Ph.D. DEGREE

The Doctor of Philosophy (Ph.D.) degree earned for scholarship and independent research in the Department of Pathology and Microbiology is conferred by the Office of Graduate Studies. Six doctoral graduate programs are unified within the Office of Graduate Studies and comprise the Interdisciplinary Graduate Program in Biomedical Sciences (IGPBS), of which the Immunology, Pathology, and Infectious Disease (IPID) Graduate Program is a component. The IPID Graduate Program stresses molecular biological, immunological and genetic mechanisms of disease while combining clinical and applied research with basic research interests. Major areas of research include: transplantation and tumor immunobiology, bacterial pathogenesis and physiology, emerging viral diseases, molecular genetics, medical biotechnology such as vaccine design, and novel approaches to treatment of diseases. This diversity of research interests offers a variety of distinctive and highly individualized opportunities for graduate training for the Ph.D. degree in the IPID Graduate Program.

The IPID Graduate Program involves over 50 faculty members across campus, providing a high faculty/student ratio, while promoting an excellent environment for collegial interactions and stimulating exchanges of ideas. We also have strong relationships with other University of Nebraska’s campuses such as UNO, UNL, and the Eppley Institute for Research in Cancer and Allied Diseases, which provide our students with even greater opportunities for collaborative research efforts.

Graduate students in the IPID Graduate Program are firmly grounded in the basic principles of biochemistry, immunology, and molecular biology. Through individual research efforts, students learn how to design experiments to test hypotheses and discover new knowledge, analyze data and effectively communicate scientific information. The doctoral training program prepares students to pursue successful independent research in academics or industry.

A minimum of 4-5 full years of graduate study is required to complete a program for a Ph.D. degree for a student who enters the program with a Bachelor’s Degree or its equivalent. The Ph.D. degree must be completed within seven years from the date of initial registration.

Neither the courses completed nor the time spent in study determines completion of requirements for the Ph.D. degree. It is earned primarily through the pursuit of excellence in a specific field of scholarship, which involves the demonstrated ability to conduct independent research.

A. Admission requirements:

Students will not be admitted to the IPID Graduate Program unless they meet or exceed the minimum requirements. The requirements for admission will be uniformly applied. All successful applicants need to have at least a ‘B’ average in college coursework. All applicants are required to take the Graduate Record General Examination (GRE). A GRE specialty examination in biology or chemistry is recommended. Successful applicants will be expected to score above the 50th percentile in each of the three (verbal, quantitative, analytical writing) general exam areas. Evidence of exceptional relevant accomplishments (e.g. a Master’s degree with peer reviewed publication) may be considered in response to a written request for a waiver of this requirement. The Medical College Admission Test (MCAT) may be considered an acceptable alternative to the GRE examination.

B. Application Process:

Applications to the IPID Graduate Program are submitted through the Interdisciplinary Graduate Program in Biomedical Sciences (IGPBS). Detailed application instructions are published on Graduate Studies admissions web site: http://www.unmc.edu/gradstudies/admissions/how-to-apply/index.html

International applicants may apply to study for a Ph.D. degree if they meet the requirements of a four-year B.S. degree or equivalent and the other criteria listed in Section A. Graduate Studies Office provides
further information regarding English language proficiency and transcript submission for international applicants.

After review of a complete application packet (including personal narrative, resume, undergraduate transcripts, GRE score report, three letters of recommendation and TOEFL/IELTS score report for international students, applicants recommended for acceptance will be notified by email. The Graduate Studies Office will send a letter of admission and admission certificate (if admitted), or a letter of rejection (if not admitted) based on the decision of the Graduate Committee.

C. Following Acceptance into the IPID Graduate Program:

Upon the student’s acceptance, he/she will be expected to rotate through three laboratories for a brief research experience (4-6 weeks), unless the student is admitted directly into a specific laboratory. Students will meet with the Chair of the Graduate Committee or with a member of the Graduate Committee to assist in selecting three laboratories for rotation. Near completion of the rotations, the student will select an advisor from one of the three laboratories, contingent upon mutual agreement between the student and the faculty director of the laboratory. The funding available for research and for student support should be discussed.

After an advisor has been selected, the student (with approval of the advisor) selects a Supervisory Committee. The minimum requirement for committee composition is:

1) four Graduate Faculty Fellows;
2) at least three from the IPID graduate program;
3) at least 2 at associate professor rank or higher; and
4) at least one of whom must be from outside the mentor’s department.

