

GUIDELINES AND POLICIES FOR THE PhD DEGREE IN

MICROBIOLOGY AND IMMUNOLOGY

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GRADUATE CURRICULA IN MICROBIOLOGY AND IMMUNOLOGY

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Introduction:

This document defines the guidelines and policies governing the Doctoral Program in the Department of Microbiology and Immunology, Medical College of Virginia Campus of Virginia Commonwealth University. This is a supplement to the current University Graduate Bulletin. Our Graduate Program includes curricula that lead to the Ph.D. degree or M.D./Ph.D. degree. The information in this document has been prepared as a guide for the graduate faculty and graduate students in the Department. All faculty and students should be thoroughly familiar with the information provided, and should adhere to these guidelines and policies in formulating the student's curriculum of education.

Graduate Program Committee (GPC):

The Graduate Program Committee (GPC) in Microbiology and Immunology is responsible for the implementation and management of the graduate program, as described in this document, and for formulating new or amended policies and practices that are subject to approval by vote of the graduate faculty. The GPC should include representatives from the major research areas of the department. The Chair of the Microbiology and Immunology Department appoints the GPC Chair and one representative from each research track through the Chair's advisory system. Additional membership of the GPC consists of one affiliate appointee elected by the faculty of the Department of Microbiology and Immunology.

Application for Graduate Study in Microbiology and Immunology:

Inquiries regarding information or admission to the graduate program in Microbiology and Immunology are referred to the Chair of the GPC for processing. Formal application is made through the Virginia Commonwealth University Admissions Office, which forwards completed applications with attendant required GRE scores and other documents to the Biomedical Sciences Doctoral Program (BSDP). Applicants may apply for admission to begin studies in any semester of the academic year, but Fall admission is recommended. Specific requirements for admission to the graduate program are defined in the University Graduate Bulletin. Admission requirements for graduate studies in Microbiology and Immunology are flexible. However, knowledge of Organic Chemistry, Fundamentals of Biology, and College Mathematics is considered necessary to pursue advanced studies. Students having a knowledge of College Physics and Analytical Chemistry will also find this helpful in pursuing their studies in Microbiology and Immunology. Foreign applicants for whom English is a second language must take the Test of English as a Foreign Language (TOEFL) examination and are expected to achieve a score of 100 or higher (internet based test; iBT).

Selections among the applicants are made after consideration of individual qualifications and availability of facilities. Preference is given to applicants who present academic potential for Microbiology and/or Immunology as demonstrated by their previous academic achievements including grade point average, Graduate Record Examination scores, and letters of recommendation. Admission to graduate study in the Department of Microbiology and Immunology leading to the Ph.D. degree requires majority approval and recommendation by the BSDP program committee, and acceptance by the Chair of the Graduate Program in the School of Medicine.

Students applying to the M.D./Ph.D. program submit an application through the American Medical College Application Service (AMCAS). After review of the AMCAS documents, the Medical School Admissions Committee will send each qualified applicant supplemental admissions material including an application for the M.D./Ph.D. program. Individuals invited for interviews will participate in the

standard interview for the M.D. program and will be interviewed also by members of the M.D./Ph.D. Steering Committee. After successful completion of two years of the Medical Curriculum, M.D./Ph.D. students will enter the Microbiology and Immunology Department as graduate students.

Student Support:

Every effort is made to provide Ph.D. and M.D./Ph.D. students (who are in good academic standing) full tuition and stipend support. In addition, support is provided for insurance coverage. However, it is difficult to predict which stipends will become available to the Department of Microbiology and Immunology for dispersal each year to graduate students in a research track. Therefore, acceptance into the Graduate Program cannot be considered a guarantee of financial support to the student. The GPC reviews student records and ranks students competitively based on academic performance, admissions program examination scores, and research progress. This assessment serves as the basis for recommendation and assignment of fellowships and assistantships administered through the department.

The major sources of support for research track graduate students are as follows:

- A. **Graduate School Fellowships** - Entering Ph.D. students with excellent academic records are eligible for support in full (tuition + stipend) for the first 2 years by the School of Medicine's Office of Graduate Studies.
- B. **Predocctoral Grants** - The NIH, the National Science Foundation and other foundations have a limited number of predoctoral grants for which any student may apply directly.
- C. **Individual faculty research grants** - All faculty accepting a graduate student in their laboratory have research grant funding.

Registration for Courses:

To be considered full-time, all students must be registered a maximum of 15 credit hours and take a minimum of 9 credits per semester in Microbiology & Immunology (MICR) courses. Registration for less than 12 credit hours during the Spring or Fall semester constitutes "part-time" status and results in a student being ineligible to receive a full-time student stipend. Students register for **3** credits (MICR697) during the Summer. The selection of courses each semester should be made in consultation with the student's permanent advisor. Under special circumstances the GPC, in consultation with the student, the student's advisor, and the relevant course directors, can vote to relax these requirements.

Adding, Dropping, or Withdrawing from Courses:

Adding, dropping, auditing, or withdrawing from a course outside of the deadline date set by the University for these changes requires signed approval by the permanent advisor. No form can be submitted to the registrar's office without the student advisor's signature. Under special circumstances, a member of the student's Graduate Advisory Committee (GAC), the Chair of the GPC, or the Chair of the Department of Microbiology and Immunology may sign. Copies of the course change form must be

sent to the GPC Chair and to the Course Director. Adding, dropping, withdrawing, or auditing a course after the deadline date set by the University cannot be authorized without a 'Special Action' form. These changes require a request in writing to the GPC signed by the student's major advisor. If the GPC approves the student request, then the student must fill out a 'Special Action' form that must be submitted to the School of Medicine Graduate Committee for approval.

