery	614-247-8425	1043 Evans	Graduate Faculty, Joint Appointment
21.	Paula Mouser	614-247-4429	470 Hitchcock	Graduate Faculty, Joint Appointment
22.	Chad Rappleye	614-247-2718	540A BioSci	Graduate Faculty
23.	John Reeve	614-292-1267	468A BioSci	Graduate Faculty, Emeritus
24.	Virginia Rich	614-247-1622	934 Riffe	Graduate Faculty
25.	Yasuko Rikihisa	614-292-9677	305 Goss Lab	Graduate Faculty, Joint Appointment
26.	Natividad Ruiz	614-292-3426	264 Aronoff	Graduate Faculty
27.	Zakee Sabree	614-292-2452	426 Aronoff	Graduate Faculty, Joint Appointment
28.	Abhay Satoskar	614-293-0537	M418 Starling-Lov	Graduate Faculty, Joint Appointment
29.	Larry Schlesinger	614-293-8636	798 BRT	Graduate Faculty, Joint Appointment
30.	Stephanie Seveau	614-247-7671	643 BioSci	Graduate Faculty, Joint Appointment
31.	Matthew Sullivan	614-247-1616	914 Riffe	Graduate Faculty
32.	F. Robert Tabita	614-292-4297	700 Riffe	Graduate Faculty, Eminent Scholar
33.	Olli Tuovinen	614-292-3379	452A BioSci	Graduate Faculty, Emeritus
34.	Hua Wang	614-292-0579	110 Parker	Graduate Faculty, Joint Appointment
35.	Marshall Williams	614-293-6715	353 IBMR	Graduate Faculty, Joint Appointment
36.	Michael Wilkins	614-292-6395	653 BioSci	Graduate Faculty, Joint Appointment
37.	David Wood	614-292-9636	435 Koffolt	Graduate Faculty, Joint Appointment
38.	Daniel Wozniak	614-247-7629	704 BRT	Graduate Faculty, Joint Appointment
39.	Kelly Wrighton	614-688-2189	440A BioSci	Graduate Faculty
40.	Li Wu	614-292-5408	466 Vet Med Bldg	Graduate Faculty, Joint Appointment
41.	Jacob Yount	614-688-1639	790 BRT	Graduate Faculty, Joint Appointment
42.	Ahmed Yousef	614-292-7814	217 Parker	Graduate Faculty, Joint Appointment

All Graduate Faculty are Category P status

ll. HANDBOOK

A. PURPOSE OF HANDBOOK

This handbook describes and presents the guidelines, rules of operation, and policies of the Graduate Program in Microbiology. It serves as the central source of information for both graduate students and faculty for the operation of the Program.

B. RELATION TO THE GRADUATE SCHOOL

The Graduate Program in Microbiology conforms to University rules as published in the Graduate School Handbook https://gradsch.osu.edu/handbook . It follows the policies, rules and guidelines found in the Graduate School Bulletin.

C. GRADUATE STUDIES COMMITTEE

1. The Graduate Studies Committee is the executive committee of the Graduate Faculty of the Program. It conducts routine matters related to graduate work and monitors the functioning of the Program. It coordinates graduate work in the program, assists members of the Graduate Faculty and represents the Program in performing specific functions related to operations of the Graduate School as defined in the Graduate School Bulletin and the Graduate School Handbook.

2. The Graduate Studies Committee consists of two subcommittees (Graduate Admissions and Graduate Program), with the membership of each including at least three Graduate Faculty, one of whom serves as Chairperson, and one Graduate Student. All members are appointed by the Microbiology Department Chairperson, in consultation with the Graduate Faculty, for terms designated by the Department Chairperson.

3. Committee members are as follows:

Dr. Irina Artsimovitch, Chairperson
Dr. Natacha Ruiz
Dr. Daniel Wozniak
Dr. Kelly Wrighton

Student Representative: Jon Lam

D. PROGRAMS:

The Microbiology Department only accepts applications to the Ph.D. program; however, after admission to the Ph. D program, and under special circumstances, students may transfer to the Master of Science degree program, either Plan A (Thesis) or Plan B (non-Thesis).

Fellowships, teaching associateships and research associateships are available for qualified Ph.D. students. Every effort is made to provide financial support to Ph.D. students throughout their graduate programs as long as they remain in good academic standing. Master's program students may be provided with financial assistance. The decision to offer assistance to a Masters student is made on an individual basis and is dependent on the qualifications of the student and the availability of funds.

Because each student is required to make reasonable and satisfactory progress toward the graduate degree during each semester of enrollment, any student enrolled in the Microbiology Graduate Program and who holds a Graduate Research Associateship (GRA), Graduate Teaching Associateship (GTA), Graduate Administrative Associateship (GAA), fellowship, or scholarship appointment is prohibited from additional outside employment without the knowledge and written consent of the Dissertation Advisor. Failure to comply with this rule may result in termination of support.

