

Doctoral Program Department of Microbiology and Immunology

Graduate studies in the Department of Microbiology and Immunology are designed to provide the doctoral student with a broad background in all aspects of Microbiology. To this end, students will take formal course work in the major areas of microbiology and immunology, participate in teaching, pursue research in areas of specialized interest, and develop a basic understanding of cellular and molecular biology. Further opportunities for scientific growth arise through participation in a weekly Journal Club, a semimonthly Research Forum and through frequent informal discussions with faculty and other students. In addition, attendance and participation at national meetings is perceived as an integral part of the student's academic maturation.

The following comprises an outline by which a student in this department may measure progress toward graduation. In addition to these guidelines, the student should become familiar with the rules and regulations addressed in the USA graduate school catalog.

A. Selection of Advisor and Area of Emphasis

During the second semester of the first year a student will rotate through laboratories to assess areas of specialization and to help decide on an advisor. This is done as part of the interdisciplinary program. During the first semester of the first year, students are encouraged to discuss research interests with **each** graduate faculty member. The progress of new students will be evaluated by the faculty at frequent intervals to ensure that the student is given proper direction.

A faculty advisor should be chosen by the student before the end of the second semester of study. Mutual agreement between the student and faculty member is, of course, necessary.

B. The Ph.D. Advisory Committee

A thesis advisory committee consisting of three departmental and two extra-departmental faculty (and the Microbiology chair as ex officio member) must meet no later than the end of their second year. All five members of the core committee must be Full Members of the Graduate Faculty. The committee is required to meet with the student every six months. **The onus of assembling the committee and of**

scheduling periodic meetings lies with the student. The student is expected to provide a written (2-3 page) progress report to the committee approximately one week prior to the committee meeting. Forms for setting up the committee (#3) and for documenting the committee meetings themselves (#4 and #5) may be found at the <http://southmed.usouthal.edu/com/bmsphd/> site under BMS Student Handbook.

After deciding on an advisor and committee, students must submit a completed Research Description Form (#3) to the Basic Medical Sciences Graduate Office. The form should also be presented at the student's first committee meeting. The purpose of this form is to: (1) declare a departmental or program affiliation, (2) designate a research advisor, (3) state a research topic for initial investigation, (4) formulate a dissertation advisory committee and (5) develop a coursework plan. Ph.D. students must complete this form no later than the end of the student's second year. Ph.D. students failing to file the completed form at these times will not be permitted to register for Doctoral Dissertation Research credit hours. The completed form must have the required authorization signatures.

The student must present a calendar form (#2) to the faculty advisor as soon as the advisor is chosen. The calendar form will be used as a checklist by the faculty advisor.

C. Departmental Preliminary Examination and Graduate Program Qualifying Examination

The Qualification Examination for candidacy to the Ph.D. Degree in Basic Medical Sciences is a very intensive academic exercise designed to test the student's mastery of course material and the ability for critical scientific thought. Before a student in the Department of Microbiology and Immunology is permitted to take the Graduate Program Qualifying Examination they must first pass a Departmental Preliminary Examination described below.

C. I. Departmental Preliminary Written Examination

The **Departmental Preliminary Written Examination** will test the student's mastery of basic concepts covered in the core courses and probe their problem-solving skills – tools essential to any doctoral candidate. The examination, prepared by the entire faculty of the department of M&I, will encompass material covered in all core course content (IDL and Dept. of M&I advanced curriculum completed to date) and in the assigned reading list (available from the departmental secretary). A booklet of sample questions is available from the departmental secretary. The chair of the student's advisory committee will determine when the student is ready to take this

examination and will request its preparation and scheduling (no later than the end of the second year of study). The exam will be administered over a period of two half-days. The chair of the department (or the chair's designee) will supervise the preparation and evaluation of the written examination. The Departmental Written Examination will be divided into four sections: (1) Immunology, (2) Virology, (3) Bacteriology, (4) Cellular Biology, Molecular Biology and Biochemistry. The student must pass all four sections to successfully complete this phase of the examination process. In the event of failure, the department will decide (by majority consensus) whether the student will be permitted to repeat the failed sections of the exam. If the student is permitted, the re-examination of the failed sections will be scheduled as determined by majority consensus of the department.

C. II. Departmental Preliminary Written Prospectus and Oral Defense

The final section of the Departmental Preliminary Examination consists of two parts that must **both** receive a passing grade by majority vote of the faculty of the Department of M&I (including the student's external Dissertation Committee members). The student is then permitted to seek approval for admission to candidacy to the Ph.D. in Basic Medical Sciences from their Examination Committee. The Examination Committee will follow the rules for approval for admission to candidacy as outlined in the Graduate Student Handbook. This phase of the examination is administered before the end of the third year of study.

