UNIVERSITY OF PUERTO RICO
MEDICAL SCIENCES CAMPUS
SCHOOL OF MEDICINE
DEPARTMENT OF MICROBIOLOGY AND MEDICAL ZOOLOGY

MANUAL FOR THE MASTER OF SCIENCE AND DOCTOR OF PHILOSOPHY DEGREES REQUIREMENTS AND REGULATIONS

This document describes the rules and regulations of the MS and PhD Program of the Department of Microbiology and Medical Zoology and is intended to complement the document titled: "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations, Revised February 2013" of the Division of Biomedical Sciences and Graduate Studies, University of Puerto Rico, School of Medicine, approved by the Institutional Academic Senate, Certification 021, 2013-2014.

Revised, amended, and approved by the Departmental Graduate Studies Committee on February 8, 2022 (Initial document revised on July 11, 1996 (CLC/mnf/cavm).

Dr. Filipa Godoy, Chair of the Department of Microbiology and Medical Zoology

Dr. Ana M. Espino, Coordinator of Microbiology's Department Graduate Program

Dr. Edna E. Aquino, Member, Microbiology's Department Graduate Studies Committee

Dr. Stephanie Dorta, Member, Microbiology's Department Graduate Studies Committee

Dr. Yisel Cantres, Member, Microbiology's Department Graduate Studies Committee

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I. REQUIREMENTS FOR ADMISSION

Students may enter the graduate program in Microbiology and Medical Zoology after receiving a bachelor's, a master's degree, or an equivalent degree in science from an accredited institution. According to the rules and regulations of the University of Puerto Rico, the applicant must complete the application process of the Graduate School of Biomedical Sciences. In addition:

1. It is expected that the applicant has completed the following basic science courses:

    a. General Biology (8 semester credits)
    b. Organic Chemistry (8 semester credits)
    c. General Chemistry (8 semester credit)
    d. General Physics (8 semester credits)
    e. Mathematics (at least one course in Calculus, 3 semester credits)
    f. Other courses are recommended (but not required) like: Analytical Chemistry, Biochemistry, Molecular Biology, Immunology, Parasitology, Microbiology, Statistics, Bioinformatics, Computer Sciences and English Writing for Science majors.

2. It is required that the student has a minimum general grade point average (GPA) of 3.0 (in a scale of 4.0) as well as in science courses (GPS).
   *The grade point average in science courses (GPS) [science and mathematics courses] of the master's in sciences (MS) or master's in health sciences (MHS) programs will be considered for the GPS calculation for admission.

3. The applicant must be interviewed by the Departmental Graduate Studies Committee or by at least two members of the Departmental faculty.

4. The applicant must be fluent in both Spanish and English.

5. The applicant should submit three letters of recommendation; at least two of these must be from professors in the major field of study.

6. The applicant needs to write an essay in English with a maximum among 250-400 words with a brief description of his/her interest in the field of Microbiology.

7. The applicant should provide evidence of any previous research experience (abstracts, papers, etc.).

8. Additional information about admission requirements, application forms, recommendation

letters official form, etc. is available at www.md.rcm.upr.edu/biomed and in Section I of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations, Revised February 2013"

Applicants will be admitted to the program for the first Semester of each academic year. The application deadline for admission is **December 1**. Admission is subject to the approval by the Departmental Graduate Studies Committee, and the Graduate Program Committee of the Graduate School, Division of Biomedical Sciences, School of Medicine of the University of Puerto Rico, Medical Sciences Campus. Only applicants with fully completed application forms and application requirements will be considered for admission.

II. ACCREDITATION OF COURSES

Students admitted to the PhD Program, which have completed a MS degree in our department or any other Graduate Program of the UPR School of Medicine Division of Biomedical Sciences could substitute up to 24 credits of the courses approved for the MS degree during a period of no more than 4-6 natural years to the approval.

If the MS degree was completed in an accredited public or private institution in Puerto Rico or in the United States, the Department will review the academic record of the student and the course Syllabi (descriptions) to determine which master's courses completed at the other institutions may be validated. The maximum number of credits that will be validated from other institutions is 24. Only graduate courses completed during a period of no more than 4-6 natural years at the time of approval, and for which grades of "B" or higher has been obtained, will be considered for validation based on the nature of their content and the student's major area of specialization.

Either the substitution or validation of courses must be made at the time of application to the Graduate School of the Medical Sciences Campus. The substitution or validation of courses will be processed according to the rules and regulations of the Registrar's Office of the University of Puerto Rico, Medical Sciences Campus. For more information, see Appendix H of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations".

Students enrolled in the master's degree Program of the Department of Microbiology and Medical Zoology with an accepted transfer to the PhD Program will have all the approved graduate courses transferred to the PhD Program.

Courses taken with "Special Permission", if approved with a minimum grade of "B", could be transferred to the student graduate academic profile if they are accepted in the Graduate Program, but **CANNOT** be used to calculate the GPS for admission to the Graduate Program.

III. STUDY PROGRAM

A. GRADUATE COURSES

A student who fully satisfies the admission requirements and is admitted to the program becomes a regular student with a full-time commitment of 9 or more credits per semester, unless registered in special courses. **The students are obligated to comply with a residency requirement of a minimum of 40 hours per week (including the summer period)** when enrolled for thesis/dissertation credits for a period of one (1) year for MS students and two (2) years for PhD students (Section VIII of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations"). The admitted student should be familiar with the **departmental bylaws** described in this manual to comply with all requirements, regulations, and responsibilities.