E. ENTRANCE REQUIREMENTS:

1. A four-year U.S. baccalaureate degree or its equivalent is required, with at least a 3.0 GPA. The following courses, offered at OSU or courses offered at other institutions that are equivalent in content, are prerequisites to enter the program:

a. Microbiology: 4100
b. Calculus: 1156
c. General Physics: 1200, 1201
d. General Chemistry: 1210, 1220
e. Organic Chemistry: 2510, 2520
f. Biochemistry: 4511
g. General Biology: 1113, 1114

2. The Graduate Admissions subcommittee decides if academic deficiencies exist at the time of a student's admission. Courses assigned to remedy deficiencies are an additional part of a student's program and do not replace other course requirements.

3. All applicants must take the Graduate Record Examination (GRE); subject tests are encouraged, but not required. The Test of English as a Foreign Language (TOEFL) and the SPEAK Test (taken once the student has been admitted) are required for all students whose native language is not English. The SPEAK is also required from students from Puerto Rico, other non-English-speaking U.S. territories, and some Caribbean countries not required to take the TOEFL, e.g., Trinidad and Tobago, and Jamaica. A passing grade of 230 in the SPEAK Test is required for a student to receive support as a GTA. Students with lower SPEAK Test scores must have their spoken English ability certified by the OSU Spoken English Program.

F. ADMISSION PROCEDURE

1. Applicants must submit a formal application to be considered for admission to the program. Application packets can be obtained from the Graduate Admissions Office, First Floor, SAS Building, 281 Lane Ave, Columbus, OH 43210. Students are encouraged to apply on-line at http://gradadmissions.osu.edu/.

2. A formal application consists of:

1) A completed application form
2) The nonrefundable application fee
3) Two (2) original copies of transcripts or record of marks for each university-level school attended.
   - Include English translations of all foreign documents.
4) Official GRE General Test scores
5) Official TOEFL scores, if applicable
6) A statement of intent (statement of purpose)
7) Three (3) letters of recommendation written on recommenders' original letterhead stationery, accompanied by completed Ohio State *Reference Forms.*
8) SPEAK Test (Once student has been admitted)

Items 1 to 5 are sent to the Graduate Admissions Office (address provided above). When possible, photocopies should also be sent to the Graduate Admissions subcommittee Chairperson in the Department of Microbiology to facilitate processing of the application. Items 6 and 7 should be uploaded through the online application, but can be sent to the Graduate Admissions Subcommittee Chair (105 Biological Sciences, 484 W. 12th Ave. Columbus, OH 43210).

Applicants are encouraged to submit completed applications by December 1 to ensure their consideration for the university fellowship program.

G. ADVISORS

1. Choosing an advisor

The Graduate Admissions Subcommittee Chairperson serves as a temporary advisor for incoming students, and assists the students in choosing courses and in initiating their graduate program. Students are required to do three seven-week rotations in laboratories of interest. Students are strongly encouraged to contact and/or visit faculty members they are considering for rotations or permanent location to obtain additional information, prior to the faculty agreeing to allow the student to rotate. Students will be required to initiate and complete a "Rotation Agreement Form" prior to beginning each rotation (forms will be available in the Microbiology office). Alternatively, students who have made contact with an individual faculty member prior to arriving on campus, and only after the faculty member's approval, can petition the Graduate Admissions Subcommittee to waive the rotations. In this latter case, both the student and faculty member must write a letter of petition; this is to ensure that all parties are aware of the decision and are in agreement. Advisors who agree to accept a student without rotations must provide the first year of support for the student. For those students participating in rotations, rotation assignments are made by the Graduate Admissions Subcommittee based on ranked choices by the students and available space in research laboratories. At the end of the rotations, rotating students submit a ranked list of three potential advisors to the Graduate Admissions Chairperson, who will consult with the faculty members before making laboratory assignments. The choice of an advisor must be the result of mutual agreement between student and advisor.

The advisor has the primary responsibility of overseeing the graduate student's choice of coursework, and provides advice in the student's conduct of study and research. A M.S. advisor must have at least Category M Graduate Faculty status; Ph.D. Advisors must be Category P. Currently, all Microbiology Graduate Faculty hold Category P status. Category M Faculty members can serve as Ph.D. advisors under the supervision of a Category P faculty member.

Funded graduate students requesting to take time off must complete a short-term leave form; this does not apply to weekend only travel or holiday breaks. The student must receive approval from their advisor and turn the form into the Graduate Studies Chair.

2. Changing advisors

The advisor for a Ph.D. candidate makes a commitment to the student to oversee progress of the student's laboratory research and class work. The student makes a commitment as an apprentice scientist to undertake laboratory research on a project to which they mutually agree. This association of student and advisor is a substantial commitment of time and resources by both parties. The obligation between both parties should compel students and faculty to seriously consider their choices in this regard.

Students choose an advisor whom they deem appropriate for their specific scientific interests. Despite careful consideration, errors in judgment may be made and the student may wish to change advisors. Students should be aware that changing laboratories will almost always result in lengthening the time before the Ph.D. is completed. In the event that a student wishes to change laboratories, the following protocol will be followed. The student may wish to first discuss issues with the current advisor. If a change in advisors is still desired, the student must meet with and explain the situation to the Graduate Program Chairperson. The student must not meet with other potential advisors within the Department. The Graduate Program Chairperson will discuss the concerns of the student with the current advisor. If BOTH the student and the advisor agree, the Graduate Program Chairperson will arrange a meeting of the student, advisor and Graduate Program Chair or designated representative to see if a solution may be found. If after consultation of the Graduate Program Chairperson with the advisor and student a solution cannot be found, the student may discuss the possibility of changing laboratories with other faculty members within the Department.