Academic Performance:

The following are minimum requirements of the Department of Microbiology and Immunology for satisfactory performance in graduate studies. An individual's curriculum within the department may have requirements that exceed those indicated below. The time limitation for completing degree requirements is eight years for the Ph.D. Program.

All full-time first year students must achieve a 3.0 overall grade point average (GPA) in a minimum of 18 graduate credit hours of required courses (exclusive of research), which are typically taken during the first two semesters while in the BSDP program. Students who do not maintain an overall GPA of 3.0 while in the BSDP program are subject to termination from consideration for admittance to the graduate program in the Department of Microbiology and Immunology. Part-time students must achieve an overall GPA of 3.0 in the first 18 credit hours (exclusive of research) for which they are registered. After the first year of graduate study, continuing students for the Ph.D. degrees must maintain an overall GPA of not less than 3.0 for graduate courses. Students who receive a grade of C or less on six credit hours or 20 percent of the credit hours attempted (whichever is greater), or a student who receives a grade of D or F, will be reviewed for possible academic termination by his/her graduate program faculty.

In the event of an unsatisfactory performance - for example, if a student fails to obtain the minimum GPA - the student's GAC or the student may petition the GPC for permission to continue in the program. Any Ph.D. student who makes less than a 3.0 GPA in any semester must make at least a 3.0 in graduate courses each semester thereafter and must achieve a cumulative GPA of 3.0 or better before he/she can graduate. A student who has petitioned successfully for continuance in the graduate program who fails to bring the cumulative GPA to 3.0 or better by the end of his/her fourth semester of graduate tenure will be dismissed from the graduate program.

If a student receives a grade of "D", "F" or "U" in any course, then the student must repeat the course(s) and earn a grade of "C" or better to be eligible to receive a degree. A student will be reviewed by his/her graduate program faculty for possible academic termination if he/she receives a grade of D or F in the repeat course. The course (credits and grade) can be counted only once for graduation credits. Students may not take the written or oral examination for the Ph.D. degree, if their overall grade point average is below 3.0. Research credits shall not be counted in computing this average, which shall be graded as P = pass, U = unsatisfactory, or F = fail.

In summary, unsatisfactory performance includes: (1) receiving a grade of D, F, or U in any course, (2) achieving a GPA of less than 3.0 after the first year of graduate school work, (3) failure of the oral examination, or (4) failure of the final oral defense. Failure to achieve and maintain the requirements indicated above could result in dismissal from the Microbiology and Immunology graduate program.

Students with unsatisfactory performance must obtain approval of the School of Medicine Graduate Committee to continue in the graduate program.

Major Advisor Selection:

The selection of a Major Advisor from among the graduate faculty is one of the most important decisions that Ph.D. and M.D./Ph.D. students make during their graduate careers. The advisor will have more influence on a student's training, direction and career choices than any other faculty member. The Major Advisor provides day-to-day guidance during the student's research activities and scientific development, and so predicting a successful working relationship is an important decision for any new student. The philosophy of this Department is to permit students as much latitude as possible in making this important decision. In addition, the graduate faculty members who wish to accept a student have the responsibility of providing financial support for the student and this requires careful long-term consideration on the part of the graduate faculty.

All Ph.D. students must have either selected a Major Advisor by the end of their second semester of graduate study or have petitioned the GPC to perform additional rotations. However, all students must have a major advisor prior to final registration for their third academic semester. No requests for assignment to a major advisor can be submitted to the GPC until the first day of the second semester of residence in the graduate program. A BSDP to PhD Transition Form and Mentor Agreement must be cosigned by the chosen mentor, indicating his/her agreement to accept the student and that he/she has identified funds to support the student. After approval, the GPC will recommend the appointment to the Chair of the School of Medicine Graduate Committee, who shall make the appointment official.

Changing the Major Advisor:

Rare circumstances may arise in which it is in the best interest of a student and/or Major Advisor to dissolve their association, which will necessitate (i) movement of the student to a new laboratory, and (ii) identification of new sources of student funding. In general, this should be viewed as a solution of last resort. Assistance should be sought from the Chair of the GPC or Chair of the Department if a potentially serious problem arises between the student and mentor that cannot be resolved to their mutual satisfaction. The student should consult with each member of his/her Student Graduate Advisory Committee. In addition, a Major Advisor may resign as the student's advisor, but this should be discussed first with the Department Chair for practical solutions.

If all attempts at mediation fail, the student may request an assignment to a new major advisor, which must be made in writing to the GPC (attention Chair of the GPC). Following deliberation by the GPC and, if necessary, in consultation with the Chair of the Department of Microbiology and Immunology, the GPC will make a recommendation regarding assignment of a new advisor. The written recommendation will be forwarded to the Chair of the School of Medicine Graduate Committee. A decision to assign a new permanent advisor will be predicated on mutual agreement of the prospective advisor and the student.