The student will first prepare a **Written Research Prospectus**. The prospectus will follow the format of an NIH R01 style research proposal adhering to the guidelines set forth in the instructions outlined in form PHS 398 (however, a 20 page limit including Figures and Tables will be used instead of the 25 page limit suggested in form PHS 398). See: <http://grants1.nih.gov/grants/funding/phs398/phs398.html>). This proposal should represent independently derived hypotheses that illustrate the student's potential for critical thinking, evaluation, and logical presentation of scientific ideas (*i.e.*, NOT written by the student's mentor). The written prospectus will pertain to the student's proposed dissertation project as agreed upon by the student, mentor, and advisory committee. In the body of the prospectus, the student will outline the Specific Aims of the project, provide Background and Significance for the project, present any Preliminary Data generated to date in support of the proposal, and finally provide a detailed description of each of the Specific Aims including the driving hypotheses behind the study, descriptions of important methods for which there is no preliminary data, potential outcomes/interpretations of results, pitfalls, and contingencies. The student should understand from the outset that the prospectus will be rigorously and critically evaluated.

The student, mentor, and student's advisory committee will agree upon a date for the student's initial submission of the prospectus. The mentor may assemble a sub-committee usually composed of the mentor and 2 additional panelists selected from the student's advisory committee for an initial review of the proposal. This process is meant to benefit the student by aiding in the preparation of the proposal prior to submission and oral defense. After a period of no more than 2 weeks from the agreed-upon submission date, the sub-committee will provide their critique to the student. At the discretion of the sub-committee, the student may be required to hold a meeting with the sub-committee to discuss the critiques of the student's draft prospectus.

Upon receipt of the sub-committee critique, the student will be given at least 1 week to revise the prospectus and submit it to the entire committee (Dissertation advisory committee and the remaining members of the Department of M&I). After no more than 2 weeks from the time of submission of the finalized prospectus and following the approval of the majority of the faculty, the formal oral defense will be held. At this formal defense of the prospectus, the Department Chair will appoint an Examination Committee Chair who will moderate the defense (not the student's mentor). The student is expected to use the opening 15 minutes (uninterrupted) to present background information and outline the salient details of the Specific Aims of the prospectus and what this work will add to their field in general. After this introduction, the panelists, as directed by the Committee Chair, will begin no more than three rounds of questions that examine the student on material germane to the prospectus. Because this defense is also considered the graduate program oral qualifying examination, the student should be prepared to answer any questions that the committee members deem relevant to the student's understanding of the proposed work.

Upon completion of the Oral Defense of Prospectus, the student will be given a grade of Pass or Incomplete by majority consensus of the entire M&I faculty and the other members of the student's advisory committee. A passing grade indicates the student has passed both the Written Prospectus and Oral Defense sections of the examination. The student's Examination Committee can then immediately vote to validate this performance to satisfy the requirements of the Graduate Program's Qualifying Examination. This fulfills the final criteria for admission to candidacy which includes: (1) maintenance of an average of "B" (or better) in coursework; (2) passing the Departmental Preliminary Written Examination; and (3) Passing the Departmental Preliminary Written Prospectus and Oral Defense by majority vote of the department of M&I; and (4) Passing the Graduate Program's Qualifying Examination.

If a grade of Incomplete is assigned, the student will be permitted one final round of revisions to the prospectus and be given a final opportunity to defend the proposal as described above (for the second round, the student will be given at least 1 week for revisions and the defense will be held 1 week after re-submission). Upon the completion of this re-examination, the student will be given a grade of Pass or Fail. If a Failing grade is assigned, the student will be recommended to the Student Promotions and Evaluation Committee for dismissal from the Graduate School as per University policy. If the student has passed the re-examination, the final decision on admission to candidacy is then rendered by the student's Examination Committee as outlined above.

D. Formal Research Proposal

As outlined the Graduate Student Handbook, the student's Written Research Prospectus developed and defended as per the requirements of the Departmental Preliminary Examination and the Graduate Program Qualifying Examination may be used as the Formal Research Proposal submitted to the Graduate Office as part of **Form #7**.

E. Dissertation and Dissertation Defense

After consultation with the committee, the student may begin writing the dissertation in preparation for the Departmental Dissertation Defense and the College of Medicine Open Defense (Exit Seminar). The Guidelines for Dissertation Preparation and Open Defense are found on-line at <http://southmed.usouthal.edu/com/bmsphd/> site under BMS Student Handbook. Please follow the guidelines therein. The Application for Defense of Dissertation (#8), and the final Administrative Certification Sheet (#9) are found on-line. The final draft of the dissertation should be distributed to the committee members no later than two (2) weeks prior to the Open Defense date (Exit Seminar). Students are responsible for typing their dissertation. Laser quality printing of the dissertation (final copy only) will be provided by the department if compatible word processing software is used by the student during preparation.

Prior to submitting their Application for Defense of Dissertation (form #8) **and prior** to scheduling the College of Medicine Open Defense (Exit Seminar), the student **must** first pass a rigorous **Departmental Dissertation Defense**. Once the student and dissertation committee agree that the student is ready to defend their research, the written dissertation will be distributed to the departmental graduate faculty and to the external members of their committee no later than two weeks prior

to the Departmental Dissertation Defense date, scheduled by the student. A **faculty Mediator, (not the mentor)**, will be appointed by the Department Chair to guide the defense. The student will be given 30 *uninterrupted* minutes to present the salient aspects of their research. Following this period, the faculty will ask questions that probe the student's ability to vigorously defend the conclusions offered. Following two rounds of questions, faculty members not part of the student's committee can excuse themselves and the Dissertation Committee may continue questioning. It is this committee that ultimately decides whether the student has satisfactorily defended their dissertation and can proceed to the Open Defense (Exit Seminar).