Research projects will not be transferred to another laboratory without the permission of the current advisor. The transferring student's dissertation will be based on experiments performed under the supervision of the new advisor.

H. ADVISORY COMMITEES

Each student must have an Advisory Committee consisting of the advisor and at least three other graduate faculty members, two of whom must be from the Department of Microbiology graduate program. The student and advisor select committee members; the advisor will be Chair of the committee. The Advisory Committee is formed no later than the Autumn Semester at the beginning of their second year of graduate study. The Graduate Studies Committee Chairperson must be notified, in writing, of the composition of the Advisory Committee. If a change in the composition of the Advisory Committee (or Dissertation Committee) is desired, the proposed change must be submitted to the Graduate Studies Committee for approval.

I. REGISTRATION

The number of credit hours attempted each semester is mutually determined by the student and the advisor and reflects faculty and student effort and the extent to which university resources are utilized. Course loads for full-time students can vary, as noted below. A student may not enroll for more than 18 credit hours per semester, 8 hours in Summer Session, without advisor and Graduate School approval. This includes audited courses.

Post Candidacy & Continuous Enrollment: All students who successfully complete the doctoral candidacy examination are required to be enrolled in every semester until graduation. These students must be enrolled for at least 3 credits per semester. This policy is effective for all students who were admitted to the Graduate School Autumn Semester 2012 and after (Section 7.8).

Graduate Associates: Graduate associates holding 50 percent or greater appointments must register for at least eight credit hours per semester, except in summer when the minimum is four credits. (Microbiology pre-candidacy students are encouraged to register for 12 credit hours per semester, four in summer session.) GAs holding a 25 percent appointment must register for at least four credit hours per semester, two credit hours in summer session. Post-candidacy doctoral students must register for at least three credit hours each semester an appointment is held, including summer term.

Fellows: Pre-candidacy doctoral students holding the title of graduate fellow, regardless of the source of the funds, must register for a minimum of 12 credit hours each semester the appointment is held (six credit hours during Summer Session). Graduate fellows who are post-candidacy doctoral students must register for at least three credit hours per semester, including Summer Semester.

Part time registration is permitted only with approval of the Graduate Studies Committee. Students are expected to complete all required classroom work within 5 semesters of initial enrollment.

Graduate students who do not enroll in the Graduate School for longer than one year, at any time during their Ph.D. program, are considered to have left the Program and must petition the Graduate Program subcommittee for re-enrollment, unless prior arrangement has been made with the advisor and Graduate Program subcommittee.

J. SATISFACTORY PROGRESS AND ACADEMIC PROBATION

Satisfactory progress toward completion of the Plan A Master's and Ph.D. degrees requires evidence of sustained progress in research, as measured by Satisfactory (S) grades in Micro 7999, 7998 or 8999, and completion of required course work. Graduate students in all programs must maintain an overall B (3.0) average. Only those courses in which the student has earned a grade of B or better are counted toward the program requirements. If a student's GPA falls below 3.0, the student is considered to be on academic probation even if formal notification has not been received from the Graduate School. As outlined in Section 5 of the Graduate School Handbook, the Graduate School formally places a student on academic probation when the student has a cumulative point hour ratio (CPHR) of less than 3.0 and the student has attempted nine or more hours of graduate credit. However, the Department of Microbiology considers a student to be on academic probation when the student's CPHR is below 3.0, regardless of the number of credit hours attempted by the student. At the beginning of the first semester of academic probation the record of the student will be reviewed by the Graduate Program subcommittee and the student informed of the actions which will be taken if the student does not attain a 3.0 CPHR by the end of the semester.

During each semester of academic probation the Graduate Program subcommittee will review the student's record. The student's advisor should attend these meetings to provide counsel either in favor of or against retaining the student. If the committee feels that sufficient progress has been made in restoring the student's CPHR to 3.0, the student will be allowed to continue in the program. In accordance with the Graduate School Handbook, the Graduate Program will deny GTA support to students on probation. Reinstatement of support may be approved when the student attains a CPHR of 3.0 or better.

Most importantly, students who have not returned to good standing after one semester will be reviewed by the Graduate Program Subcommittee. The student will also be notified by the Graduate School if they are not making “reasonable progress” towards their degree. Further, a student may then be dismissed from the graduate program if s/he fails to restore their CPHR to 3.0 within two semesters of being placed on probation, or if s/he is placed on probation for any two semesters before completing the Candidacy Exam. More information on academic probation may be found in section 5 of the Graduate School Handbook.

K. TEACHING EXPERIENCE

All graduate students must gain teaching experience through undergraduate classroom/laboratory instruction by serving as a GTA for a minimum of one semester. As soon as the appointment is made, each GTA should check with the instructor in

charge of the course for instructions prior to the beginning of the semester; a GTA position is a 50% appointment. In most instances, students will fulfill the teaching requirement during their first year. For students transferring from another institution, teaching for a minimum of one semester at their previous institution will fulfill this requirement.

