

# MOLECULAR BIOLOGY AND BIOCHEMISTRY

*The Interdisciplinary Ph.D. program is no longer accepting applications. The Civil Engineering, Computer Science, Economics, Education, Electrical and Computer Engineering, Humanities, Mechanical Engineering, and Natural Sciences Ph.D. programs are now open for applications. Please inquire to [umkcs@umkc.edu](mailto:umkcs@umkc.edu) with any questions.*

## Discipline Coordinator

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Molecular Biology and Biochemistry faculty who are members of the Doctoral Faculty (<http://sgs.umkc.edu/for-faculty-and-staff/doctoralgraduate-faculty-lists/>)

Molecular Biology and Biochemistry is a discipline in the Interdisciplinary Ph.D. (<https://catalog.umkc.edu/colleges-schools/graduate-studies/interdisciplinary-phd-program/>) Program administered by the School of Graduate Studies.

**Note:** The discipline-specific requirements listed here are *in addition* to the requirements listed in Interdisciplinary Ph.D. Application Procedure and Minimum Criteria for Admission and Minimum Interdisciplinary Ph.D. Academic Regulations and Degree Requirements.

## Discipline-Specific Admission Requirements

A cumulative GPA of at least 3.0 (on a 4.0 scale) on all college work for bachelor's degree or post-baccalaureate work. Due to the sequencing of coursework, new students selecting molecular biology and biochemistry as their primary discipline will normally only be admitted in the fall term.

## Qualifying Requirements for Full Admission

Minimum of 16 hours of approved graduate coursework at UMKC toward the Ph.D. program with a grade-point average of at least 3.0 on a 4.0 scale. International students must establish English proficiency.

## Suggested Compatible Co-disciplines

Chemistry (<https://catalog.umkc.edu/colleges-schools/graduate-studies/chemistry/>), Cell Biology and Biophysics (<https://catalog.umkc.edu/colleges-schools/graduate-studies/cell-biology-biophysics/>), Oral and Craniofacial Sciences (<https://catalog.umkc.edu/colleges-schools/graduate-studies/oral-craniofacial-sciences/>), Pharmaceutical Science (<https://catalog.umkc.edu/colleges-schools/graduate-studies/pharmaceutical-sciences/>), Pharmacology (<https://catalog.umkc.edu/colleges-schools/graduate-studies/pharmacology/>), Physics (<https://catalog.umkc.edu/colleges-schools/graduate-studies/physics/>)

## Core Program Requirements

### Molecular Biology and Biochemistry as a Primary Discipline

Minimum core requirement is 33 course credit hours and 15 dissertation research credits in Molecular Biology and Biochemistry for a total of 48 post-baccalaureate credit hours, distributed as indicated below:

Code	Title	Credits
LS-MBB 5561	Advanced Principles of Biochemistry	3
LS-MBB 5530	Advanced Principles of Molecular Biology	3
LS-MBB 5596 or LS-MBB 5597	Advanced Experimental Molecular Biology I Advanced Experimental Molecular Biology II	2
LS-MBB 5611 or LS-CBB 5612	Seminar in Molecular Biology and Biochemistry (*) Seminar in Cell Biology and Biophysics	1
LS-MBB 5690 or LS-CBB 5690	Analytical Methods in Molecular Biology and Biochemistry Analytical Methods in Cell Biology and Biophysics	5
BIOLOGY 5501	Proposal Writing	1

7 cr. hr. in discipline or related discipline courses (LS-CBB, LS-MBB, BIOL, PHARM, etc.) 15 cr. hr. LS-MBB 5699 Dissertation Research.

\* Students may take LS-CBB 5612 or LS-MBB 5611 twice (for a total of 2 credit hours) or take each class once (for a total of 2 credit hours).

### Related Discipline Courses Required

Ten additional course credit hours in one related discipline or combination of disciplines. Related disciplines are defined as Cell Biology and Biophysics, Chemistry, Pharmaceutical Science, Pharmacology, Oral and Craniofacial Sciences or other. Seminar courses may be part of this component of required courses, up to a maximum of three for the program, as are two additional credits of advanced experimental molecular or cell biology.

