

# Doctor of Philosophy in Molecular, Cellular, and Developmental Biology

## Molecular Biosciences Doctoral Programs

Molecular Biosciences is an interdisciplinary group of faculty, postdoctoral fellows and graduate students who perform cutting edge research across a wide range of areas (<https://molecularbiosciences.ku.edu/research-areas/>), including biochemistry, biophysics, structural biology, bioinformatics, cancer biology, genetics, genomics, immunology, microbiology, virology, neurobiology, molecular, cellular and developmental biology. Our researchers investigate fundamental biological and biomedical problems on all levels, from molecules to cells to organisms. Our research labs collaborate to solve complex questions using a range of approaches, and make use of the world-class core facilities at KU. The Department of Molecular Biosciences at the University of Kansas is an excellent environment for research and graduate training in biology.

The department offers Doctor of Philosophy degrees in Biochemistry and Biophysics (<http://molecularbiosciences.ku.edu/biochemistry-graduate-program/>), in Molecular, Cellular, and Developmental Biology (MCDB (<http://molecularbiosciences.ku.edu/mcdb-graduate-program/>)), and in Microbiology (<http://molecularbiosciences.ku.edu/microbiology-0/>). General information about the department, our faculty and students, and alumni of our graduate programs can be found on our website (<https://molecularbiosciences.ku.edu/>). Detailed information about admission (<https://molecularbiosciences.ku.edu/graduate-admissions/>) and financial support (<http://molecularbiosciences.ku.edu/stipend/>) is also available.

Note that the various B.A. and B.S. undergraduate degree programs in biology are listed at the Biology Undergraduate Programs (<http://catalog.ku.edu/liberal-arts-sciences/biology/>) page.

## Admission to Graduate Studies

### Admission Requirements

- All applicants must meet the requirements outlined in the Admission to Graduate Study (<https://policy.ku.edu/graduate-studies/admission-to-graduate-study/>) policy.
- Bachelor's degree: A copy of official transcripts showing proof of a bachelor's degree (and any post-bachelor's coursework or degrees) from a regionally accredited institution, or a foreign university with equivalent bachelor's degree requirements is required.
- English proficiency: Proof of English proficiency (<https://gradapply.ku.edu/english-requirements/>) for non-native or non-native-like English speakers is required. There are two bands of English proficiency, including Admission and Full proficiency. For applicants to online programs, Full proficiency is required.

## Graduate Admission

The Department of Molecular Biosciences (<http://molecularbiosciences.ku.edu/>) recognizes the importance of investing in the careers of future biomedical scientists. We welcome graduate students into our vibrant scientific community, where they have the

opportunity to become outstanding researchers and prepare for an exciting future in science.

All students seeking a graduate degree must submit a formal application to the Molecular Biosciences graduate program. Full information on the application process, and a link to apply online can be found on our website (<https://molecularbiosciences.ku.edu/graduate-admissions/>). Application materials for the Molecular Biosciences graduate program include:

1. An application form
2. 1 official copy of all academic transcripts (international students must also provide a translated copy);
3. A Curriculum Vitae or résumé (1 to 2 pages);
4. 3 letters of recommendation from qualified individuals using the Graduate Letter of Recommendation form;
5. A Statement of Research Interests and Goals. A strong statement will include: (a) A description of previous research experiences, if applicable, discussing how these have prepared you for graduate school both professionally and personally, (b) A discussion of your broad research interests, and (c) A description of your future career goals, discussing how a PhD from our department will help further these goals. (1-2 pages)
6. Application Fee
7. Non-native speakers of English must meet the English proficiency requirements for employment as a GTA/GRA: minimum TOEFL (iBT) SPEAKING score of 22, AND all other parts scores at least 20; or IELTS SPEAKING score of 7, with no other part score below 5.5. Scores must be less than 2 years old from the time of initial enrollment.

More information can be found here: <https://gradapply.ku.edu/english-requirements> (<https://gradapply.ku.edu/english-requirements/>)

GRE scores are not required for your application. You may submit your official GRE scores if you feel it will help the admissions committee better understand your academic capabilities. But electing not to submit scores will not impact your chance of admission.

Complete applications received by **December 1st** are reviewed by the Molecular Biosciences graduate admissions committee. Admission into our program is competitive, and we receive a large number of applications each year. Students will be informed of admission decisions early in the new year, admissions decisions are finalized by April 15, and newly admitted students matriculate in August.

Our holistic evaluation is based on several criteria, including grades, the strength of recommendation letters, previous research experience, and the fit of your career goals with our educational program.

The department is committed to enhancing diversity (<https://molecularbiosciences.ku.edu/dei-statement/>) in the life sciences, encourage participation from individuals with diverse life experiences, and strive to foster an inclusive research and training environment for all our faculty, students, and staff.