L. PUBLICATION REQUIREMENT

The student must have one or more publications in peer-reviewed journals before applying for graduation with a Ph.D. At least one of the student's publications must list the student as first author. The paper must be published, in press, or accepted. Submitted manuscripts and manuscripts "in preparation" will not be counted. The minimum of one publication is required; however, individual labs may require more.

Students may not apply to defend their Doctoral Dissertation unless the requirement for publication is met. It is the faculty mentor's responsibility to assure that this policy is followed.

M. DESCRIPTION OF THE Ph.D. PROGRAM

1. Introduction

The Ph.D. Program is designed to prepare the candidate for a career as a research scientist and usually requires approximately five years. The student works closely with the advisor who guides the development of an individual student's program within the guidelines laid down by the Graduate School and outlined in this handbook. The student develops a research project and prepares a dissertation under the guidance of the advisor and with the help of the Advisory Committee. The student takes appropriate courses and must pass a Candidacy Examination (also referred to as the "General Examination") and Final Oral Examination.

The student should meet with the Advisory Committee at least once a year, starting at the first semester of the second year of graduate study. These meetings, described more fully in the following sections, are to aid the student and advisor in evaluating the student's performance and to obtain advice from the Advisory Committee on the research project.

2. Course Requirements

Students entering the Ph.D. program will follow a four-course, 10 credit hour core curriculum. In addition to the core, students are required to complete eight (8) hours of graded electives, which must include 1.5 hours of 5000-level or above Biochemistry. The student, in consultation with the thesis advisor, will establish an Advisory Committee who will provide guidance on the selection of elective courses in the second year. A grade of B or higher is required in all graded courses. First year students will also begin their laboratory rotations during the first semester in MICRBIOL 6789: Research Principles and Techniques in Microbiology; students will complete three seven (7)-week rotations before selecting a thesis advisor.

Students are expected to have chosen their thesis advisors prior to the Summer Semester. The student's thesis advisor, in consultation with the Advisory Committee, will provide guidance for the selection of courses needed to meet the requirements for Microbiology and Biochemistry course distribution and the overall credit hour requirements.

Students who are transferring to the program from another institution with their advisor will not be required to participate in rotations. These transfer students are expected to establish their Advisory Committees no later than completion of the first term in the program. This committee, in consultation with the Graduate Studies Committee, will determine which core and elective courses are required to supplement the student's prior coursework.

All graduate students will enroll in Microbiology seminars each semester (MICRBIOL 8899 and MICRBIOL 7899) throughout their program: Ph.D. students are required to complete a minimum of two presentations in MICRBIOL 8899. All students are required to attend each seminar throughout the year in both Micro 7899 and 8899; students failing to do so, and not receiving approval to miss a seminar, will receive a grade of U. In addition, first year students must complete MICRBIOL 7600, or its equivalent; this will usually occur in the first semester.

Doctoral program requirements, a sample schedule and a list of approved electives are provided below. Students may take other elective courses as appropriate for their dissertation research; these courses must be approved by their Thesis Advisory Committee. Doctoral students must complete 80 credit hours to qualify for the degree; students transferring to OSU from another university must complete at least 30 credit hours at OSU.

Program Summary: Ph.D. Microbiology

	Semester Hours
First Year Core (10 hours)	
MICRBIOL 6010: Principles of Microbiology	2
MICRBIOL 6020: Microbial Physiology and Biochemistry	3
MICRBIOL 7020: Physiology Meets Pathogenesis	2
MICRBIOL 6080: Advanced Microbial Genetics	3
Research Rotations (9 hours)	
MICRBIOL 6789, Research Principles and Techniques in Microbiology (Laboratory Rotations: 1st year)	9
Electives (8 hours)	
Students choose from an approved list of electives (Electives must include at least 1.5 hours of 5000-level or above Biochemistry)	8
Required Microbiology seminars (Au and Sp)	
MICRBIOL 7600: First Year Student Orientation	1
MICRBIOL 7899: Microbiology Colloquium	1
MICRBIOL 8899: Seminar in Microbiology	1
Research	
MICRBIOL 7899: Research in Microbiology (pre-candidacy)	
MICRBIOL 8999: Research in Microbiology (post-candidacy)	variable
Total hours	**≥80**

Example Schedule
First Year
Autumn Semester

Course	Semester Hours
MICRBIOL 6010: Principles of Microbiology	2
MICRBIOL 6020: Microbial Physiology and Biochemistry	3
MICRBIOL 7899: Microbiology Colloquium	1
MICRBIOL 8899: Seminar in Microbiology	1
MICRBIOL 7600: First Year Student Orientation	1
MICRBIOL 6789: Research Principles and Techniques in Microbiology (Laboratory Rotations: 1st year)	4
	Total 12

Spring Semester

Course	Semester Hours
MICRBIOL 7020: Physiology Meets Pathogenesis	2
MICRBIOL 6080: Advanced Microbial Genetics	3
MICRBIOL 7899: Microbiology Colloquium	1
MICRBIOL 8899: Seminar in Microbiology	1
MICRBIOL 6789, Research Principles and Techniques in Microbiology (Laboratory Rotations: 1st year)	5
	Total 12