All students pursuing an MS or PhD degree in Microbiology must commit to their program full-time. The following outlines the sequence of steps expected from each student regarding their academic program.

1. Admission as regular student
2. Master's degree students will take one and a half years of coursework, while PhD students will take two years of coursework under the guidance of the Departmental Graduate Student Coordinator.
3. Selection of the Thesis/Dissertation Advisor and Thesis/Dissertation Committee no later than the second semester of their first year for MS students and no later than the second semester of the second year for PhD students.
4. For PhD students, the Qualifying Examination should be taken during the first semester of the third year or as soon as the departmental and/or course requirements have been met.
5. Doctoral's degree students will have an approved degree candidacy after meeting all Departmental and Graduate Program requirements, passing the Qualifying Examination and approval of the research proposal.
6. Master's degree students should have an approved thesis proposal to get the MS candidacy.
7. Students must meet twice a year with their Thesis/Dissertation Committee to discuss their research progress. The agreements from the meeting will be summarized in the Appendix E, which will be submitted to the Deanship of Biomedical Sciences at the end of May of each year (see Appendix A and E of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations").
8. Completion of research and writing of the thesis/dissertation. The student should consult frequently with the committee members, to avoid the need for major revisions of the final copy or other unusual delays.
9. Approval of the final oral examination. The student must defend the quality of his/her research, the quality of the written thesis/dissertation, and his/her competence in other matters that the Thesis/Dissertation Committee consider important.
10. It is required that the PhD students submit for publication her/his research work.

11. The office of the Associate Dean for Biomedical Sciences will certify granting the degree.

The expected time for completion of all requirements for a master's degree is three (3) years and for a Doctoral Degree is six (6) years.

A total of 27 semester credits of coursework plus six (6) semester credits of thesis research (MICR 8599) for a total of 33 credits is the minimum required to complete the MS Degree Program. A total of 42 semester credits of coursework plus eighteen (18) semester credits of thesis research (MICR 8599) for a total of 60 credits is the minimum required for the completion of the PhD Program. Only courses approved with a grade of A, B or P will be considered for the total number of credits of course work.

The course Introduction to Medical Microbiology (MICR 8499; 6 credits) must be approved with a B or higher grade. If the student obtains a C grade in the course, a reposition exam will be given, which he/she must pass with a minimum grade of B to continue in the program. Students with D or F are not allowed to take the reposition exam and must repeat the course in the next academic year for one last time. The reposition exam will be given before the last date of late registration. If the student gets grade of C, D or F in the reposition exam, he/she must repeat the course the next academic year – as an ultimate opportunity. A failure (C, D or F) or withdrawal from the repetition of the Introduction to Medical Microbiology course will automatically dismiss the student from the Microbiology Graduate Program. Students academically dismissed will not be considered for readmission in the Microbiology Graduate Program.

A student who has a C in any of the required Departmental courses must repeat the course and pass it with a minimum grade of B.

A student with C in any other Departmental elective course could take another elective course to substitute for the one that he or she has with C.

If a student has a C in the Biochemistry courses (BCHM 8511 and BCHM 8512), he/she must repeat the course and pass it with a minimum grade of B. Those students that withdraw or failed (C, D or F) the Biochemistry courses must repeat the same courses. Students with a C grade in any of the Biochemistry courses could be allowed to take departmental courses which require Biochemistry as a pre-requisite if approved by the coordinator of the affected departmental courses.

A student whose GPA falls below 3.0 will immediately be put on probation by the Graduate Program and would not be able to participate from the "Ayudantía" Program. If the grades of the probation semester do not bring the cumulative grade point average to ≥3.00, the student is automatically dismissed from the Microbiology Graduate Program. For details of the extension of the probationary period see Appendix A of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations".

Graduate students are not allowed to withdraw from any course without the previous approval of the Departmental Graduate Committee.

A student may request a leave of absence (personal or sickness leave) from the Graduate Program by submitting a written request to the Graduate Studies Coordinator, and the Department Chair, meeting and discussing with them the petition. If the student is not in a good academic standing, that issue will not be used to request a leave of absence. The Department Chair or Graduate Studies Coordinator will present the request, with all pertinent documents and information submitted by the student, to the Graduate Committee for their perusal. The Graduate Committee, through the office of the Deanship will inform the student of the decision. For more details of the terms of leave of absence time and eventual readmission see Appendix A of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations".

REQUIRED COURSES

The student's individual course curriculum will be determined considering the student's research interests and the Departmental course requirements. The Departmental course requirements are the following:

1. Medical Microbiology (MICR 8499)	6 credits
2. Principles of Immunology (MICR 8540)	3 credits
3. Biochemistry-1 (BCHM 8511)	3 credits
4. Biochemistry-2 (BCHM 8512)	3 credits
5. Statistics for Biomedical Sciences (CBIO 8500) or MATE 6686 (Rio Piedras)	3 credits
6. Graduate Seminar (MICR 8580)	
a. MS students	1 credit
b. PhD students*	3 credits
7. Practice Teaching (MICR 8590) **	1 credit
8. Preparation of Thesis Proposal in Microbiology (MICR 8596)	1 credit
9. Introduction to Research (MICR 8496)	1 credit
10. Preparation for Qualifying Exam of Microbiology (MICR 8597)	3 credit

*It is mandatory that the 3 seminar credits must be completed as follows: 1 credit during the second, third and fourth year of graduate studies.