## Electives

Each student's supervisory committee may require additional courses in any University-approved doctoral discipline as preparation for specific areas of research. These additional requirements may not exceed nine credit hours beyond the 33 credits required for the basic course core. These electives may be taken at any time during enrollment as a graduate student, up to the semester prior to that in which the dissertation defense will occur. No more than seven course credit hours of 5500-level courses, or their equivalent, can be taken at institutions outside UMKC. Remember that 5700-level courses may not be used to satisfy course requirements for the program.

## Molecular Biology and Biochemistry as a Co-discipline

Code	Title	Credits
Required courses		
LS-MBB 5561	Advanced Principles of Biochemistry	3
LS-MBB 5530	Advanced Principles of Molecular Biology	3
LS-MBB 5611	Seminar in Molecular Biology and Biochemistry	1
Additional SBC graduate courses (LS-CBB, LS-MBB or BIOL) for a minimum of 10 cr. hr.		

## Other Discipline-Specific Special Requirements

### Research

The Division of Biological and Biomedical systems offers research opportunities in many areas of modern life sciences that address problems of basic life processes at the cellular, subcellular and molecular levels. Graduate studies offered with primary participation of the faculty in the Division of Molecular Biology and Biochemistry are based on the belief that training for research can be best accomplished by having an appropriate breadth of background coursework, combined with a depth of specialization in a particular research area. The faculty have established guidelines that have a minimum of formal requirements so that students have the flexibility to advance at a pace consistent with development of the individual. Diligence, creativity and independent thinking are the qualities desired in the candidate's dissertation work.

### Teaching

As part of their graduate training, all Ph.D. students with Molecular Biology and Biochemistry as the primary discipline participate in the teaching program of the Division of Biological and Biomedical systems. This is an important component of preparation for a career in academia or other institutions and aids in the development of effective communication skills.

### Seminars

Students will participate in seminars in which current developments in various areas of life sciences will be discussed and explored. Students also will present seminars on their own work or on work in the current scientific literature. The latter is taken as part of the core of graduate-level courses in the primary or co-disciplines.

### Course Restrictions

5700-level courses may not be used to satisfy molecular biology and biochemistry discipline-specific course requirements.

### Dissertation

The dissertation abstract and proposal must be submitted to and approved by the supervisory committee prior to beginning the third academic year of study after enrollment in the Ph.D. program.

### Retention in Program

For students with this discipline as their primary discipline, no more than one C grade in a core course, and no D or F grades, are permitted. A student who receives more than one C grade will be recommended for termination from the doctoral program. A student who receives a D or F grade will be dropped from the program.

The doctoral faculty in Molecular Biology and Biochemistry meets formally at the end of each academic year to discuss and evaluate the progress of all graduate students. Each student's committee also meets with the student at least once a year. After the annual doctoral faculty meeting, all students receive written evaluations of their status and a report is placed in each student's file.

## Requirements for Comprehensive Examinations

To become a Ph.D. candidate, the student must pass a Comprehensive Exam that may be taken on completion of essentially all of the coursework specified in the student's study plan and on satisfactorily fulfilling the requirements for full admission. This must be done before the *beginning* of the third academic year after admission to UMKC with graduate student status, or (for part-time students) immediately after completion of 25 credit hours approved by the discipline-doctoral program at UMKC. This exam will be administered by the student's supervisory committee and will test the student's knowledge of background material, as well as the student's ability to analyze and interpret information and solve problems.

**Written Portion**

The written examination for students who have Molecular Biology and Biochemistry as their primary discipline consists of an NIH-style grant proposal that the student will prepare. The topic of the research proposal will be determined by the student in consultation with the student's supervisory committee.

**Oral Portion**

The oral examination also has two aspects: (1) questions covering the grant proposal prepared by the student for the written examination and (2) other related material in the student's area of specialization, including fundamental knowledge of the primary and secondary disciplines.