Summer Term

Course	Semester Hours
MICRBIOL 7998: Research in Microbiology	4
	Total 4

Second Year
Autumn Semester

Course	Semester Hours
Electives	5
MICRBIOL 7899: Microbiology Colloquium	1
MICRBIOL 8899: Seminar in Microbiology	1
MICRBIOL 7998: Research in Microbiology	5
	Total 12

Spring Semester

Course	Semester Hours
Electives	5
MICRBIOL 7899: Microbiology Colloquium	1
MICRBIOL 8899: Seminar in Microbiology	1
MICRBIOL 7998: Research in Microbiology	5
	Total 12

Summer Term

Course	Semester Hours
MICRBIOL 7998: Research in Microbiology	4
	Total 4

Total for Years 1 and 2 **(56 Total hours)**

Years 3 and Post-Candidacy*: Autumn and Spring Semesters and Summer Term

Course	Semester Hours*		
	Autumn	Spring	Summer
MICRBIOL 7899: Microbiology Colloquium	1	1	-
MICRBIOL 8899: Seminar in Microbiology	1	1	-
MICRBIOL 7998 (or 8999): Research in Microbiology	1	1	3

*Times will vary; however, students must complete a total of 80 hours for the Ph.D. degree program.

Current Electives*

Semester Course Number	Course Title	Semester Hrs.
MICRBIOL 5155	Environmental Microbiology	3
MICRBIOL 6797	Study at a Foreign Institution	1-17
MICRBIOL 6798	Study Tour at a Domestic or Foreign Institution	1-17
MICRBIOL 7010	Cellular and Molecular Immunology	3
MICRBIOL 7023	Molecular Immunology: Lecture	3
MICRBIOL 7050	Fermentation Biotechnology	3
MICRBIOL 7060	Advanced Topics in Molecular Microbiology	2
MICRBIOL 7070	Antibiotics	3
MICRBIOL 7536	Advanced Food Microbiology	2
MICRBIOL 7724	Molecular Pathogenesis	3
MICRBIOL 7889	Host-Pathogen Interactions: Research Seminar	1
MICRBIOL 8010	Selected Topics in Advanced Immunology	3
MICRBIOL 8032	Advanced Cellular Immunology	2
MICRBIOL 8050	The RNA World	2
MICRBIOL 8193#	Individual Studies	1-5
BIOCHEM 5613	Biochemistry and Molecular Biology I	3
BIOCHEM 5614	Biochemistry and Molecular Biology II	3
BIOCHEM 5615	Biochemistry and Molecular Biology III	3
BIOCHEM 6706	Advanced Biological Chemistry Lab	4
BIOCHEM 6762	Advanced Biochemistry: Enzymes	1.5
BIOCHEM 6763	Advanced Biochemistry: Membranes and Lipids	1.5
BIOCHEM 6761	Advanced Biochemistry: Macromolecular Structure and Function	3
BIOCHEM 7770	Advanced Biochemistry: Protein Engineering	2
BIOCHEM 7775	Biophysical Chemistry	2
BIOCHEM 8821	Advanced Enzymology	2
BIOCHEM 8900	Advanced Biochemistry: Biomolecular NMR	2

EARTHSC 5194	Group Studies-Geomicrobiology	3
MOLGEN 5623	Genetics and Genomics	2
MOLGEN 5630	Plant Physiology	3
MOLGEN 5643	Plant Anatomy	3
MOLGEN 5700	Systems of Genetic Analysis	3
MOLGEN 5701	DNA Transactions and Gene Regulation	4
MOLGEN 5705	Advances in Cell Biology	2
MOLGEN 5715	Developmental Genetics	2
MOLGEN 5735	Plant Biochemistry	3
MOLGEN 5796	Current Topics in Signal Transduction	2
MOLGEN 6625	Plant Metabolic Engineering	2
MOLGEN 6725	Circadian Biology	2
MOLGEN 7540	Molecular Biology and Pathogenesis of Viruses	4
MOLGEN 7801	Research Seminar: Developmental Genetics	2
MOLGEN 7802	Research Seminar: Cell Biology	2
MOLGEN 7806	Gene Expression: Transcriptional Regulation	2
MOLGEN 7807	Gene Expression: Post-transcriptional Control	3

*The list of available Electives may vary. Students should consult with the Graduate Program subcommittee Chair for questions concerning the availability and eligibility of elective classes.

Doctoral students may enroll in MICRBIOL 8193, Individual Studies; however, these hours will not be counted toward the eight (8)-hour elective requirement

3. Yearly Reviews and Candidacy Exam

To assist the development of each student, an annual review of progress will be made by the student's Advisory Committee. It is the responsibility of the student and his/her advisor to plan review meetings and to ensure that reports of the meetings are placed in the student's file each year.

a. First-Year Review

The First Year Review, which should occur at the start of the second year, provides the first official opportunity for the student to meet with the Advisory Committee. The student should bring a summary of his/her coursework and grades, and prepare a short oral presentation of his/her research project. The committee will review the academic record and plan of the student and provide advice on the design and implementation of his/her research.