**To comply with the Practice Teaching course, the student will have to serve as laboratory proctor under the supervision of one Faculty member. The Departmental Graduate Committee and the Department Chairperson can exempt students that submit evidence of having previous teaching experience in Microbiology, Medical Zoology, or related fields, from this

requirement upon the approval.

ELECTIVE COURSES

The MS student must take a minimum of one (1) Departmental elective course. The PhD student must take a **minimum** of four (4) Departmental elective courses. The Departmental elective courses to be offered are the following:

1. Medical Mycology (MICR 8530) * 2 credits
2. Medical Mycology Laboratory (MICR 8531) * 1 credit
3. Virology (MICR 8510) * 3 credits
4. Protozoa (ZOME 8506) 2 credit
5. Genetics and Molecular Biology (MICR 8525) 4 credits
6. Experimental Biotechnology & Immunology (MICR 8519) 3 credits
7. Strategies in Vaccine Development (MICR 8546) 3 credits
8. Introduction to Parasitology (ZOME 8502) * 3 credits
9. Molecular Methods Applied to Microbiology (MICR 8517/MICR 8518) 3 credits.
10. Human Microbiome (MICR 8502) * 2 credits
11. Advanced Immunology (MICR 8545) * 2 credits

ADVANCED TOPICS COURSES

1. Advanced Topics in Medical Microbiology (MICR 8504-06) (1 to 3 credits)
2. Advanced Topics in Virology (MICR 8514-16) (1 to 3 credits)
3. Selected Topics in Microbiology (MICR 8517-18) (1 and 2 credits)
4. Advanced Topics in Mycology (MICR 8532-34) (1 to 3 credits)
5. Advanced Topics in Immunology (MICR 8542-44) (1 to 3 credits)
6. Advanced Topics in Microbial Genetics (MICR 8562-64) (1 to 3 credits)
7. Laboratory Methods in Parasitology (ZOME 8513-8516) (1 to 4 credits)

*Students who will pursue their research project in the areas of **Mycology, Parasitology, Virology, Immunology or Microbiome** must take the specific graduate course associated to their research field before completing the fourth (4^{th}) year of graduate studies.

The elective course ZOME 8502 (Introduction to Parasitology) will be offered every year during the second semester of the first year, whereas the other elective courses will be offered on alternate years, with at least two elective courses offered per semester.

Electives courses outside of the Department of Microbiology and Medical Zoology, and any of the courses listed as Advanced Topics in a particular field of Microbiology and Medical

Zoology can be taken. However, these extra courses will not count towards the fulfillment of the two (2) Departmental elective courses for MS students, or the four (4) elective courses for PhD students unless the Departmental Graduate Studies Committee, the Departmental Chairperson, and the appropriate Institutional Officers, if needed approve the course(s). Any new departmental structured elective course can be added to the above elective course list upon approval by the Departmental Graduate Studies Committee, the Departmental Chairperson, and the appropriate Institutional Officers.

B. ACADEMIC PROGRAM SCHEDULE FOR MASTER (MS) STUDENTS

The student admitted to the master's degree program is expected to follow a full-time schedule described as follows:

First Year

1. First semester

Introduction to Medical Microbiology (MICR 8499)	6 credits
Biochemistry I (BCHM 8511)	3 credits
Introduction to Research (MICR 8496)	1 credit
	Total: 10 credits

2. Second semester

Biochemistry II (BCHM 8512)	3 credits
Basic Immunology (MICR 8540)	3 credits
Two departmental elective courses related to the Specialization area	5-6 credits
	Total: 11-12 credits

3. Summer

Advanced Topics in the specialization area	1-3 credits

Second Year

1. First semester

Biostatistical / Bioinformatic (MATE 6686)	3 credits
Preparation of Thesis proposal in Microbiology (MICR 8596)	1 credit
Ethic CBIO 8991	1 credit
	Total: 5 credits

2. Second semester

Master's Thesis (MICR 8595)	6 credit
Practice Teaching (MICR 8590)	1 credit
Graduate Seminar (MICR 8580)	1 credit
Ethics CBIO 8992	2 credits

Total: 10 credits

3. **Summer**
   Advance Topics in the specialization area 1-3 credits

Third Year

1. **First semester:**
   MICR 8595 0 credit

2. **Second Semester**
   Thesis Defense 0 credit

Total 33 minimum credits are required (this does not include summers courses and Ethic courses).

It is expected that the student completes all requisites to degree in two years and defend his (her) thesis during the second semester of third year. From the first semester of the third year and until graduation time, student should register in the course master's Thesis (MICR 8595) (0 credits).

To complete the time to degree to MS, the student will follow this sequence of events:

a) Choose the mentor early during the 2nd semester of first year (January-February).
b) Name the Thesis Committee and have it approved by the Graduate Program by the end of second semester (May) of the first year.
c) The Thesis Proposal defense must be scheduled and completed during the first semester of 2nd year.
d) The experiments scheduled in the thesis project should begin no later than January (2nd semester). The project assigned to the student must be performed in no more than one year. It is recommended that specific aims be limited to one or two.

