

# Doctor of Philosophy in Microbiology

---

A Ph.D. is required for careers in independent academic research in microbiology and immunology. The Ph.D. degree is most often followed by two or more years of postdoctoral training in a specific area of research. Ph.D. graduates in microbiology, with appropriate postdoctoral experience, are ready to compete effectively for faculty positions at a college or university, senior level positions in biotech industry and government.

The faculty in this program have diverse research interests ranging from the molecular pathogenesis of infectious agents (bacteria and viruses) to the understanding of immune function. Students with undergraduate degrees in microbiology, biochemistry or other similar disciplines are encouraged to apply.

The application process is an online process. Application to this graduate program is facilitated through the Interdisciplinary Graduate Program in Biomedical Sciences (IGPBS). (<https://catalog.ku.edu/medicine/graduate-program-biomedical-sciences/>) Detailed instructions on how to apply and the application deadlines are posted on the Interdisciplinary Graduate Program in Biomedical Sciences website <http://www.kumc.edu/igpbs/how-to-apply.html>.

## Admission requirements:

- Bachelor's degree from a regionally accredited institution documented by submission of official transcript indicating the degree has been conferred before entering the program. Official transcripts from institutions attended post-baccalaureate are also required. Students with degrees from outside the U.S. may be subject to transcript evaluation indicating the degree is equivalent to a U.S. degree and meets the minimum cumulative GPA requirements.
- A cumulative grade-point average (GPA) of at least a 3.0 on a 4.0 scale for the bachelor's degree.
- Applicants who are not native speakers of English, whether domestic or international, must demonstrate they meet the Minimum English Proficiency Requirement (<https://catalog.ku.edu/graduate-studies/kumc/#EnglishProficiencyRequirement>).
- A background check (<https://catalog.ku.edu/graduate-studies/kumc/#BackgroundCheck>) is required during the admission process; it may affect the student's eligibility to enter the program.
- An official copy of the Graduate Record Examination (GRE) score sent from Educational Testing Service (ETS) to University of Kansas Medical Center - ETS institutional code 6895 - **GRE Scores NOT APPLICABLE TO THE IGPBS.**
- Three letters of recommendation.
- Prerequisite coursework:
  - One year of general chemistry
  - One year of organic chemistry or one semester of organic chemistry and one semester of biochemistry
  - One year of biological sciences
  - One semester of calculus
  - One semester of physics
- Research experience (beyond labs associated with lecture courses) is strongly suggested.

- Interview - the most qualified applicants will receive an invitation for an interview.

Applicants will be assessed based on a combination of GPA, research experience, and interview. After an applicant has been admitted, a program may defer an applicant's admission for one year after which time the applicant must submit a new application.

Admission requirements are subject to change. In most cases, use the catalog of the year student entered the program. *Other years' catalogs*.

The program consists of coursework, research experience, and the successful completion of a doctoral dissertation. Dissertation research culminates in a final dissertation examination consisting of an oral presentation by the candidate and an examination by the faculty. Relevant prior graduate work is taken into consideration in setting up individual programs of study leading to the Ph.D.

## Degree requirements:

- Degree requirements are normally completed within 5 years of admission to the program although a maximum of 8 years is allowed.
- Cumulative grade-point average (GPA) of at least a 3.0 for all KU graduate coursework.
- Successful completion of the University's Research Skills and Responsible Scholarship (<https://catalog.ku.edu/graduate-studies/kumc/#ResearchSkillsandResponsibleScholarship>) requirement prior to the semester the Oral Comprehensive Examination is scheduled.
  - Successful completion of GSMC 857 Biographics, GSMC 852 Introduction to Biomedical Research I and GSMC 855 Introduction to Biomedical Research II (or equivalent) meets the Research Skills requirement.
  - Successful completion of GSMC 856 Introduction to Research Ethics (or equivalent) meets the Responsible Scholarship requirement.
- Successful completion of the Residence Requirement ([https://catalog.ku.edu/graduate-studies/kumc/#Doctor%20of%20Philosophy%20\(PhD\)%20Degree%20Requirements](https://catalog.ku.edu/graduate-studies/kumc/#Doctor%20of%20Philosophy%20(PhD)%20Degree%20Requirements)) prior to the semester the Oral Comprehensive Examination is scheduled. The requirement is met by enrollment in full-time status a minimum of two semesters.
- Successful completion of the Oral Comprehensive Examination (<https://catalog.ku.edu/graduate-studies/kumc/#ComprehensiveOralExamination>). After completing GSMC courses and two full semesters in the department, students start their comprehensive exam. The exam is an NIH F31 Fellowship style that provides maximum flexibility by allowing the topic to be on the student's research topic, closely related or off-topic. A pre-proposal allows the committee to provide guidance before submission of the final written comprehensive exam. Finally, there is an oral defense of the proposal. The goal is to accomplish all of this within five months. Students are recognized as formal doctoral candidates after they have passed the comprehensive examination.
- Successful completion of the Post-Comprehensive Enrollment (<https://catalog.ku.edu/graduate-studies/kumc/#PostComprehensiveEnrollment>) requirement.
- Enrollment in a minimum of one (1) credit hour of MICR 999 Dissertation for Ph.D. in Microbiology the semester the student will defend dissertation and graduate.
- Successful completion of the Final Oral Examination (<https://catalog.ku.edu/graduate-studies/kumc/#FinalOralExamination>) (dissertation defense.) The doctoral candidate prepares a written dissertation detailing the results of their original research.