The advisor will submit an Annual Review Form to the Graduate Program Chairperson; if the advisor feels there are deficiencies, a letter addressing these deficiencies will be provided to the Graduate Program Chairperson and the student. The Graduate Program Chairperson reviews these summaries, and if necessary discusses any problems with the advisor, the student, and the Graduate Program subcommittee.

b. Second-Year Review and Candidacy Exam

Near the end of the second year of graduate study, all graduate students are required to schedule a committee meeting. This Second Year Review serves as an evaluation of the student's progress toward the degree and as a planning meeting for the Candidacy Exam proposal (see below). The Candidacy Exam must be taken by the end of Autumn Semester of the third year of enrollment; students who fail to meet this requirement will be denied enrollment (exceptions are by petition to the Graduate Program subcommittee, and will be granted only under extreme extenuating conditions such as serious illness).

The Candidacy Exam proposal should include three Specific Aims. Two of the Aims will focus on research that is actually planned for the dissertation. The remaining Aim (the independent Aim) can be on a related topic, but cannot address a question currently under investigation in the advisor's laboratory.

The Second Year Review is intended to be an interactive discussion of student's research progress and his/her plan for the Candidacy Exam proposal. The student should provide a summary of his/her coursework and grades, which will be reviewed by the committee to ensure that the curriculum requirements have been adequately met. Then, the student will present his/her research progress and an outline of proposed Aims for the Candidacy Exam document. The student should plan an approximately 30 minute oral presentation and be prepared for an active discussion. The student is required to come to the meeting with 2-3 suggestions for the independent Aim. Ideas for this Aim must originate from the student and may be discussed with the advisor prior to the meeting. By the close of the Second Year Review, the Specific Aims of the proposal should be agreed upon (by the committee members and student). The student then has four weeks (28 days) to prepare the Candidacy Exam proposal. The advisor will submit an Annual Review form to the Graduate Program Chairperson that summarizes the meeting and includes a list of the Aims decided upon.

c. Candidacy Examination (General Examination)

After the Second Year Review, the student will have four weeks to prepare his/her Candidacy Exam proposal. This proposal will follow that of an NIH R01 application. The scope of the proposal should include sufficient work to occupy the full-time efforts of a single researcher for a two-year period. The proposal must have the following sections: Abstract, Specific Aims, Research Strategy, and References. The Research Strategy section has subsections titled Significance, Innovation, and Approach. The document must not exceed one page each for the Abstract and Specific Aims, and 12 pages for the Research Strategy. The References section does not count toward any page limits. The pages are single spaced with font and margin limits as described in the NIH instructions. Students are encouraged to review the candidacy exam guidelines (http://microbiology.osu.edu/files/Guidelines_GeneralExam.pdf).

Within one week of submission of the document, each committee member will complete a proposal evaluation form, which will be submitted to both the advisor and student. The proposal will be graded as High Pass, Pass or Unsatisfactory. A minimum grade of Pass is required from all committee members before the student can schedule the oral portion of the exam. Once the student passes the written portion of the exam, the oral portion of the exam should be held within three weeks. The scheduling of this exam, and the completion of the Doctoral Notification of Candidacy Examination form, should begin immediately (see below).

If any committee member finds the proposal to be unsatisfactory, the student will have two weeks to revise and resubmit the document to the committee. The revised document will not be re-graded and the student must defend this document in the oral exam. In the circumstance where the Committee decides that the proposal is unacceptable, the student may waive the right to take the oral portion of the examination (per Graduate School rules) by submitting a written statement requesting the waiver to the Committee. The results of the Examination are recorded as "unsatisfactory" with the Graduate School. The Committee will then decide whether the student will be permitted to take a second Candidacy Exam and must record the decision on the Candidacy Examination Report form.

The student must complete the Doctoral Notification of Candidacy Examination form with the scheduled date of the oral examination; this must be completed online at GradForms.osu.edu. This form must be submitted to the Graduate School at least two weeks in advance of the scheduled oral examination. If this form is not completed, the oral exam will be rescheduled. The student also provides a copy of the proposal to the Graduate Faculty Representative as soon as the Graduate School informs the advisor (Graduate Faculty Representatives are only assigned on a second attempt at passing the Candidacy Exam).

Two to three weeks after approval of the written document, an oral examination will be conducted in which the student defends the proposal. The Advisory Committee selected for the Second Year Review will evaluate the student in this exam. At the beginning of the oral exam, the student may give a brief overview of the goals of the proposal. This will be followed by a question and answer period. The student should be prepared to answer questions on the rationale, design, and implementation of the experiments as well as his/her general knowledge of the field. The entire exam cannot last more than two hours. Upon completion of the oral exam, the Candidacy Exam Form (emailed to the

advisory committee at the beginning of the exam) must be signed by the committee members. This form must be completed within 24 hours of the exam. The committee must unanimously agree that the student's performance was satisfactory for the student to pass.