   - If for example, the proposed project includes work with animal and/or human samples, it is required that these samples are already collected and ready for analysis in the laboratory. The student should not have to wait for IACUC or IRB approval of protocols to complete their master's degree.
   - Projects that involve new techniques or protocols cannot be used for a master's thesis to avoid and decrease troubleshooting that the student might encounter.

e) When submitting the Thesis Proposal, the student must submit a "Timeline" of the proposed experiments so that the Graduate Program Committee can evaluate whether the proposed goals are realistic/feasible for a one-year project. The Graduate Program Committee will not interfere with the science involved; it will only evaluate the project's viability for the suggested timeline.

C. ACADEMIC PROGRAM SCHEDULE FOR PhD STUDENTS

A **PhD student** is expected to follow a full-time schedule described as follows:

First Year

1. **First semester**

Introduction to Medical Microbiology (MICR 8499)	6 credits
Biochemistry I (BCHM 8511)	3 credits
Introduction to Research (MICR 8496)	1 credit
	Total: 10 credits

2. **Second semester**

Basic Immunology (MICR 8540)	3 credits
Biochemistry II (BCHM 8512)	3 credits
Two departmental elective courses	3-5 credits
Advanced Topics Course (Lab Rotation)	2-3 credits
	Total: 11-12 credits

3. **Summer**

Advanced Topics Course (Lab Rotation)	3 credits

Second Year

1. **First semester**

Advanced Topics Course (Lab Rotation)	2-3 credits
Statistics for Biomedical Sciences (CBIO 8500)	3 credits
One departmental elective course	3-4 credits
	Total: 8-10 credits

2. **Second semester**

One departmental elective course	3 credits
Advanced Topics Course (Lab Rotation)	4 credits
Graduate Seminar (MICR 8580)	1 credit
Practice Teaching (MICR 8590)	1 credit
	Total: 9 credits

3. **Summer**

Advanced Topics Course (Lab Rotation)	3 credits

Third Year

1. **First Semester**

Qualification Exam MICR 8597 3 credits
Ethic part-1 (CBIO 8991) 1 credit
Total: 4 credits

2. **Second Semester**
   Graduate Seminar (MICR 8580) 1 credit
   Preparation of Thesis Proposal in Microbiology (MICR 8596) 1 credit
   Ethic part-2 (CBIO 8992) 2 credits

   Total: 4 credits
3. **Summer**
   Advanced Topics Course (Lab Rotation) 3 credits

Fourth Year

1. **First Semester**
   Graduate Seminar (MICR 8580) 1 credit
   Doctoral Dissertation (MICR 8599) 15 credits
   Total: 16 credits
2. **Second Semester**
   Doctoral Dissertation (MICR 8599) 0 credit
   Total: 0 credits

Total 60 minimum credits (this does not include summer courses and Ethic courses). If the student takes more than four years to complete his/her degree she (he) should registers in the course Doctoral Dissertation (MIC 8599) (0 credit) until graduation time.

D. TRANSFER TO THE DOCTORAL PROGRAM

Students who are enrolled in the master's degree Program of the Department of Microbiology and Medical Zoology should complete the MS degree prior request transfer to the PhD Program. Only in very exceptional cases, the student could be eligible for transfer to the PhD Program early in their graduate studies (no later than the second year) and the transference will be processed according to the regulations established in the "Manual for Master and Philosophical Degrees Requirements and Regulations." To be considered exceptional the student must fulfil the following requirements:

1. A minimum average of 3.5 or more in the graduate GPS.
2. Author or co-author of a publication submitted related to their research area
3. The student requesting the transfer complies with the recommended admission formula scores of 60 or higher for admission to the PhD program of the Graduate School Program.
4. The student may have not disciplinary findings and/or sanctions as stipulated in the

Disciplinary Rules and Procedures of the General Student Regulations.

The Departmental Graduate Studies Committee will discuss each transfer request, but the Graduate Committee of the Division of Biomedical Sciences, University of Puerto Rico, and School of Medicine will make the final approval. Master's degree students who changed to the PhD Program can request the transfer of all approved graduate courses to the PhD Program except for the six (6) semester credits of thesis research (MICR 8595).

IV. CANDIDACY

A. The Candidacy for the MS Degree

Admission to candidacy will be requested after the student has fulfilled all the following requirements:

1. Satisfactory completion of all the required courses and the requirements of the Department.
2. Completion of a minimum of 28 semester credits with a minimum 3.0 cumulative grade point average in a scale of 4.0.
3. Accumulation of a minimum of 1 year of residency in the Department.
4. Approval of the thesis proposal.

B. The Candidacy for the PhD Degree

Admission to candidacy will be requested after the student has fulfilled all the following requirements:

1. Satisfactory completion of all the required courses and the requirements of the Department.
2. Completion of a minimum of 48 semester credits with a minimum 3.0 cumulative grade point average in a scale of 4.0.
3. Accumulation of a minimum of 2 years of residency in the Department.
4. Satisfactory completion of the qualifying examination.
5. Approval of the dissertation proposal.

All the graduate students (candidates) should conduct themselves in an ethical and professional manner and follow the educational requirements on the "Responsible Conduct in Research Compliance Program" as described in the following website: http://www.md.rcm.upr.edu/biomed/pdf/nuevo%20ingreso/3_RC2P_2011-12_v1.pdf (Section IV of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations."

V. THESIS / DISSERTATION COMMITTEE COMPOSITION

The Thesis/Dissertation Advisor chosen by the student must comply with all the qualifications described in section IV and in Appendix B of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations." The student and thesis advisor should sign the document "Compact between Biomedical Graduate Students and their research Advisors" as recommended by the Division of Biomedical Sciences in the certification number 02 from year 2009-2010. **A signed copy should be sent to the Departmental Graduate Studies Committee.** This document is available at Appendix A in this document and at Appendix J of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations."