Student's Graduate Advisory Committee (GAC):

In consultation with the Major Advisor, potential members of a student's GAC should be contacted during the third semester of training. The student should then file the Admission to Candidacy Form and select their GAC in GradTrak

(<https://login.vcu.edu/cas/login?service=https://www.apps.som.vcu.edu/gradtrak/login/login.aspx>)

A student's GAC for the Ph.D. program is composed of a minimum of three graduate faculty members holding a primary appointment in the Department of Microbiology and Immunology and two additional graduate faculty members from outside the Department of Microbiology and Immunology. The student's Major Advisor serves as the Chair of the GAC for the Ph.D. program and must have an appointment in the Department of Microbiology and Immunology.

The Ph.D. and M.D./Ph.D. student's progress and development will be monitored and guided by the student's GAC and Major Advisor. The student's GAC will approve the student's dissertation topic, administer the written and oral examinations, oversee the student's dissertation research on a regular basis, supervise the dissertation defense, and approve the dissertation when satisfied with its quality. The student's GAC is responsible for establishing the content of the student's course work in final detail, as well as monitoring the progress of the student's research. The final curriculum for the Ph.D. degree shall be formulated and approved by the student's GAC (in consultation with the student) .

The student's GAC will meet with the student at least once a year. Occasions may arise in which it is necessary to change the committee composition, and substitution of one member for another should be accomplished by formal approval of the department GPC.

Records of Graduate Progress:

A "Semester Report on Graduate Student Status" form (see Appendix) documenting the student's progress is submitted to the GPC at the end of each academic semester (e.g., first weeks of January and June) by the student. This describes progress with regard to the degree requirements, and includes comments on the student's overall development and academic/research accomplishments. Major advisors will have an opportunity to document to approve of this document and to additionally append any concerns about a student's performance in the research laboratory.

The GPC will call a meeting of the Graduate Faculty at least twice each academic year after the end of each semester (e.g., January and June). The agenda may include the following: (1) updating of the Graduate Faculty of the progress of all graduate students in the Department; (2) voting as a faculty on the continuation, promotion, or retention of each graduate student enrolled in the program; (3) discussion of, and/or voting on, faculty related policy developments or changes, and (4) discussion and/or voting on policies or changes in guidelines developed by the GPC. New policies formulated by the GPC become effective only after they have been approved by vote of the graduate faculty of the Department of Microbiology and Immunology. The GPC is authorized to convey to the student in writing, the report of his/ her progress as discussed at the semi-annual Graduate Faculty Meetings.

The "Semester Report on Graduate Student Status" forms will be maintained in the student's permanent file within the Department of Microbiology and Immunology. The file will be used for monitoring student's progress towards the Ph.D. degree. The GPC will review the Graduate Student Status forms (at least once per semester) and, if necessary, make appropriate recommendations to the student and his/her major advisor. In addition, each student must update on an annual basis his/her student file as to current address.

Each student is responsible for generation of an Individual Development Plan (IDP). The recommended process for generating this document is to follow the instructions at the following website: <http://myidp.sciencecareers.org/>. Certification that the IDP has been created should be submitted to the GPC yearly. The overall outcome including short and long term goals should be shared with the student's major advisory and GAC. The form for reporting this information to the GAC is included in the appendix. Yearly progress towards the goals set forth in the IDP should be shared with the GAC at the yearly committee meetings.

Appeals:

Under extraordinary circumstances, appeals to the GPC may be made to waive certain Department requirements, but not University requirements. The GPC lacks the authority to waive University requirements and guidelines. Both the student's advisor (and/or GAC) and the student must petition the GPC separately in writing for a waiver. If the GPC considers the petition favorably, the petition will be sent, along with a letter of recommendation, to the office of the Chairperson, School of Medicine Graduate Committee and made a part of the student's permanent file.

GRADUATE CURRICULUM IN MICROBIOLOGY AND IMMUNOLOGY

General Guidelines:

- Courses - Students in the graduate program in Microbiology and Immunology must meet all requirements specified in their approved curriculum of study in order to obtain a degree. However, the student's Graduate Advisory Committee (GAC) can elect to alter the curriculum requirements when such changes are beneficial to the student.
- MICR690 - All students are required to attend all Departmental Seminars and all presentations in the Student Research Seminar series throughout their tenure. Beginning with the second year of the program, students give an annual presentation in the Student Research Seminar series. Ph.D. students should present at least 4 research seminars during their tenure as graduate students. A seminar as part of the thesis defense will fulfill this obligation in the last year of the student's graduate tenure.
- MICR692 or 694 - Students are required to register for one Journal Club per year, starting in the second year of the program.
- Research - Ph.D. and M.D./Ph.D. students in the Department of Microbiology and Immunology are required to conduct an original, independent research project under the supervision of their advisor. The research project is a major component of the graduate curriculum. A dissertation (Ph.D. or M.D./Ph.D. degree) reporting the results of an original investigation and its significance in relation to existing scientific knowledge must be written. It should conform to the general style and format of journals such as those published by the American Society for Microbiology (this format is specified by the MCV Graduate Committee).

A. Doctor of Philosophy (Ph.D.) Program

The student and the student's GAC will formulate a suitable curriculum of study based on the student's area of interest.