Students who pass the written and oral portions of the Candidacy Exam will be advanced to Candidacy. If the Candidacy Exam is deemed unsatisfactory by the examining committee, the committee may: (i) recommend that the student retake the oral defense portion of the exam, based on the original written proposal, (ii) recommend that another problem and examination be given, at a time suggested by the Committee, (iii) recommend that the student transition to the Master's program and not be advanced to candidacy, or (iv) recommend that the student withdraw from the graduate program. In accordance with the Graduate School rules, no student is permitted to take the Candidacy Exam more than twice. On the second attempt, the Graduate School will assign a faculty representative to participate in the examination. A student whose performance is recorded as Unsatisfactory on two attempts at the Candidacy Exam is not permitted to be a doctoral candidate in the same or in any graduate program at this University.

d. Annual Reviews after the Second Year

Students are required to have annual committee meetings, to provide updates on research progress and modifications of the research plan, and to obtain input from the Advisory Committee. Students are required to prepare a short progress report (1-2 pages) and this document should be placed in the student's file as an appendix to the Annual Review. A reminder will be sent to the student each summer.

An Advisory Committee meeting will be held one semester before the projected graduation date. During this meeting the student will summarize the research accomplished to date. The committee members will review the material to be included in the Dissertation, and will make specific recommendations concerning the completion of the Dissertation.

4. Dissertation Committee

a. Generally, the Advisory Committee will become the Dissertation Committee and eventually the Final Oral Examination Committee. Additional members of the Final Oral Examination Committee are permitted within the rules of the Graduate School. At least three members of the Dissertation Committee must be Category P Graduate Faculty members of the Department of Microbiology graduate program. Changes in the composition of the Advisory Committee, Dissertation Committee, or Final Oral Examination Committee require approval of the faculty member(s) being replaced and the Graduate Program Chairperson.

b. The Dissertation Committee must have at least one week to review the dissertation before signing the Draft Approval form required by the Graduate School. The Dissertation Committee must agree unanimously that the dissertation (draft) is satisfactory before the student may proceed to the dissertation defense. The completed and signed Draft Approval form is due to the Graduate School office two weeks prior to the Final Oral Defense. This is necessary for the Graduate School to arrange for a Graduate Faculty Representative for the Final Oral Defense.

5. Dissertation Defense

a. The committee consists of the advisor (as chairperson), at least three other graduate faculty members, and a Graduate School Representative selected by the Graduate School. The members of the Dissertation Committee are included in the oral examination committee.

b. The defense is an oral examination evaluating the candidate's knowledge and research performance in his/her area of specialization. It may also cover allied areas at the discretion of the examiners.

c. The examination lasts no more than two hours.

d. The time and place of the examination is determined by the advisor in consultation with the student and members of the Dissertation Committee. The examination must occur between two and four weeks after the student's dissertation draft has been approved.

e. The committee must unanimously agree that the student's performance is satisfactory for the student to pass; the advisor votes last.

f. A student may retake the examination, once, at the discretion of the examining committee.

6. Thesis Seminar

Students are required to present a public lecture on their research before graduation.

Further information on the Ph.D. program requirements may be found in Section 9 of the Graduate School Handbook.

N. MASTER OF SCIENCE PROGRAM

The Department of Microbiology does not formally accept students into the M.S. degree program. The decision to leave the doctoral program with a M.S. degree usually occurs at one of two time points. Some students may decide after completing the first year coursework and laboratory rotations to pursue a non-thesis M.S. degree (Plan B). These students meet with the Graduate Program Chairperson, or an advisor recommended by the Graduate Program Chairperson, to plan the remainder of the student's coursework. The Graduate Program Chairperson also assembles an examination committee for the student's exit examination when all program requirements have been met. Alternatively, some students will have selected a doctoral thesis advisor and completed their coursework under the guidance of their advisor and Advisory Committee, but chose to leave the program before or after they have completed the Candidacy Examination. This latter group of students often has completed substantial research in their first two years and they are expected to present a M.S. thesis (Plan A). They may also choose the non-thesis M.S. option; however, the student and the advisor must agree upon this decision since granting agencies will require documentation of the student's work. Both Plan A and Plan B M.S. students are required to complete the 10 hour core described for the doctoral program and eight (8) hours of graded electives, which must include 1.5 hours of 5000-level or above Biochemistry. A grade of B or higher is required in these courses. All graduate students will enroll in Microbiology seminars (MICRBIOL 8899 and MICRBIOL 7899) throughout their program and M.S. students must make at least one presentation in MICRBIOL 8899.

Program Summary: M.S. Microbiology

	Semester Hours
First Year Core (10 hours)	
MICRBIOL 6010: Principles of Microbiology	2
MICRBIOL 6020: Microbial Physiology and Biochemistry	3
MICRBIOL 7020: Physiology Meets Pathogenesis	2
MICRBIOL 6080: Advanced Microbial Genetics	3
Research Rotations (9 hours)	
MICRBIOL 6789, Research Principles and Techniques in Microbiology (Laboratory Rotations: 1st year)	9
Electives (8 hours)	
Students choose from an approved list of electives (Electives must include at least 2 hours of 5000-level or above Biochemistry)	8
Required Microbiology seminars (Au and Sp)	
MICRBIOL 7600: First Year Student Orientation	1
MICRBIOL 7899: Microbiology Colloquium	1
MICRBIOL 8899: Seminar in Microbiology	1
MICRBIOL 7193: Individual Studies	variable#
MICRBIOL 7998: Research in Microbiology (pre-candidacy)	variable#
MICRBIOL 7999: Research in Microbiology-M.S. Thesis	variable#
Total hours (typical minimum)	44

#Students may enroll in MICRBIOL 7193 or 7998; however, these hours will not fulfill any of the core or elective requirements.