The student will select a Thesis/Dissertation Committee in consultation with the Thesis/Dissertation Advisor following the procedures described in section IV and in Appendix B of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations."

A. MS Degree

Master's degree students are required to have a minimum of three (3) members on their Thesis Committee, which include two (2) members and the thesis director. Two of them (including the thesis advisor) must be members of the Department of Microbiology and Medical Zoology with a regular faculty appointment (including Ad-Honored or Joint professors). The other committee member must be from a related field from outside of the department. If the advisor is an Ad-Honored or Joint professor, he/she will be considered as thesis director. In such situations, a co-director must be named, and this person should be a full-time faculty member of our department. The specific function of the co-director will be to ensure that all our regulations regarding thesis's committee composition, presentation of study proposal, meetings on project's progress, etc. be fully and timely completed. Thus, the co-director will function as a "link" between the student, the thesis committee, and the Departmental Director.

B. PhD Degree

Doctoral candidates are required to have a minimum of five (5) members on their Dissertation Committee. The Dissertation Committee will consist of the research advisor as director, at least three faculty members from the Department of Microbiology and Medical Zoology and a minimum of one faculty member from outside the department. If the advisor is an Ad-Honored or Joint professor, he/she will be considered as the director. In such situations, a co-director must be named, and this person should be a full-time faculty member of the Department of Microbiology and Medical Zoology. The specific function of the co-director will be to ensure that all our regulations regarding thesis's committee composition, qualifying examinations, presentation of study proposal, meetings on project's progress, etc. be fully and timely completed. Thus, the co-director will function as a "link" between the student, the thesis committee, and the Departmental Director.

NOTE: Additional members to the Thesis Committee can be added if deemed necessary and with the approval of the departmental Graduate Committee.

C. Acceptance

The student's advisor must inform the Departmental Graduate Studies Committee and the Department Chairperson the composition of the Thesis/Dissertation Committee in writing. The curriculum vitae (CV) from the external members should be submitted to the Graduate Program Committee for approval. This Thesis/Dissertation Committee becomes official once the Graduate Program Committee approves it.

D. Substitutions to the Thesis/Dissertation Committee

To change the thesis advisor, the student must obtain written permission from the Departmental Chairperson. The Graduate Program must be notified, in writing, of any change of Thesis/Dissertation Advisor. If the Advisor is also the Departmental Chairperson, the Graduate Studies Coordinator should notify the Graduate Program (in writing) about the change and provide the name of the prospective Advisor. Any change of Thesis/Dissertation Advisor must obtain the approval of the Graduate Program Committee. The Graduate Program Committee acts as the final authority concerning Thesis/Dissertation Advisor changes.

The student and the Thesis/Dissertation Advisor may recommend changes in Committee members. Such changes must obtain written approval from the Departmental Chairperson. Proposed changes in Committee composition must meet with the approval of the Graduate Program Committee. The Graduate Program Committee acts as the final authority concerning changes in the Thesis/Dissertation Committee.

Substitutions to the Thesis/Dissertation Committee, including the Thesis/Dissertation Advisor are described in Section IV of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations."

VI. QUALIFYING EXAMINATIONS FOR PhD STUDENTS

The qualifying exam is mandatory for all Ph.D. students. The qualifying examination will be offered during the **first semester of the third year** of study. Under special circumstances, and with the recommendation of the Departmental Graduate Committee, and with the approval of the Department Chair, the exam could be postponed to the second semester of the third year. Students who have completed a master's in microbiology prior to be admitted to the Ph.D. program will be eligible to take the qualifying examination **in the second semester of the second year of doctoral studies.** All students must take the qualifying exams before entering the fourth year of study**.**

During the semester the student is preparing and taking the qualifying examination, he/she will register in the three (3) credits course MICR 8597, which will provide a full-academic load. Prior to taking the qualifying exam students must have fulfilled the following requirements:

1. Obtain satisfactory grades in their courses, maintaining a minimum cumulative grade point average of 3.0 in a scale of 4.0, during their graduate studies.
2. Accumulate 42 semester credits in graduate courses and satisfactorily complete all required courses including one (1) seminar. The student must complete the 6 remaining credits during that academic year including the Advanced Topic for the Qualifying Exam (3 credits), the preparation of proposal (1 credit) and two graduate seminars (2 credits).
3. Approval of the Dissertation Advisor and Committee.

A. Objective of the Exam

The qualifying examination aims at measuring the ability of the students in two main respects:

a) Knowledge Acquisition

The exam should measure depth and breadth of student's comprehension of the main topics of her/his specialization highlighted by the contributions of the chosen Committee Member's expertise.

b) Analytical Ability

The exam aims at measuring the student's analytical ability to think, to interpret, to infer and to assess concepts and suggest appropriate solutions to given questions.

B. Format of the Qualifying Exam

a) The qualifying exam consists of two parts: 1) written and 2) oral.

b) The qualifying examination will cover general concepts of the area(s) of specialization selected by the student with the recommendation of the Dissertation Advisor.