All supporting documentation should be uploaded online when you apply. If this is not possible, please send documentation to:

**Cassandra Jim**  
**Graduate Program Coordinator**  
**The University of Kansas**

**Department of Molecular Biosciences**  
**Haworth Hall**  
**1200 Sunnyside Ave., Room 2034**  
**Lawrence, KS 66045**

## **Molecular, Cellular, and Developmental Biology**

### **Required Course Work**

The following courses are required for all students in the Biochemistry and Biophysics PhD. These courses must be completed by the end of the semester of the oral comprehensive exam. Note that these are minimum requirements to be approved to move forward to the oral comprehensive exam.

<b>Code</b>	<b>Title</b>	<b>Hours</b>
BIOL 985	Advanced Study (1 credit in fall and spring semester of first and second year of study)	4
BIOL 807	Graduate Molecular Biosciences	3
BIOL 817	Rigor, Reproducibility and Responsible Conduct in Research	3
BIOL 925	Research Grant Proposal Preparation (Fall of 2nd year)	3
	Select three graduate-level courses (numbered 600+) that total 9 credit hours. The following courses that satisfy these criteria are frequently offered although others could be acceptable).	9
BIOL 650	Advanced Neurobiology	
BIOL 680	Genomics	
BIOL 750	Advanced Biochemistry	
BIOL 752	Cell Biology	
BIOL 755	Mechanisms of Development	
BIOL 757	Carcinogenesis and Cancer Biology	
BIOL 772	Gene Expression	
<b>Total Hours</b>		<b>22</b>

### **Seminar Enrollment**

From the start of the first year of graduate study, enroll in 1 credit hour of required seminar every Fall and Spring semester. Seminar examples include: BIOL 701 or BIOL 905.

### **Teaching Requirement**

Doctoral students must complete at least 2 semesters of teaching as a GTA (Graduate Teaching Assistant) during the program.

### **Research Skills & Responsible Scholarship**

The University requires that every doctoral student receive training in responsible scholarship pertinent to the field of research and obtain research skills pertinent to the doctoral level of research in their field(s). These requirements must be completed by the end of the semester that the student takes the oral comprehensive exam. For students in Molecular, Cellular and Developmental Biology, this requirement is satisfied by completion of BIOL 817 (completed in the first year).

### **Oral Comprehensive Exam**

The PhD qualifying exam consists of an oral exam assessed by Graduate Faculty committee established in the second year of study. Students prepare for the exam by taking BIOL 925 in preparation and then writing a research grant proposal that includes guidance from the student

mentor and all members of the exam committee (<https://policy.ku.edu/graduate-studies/oral-exam-committee-composition/#:~:text=Committee%20Composition%20Requirements%20Doctoral%20student%20oral%20examinations%20include,%284%29%20voting%20members%20This%20is%20the%20minimum%20requirement>). Students must take the exam toward the end of the Spring semester in their second year but before the fall semester of their third year. Students who do not pass all portions of the exam may switch to the Master's degree, but may not be approved to continue in the PhD.

### **Requirements Post-Comprehensive Exam**

Upon passing the comprehensive examination, the student becomes a candidate for the Ph.D. degree and is approved to proceed with their dissertation research and project. At least once each year after passing the comprehensive examination, the student must schedule a meeting with his or her dissertation committee to discuss progress towards the completion of the dissertation and any other concerns. Starting the semester following successful completion of the oral comprehensive exam, students must enroll in accordance with the Office of Graduate Studies' Doctoral Candidacy Policy (<https://policy.ku.edu/graduate-studies/doctoral-candidacy/>). This enrollment includes, but is not limited to, at least 1 dissertation hour every semester until graduation. See the Doctoral Candidacy policy for more information about this University requirement.

### **Dissertation Defense**

The dissertation must be an original work of research that advances the field of Molecular, Cellular and Developmental Biology and complies with the Office of Graduate Studies' Doctoral Dissertation policy (<https://policy.ku.edu/graduate-studies/doctoral-dissertation/>). Upon approval by the students committee that the student's dissertation research and written document is complete, the student must defend the dissertation before all committee members in the "final oral examination," or dissertation defense. The final dissertation defense includes a public presentation of the dissertation research by the candidate and concludes with a period of questioning by the committee, faculty, and public in attendance. After posing questions to the student about the dissertation work, committee members deliberate and vote on a grade of Satisfactory or Unsatisfactory. A grade of Satisfactory requires a majority vote and may be contingent on the completion of specific revisions by a designated due date. The committee may also recommend that a student earning a satisfactory grade be considered for Honors by the Department.

At the completion of this program, students will be able to:

- Understand fundamental general concepts in molecular biosciences as well as principles of their specific research area.
- Understand methods and designing experiments.
- Interpret results and the formulation of testable hypotheses.
- Be aware of broader significance and effective communication to a wide audience.