Curriculum: All Ph.D. programs of study should include:

- IBMS 600 Laboratory Safety
- IBMS 620 Laboratory Rotations (for total of 6 credits)
- OVPR 601/602/603 Scientific Integrity and/or Responsible Conduct of Research
- MICR 505 Immunobiology
- MICR 515 Principles of Molecular Microbiology
- MICR 690 Research Seminar
- Journal Club - For the second year and beyond, students register for one of the following journal clubs based on their research interests students may select from three possibilities listed below:
 - MICR 692 Current Topics in Molecular Pathogenesis
 - MICR 694 Current Topics in Immunology

Other Courses (students must take at least 6 credits of the following 600-level courses):

- MICR 686 Advanced Immunology - can be taken twice for a grade by Immunology Track students.
- MICR 684 Molecular Biology of Cancer
- MICR 618 Molecular Bacterial Pathogenesis
- MICR 607 Techniques in Molecular Biology & Genetics
- MICR 605 Prokaryotic Molecular Genetics
- Courses in Special Topics as well as courses from other departments are encouraged and may be required by the student's GAC.

Normally, a student will have earned at least 40 semester hour credits in formal graduate courses before taking the comprehensive written examination. A maximum of eight semester hours of graduate credits applicable toward the degree may be transferred from another recognized institution or from another Virginia Commonwealth University program. This requires the recommendation of the student's GAC and approval by the GPC and the chair of the Graduate Committee of the School of Medicine. A typical curriculum schedule for the Ph.D. program is outlined in the Appendix.

Seminars: Ph.D. students are required to attend Research Seminar (MICR690) throughout their tenure in the graduate program regardless of whether or not they are registered for MICR690 for credit. First year students will not give presentations during the course. Students must be registered for MICR690 during Fall and Spring semesters throughout their second and subsequent years. However, the student is required to present a seminar for only one semester within a given year. Students typically present at least three research seminars based on their research prior to their dissertation defense. The dissertation presentation may be used to fulfill the last year's research seminar requirement. The guidelines defining the nature of these presentations are set by the MICR690 Course Director.

Written examination (grant proposal) and oral defense of proposal: The student generally takes the Written and Oral examinations late in the second or early in the third year of study. The written component of the exam will be based upon the student's independently-written grant proposal. This written effort must be accomplished by the student without input from the faculty mentor. However, the student is allowed to solicit advice about grant-writing, aims, feasibility, etc. from members of the department or from members of their Graduate Advisory Committee (GAC). The student's faculty advisor is not allowed to provide text editing or specific recommendations about aims or grant structure. This document will be assessed by all of the members of the student's Graduate Advisory Committee according to the Rubric provided by the School of Medicine.

The oral examination is designed to assess the student's aptitude and potential to ultimately perform as an independent scientist. This examination involves the defense of a research proposal written by the student that describes the research plan he/she expects to follow. The student will be evaluated based on his/her ability to (a) demonstrate the ability to define scientific problems and design reasonable and efficient experimental plans to solve them, (b) explain the rationale behind the choice of methods and experimental designs presented in the proposal, and evaluate alternative approaches, (c) demonstrate a developing knowledge of the literature and methodologies relevant to the proposal, and (d) demonstrate a developing ability to critically evaluate both the literature and his/own experimental results.

a. Preparation of the grant proposal. The student writes a research grant proposal on his/her own research project according to the instructions that apply to the 'Research Plan' section of a NIH Predoctoral Fellowship (F31) application.

Note that the research proposal is not intended to confine the development of the student's independent research project, which may take on different directions depending upon new results. This grant proposal will serve as the written exam instrument as well as a departure point for questioning for the oral comprehensive examination (see below).

The Research Proposal should not exceed 7 single-spaced pages in total. Brief guidelines for the proposal's format are as follows:

I. Specific Aims (1 page). What do you intend to do or discover? State your research project in 2 to 3 clear and realistic one-sentence aims. Also, state the hypothesis to be tested for each aim. A few more sentences after each objective may be necessary to clarify the rationale and innovation of the project.

II. Research strategy (6 pages)

Significance. Why is the work you are going to do important? How is the project important to the field?

Innovation. How are the techniques or hypotheses to be tested novel? How do the proposed studies push the field in new directions?

Preliminary Studies. Describe your own preliminary studies and the data you have obtained in the laboratory that are relevant. Graphs, tables and figures are encouraged.

Research Design and Methods. Discuss the experimental design for each Specific Aim in detail. Briefly describe the procedures that will be used. Include how the data will be collected, analyzed and interpreted. Describe new methods and the advantages over existing methods. Discuss the potential difficulties and limitations of the proposed procedures. Describe alternative and complimentary approaches to achieve the aims.

The writing of the proposal should reflect the **student's own efforts**. The student transmits the grant proposal to the student's Graduate Advisory Committee (GAC) and to the Graduate School at least two weeks prior to the date of the oral examination.

A memo should be sent to the GPC Chair to document that the student has passed the written exam (see Appendix). In case of failure, the examination may be retaken only upon approval of the department GPC . The retake of the written examination must occur within 90 days following the first examination. If the examination is failed a second time, the student will not be allowed to continue in the Ph.D. program.

b. Oral Defense of the Proposal: The research grant proposal prepared by the student (see above) will serve as the departure point for questioning for the oral part of the examination.