NOTE: It is not necessary to have defined the hypothesis or specific aims of the research project to take the qualifying exam.

c) The areas of specialization from which the student will choose to be examined could include one or more of the following:

- Immunology
- Medical Bacteriology
- Medical Virology
- Molecular Biology
- Medical Zoology
- Medical Mycology
- Microbial Ecology

Exam Committee

a) The Ph.D. Exam Committee will have the same composition of the Dissertation Committee and will consist of five (5) members: three members should hold a full appointment as faculty members and two others will be external members. In case the mentor is an Adjunct or Ad-honored Professor please refer to section **IV. Thesis/Dissertation Committee Composition** in page 13 for the Exam Committee composition. Usually, the student's mentor will be one of the three faculty members and will serve as the Committee Chair.

b) The Chair of the Committee (the student's mentor) **will not be an examiner to avoid conflict of interest**. The role of Committee Chair is ascribed to request the study material and request the questions to the other four Committee members. The Committee Chair will apply the written exam and will conduct the oral exam discussion. However, the student's mentor will refrain from assigning study material, preparing questions, or asking questions during the written exam. It is not expected that the mentor asks any questions during the oral exam, however the mentor is free to contribute to the discussion and clarify any aspects he/she deems appropriate.

C. Parts and Procedures of the Exam

a) In agreement with the student, the Exam Committee will set the date of the exam during a brief meeting in which the student will present to the committee the specialization areas selected.

b) During the meeting the Committee Chair will distribute among the other four-committee members the themes to be examined, which will be agreed with the expertise of each committee member and the specialization areas selected.

c) The study material to be assigned to the student could include scientific articles, book chapters, a combination of scientific articles and book chapters as well as any other scientific material that consider pertinent for the exam.

d) The number of documents (study material) to be delivered to the student from each committee member will range between 3 to 6 documents. Thus, each student could receive a minimum of twelve (12) and up to maximum of twenty-four (24) study-documents.

e) The extension and complexity of the study material will be discretional for each committee member and will depend on the specialization areas selected. Students are highly encouraged to expand the information contained in the study material by consulting additional scientific literature.

f) The Committee members should be available in case the student requires any clarification regarding the study materials assigned.

g) The time that the student will devote to study the assigned material will be defined in advance by agreement between the student and the examination committee. However, this

time should not be shorter than six (6) weeks or longer than eight (8) weeks and will start to run from the moment in that the student has in her/his hands all the study-material.

h) The written exam will consist of eight (8) questions (two from each examiner)

i) The Committee Chair will divide the questions equally for a two-day exam to cover basic knowledge in the chosen field, experimental design, and interpretation of data.

j) The written exam is to be done in a two-day period, in-person under the supervision of the Committee Chair (PI). The PI is responsible for identifying a clean, safe, and quite environment (office/lab where the student can write without interruptions and without access to any source of external information or access to the study documents).

k) The responses to the written exam are usually handmade. The student should take care of an adequate grammar using and legible wording. However, to make easier the writing process the Committee Chair could provide the student a computer (laptop or desktop) specifically prepared for that exam. If the student needs to make draws, diagrams, flow chart etc., they can be done in hard copy. Therefore, in addition to the computer, the Committee Chair will provide to the student pencils, white sheets, eraser, and pencil sharpener. The Committee Chair will be responsible to ensure that the computer will be not connected to internet or WIFI and will not contain any information stored in the hard disk or desktop.

l) The responses to the questions should be written using Microsoft Word and the document will have the following pre-determined format in margins: Top: 2.54 cm, Bottom: 2.54 cm, Left: 1,27cm and Right:1,27cm. The answers to each question will be written at single space and the length of response will not exceed of 5-pages per question.

m) From the eight (8) questions, the student will have to answer six (6) in two 8 hours' periods (2 days).

n) Each day the student will be given four questions (one from each committee member) from which he/she should answer three questions. It is mandatory that the questions responded by the student in the written exam include at least one from each committee member.

o) The student will be notified within the next 2 weeks after the written exam when he/she will take the oral portion of the exam, which should be taken within the next 2 weeks after this notification. Alternatively, in the committee meeting that decides the dates of the written component, the committee may also choose to define the date and time of the oral component, provided it is within 2 weeks after the written exam.

p) In the oral exam the student will be required to respond the two (2) questions that she (he) does not respond in the written exam or clarify any other question which committee member

deem appropriate. The oral exam is an open exam in which the Committee members can make any questions that they consider pertinent. It is not expected that the mentor asks any questions during the oral exam, however the mentor is free to contribute to the discussion and clarify any aspects he/she deems appropriate.

q) The duration of the oral exam should be minimum one (1) hour and does not exceed five (5) hours. It should be an appropriate time to really evaluate independence, knowledge of the topics and clarify any doubts that have risen during the written component.

D. General Terms

a) Each examiner will quantitatively grade the oral and written components following a rubric **(see rubric below)**. Thus, after the oral examination has taken place, the Committee Chair will ask the student to abandon the examination room/ conference call. The Committee members will grade the student's entire exam, and immediately communicate the result to the Committee Chair. The Committee Chair will average the scores and ask student back to the meeting and inform of the grade.

b) The passing grade in the exam is **79.6% (B)**. The results will be promptly reported to the student as Pass (P) or Fail (F).

c) Those students who do not pass the exam (written or oral or both) will have a second opportunity during the end of the semester or the following semester. If the Committee determine that the failure is due to weakness or lack of knowledge in a specific study-area, the student will repeat only that specific area. If the Committee determines that the failure is due to weakness in multiple areas, the student will repeat the whole exam.

d) If the student fails, in the second exam he/she will be automatically dismissed from the Doctoral Program (Section II of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations"). This student will have the option to complete a MS Degree.

e) The exam committee of a student that failed will declare its decision in writing (written by the Committee Chair) in a period not more than one week from the date of the oral exam and the decision will be final and not negotiable.

f) The student is deemed a doctoral candidate after passing the qualifying exam

g) The Committee Chair will notify by written to the Head of Department the results of the exam.

h) The Head of Department will notify by written to the Graduate Program Committee and the Associate Dean of Biomedical Sciences the results of the exam.

