BIOCHEMISTRY AND MOLECULAR GENETICS (MS)

Master of Science in Biochemistry and Molecular Genetics
Unit: School of Medicine (https://louisville.edu/medicine/) (GM)
Department: Biochemistry and Molecular Genetics (http://louisville.edu/medicine/departments/biochemistry/)
Program Webpage (https://louisville.edu/medschool/biochemistry/)
Academic Plan Code(s): BIOCMS

Program Information

The Master of Science in Biochemistry and Molecular Genetics program is two-to-three-year course of study designed for students interested in:

- A master's degree leading to jobs that do not require extensive research experience or credentials, e.g., pharmaceutical representatives, medical insurance providers, scientific writing.
- Preparation for professional school, e.g., medical or legal.
- Combined programs to form hybrid or dual science/business or science/public health degrees, such as an MS/MBA or MS/MPH programs.
- Gaining practical training in laboratory technique and data analysis as the basis for a career in biotechnology or academic research.

As teachers and scientists, the faculty of the Department of Biochemistry and Molecular Genetics subscribe to the following missions:

- Provide up-to-date and high-quality classroom and laboratory instruction in the disciplines of biochemistry, genetics, and molecular biology to students at the university.
- Conduct and publish research or other scholarship in areas that advance knowledge within a discipline, contribute to improving the human condition, and contribute to teaching.
- Train students and post-doctoral fellows in biochemical research.

Admission Requirements

All applications must be submitted online (https://louisville.edu/graduate/apply/) to the Graduate School.

Only complete applications will be reviewed. A complete application must have all the following:

- Transcripts of all course work
- At least two letters of recommendation, preferably from faculty in biology and/or chemistry
- A personal statement of interest

Selection Process

Applications will be reviewed by the Director of Graduate Studies and the Graduate Executive Committee of the Department. We use a holistic review process and use the GPA and experience to select applicants we feel will be successful in our program.

Final decisions for admissions will be made in April-May of each year.

Program Requirements

Code	Title	Hours
Program Core		**18**
BIOC 606	Biochemistry Seminar	1
BIOC 630	Responsible Conduct of Research: Survival Skills and Research Ethics	1
BIOC 645	Advanced Biochemistry I	4
BIOC 647	Advanced Biochemistry II	4
BIOC 668	Molecular Biology	4
Students complete one of the following options:		**12**
MS Thesis Option		
Electives (6 credit hours)		
Ten (10) credit hours from the following:		
BIOC 613	Biochemistry Laboratory	2-4
BIOC 619	Research	1-15
MS Non-Thesis Option: Laboratory-Based		
BIOC 611	Techniques in Biomolecular Interactions	4
BIOC 613	Biochemistry Laboratory	4
Electives		**4**
MS Non-Thesis Option: Course-Based		
Two from the following:		
BIOC 670	Biomedical Genetics and Genomics	3-5
BIOC 675	Cancer Biology	4
BIOC 661	Molecular Mechanisms of Toxicology	3
BIOC 663	High-Throughput Sequencing Data Analysis	3
Electives (inside or outside BIOC), 8+ credit hours [1]		
Minimum Total Hours		**30-32**

[1] Laboratory work (BIOC 613) may be considered an elective to count towards the non-thesis, course-based degree option.

Thesis/Final Paper

Thesis

A MS research thesis is required for the thesis option. Students, with the consent of their committee, may choose between a traditional research thesis format or a thesis in which the methods and results sections are replaced by manuscripts ready for submission for publication in a refereed journal.

In either case, the thesis must conform to the Graduate School Standards for Preparation of Theses and Dissertations (https://louisville.edu/graduate/current-students/thesis-dissertation-information/).

Paper
A paper based on literature research or laboratory research (rotation research) is required for the non-thesis, lab option. The topic will be approved by the Director of Graduate Studies and the paper evaluated by two faculty.

A paper based on literature research is required for the non-thesis, coursework option. The topic will be approved by the Director of Graduate Studies and the paper evaluated by two faculty.

Schedule of Course Offerings

Year 1		
Fall		**Hours**
BIOC 611	Techniques in Biomolecular Interactions	4
BIOC 645	Advanced Biochemistry I (Required)	4
BIOC 648	Journal Club in Biochemistry and Molecular Genetics	1
BIOC 663	High-Throughput Sequencing Data Analysis (Elective)	3
BIOC 670	Biomedical Genetics and Genomics (Elective)	3 or 5
BIOC 680	Biomolecular Interactions (Elective)	2
BIOC 606	Biochemistry Seminar (Required)	1
BIOC 603	Special Topics in Biochemistry (Elective)	1-4
BIOC 613	Biochemistry Laboratory (Required for lab-based option)	2-4
BIOC 619	Research (Required for thesis-based option)	1-9
	Hours	**18-20**
Spring		
BIOC 603	Special Topics in Biochemistry	1-4
BIOC 606	Biochemistry Seminar	1
BIOC 613	Biochemistry Laboratory (Required for lab-based option)	2-4
BIOC 619	Research (Required for thesis-based option)	1-9
BIOC 647	Advanced Biochemistry II (Required)	4
BIOC 675	Cancer Biology (Elective)	4
BIOC 630	Responsible Conduct of Research: Survival Skills and Research Ethics (Required)	1
BIOC 661	Molecular Mechanisms of Toxicology (Elective)	3
BIOC 667	Cell Biology (Elective)	3
BIOC 668	Molecular Biology (Required)	4
	Hours	**19**
	Minimum Total Hours	**37-39**