Although the examination will focus on the proposal and related subjects, questions should be asked to test the breadth of the student's analytical abilities in peripheral areas as well. The oral examination must be scheduled through the Graduate Education Office (via GradTrak). The oral examination committee will consist of the student's GAC and the Dean or a designated Dean's representative. Following the oral examination, the oral examination committee meets in executive closed session to vote. All members of the oral examination committee must vote to either Pass or Fail the student. To pass the examination, the student must receive no more than one negative vote. The chair of the GAC will submit a memo (see Appendix) to the department GPC indicating that the student has passed the oral examination, thus recommending that the student be admitted to candidacy for the Ph.D. degree. The GPC will then forward the recommendation to the Chair of the Graduate Committee.

To qualify as a Ph.D. candidate, both the written and oral examinations should be completed prior to the start of the fourth year of training. Entering into Ph.D. candidacy is associated with tuition relief provided by the graduate school. Both the written and oral examinations must be successfully completed at least six months before submission of the doctoral dissertation. If failed, the orals examination must be retaken within 60 days with approval of the GPC and the School's Graduate Committee. If the examination is failed a second time, the student will not be allowed to continue in the Ph.D. program and will be transferred to the M.S. program. The student is then subject to all stipulations and guidelines that govern the M.S. program.

Dissertation: Ph.D. students must complete an original, independent research project under the supervision of their advisor. A written dissertation is prepared to report the results of an original investigation and its significance in relation to existing scientific knowledge. The goal of a scientist is to create new knowledge, and so the dissertation should formally demonstrate the student's ability to achieve this goal. Consequently, the quality and quantity of new knowledge that is generated will be the primary factor in determining the acceptability of a student's dissertation to his/her advisor and GAC. However, it is not possible to describe a precise standard by which to judge the acquisition of new knowledge. The following benchmarks are offered as a guide to students and their GAC's to evaluate the body of work: (a) A dissertation should address a significant biological or medical problem. In that it represents considerable effort by the student, the expenditure of time and resources should be justified. (b) A dissertation should be focused. The hypotheses tested should be clearly related to a well-defined subject, and the questions addressed should build upon one another to develop a body of knowledge. A series of unrelated findings should not be acceptable. (c) The conclusions drawn should be valid and based on adequate evidence presented. Appropriate controls should be clear in each experiment, and the technologies used should be modern and sufficiently powerful.

The format of the dissertation should conform in general style to that of journals such as those published by the American Society for Microbiology as specified by the Dean's office. Each member of the student's GAC must sign a signature page signifying his/her approval of the final dissertation document.

Dissertation defense: Upon satisfactory completion of all required formal course work, passing of the written and oral examinations, and approval of the dissertation by the student's GAC, the student's advisor will notify the Chair of the Graduate Program Committee and schedule the dissertation defense. The time and place of the defense, along with the candidate's name, department, and dissertation title

shall be announced by the Graduate School at least seven days prior to the scheduled day of the defense.

The first part of the dissertation defense consists of a seminar in which the student presents the research project. The seminar is open to all interested parties and is followed by questions from the audience. The second part of the defense consists of an oral examination conducted in closed session and open only to the faculty and the student's oral examination committee. The oral examination committee consists of all members of the student's GAC (There is no Dean's Representative for the Dissertation Defense). The oral examination committee will ask questions concerning the course work and the dissertation, and will assess the student's ability to think and communicate using facts and concepts gained from his/her studies. Faculty who are not members of the oral examination committee are also expected to ask questions and may comment, but not vote, on the success or failure of the candidate. The student's advisor, as Chair of the oral examination committee, must allow ample time during the examination for questioning by faculty members. Following the oral examination, the oral examination committee meets in executive closed session to vote. All members of the oral examination committee must vote to either Pass or Fail the student. To pass, the student must receive no more than one negative vote. If the student fails the dissertation oral examination, he/she after consultation with his/her Graduate Advisory Committee, may repeat the oral examination component within 90 days following approval by the GPC and the Graduate Committee. If the student fails the examination a second time, then he/she is dismissed from the Ph.D. program.

B. Doctor of Medicine/Philosophy (M.D./Ph.D.) Program (See Addendum I)

A suitable curriculum of study will be formulated by the student and the Graduate Advisory committee based on the student's area of specialization. M.D./Ph.D. students must follow the guidelines established by the M.D./Ph.D. Steering Committee. All M.D./Ph.D. programs include two years of course work in the medical curriculum and usually three laboratory rotations before beginning the graduate phase of the program. Students must register for Scientific Integrity (OVPR 601/602/602) and IBMS 600 Laboratory Safety.

Seminars: Students must attend the bi-monthly research meetings of the M.D./Ph.D. program. Attendance at research seminar sessions of MICR690 is recommended.

Curriculum: A typical curriculum of study for the M.D./Ph.D. in Microbiology and Immunology contains a nucleus of graduate courses similar to those found in the Ph.D. degree program. Normally, a student will have completed 18 months of course work in the Medical School Curriculum and earned about 24 semester credit hours in graduate-level course work (including Directed Research) before taking the written examination. (See Appendix).

Grant Proposal, Written and Oral Examinations, Dissertation, and Defense: The requirements for a grant proposal, for written and oral examinations, and for the dissertation and oral defense are as indicated for the Ph.D. program (see above). However, unlike Ph.D. students, M.D./Ph.D. students who fail their comprehensive examinations twice do not have the option of transferring to an M.S. program, but will be transferred to the M.D. program. In addition, M.D./Ph.D. students must pass Step I of the National Medical Board Examination in order to continue in the Graduate Program.