Following approval from Graduate Committee Chair and Graduate Studies Office, the supervisory committee meets to discuss the student’s Program of Studies form for their entire Ph.D. program.

Selection of an advisor, appointment of the Supervisory Committee, and determination of an appropriate program of studies are sequential steps, and the latter two require independent approvals by the Graduate Committee.

Each student is responsible for ensuring that they are enrolled. Students complete registration on-line via MyRecords. The students are required to obtain the instructor’s permission code, when applicable, for each course in which they enroll. Students must register for each semester and class they plan on attending in order to use UNMC facilities.

D. Required Curriculum:

Prior to each semester, The Graduate Studies Office sends an announcement to students regarding registration and other pertinent information for the upcoming semester. Each department’s courses are listed in MyRecords only.

All Ph.D. students in the IPID Graduate program must:

1. Enroll in PAMM 992 Advanced Topics, continuously during their degree program. This required course is a study of current concepts and findings in selected areas of pathobiology, including a review of current literature and research.

2. Enroll in PAMM 970 Seminar course during their degree program. They are required to attend each seminar as well as present a seminar of their own research activities.

3. Take all three core IGPBS courses in the first semester:
   IPBS  801  Fundamentals of Biomolecules
   IPBS  802  Molecular Cell Biology
   IPBS  803  Fundamentals of Receptors and Cell Signaling

Note: M.D./Ph.D. students may substitute Medical School Biochemistry for this requirement.
4. Take a minimum of four of the following courses:
   - PAMM 857 Introductory Immunobiology (under revision)
   - PAMM 871 Antibiotics: Mechanisms of Action and Resistance
   - PAMM 880 Principles and Methodology in Cancer Research (CRGP 880)
   - PAMM 890 Molecular Biology of Viruses
   - PAMM 898 Bacterial Genetics
   - PAMM 910 Bacterial Pathogenesis
   - PAMM 930 Neuroimmunology (PHAR 930)
   - PAMM 940 Molecular Basis of Human Disease
   - PAMM 950 Special Topics. (Various topics offered)
   - PAMM 955 Advanced Immunobiology
   - BIOS 806 Biostatistics I
   - BIOI 8866 Bioinformatics Algorithms
   - PHAR 902 Human-Specific Disease Modeling in Mice

   **Note:** M.D./Ph.D. students should take minimum two of the above mentioned courses.

Additional courses may be taken due to student interest or on advice of the supervisory committee. Additional course offerings include:
   - PAMM 830 Clinical Laboratory Management I
   - PAMM 950/831 Clinical Laboratory Management II
   - PAMM 873 Introduction to Genetic Sequence Analysis
   - PAMM 956 Advanced Immunology Laboratory
   - CRGP 940 Short Course in Cancer Biology
   - CIP 814 Scientific Writing
   - GCBA 806 Teaching & Research Presentation Skills
   - MMI 921 Clinical Applications of Molecular Diagnostics
   - MMI 922 Molecular Diagnostic Laboratory Techniques

Other courses may also be offered in other programs that are of interest to the student

**Responsible Conduct in Research (RCR) training:**
All Ph.D. graduate students must complete the Responsible Conduct in Research (RCR) training once during their program. This is a Graduate College requirement in addition to the coursework described above. RCR training is offered every fall and spring semester. Students can sign in following instructions in an e-mail notification from Graduate Studies

**Grading:**
A grade of B or higher is expected in each of the courses taken, with the exception of those listed as Pass/Fail.

**Changes to curriculum:**
Any changes from these requirements must be approved by the Graduate Committee following petition by the student and their supervisory committee.

**Annual progress report:**
Students are required to prepare an annual progress report, which will be discussed at a supervisory committee meeting by the end of each year.

**E. Comprehensive Examination:**

1. Ph.D. students must pass their comprehensive examination no later than three years after the start of their program. M.D./Ph.D. students must pass no later than one year after the start of their Ph.D. program.

2. The comprehensive examination will consist of review and oral defense of a research grant application written by the student using the National Institute of Health (NIH) investigator-initiated research grant proposal (R01) format. The subject matter of the research grant application must be
approved by the student’s supervisory committee and may be in the same general, but not specific, focus area as the student’s proposed dissertation research. The Supervisory Committee must approve the specific aims of the grant application before the full proposal is written, and provide critiques of the full application before the comprehensive examination is scheduled.

