

Master of Science in Pharmacology

Pharmacology and Toxicology both require an understanding of basic properties and actions of chemicals and the biological systems they affect. Pharmacology though, focuses more on the therapeutic actions of chemicals (particularly drugs) in the health sciences, the use of drugs as therapeutic agents in medicine or as tools in scientific research, and the development and regulation of pharmaceuticals. Pharmacologists perform many different duties including research and teaching in academic, nonprofit and industrial settings, and in consulting and public service.

The Master of Science (M.S.) in Pharmacology degree program provides an academic experience that emphasizes research skills and prepares students for a range of careers in varied employment settings or more advanced academic study. The M.S. curriculum provides a foundation of core concepts and skills through required coursework, but allows considerable flexibility for individualization through advanced electives and mentored research experiences.

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*».

Degree Requirements:

- Degree requirements are normally completed within 3 years of admission to the degree program although a maximum of 7 years is allowed.
- Cumulative grade-point average (GPA) of at least a 3.0 for all KU graduate coursework.
- Completion of a minimum of 30 credit hours.
- Enrollment in a minimum of one (1) credit hour the semester the student will graduate.
- Successful completion of either a thesis defense or general examination (<https://catalog.ku.edu/graduate-studies/kumc/#ThesisDefense>) the semester the student will graduate.
- If thesis option chosen, then enrollment in a minimum of one (1) credit hour of PHCL 899 Thesis in Pharmacology and successful thesis submission and publication (<https://catalog.ku.edu/graduate-studies/kumc/#ThesisSubmission>) (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	1
GSMC 859	Research Rotations	1-4

- Successful completion of the following Pharmacology courses:

Code	Title	Hours
PHCL 880	Essentials of Pharmacology	4
PHCL 890	Research in Pharmacology	1-10
PHCL 898	Principles of Pharmacology	1
PHCL 899	Thesis in Pharmacology (if thesis option chosen)	1-10

- Successful completion of elective coursework as determined in consultation with the student's advisor.

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		
	10-13	7-10	4-6

Total Hours 21-29

Year 2

Fall	Hours Spring	Hours Summer	Hours
PHCL 890	1-6 PHCL 890	1-6 PHCL 890	1-3
PHCL 898	1		
	2-7	1-6	1-3

Year 3

Fall	Hours Spring	Hours Summer	Hours
PHCL 899 or 890	1-6 PHCL 899 or 890	1-6 PHCL 899 or 890	1-3
PHCL 899 if thesis option chosen, otherwise PHCL 890	PHCL 899 if thesis option chosen, otherwise PHCL 890	PHCL 899 if thesis option chosen, otherwise PHCL 890	
Thesis defense or general examination scheduled semester approved by committee to graduate.			
	1-6	1-6	1-3

Total Hours 7-31

TECHNICAL STANDARDS AND REQUIREMENTS FOR GRADUATE STUDIES IN THE DEPARTMENT OF PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS

The M.S. degree signifies that the holder is prepared for entry into research in industrial or academic laboratory settings. To that end, graduates must have the knowledge and skills to function in a broad

variety of laboratory settings. Therefore, all students admitted for graduate studies in Pharmacology and Toxicology 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 perform 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:** These 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 Department of Pharmacology, Toxicology and Therapeutics, University of Kansas School of Medicine, MS 1018, 3901 Rainbow Blvd., Kansas City, Kansas 66160; Phone: (913) 588-0028 E-mail: bhagenbuch@kumc.edu or (913) 588-7519 kmccarso@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 admission to academic programs at the University of Kansas Medical Center. In such cases, the determination of eligibility for admission will be made on an individual basis in consultation with the applicant's physician; the decision will take a number of factors into consideration, including the 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.