MODEL CURRICULUM FOR Ph.D. PROGRAM

Department of Microbiology & Immunology

Semester 1 (BSDP) - Fall

- Counselor assigned
- MICR 692 or MICR694 Journal club
- IBMS 600 Laboratory Safety
- IBMS 620 Laboratory Rotations
- MICR 690 Departmental Seminar
- MICR 505 Immunobiology
- MICR 515 Principles of Molecular Microbiology

Semester 2 (BSDP) - Spring (* offered in alternate spring semesters)

- IBMS 620 Laboratory Rotations
- OVPR601/602/603 Scientific Integrity
- MICR686 Advanced Immunology
OR
- MICR618 Molecular Bacterial Pathogenesis *
OR
- MICR684 Molecular Biology of Cancer
- MICR690 Research seminar
- **Cumulative GPA of 3.0 required to continue**
- **Permanent Advisor chosen after rotations completed**

Summer

- MICR697 Research

Year 2 (Microbiology & Immunology): Semesters 3-4 - Fall / Spring (+ = electives)

- MICR697 Research
- OVPR601 Scientific Integrity
- MICR607 Techniques +
- MICR690 Research Seminar
- MICR692 or MICR694 Journal Club
- MICR605 Molec. Genetics +
- MICR684 Molec Biol of Cancer +
- MICR/BNFO 653 Adv. Molec. Genetics +
- Student's GAC formed, 1st meeting held in the fall

Summer

- MICR697 Research (3 credits)
- Proposal preparation (written exam)
- Oral examination

Year 3 (Microbiology & Immunology): Semester 5-6 - Fall / Spring

- MICR697 Research
- MICR690 Research Seminar
- MICR692 or MICR694 Journal Club

Summer

- MICR697 Research

Years 4-5 (Microbiology & Immunology) Fall / Spring

- MICR697 Research
- MICR690 Research Seminar
- MICR692 or MICR694 Journal Club

Summer

- MICR697 Research

Summary of Degree Requirements

Department of Microbiology & Immunology

	Ph.D.	M.D./Ph.D.
Minimum Grade Point Average	3.0	3.0
MICR 505	Yes	Recommended
MICR 515	Yes	Recommended
Laboratory Safety (IBMS 600)	Yes	Yes
Laboratory Rotations (IBMS 620)	Yes	No
Scientific Integrity (OVPR 601/602/603)	Yes	Yes
Examinations	Written + Oral	Written + Oral
National Medical Boards	No	Yes
Research Seminar [IBMS 690 (first year) and MICR 690]	Yes	Yes
Oral Examination/Defense	Yes	Yes

*after the first year in the program

**SEMESTER REPORT ON GRADUATE STUDENT STATUS
DEPARTMENT OF MICROBIOLOGY AND IMMUNOLOGY
SEMESTER REPORT ON GRADUATE STUDENTS**

Semester Report on Graduate Student Status: Fall Spring Year: _____

Student Name: _____

Advisor Name: _____

Degree Sought: MS PhD MD/PhD

Has your committee been formed in GradTrak? _____ Yes No _____

Has your committee been approved in GradTrak? _____ Yes No _____

Graduate Advisory Committee (Required one per Academic Calendar Year):

Date of Graduate Advisory Committee Meetings (Required one per Academic Calendar Year)	Minutes Submitted	IDP reviewed

Graduate Advisory Committee Meeting planned for: _____

Have you completed your Individual Development Plan (IDP)? ___ Yes No ___

Have you reviewed your IDP with your Advisor? ___ Yes No ___

Have you reviewed your IDP with your Committee? ___ Yes No ___

Have you updated your IDP at least once per year? ___ Yes No ___

Qualifying Examinations (date of completion or planned examination):

Written Exam (Date Taken)	Passed (Yes or No)	If No, Written exam retaken (Date)	Passed (Yes or No)

If not taken, has the examination been planned? _____

If so, when? _____

Oral Exam (Date Taken)	Passed (Yes or No)	If No, Oral exam retaken (Date)	Passed (Yes or No)

Individual Funding Proposal (Grant):

Date Submitted	Title	Agency	Funded Yes/No	Date Awarded	Grant Number	Award Period

Manuscripts (In Prep, In Progress, Submitted, Published) Please provide the complete citation with PMID and PMCID:

Ex: P. aeruginosa SGNH Hydrolase-Like Proteins AlgJ and AlgX Have Similar Topology but Separate and Distinct Roles in Alginate Acetylation. Baker P, Ricer T, Moynihan PJ, Kitova EN, Walvoort MT, Little DJ, Whitney JC, Dawson K, Weadge JT, Robinson H, Ohman DE, Codée JD, Klassen JS, Clarke AJ, Howell PL. PLoS Pathog. 2014 Aug 28;10(8):e1004334. doi: 10.1371/journal.ppat.1004334. eCollection 2014 Aug. PMID: 25165982 PMCID:PMC4148444

****Please update each semester, adding new publications first****

Manuscripts

Conferences:

Title of Meeting	Dates and Location of Meeting	Poster or Oral Presentation Title	Travel Award Yes/No

Awards:

Title of Award	Organization Presenting Award	Travel Award Yes/No

Community Service:

Community Service Description (ex, ____ Middle School Science Fair Judge; Assist High School Student with project)	Date