There is a high expectation that the research proposal will explore new areas of interest. It is also expected that the hypothesis for the proposed research will be the result of a comprehensive review of the literature. Supporting data should be drawn from literature that is current and relevant to the topic. Hypothetical preliminary data is not appropriate.

3. For the oral defense, the proposal review, presentation and initial questioning will be open to the graduate students and faculty. The entire examination will be open to the Graduate Faculty.

4. The examining committee will consist of the student’s Ph.D. Supervisory Committee and one faculty member outside the student’s Supervisory Committee (often but not necessarily selected for expertise in the area of the research proposal) as well as a member of the Graduate Committee, to both review and participate in the examination. The examining committee will select a member other than the mentor to serve as chairperson during administration of the comprehensive examination.

5. During the oral comprehensive the mentor can be present but should not ask questions/add input until the end of the examination. After the mentor’s questions, the student will leave the room and the mentor could provide confidential comments to the examination committee. The mentor would then leave the room before the remaining examination committee votes on the examination outcome.

6. The oral examination will include questions concerning the material in the research proposal, but must also include a general examination of the student’s area of research interest and graduate studies, (e.g. virology, immunology, genetics, pathobiology, cancer). Students must be prepared to be tested on knowledge in areas beyond the research proposal.

7. If more than one member of the examining committee recommends failure in a comprehensive examination or defense of thesis (final oral examination), the student shall be considered to have failed the examination. In the event of failure, the examining committee will, within seven days, recommend to the Dean for Graduate Studies whether the student should be given the option of retaking the examination. If so, the committee will identify general areas of weakness, which require special attention and any remedial actions, which the student needs to complete prior to re-examination. Note that examining committees have only the options of pass, fail, or fail with recommendation to the Dean that the student be allowed to repeat the examination.

Student’s Exam Committee members are responsible for evaluating the performance of the student and entering the exam outcome into Seguidor individually within seven days of the exam. Students who pass the comprehensive examination and have also completed all course requirements will be admitted to candidacy for the Ph.D. degree.

Time line:

a) Specific Aims should be accepted by the supervisory committee by the beginning of the 1st semester of the 3rd year (or the beginning of the 2nd semester if the student started in January).

b) The proposal should be submitted to the examining committee by 2 weeks before the defense of the proposal.

c) The proposal must be defended by the end of the 3rd year from the start date of entering the program. If the exam is failed, the student should defend a second attempt within the following three months.
F. Completion of the Program:

The final step for the Ph.D. student is to write and defend a dissertation. For completion of the program, it is required that the dissertation work is submitted for publication in a peer reviewed journal. However, to be competitive in the scientific field, it is expected that students have publications by the time of the dissertation defense. The dissertation research is presented to an audience of peers and faculty members, and is open to the public. The student will defend the premise, methods, results and conclusions of their research. After the presentation and defense, the Examination Committee (Supervisory Committee plus one faculty member outside the student’s Supervisory Committee as well as a member of the Graduate Committee) meets to determine if the student has adequately presented and defended their research, and whether their knowledge of the research problem and defense of the work was appropriate for granting the Ph.D. The committee may give suggestions concerning the dissertation and suggest changes, additions, deletions, etc. If more than one member recommends failure in a defense of dissertation (final oral examination), the student shall be considered to have failed the examination. In the event of failure, the examining committee will, within seven days, recommend to the Dean for Graduate Studies whether the student should be given the option of retaking the examination. If so, the committee will identify general areas of weakness, which require special attention and any remedial actions that the student needs to complete prior to re-examination. **Note that examining committees have only the options of pass, fail, or fail with recommendation to the Dean that the student be allowed to repeat the examination.**

Following defense of the dissertation, Student’s Exam Committee members are responsible for entering the exam outcome into Seguidor individually within seven days of the exam. The Supervisory Committee Members, Advisor, and the Chair of the Graduate Committee will sign the “Report on Doctoral Degree” form, which will be submitted to the Graduate Studies Office with all other required documentation, which are listed in ‘Dissertation & Graduation Instructions for Ph.D. Candidates’ document.

G. Retaking Examinations:

No student shall be permitted to take either the comprehensive examination or defense of dissertation (final oral examination) more than twice. If re-examination is recommended and approved, the student must wait a minimum of three months before retaking the examination. The same committee will give the re-examination unless the Supervisory Committee responsible for the student’s program recommends and the Dean for Graduate Studies approves a substitution.

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