E. EVALUATION RUBRIC: Ph.D. Qualifying Examination

Each committee member should fill in their independent assessment of the student's performance on this exam in the areas listed below. Committee Chair will make the calculations to determine the average grade awarded by each Committee Member. The rubric must be shared by the committee chair in advance to committee members and prior to the oral examination.

Field Specific Knowledge		Score	Weight	Weighted Score
Understanding of Study-Material	4.Thoroughly demonstrates understanding of the study-documents assigned. 3. Demonstrates moderate understanding of the study-documents assigned. 2. Demonstrates few understandings of the study-documents assigned 1. Demonstrates no understanding of the study-documents assigned		X4	
			Understanding of Study-Material	**/16**
Communication Skills	4. Thoroughly communicates in a clear and effective manner in writing 3. Demonstrates moderate capacity to communicate in writing 2. Demonstrate some capacity to communicate in writing 1. Demonstrate minimal capacity to communicate in writing. Several problems summarizing his/her knowledge or lack of knowledge in the field		X1	
	Uses language that…. 4. Skillfully communicates, effectively orally with clarity & fluence; almost error-free (regardless of accent) 3. Demonstrates moderate capacity to communicate orally, straightforwardly conveys meaning with clarity; few errors 2. Generally, conveys meaning; some errors 1. Audience has difficulty understanding the message student conveys due to lack of clarity and meaning because of errors in usage		X1	
			Communication Skills	**/8**
	4. Thoroughly elaborates his own hypothesis, and design experiments as requested by			

Inquiry and Analysis	committee members 3. Demonstrates moderate capacity to elaborate own hypothesis and design experiments 2. Demonstrate fair capacities to elaborate hypothesis experimental designs 1. Demonstrate minimal capacity to elaborate new hypothesis or experimental designs.		X2	
	4. Demonstrate significant capacity to interpret results, consider alternative approaches and elaborate conclusions based on data. 3. Demonstrate moderate capacity to interpret results, consider alternative approaches and elaborate conclusions based on data. 2. Demonstrate fair capacities to interpret results, consider alternative approaches and elaborate conclusions based on data. 1. Demonstrate minimal capacity to interpret results, consider alternative approaches and elaborate conclusions based on data.		X2	
			Inquiry and Analysis	**/16**
			Total of Weighted Score	**/40**
			Final Score (%)	

OVERALL ASSESSMENT BY COMMITTEE CHAIR

NAME OF EXAMINING COMMITTEE MEMBERS:

_____, MEMBER 1 _SCORE_____
_____, MEMBER 2 _SCORE_____
_____, MEMBER 3 _SCORE_____
_____, MEMBER 4 _SCORE_____

Does not Pass Qualifying Exam	**Passes Qualifying Exam**
Does not meet Expectations:	Meet Expectations:
ADDITIONAL COMMENTS	

	AVERAGED SCORE

Scores <79.6% **is considered FAIL)**

VII. PREPARATION OF THE THESIS/DISSERTATION PROPOSAL

Master of Science (MS) students must write their proposal on the first semester of the second year and for PhD students, on the second semester of the third year. Students in this stage should register in the one (1)-credit MICR 8596 course "Preparation of the Thesis/Dissertation Proposal in Microbiology" under their Advisor section. This course is considered as a full academic load. In this course, a Departmental faculty member assigned by the Departmental Graduate Committee will explain how to write a NIH-like proposal as required by Section IV of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations." Both, Thesis/Dissertation proposals should be written following the F31, R21-NIH style (6 pages maximum).

The proposal must be based on scientific principles, and it is intended as a preliminary outline of research leading to an original contribution to the scientific literature. The student's Advisor is responsible for the supervision, guidance, and final grading. The student should present and defend his/her proposal to the Thesis/Dissertation Committee before the semester ends. In case the student does not complete or approve the course requirements in one semester, the student will obtain a grade of "In Progress". If the student does not complete or approve the course in the second semester, he/she will receive a grade of "Incomplete", which must be removed in the following semester.

Students and Advisors that decide to use a different format for the proposal must first obtain approval of the selected style by the Graduate Committee of the Division of Biomedical Sciences.

Students who pass their Dissertation proposal presentation are strongly encouraged to submit an independent pre-doctoral fellowship application to external funding agencies, such as NIH, NSF, Ford Foundation and American Society for Microbiology (ASM) among others. The Ruth L. Kirschstein National Research Service Awards for Individual Pre-Doctoral Fellows (F31) format to prepare the proposal document is in the following website:
"http://www.nigms.nih.gov/Training/MARC/MARCPredoctoral.htm."

A. Approval of the Thesis/Dissertation Proposal

A. The student must first obtain approval of the Advisor prior to submit the Proposal to the other members of the Thesis/Dissertation Committee. The proposal is then presented to the Thesis/Dissertation Committee for approval.
B. The Thesis/Dissertation Committee approves the Proposal by signing a final copy.