Student signature: _____ **Date:** _____

Advisor Comments [Comments on academic status, grade point average, course work, Research Seminar Presentations; Any Changes in Committee composition, course plan, or research project since initial approval by MCV Graduate Committee; Comments on Student’s scholarly productivity (abstracts, manuscripts, oral presentations and attendance at meetings, etc.)]:

Anticipated date of completion of all degree requirements (Semester/Year): _____

Advisor signature: _____ **Date:** _____

STUDENT'S GRADUATE ADVISORY COMMITTEE (GAC) MEETING REPORT

Department of Microbiology & Immunology

Student:

Degree Sought / Year in Program:

Major Advisor:

Meeting Date/Time/Place:

Was the student's updated IDP discussed at this meeting? ___Yes No___

If no, why not? _____

Committee Members (NP = indicated if not present):

- 1.
- 2.
- 3.
- 4.
- 5.

Comments on the meeting and progress of the student:

GRADUATE STUDENT WRITTEN EXAMINATION REPORT

Department of Microbiology & Immunology

Examination (Written):

Student:

Degree Sought / Year in Program:

Major Advisor:

Meeting Date/Time/Place:

Title of Research Project:

Graduate Advisory Committee Members (indicate Pass or Fail for each):

Committee Member Name (Please Print)	Pass/Fail
1.	
2.	
3.	
4.	
5.	

Comments on the completion of the written exam:

Submit completed form to the GPC Chair

GRADUATE STUDENT ORAL EXAMINATION REPORT

Department of Microbiology & Immunology

Completion of Oral Exams

Name _____

VCU ID NUMBER (-----) _____

Date of Completion _____

Advisor Signature _____

Committee Member Sign

Print

Committee Member Sign

Print

Committee Member Sign

Print

Committee Member Sign

Print

Dean's Rep Sign

Print

For Advisor Use Only

Authorization for Stipend

Budget Code to charge: _____

Advisor Signature: _____

Office Use Only

Date Received: _____

Date Completed: _____

Program Performance Evaluation

Student's Name _____ Student ID No.: V _____

Date: _____ Program: _____ Degree: _____

	Unsatisfactory (1)	Satisfactory (2)	Exemplary (3)
Demonstrates Oral Communication Skills			
Demonstrates Written Communication Skills			
Displays Competence in Experimental Design			
Demonstrates Problem Identification and Solving Skills			
Displays Integrated Knowledge of Bioscience			
Overall			

Comment (optional):

Written Candidacy Examination Scoring Rubric

1. Identifies Appropriate Background / Existing Information

Unacceptable - Weak or inappropriate information related to problem/question is presented; lack of appropriate citations

Acceptable – Appropriate information related to problem / question is presented with appropriate citations

Excellent - Information presented related to problem / question displays expanded scope and relevance

Outstanding - Information presented displays expanded scope and relevance and is organized to enhance response to the problem / question presented

2. Presentation, Assessment and Analysis of Supporting Evidence

Unacceptable - Confused presentation of information and evidence in support of answer(s)

Acceptable – Organization of evidence and analysis is generally clear but may contain flaws

Excellent - Organization of evidence and analysis reflects clear relationships of information supporting response

Outstanding – Organization of evidence and analysis is exceptionally clear in showing relationships of information supporting response including an indication of the relative importance of components of the evidence presented

3. Develops, Communicates and Explains Answers Clearly and Effectively

Unacceptable - Response is not supported by evidence or evidence related to the answer given

Acceptable - Response incorporates evidence appropriate to the problem / question; demonstrates ability to organize evidence to support response though logical presentation may be flawed

Excellent – Answers are consistently well developed with appropriate evidence and / or examples presented in support; demonstrates ability to combine elements of evidence in creative ways to construct a logical and effective answer; some inconsistencies may be present

Outstanding – Answers demonstrate skills in logic and creativity in the selection of evidence including an evaluation of the relative merit of sources, an appropriate weighting of sources which are combined clearly to provide a logical and effective response

4. Uses Appropriate Grammar, Vocabulary and Style

Unacceptable –

Shows patterns of flaws in grammar, syntax and word choice that interferes with intended meaning or communication

Acceptable –

Demonstrates competent writing; may have occasional grammatical or syntax flaws. Flaws do not interfere with intended meaning or communication.

Excellent –

Displays command of grammar, selection of vocabulary and syntax; may have limited minor flaws

Outstanding –

Displays superior use of grammar, syntax and vocabulary to enhance meaning and communication

Written Examination Performance Evaluation

Student's Name _____ **Student ID No.:** V _____

Date: _____ **Program:** _____ **Degree:** _____

	Unacceptable (1)	Acceptable (2)	Excellent (3)	Outstanding (4)
Identifies Background / Existing Information				
Presents, Assesses and Analyzes Supporting Evidence				
Develops, Communicates and Explains Answers Effectively				
Uses Appropriate Grammar, Vocabulary and Style				
Overall				

Comment (optional):

Table 1. The Characteristics of Dissertations

Below are the criteria the focus group members specified for each level of dissertation quality.