- Successful Dissertation Submission and Publication (<https://catalog.ku.edu/graduate-studies/kumc/#DissertationSubmissionandPublication>) (according to Office of Graduate Studies policy.)
- Successful completion of the following Interdisciplinary Graduate Program in Biomedical Science (IGPBS) (<https://catalog.ku.edu/medicine/graduate-program-biomedical-sciences/>) courses (or their equivalent):

Code	Title	Hours
GSMC 850	Proteins and Metabolism	2
GSMC 851	Molecular Genetics	2
GSMC 852	Introduction to Biomedical Research I	2
GSMC 853	Cellular Structure	2
GSMC 854	Cell Communication	2
GSMC 855	Introduction to Biomedical Research II	2
GSMC 856	Introduction to Research Ethics	1
GSMC 857	Biographics	1
GSMC 858	Introduction to Faculty Research (Direct admits do not take this course.)	1
GSMC 859	Research Rotations	1-4

- Successful completion of the following Microbiology courses:

Code	Title	Hours
Take two of the following courses:		
MICR 810	Fundamentals of Immunology	2
MICR 811	Molecular Genetics of Bacteria and Phages	2
MICR 812	Molecular Virology and Pathogenesis	2
Take the following courses:		
MICR 830	Seminar in Microbiology	1
MICR 835	Research in Microbiology	1-6
MICR 990	Research for Ph.D. in Microbiology	1-10
MICR 999	Dissertation for Ph.D. in Microbiology	1-10

- Successful completion of two of the following elective courses; one must be an advanced course in the student's research area. Courses are selected in consultation with the student's advisor. One of these courses must be completed prior to scheduling the oral comprehensive exam.

Code	Title	Hours
MICR 808	Immunology (offered Spring only)	3
MICR 809	Tumor Immunology (offered Spring only)	3
MICR 820	Bacterial Genetics and Pathogenesis (offered Spring only)	3
MICR 825	Virology (offered Spring only)	3
MICR 826	Oncogenesis Associated with Viral Infections	3
MICR 855	Host-Pathogen Interactions	3

- Successful completion of additional elective coursework as determined in consultation with the student's advisor or research committee. Electives may include the Microbiology courses listed below or courses from other departments.

Code	Title	Hours
MICR 801	Principles of Immunology (offered Fall only)	1
MICR 802	Principles of Virology (offered Fall only)	1

MICR 803	Principles of Bacterial Genetics and Pathogenesis (offered Fall only)	1
MICR 804	Science Communication	1
MICR 805	Teaching in Higher Education (offered Fall and Spring)	3

- Successful presentation of a literature seminar.
- Participation in the Work in Progress series (meets monthly.)

Students enrolled in the MD-PhD Physician Scientist Training Program should review the Degree Requirements (<https://catalog.ku.edu/medicine/combined-md-phd/#degreerequirementstext>) section of this catalog for that program.

Degree requirements and course descriptions are subject to change. Any courses taken as an equivalent must be approved by the Graduate Director and the Office of Graduate Studies. In most cases, use the catalog of the year student entered the program. *Other years' catalogs*.

## Typical Plan of Study

### Year 1

Fall	Hours Spring	Hours Summer	Hours
GSMC 850	2 GSMC 853	2 GSMC 861	3
GSMC 851	2 GSMC 854	2 May take an elective course from the student's chosen degree program in consultation with the student's advisor.	1-3
GSMC 852	2 GSMC 855	2	
GSMC 856	1 GSMC 859	1-4	
GSMC 857	1		
GSMC 858	1		
GSMC 859	1-4		
<b>10-13</b>		<b>7-10</b>	<b>4-6</b>

**Total Hours 21-29**

### Year 2

Fall	Hours Spring	Hours Summer	Hours
MICR 810	2 MICR 830	1 MICR 835	3
MICR 811	2 MICR 835	1-6 Minimum enrollment required is 3 credit hours.	
MICR 812	2 Electives	1-6	
Take two of these three courses: MICR 810, 811 and 812	Minimum enrollment required is 6 credit hours.		
MICR 830	1		
MICR 835	1-6		
Electives	1-6		

