Master of Science in Cancer Biology

The Master of Science (M.S.) program in Cancer Biology prepares the student for a career at the advanced technical level in academia, industry, or government. Graduating students may also find teaching positions at the secondary or junior college level.

The application process is an online process. Application to this graduate program is facilitated through the Interdisciplinary Graduate Program in Biomedical Sciences (IGPBS). (http://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://www.kumc.edu/academic-and-student-affairs/departments/office-of-international-programs/inbound-programs/information-for-students/academic-english-requirements.html).
- 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.
- 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.

Applicants will be assessed based on a combination of GPA, and research experience. Students not meeting the above requirements may be eligible for provisional admission. 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 Master of Science (M.S.) program in Cancer Biology prepares the student for a career at the advanced technical level in academia, industry, or government.

Degree requirements:

- Degree requirements are normally completed within 3 years of admission to the program although a maximum of 7 years is allowed.
- Completion of a minimum of 30 credit hours.
- Cumulative grade-point average (GPA) of at least a 3.0 for all KU graduate coursework.
- Enrollment in a minimum of one (1) credit hour of CBIO 899 Master's Thesis in Cancer Biology the semester the student will defend the thesis and graduate.
- Successful completion of the thesis defense (https://catalog.ku.edu/archives/2024-25/graduate-studies/kumc/#ThesisDefense) or general examination the semester the student will graduate. The thesis should be comparable in scope to justify co-authorship on a rigorously peer-reviewed manuscript. In general, CBIO students graduating with an MS degree should have justified co-authorship on at least one peer-reviewed publication (as determined by their thesis advisory committee).
- Successful Thesis Submission and Publication (https://catalog.ku.edu/archives/2024-25/graduate-studies/kumc/#ThesisSubmission) (according to Office of Graduate Studies policy.)
- Successful completion of the following Interdisciplinary Graduate Program in Biomedical Science (IGPBS) (http://catalog.ku.edu/medicine/graduate-program-biomedical-sciences/) courses (or their equivalent):

Code	Title	Hours
GSMC 850	Proteins and Metabolism	2
GSMC 852	Introduction to Biomedical Research I	2
GSMC 856	Introduction to Research Ethics	1

- Successful completion of the following Cancer Biology courses:

Code	Title	Hours
CBIO 800	Mechanisms of Tumor Development and Progression: Colloquium Format	3
CBIO 840	Tumor Microenvironment	2
CBIO 850	Cancer Center Seminar	1
CBIO 860	Communicating Cancer Science	1
CBIO 870	Analysis of Scientific Papers	1
CBIO 890	Master's Research in Cancer Biology	1-10
CBIO 899	Master's Thesis in Cancer Biology	1-10
CBIO 900	Carcinogenesis and Cancer Biology	3

- Successful completion of PATH 913 Introduction to Grant Proposal Writing.
- Successful completion of advanced elective coursework as determined in consultation with the student's advisor. Electives may be chosen from this list but are not limited to:

Code	Title	Hours
Cancer Biology courses		
CBIO 820	Cellular and Molecular Mechanisms of Signal Transduction in Cancer: Colloquium	2
CBIO 880	Advanced Topics in Cancer Research	1-5
Other Department courses		
ANAT 845	Graduate Histology	3
ANAT 868	Advanced Developmental Biology	2
BCHM 808	Methods for Analyzing Biomolecules	3
BCHM 922	Advanced Molecular Genetics	3

BCHM 923	Protein Structure and Function	3
BIOS 714	Fundamentals of Biostatistics I	3
BIOS 717	Fundamentals of Biostatistics II	3
DN 884	Diet, Physical Activity & Cancer	3
MICR 805	Teaching in Higher Education	3
MICR 808	Immunology	3
PATH 803	Stem Cell Biology	2
PATH 804	Selected Topics in Signal Transduction	1
PATH 806	Epigenetics	2
PHCL 761	General Principles of Pharmacology	1
PHCL 765	Chemotherapy	1
PHSL 843	Physiology of Disease	3
Course in fundamentals of biostatistics and/or informatics.		

- Continued attendance at the KUCC seminar (minimum 75% required determined by sign-in) in both the Fall and Spring semesters after completing 5 semesters of CBIO 850 Cancer Center Seminar.
- Annual presentation and continued attendance at Communicating Cancer Science in both the Fall and Spring semesters after completing 5 semesters of CBIO 860 Communicating Cancer Science.
- Annual participation and/or attendance at the KU Medical Center Student Research Forum.
- Annual participation and/or attendance at the KU Cancer Center Research Retreats.

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	CBIO 850	1	CBIO 890	1-10
GSMC 852	2	CBIO 860 (one presentation annually Fall or Spring)	1	May take an elective course from the student's chosen degree program in consultation with the student's advisor.	
GSMC 856	1	CBIO 870	1		
CBIO 890	1-10	CBIO 890	1-10		
	6-15		**4-13**		**1-10**

Year 2

Fall	Hours	Spring	Hours	Summer	Hours
CBIO 900	3	CBIO 800	3	CBIO 890	1-10
CBIO 850	1	CBIO 850	1	Elective	1-3
CBIO 860 (one presentation annually Fall or Spring)	1	CBIO 860 (one presentation annually Fall or Spring)	1		
CBIO 870	1	CBIO 870	1		
CBIO 890	1-10	CBIO 890	1-10		
Elective	1-3	PATH 913	1		
Annual participation and/or attendance in the KU Cancer Center Research Retreats.		Annual participation and/or attendance in KUMC Student Research Forum.			
	8-19		**8-17**		**2-13**

Year 3

Fall	Hours	Spring	Hours
CBIO 840 (alternating years)	2	CBIO 820 (alternating years)	2
CBIO 850	1	CBIO 850	1
CBIO 860 (one presentation annually Fall or Spring)	1	CBIO 860 (one presentation annually Fall or Spring)	1
CBIO 870	1	CBIO 870	1
CBIO 899	1-10	CBIO 899	1-10
Elective	1-3	Annual participation and/or attendance in KUMC Student Research Forum.	
Thesis defense scheduled semester approved by committee to graduate.			
Annual participation and/or attendance in the KU Cancer Center Research Retreats.			
	7-18		**6-15**

Total Hours 42-120

TECHNICAL STANDARDS AND REQUIREMENTS FOR THE M.S. IN CANCER BIOLOGY

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.

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 Department of Cancer Biology, University of Kansas School of Medicine, 2003 Wahl Hall West, 3901 Rainbow Blvd., Kansas City, Kansas 66160 (Phone: (913) 945-7739 E-mail: cancerbiology@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.