C. Once approved the Thesis/Dissertation Proposal must be sent to the Associate Dean for Biomedical Sciences. The Thesis/Dissertation Advisor has the responsibility of sending the signed copy to the Graduate Program through the Departmental Chairperson.

VIII. THESIS/DISSERTATION RESEARCH

A. Monitoring the Progress of the Students

The Thesis/Dissertation Advisor will be responsible for designing the student's research project as soon as the student begins to work in the chosen laboratory. According to Section IV, page 10 of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations" **the student cannot register in Thesis/Dissertation Research until all the requirements for candidacy have been met, including the proposal approval.**

Candidates and their advisors should follow the guidelines in the document titled "Compact between Biomedical Graduate Students and their research Advisors" in the Appendix A of this document.

The Advisor, together with the Thesis Committee, should ensure that the student's Master project is designed to be completed in **one year** and the PhD project in approximately **three years**. Projects that require on human specimens (participant recruitment) **should not be assigned to MS** students at least the samples are already collected.

The Thesis/Dissertation Committee will monitor the student's progress according to Appendices A and E of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations." **The Advisor and the Thesis/Dissertation Committee must meet with the student at least twice a year and submit a brief written annual report (Appendix E) to the Departmental Graduate Committee.** The Departmental Graduate Committee will keep a copy of the written progress report and will forward the original to the Graduate School for inclusion in the student permanent record. The student will also meet with the Thesis/Dissertation Committee when he/she and his/her Thesis/Dissertation Director feel that the work is completed. The student's committee then decides if he/she has fulfilled the proposed research requirements (Section VI, page 13). The student is then allowed to proceed with the writing of his/her Thesis/Dissertation. The decision of the Committee is then forwarded to the Chairperson of the Department with a copy send to the Departmental Graduate Committee.

It is mandatory that the PhD student submits for publication at least one (1) research article of her/his thesis theme to a peer-reviewed journal one or two semesters prior to the Final Oral Defense. Prior to scheduling the thesis defense the article must already be published or in-press. No articles (under peer review/submitted) will be accepted as a requirement for defense. (Section VIII, page 22 of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations."

B. Preparation of Thesis/Dissertation Manuscript

Prior to writing the initial Thesis/Dissertation draft, the student must meet with the Thesis/Dissertation Committee to verify that the experimental work has been adequately completed and which style should be used (Traditional or Subdivided in article format). The guidelines to write the thesis/dissertation are specified in Section VI of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations." The student and the advisor will have a maximum of six calendar months to prepare the preliminary thesis/dissertation draft, from the date of the permission granted by the Thesis/Dissertation Committee.

C. Thesis/Dissertation Defense and Final Approval

The thesis/dissertation defense and requirements for final approval will be performed as described in Section VII of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations."

The Departmental Graduate Studies Coordinator will certify that the student has met all the Departmental courses and Graduate Program requirements. The schedule for the thesis/dissertation defense will be issued according to the recommendations of the student and Thesis/Dissertation Advisor following Appendix D of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations."

For the master's Candidate**,** at least three (3) neat, printed copies of the thesis (previously approved by the Thesis Advisor) will be distributed to the Thesis Committee at least two (2) weeks prior to the scheduled defense. For the PhD Candidate**,** at least five (5) neat, printed copies of the dissertation will be distributed to the Dissertation Committee at least three (3) weeks prior to the scheduled defense.

Once the Thesis/Dissertation has been corrected and the student feels he/she is prepared, he/she will ask his/her Thesis/Dissertation Director to submit a schedule for the final Thesis/Dissertation Presentation and Defense.

The Thesis/Dissertation Oral Presentation must cover the following content:

Thesis/Dissertation Oral Presentation	**Time**
Introduction, Long-term Goals, Hypothesis and Specific Aims	15 min
Materials and Methods, Results and Discussion	30 min
Conclusions, Future-Plans and Acknowledgments	5 min
Total	**50 min**

During the Thesis/Dissertation Presentation, the student will take 50 minutes to briefly describe the thesis research, after which the presentation will be opened for questions from the members of the audience on matters pertaining directly to the area of the thesis research.

Afterwards, the Thesis/Dissertation Committee will meet in private with the student and members of the Committee to conduct a final oral examination of the thesis work. Finally, the student will be excused, and the Committee will vote as to the final approval of the thesis, content, and presentation. A majority vote in favor will be required for final approval of the thesis and the oral presentation. If the Thesis/Dissertation Committee feels that the student has not demonstrated sufficient knowledge of the matters discussed, the student will be asked to present again and resubmit a new date within 6 months for his/her oral presentation according to the requirements described in the document Section VII of the "Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations".

IX. STUDENT'S RESPONSIBILITY

The student is required to attend all scientific and academic activities sponsored by the Department of Microbiology and Medical Zoology (Seminars and Thesis/Dissertation Presentations) during his/her studies.

It is the student responsibility to understand and comply with the rules and regulations of the Master or Doctoral Program in Microbiology and Medical Zoology (summarized in this document) as well as those of the Graduate School of Biomedical Sciences ("Manual for the Master of Science and Doctor of Philosophy Degrees Requirements and Regulations").The Thesis/Dissertation Advisor and the Thesis/Dissertation Committee, as well as the student, have the responsibility to make sure that the student has fulfilled and complied with all of the requirements for the degree.