Minimum enrollment required is 6 credit hours.			
	9-19	3-13	3
<b>Year 3</b>			
<b>Fall</b>	<b>Hours Spring</b>	<b>Hours Summer</b>	<b>Hours</b>
MICR 830	1 MICR 990	1-6 MICR 990	3
MICR 835	1-6 Electives	1-6 Minimum enrollment required is 3 credit hours.	
Electives	1-6 Minimum enrollment required is 6 credit hours.		
Minimum enrollment required is 6 credit hours.			
Oral Comprehensive Exam may be scheduled as early as this semester if approved by committee to proceed.			
	3-13	2-12	3
<b>Year 4</b>			
<b>Fall</b>	<b>Hours Spring</b>	<b>Hours Summer</b>	<b>Hours</b>
MICR 990	6 MICR 990	1-6 MICR 990	1-3
Minimum enrollment required is 6 credit hours.	18 hour postcomp enrollment completed Fall Year 4 if Oral Comp passed Fall Year 2 - may begin reduced enrollment Spring Year 4.		
	6	1-6	1-3
<b>Year 5</b>			
<b>Fall</b>	<b>Hours Spring</b>	<b>Hours Summer</b>	<b>Hours</b>
MICR 999	1-6 MICR 999	1-6 MICR 999	1-3

Final Oral Exam (dissertation defense) scheduled semester approved by committee to defend and graduate		
1-6	1-6	1-3

**Total Hours 34-93**

### TECHNICAL STANDARDS AND REQUIREMENTS FOR THE MICROBIOLOGY GRADUATE PROGRAM

The Ph.D. degree signifies that the holder is prepared for entry into research and/or teaching in postgraduate training and faculty positions. It follows that graduates must have the knowledge and skills to function in a broad variety of academic situations in the classroom and laboratory. Therefore all students admitted for graduate study must meet the following abilities and expectations.

1. **Observation:** The candidate must be able to observe demonstrations and experiences in the basic sciences, including but not limited to biology demonstrations in animals, cultures, and microscopic studies of tissues in normal and pathologic states. A candidate must be able to observe and analyze experimental detail. Observation necessitates the functional use of the sense of vision and somatic sensation.
2. **Communication:** A candidate should be able to communicate, to understand, and to observe lectures and laboratory instruction. A candidate must be able to communicate effectively in order to present and analyze research data. Communication includes not only speech, but also reading and writing. The candidate must be able to communicate effectively and efficiently in oral and written form with students, staff, and faculty.
3. **Motor:** Candidates should have sufficient motor function to carry out lab techniques. A candidate should be physically able to do laboratory procedures and analyze data. Such actions require coordination of both gross and fine muscular movements, equilibrium, and functional use of the senses of touch and vision.
4. **Intellectual-Conceptual, Integrative, and Quantitative Abilities:** The abilities include measurement, calculation, reasoning, analysis, and synthesis. Problem solving, the critical skill demanded of scientists, requires all of these intellectual abilities. In addition, the candidate should be able to comprehend three-dimensional relationships and to understand the spatial relationships of structures.
5. **Behavioral and Social Attributes:** A candidate must possess the emotional health required for full utilization of his/her intellectual abilities, the exercise of good judgment and the prompt completion of all responsibilities attendant to the completion of research and teaching responsibilities. Integrity and motivation are personal qualities, which are required for success in science.

Disabled individuals are encouraged to apply. Applicants whose response indicates that they cannot meet the expectations will be reviewed by the Graduate Committee and Technical Support staff of KUMC to assess the extent of the student's difficulties. At this review the provisions for reasonable accommodation will be determined.

For further information, contact the Microbiology Graduate Program, University of Kansas Medical Center, 3025 Wahl Hall West, 3901

Rainbow Blvd., Kansas City, Kansas 66160. Phone: (913) 588-7099; Fax: (913) 588-7295; E-mail: micrograd@kumc.edu.

#### **STUDENT POLICY ON INFECTIOUS DISEASE**

Due to the need to assure the health and safety of students, faculty, and staff, the fact that an applicant for admission has an infectious disease or is the carrier of an infectious disease may be a factor in determining eligibility for academic program admission at the University of Kansas Medical Center. Determination of eligibility for admission in such cases will be made on an individual basis in consultation with the applicant's physician, taking into consideration (among other factors), legal requirements and the current best medical information available to determine whether the applicant could complete the normal course of study with reasonable accommodation and without risk to him/herself or to others. Therefore, applicants having an infectious disease or who are carriers of an infectious disease must advise the Graduate Committee of this fact and may be required to provide medical records for review by the Student Health Physician in order to determine eligibility for admission.

#### **DRUG FREE WORKPLACE POLICY OF THE UNIVERSITY OF KANSAS**

It is the policy of the University of Kansas that unlawful manufacture, distribution, dispensing, possession, or use of controlled substances or alcohol is prohibited in buildings, facilities, or grounds controlled by the University. Any student found to be illegally manufacturing, distributing, dispensing, possessing, or using controlled substances or alcohol at the University or any of its affiliated educational sites, shall be subject to disciplinary action in accordance with applicable policies as outlined in the Graduate Student Handbook. Students are reminded that illegal manufacture, distribution, dispensing, possession, or use of controlled substances may also subject individuals to criminal prosecution.