The student anticipating graduation should be aware that passing the Departmental Dissertation Defense is **NOT** a forgone conclusion. Because of this, definitive commitments to potential Postdoctoral mentors should NOT be made until the successful completion of this Defense. Following the Departmental Dissertation Defense, the Dissertation Committee may decide additional experiments or writing may be required or the student can be declared ineligible. It is the responsibility of the Dissertation Committee to see that the deficiencies noted during the Departmental Defense are rectified prior to scheduling the College of Medicine Open Defense.

F. Journal Club

The Department of Microbiology sponsors a Journal Club the first three Monday's of the month at 12:00 noon. Presentations by the graduate students and attendance is required.

G. Research Forum

The Department of Microbiology also holds a semimonthly Research Forum to discuss in-house research projects by students and faculty. The forum is held on the first and third Wednesday nights of the month at 5:30 p.m. Attendance at these academic encounter groups is required for all students. Each student's progress will be evaluated at a departmental faculty meeting held within a week after their forum. Constructive criticisms voiced by the faculty at this meeting will be relayed to the student.

H. Satisfactory Performance in Departmental and External Courses.

Graduate Students within the Department of Microbiology and Immunology are expected to achieve a grade of B or better in all internal-departmental courses. A grade of C reflects an unsatisfactory level of understanding for a major field of study.

Receiving a C in a departmental course may be cause for immediate dismissal. In addition, a grade of C or better is necessary in all required external courses.

SUMMARY OF REQUIREMENTS AND MILESTONES

By the end of the second semester, 1st year.

- [] Select Advisor.
- [] Give calendar Form to advisor (on-line Form #2).

By the end of second semester, 2nd year.

- [] Select Ph.D. advisory committee and submit Registration of Research Description Form to Basic Medical Sciences Graduate Office (on-line Form #3)
- [] Schedule first meeting of advisory committee (on-line Form #4)
- [] Distribute copy of Research Description Form at first committee meeting
- [] Schedule committee meeting every 6 months (on-line Form #5)
- [] Submit 2 - 3 page progress report 1 week before each meeting

- [] Complete reading list
 - Alberts et al. Molecular Biology of the Cell - Most recent edition
 - and Voet et al. Biochemistry - Most recent edition

- [] Take Departmental written Examination (written)

By the end of Second Semester, 3rd year

- [] Complete Formal Research Proposal (Prospectus) (on-line Form #7), also known as the IDL Written Qualifying Examination.
- [] Distribute proposal to committee no later than 2 weeks before oral defense of proposal (IDL Written Qualifying Examination). Testing committee will consist of the Faculty of the Department of Microbiology and Immunology and members of the student's committee.
- [] Consult with dissertation committee about oral examination.
- [] Defend IDL Written Qualifying Examination.
- [] Make sure Admission to Candidacy Form is on file verifying completion of written preliminary (the Prospectus) and oral qualifying examinations (on-line Form #5)

Completion of Research

- [] Begin writing dissertation after consultation with committee
- [] Read guidelines for dissertation preparation and open defense. Found on-line at <http://southmed.usouthal.edu/com/bmsphd> site under BMS Student Handbook.
- [] Submit draft of Dissertation to Departmental Faculty and extra-departmental committee members no later than two weeks prior to the Departmental Dissertation Defense.
- [] Defend dissertation to department graduate faculty and committee (Departmental Dissertation Defense)
- [] Notify Department Secretary when committee approves dissertation for Open defense. So that arrangements can be made for the auditorium, announcements, programs, and refreshments.
- [] Complete application for College of Medicine Open Defense on-line Form #8).
- [] Complete application for graduation (obtain application Form from the University Registrar).
- [] Submit final draft of dissertation to committee members no later than 2 weeks before defense date
- [] Submit Administrative Certification Form (on-line Form #9) after dissertation defense.

[on-line Forms: the BMS Student Handbook at
<http://southmed.usouthal.edu/com/bmsphd/handbook04.pdf>]

Ph.D. Curriculum

Department of Microbiology and Immunology Course Requirements

Interdisciplinary Core Curriculum

IDL580 and 581	Fundamentals of Biomedical Science
IDL576	Literature Reports
IDL577	Introduction to Research Methods
IDL594	Directed Studies
GIS501	Research Integrity

Core Departmental Courses

MIC 530	Medical Microbiology/Immunology
MIC 536	Literature Reports
MIC 636	Microbiology and Immunology Research Seminar
MIC 537	Dir. Studies Microbiology
MIC 799	Research and Dissertation
MIC 632	Advanced Immunology
MIC 630	Microbial Physiology, Genetics, and Pathogenesis
MIC 633	Advanced Virology

Seminar(s)

Distinguished Scientist Seminar Series

Electives

BCH 622	Molecular Biology
BCH 620	Enzymes and Proteins
Graduate Offerings from Other Basic Medical Science Departments	

Elective choices are based on student interest and must receive dissertation committee approval.