Outstanding	Very Good
<ul style="list-style-type: none"> • Is original and significant, ambitious, brilliant, clear, clever, coherent, compelling, concise, creative, elegant, engaging, exciting, interesting, insightful, persuasive, sophisticated, surprising, and thoughtful • Is very well written and organized • Is synthetic and interdisciplinary • Connects components in a seamless way • Exhibits mature, independent thinking • Has a point of view and a strong, confident, independent, and authoritative voice • Asks new questions or addresses an important question or problem • Clearly states the problem and why it is important • Displays a deep understanding of a massive amount of complicated literature • Exhibits command and authority over the material • Argument is focused, logical, rigorous, and sustained • Is theoretically sophisticated and shows a deep understanding of theory • Has a brilliant research design • Uses or develops new tools, methods, approaches, or types of analyses • Is thoroughly researched • Has rich data from multiple sources • Analysis is comprehensive, complete, sophisticated, and convincing • Results are significant • Conclusion ties the whole thing together • Is publishable in top-tier journals • Is of interest to a larger community and changes the way people think • Pushes the discipline’s boundaries and opens new areas for research 	<ul style="list-style-type: none"> • Is solid • Is well written and organized • Has some original ideas, insight • Has a good question or problem that tends to be small and traditional • Is the next step in a research program (good normal science) • Shows understanding and mastery of the subject matter • Has a strong, comprehensive, and coherent argument • Includes well-executed research • Demonstrates technical competence • Uses appropriate (standard) theory, methods, and techniques • Obtains solid, expected results or answers • Misses opportunities to completely explore interesting issues and connections • Makes a modest contribution to the field but does not open it up

Acceptable

- Is workmanlike
- Demonstrates technical competence
- Shows the ability to do research
- Is not very original or significant
- Is not interesting, exciting, or surprising
- Displays little creativity, imagination, or insight
- Writing is pedestrian and plodding
- Has a weak structure and organization
- Is narrow in scope
- Has a question or problem that is not exciting—is often highly derivative or an extension of the adviser's work
- Displays a narrow understanding of the field
- Reviews the literature adequately—knows the literature but is not critical of it or does not discuss what is important
- Can sustain an argument, but the argument is not imaginative, complex, or convincing
- Demonstrates understanding of theory at a simple level, and theory is minimally to competently applied to the problem
- Uses standard methods
- Has an unsophisticated analysis—does not explore all possibilities and misses connections
- Has predictable results that are not exciting
- Makes a small contribution

Unacceptable

- Is poorly written
- Has spelling and grammatical errors
- Has a sloppy presentation
- Contains errors or mistakes
- Plagiarizes or deliberately misreads or misuses sources
- Does not understand basic concepts, processes, or conventions of the discipline
- Lacks careful thought
- Looks at a question or problem that is trivial, weak, unoriginal, or already solved
- Does not understand or misses relevant literature
- Has a weak, inconsistent, self-contradictory, unconvincing, or invalid argument
- Does not handle theory well, or theory is missing or wrong
- Relies on inappropriate or incorrect methods
- Has data that are flawed, wrong, false, fudged, or misinterpreted
- Has wrong, inappropriate, incoherent, or confused analysis
- Includes results that are obvious, already known, unexplained, or misinterpreted
- Has unsupported or exaggerated interpretation
- Does not make a contribution

Table 2. Some Dimensions of the Different Components of the Generic Dissertation

The following dimensions emerged from the analysis of the results of the study described in this article.

Component 1: Introduction

The introduction

- Includes a problem statement
- Makes clear the research question to be addressed
- Describes the motivation for the study
- Describes the context in which the question arises
- Summarizes the dissertation's findings
- Discusses the importance of the findings
- Provides a roadmap for readers

Component 2: Literature Review

The review

- Is comprehensive and up to date
- Shows a command of the literature
- Contextualizes the problem
- Includes a discussion of the literature that is selective, synthetic, analytical, and thematic

Component 3: Theory

The theory that is applied or developed

- Is appropriate
- Is logically interpreted
- Is well understood
- Aligns with the question at hand

In addition, the author shows comprehension of the theory's

- Strengths
- Limitations

Component 4: Methods

The methods applied or developed are

- Appropriate
- Described in detail
- In alignment with the question addressed and the theory used In addition, the author demonstrates
- An understanding of the methods' advantages and disadvantages
- How to use the methods

Component 5: Results or Analysis

The analysis

- Is appropriate
- Aligns with the question and hypotheses raised
- Shows sophistication
- Is iterative

In addition, the amount and quality of data or information is

- Sufficient
- Well presented
- Intelligently interpreted

The author also cogently expresses

- The insights gained from the study
- The study's limitations

Component 6: Discussion or Conclusion

The conclusion

- Summarizes the findings
- Provides perspective on them
- Refers back to the introduction
- Ties everything together
- Discusses the study's strengths and weaknesses
- Discusses implications and applications for the discipline
- Discusses future directions for research

Thesis/Dissertation Evaluation

Student's Name _____ **Student ID No.: V** _____

Date: _____ **Program:** _____ **Degree:** _____

	Unacceptable (1)	Acceptable (2)	Excellent (3)	Outstanding (4)
Introduction – Provides a Problem Statement, Context, Strategy and Overall Findings				
Literature Review – Incorporates a Current Summary and Analysis of Literature				
Theory – Explains the Approach to Addressing the Problem				
Methods – Provides Adequate Description Related to Addressing Problem				
Results / Analysis – Appropriate Presentation of Data and Alignment with Stated Problem				
Discussion / Conclusion – Summarizes and Integrates Results; Discusses Implications and Future Direction				
Overall				

Comments (optional):