1. Plan A - Thesis:

   a. Course Requirements

A minimum of 44 credits of graduate level work must be completed within six (6) calendar years. Plan A M.S. students are required to complete the 10 hour core described for the doctoral program, and eight (8) hours of graded electives that must

include 1.5 hours of 5000-level or above Biochemistry. Plan A M.S. students will enroll in Microbiology seminars (MICRBIOL 8899 and MICRBIOL 7899) throughout their program and must make at least one presentation in MICRBIOL 8899. A maximum of six (6) credits may be transferred from other programs to satisfy the 44 minimum credit requirement. Decisions concerning transfer of credits are the responsibility of the Graduate Program subcommittee.

A GPA of 3.0 must be maintained and a grade of B or better must be received in each class to be counted toward the Academic Requirements.

Students receiving 2 Unsatisfactory (U) grades in Microbiology 7998 or 7999 are denied further registration in the Program.

A Plan A Master's program requires a Thesis based on the student's research. Students have an annual meeting with their Advisory Committees to aid in the development of their programs and to evaluate their progress. These meetings follow the format of the annual meetings as described for the doctoral program.

b. Final Examination

The final examination is conducted by a committee consisting of the student's advisor (Chairperson of the committee) and at least two other faculty from the Microbiology Graduate Program (Category M or P status). This committee normally includes the members of the Advisory Committee.

The student's M.S. Dissertation Committee must have at least one week to review the dissertation and the Committee must agree unanimously that the dissertation (draft) is satisfactory before the student may proceed to the dissertation defense. The final examination is an oral examination lasting approximately two hours. It is a Defense of Thesis examination but questions may be asked both in the student's area of interest and in more general aspects of Microbiology and related areas. The committee must unanimously agree that the student's performance was satisfactory for the student to pass.

It is the responsibility of the student to contact the Graduate School and obtain the proper documents for of the M.S. exam.

2. Plan B - Non-Thesis:

a. Course Requirements

A minimum of 44 credits of graduate level work must be completed within six (6) calendar years. Plan B M.S. students are required to complete the 10 hour core described for the doctoral program, and eight (8) hours of graded electives that must include 1.5 hours of 5000-level or above Biochemistry. Plan B M.S. students will enroll in Microbiology seminars (MICRBIOL 8899 and MICRBIOL 7899) throughout their program and must make at least one presentation in MICRBIOL 8899. A maximum of six (6) credits may be transferred from other programs to satisfy the 44 minimum credit requirement. Decisions concerning transfer of credits are the responsibility of the Graduate Program Committee.

The advisor for a Plan B student is appointed by the Graduate Program Committee Chairperson and is a Graduate Faculty member of at least Category M Graduate Faculty status in the student's area of interest. The student must pass a Final Written Examination and a one- to two-hour oral examination. The Written Examination takes the format of a mini-review on a topic area identified by the student's advisor. The document will have a minimum length of 12 single spaced pages with font and margin limits as described in the NIH grant submissions (see Candidacy Examination section above). Students may also petition the Graduate Program Committee Chairperson and their advisor requesting an alternative Written Examination in the form of a comprehensive examination on topics related to the student's interests and general Microbiology. This exam will be generated by the student's advisor and will be a minimum of four (4) hours in duration. The oral examination will cover topics presented in the Written Examination and may include questions dealing with more general aspects of Microbiology and related areas. The Master's Examination Committee consists of the student's advisor as Chairperson and two other Category M or Category P Graduate Faculty members from the Program. The committee must unanimously agree that the student's performance was satisfactory for the student to pass.

The time of the examination and the composition of the Committee are determined by the student's advisor within the guidelines of the Graduate School and the Program. The members of the student's Advisory Committee may serve on the Examination Committee.

It is the responsibility of the student to contact the Graduate School and obtain the proper documents for the M.S. exam.

Students in the Plan B option must request reinstatement in the Program if they fail to enroll in courses for 1 or more semesters. The Graduate Program Committee will act upon the request for reinstatement.

O. EARLY TERMINATION AND TRANSFER BETWEEN PROGRAMS

Ph.D. students who leave the program after passing the Candidacy Exam can receive the M.S. degree after fulfilling the Microbiology graduate program requirements. Students who have not completed the Candidacy Exam may transfer from the Ph.D. program to the Plan A or Plan B Master's program. Students may also transfer between Plan A and Plan B Master's programs. In all cases the student's advisor and the Graduate Program subcommittee must approve the transfer. It is important to note that transfer from the Ph.D. program to a Master's program may result in termination of departmental support at the end of the semester in which the transfer occurs.

III. Department Staff

Staff Member	Title	Office	Phone	Email
Tammy Bullwinkle	Program Specialist	384B BioSci	2-5867	bullwinkle.1@osu.edu
Pete Bujnak	Microbiology Lab Preparator	305 BioSci	2-4439	bujnak.2@osu.edu
Tammy Dickey	Department Manager	105 BioSci	8-2431	dickey.95@osu.edu
Mette Ibba	Program Specialist	374 Biosci	2-0509	ibba.2@osu.edu
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