BIOCHEMISTRY AND MOLECULAR BIOLOGY, M.S.

Overview

The Department of Biochemistry & Molecular Biology offers programs leading to the MS, PhD or MD/PhD degrees. These are research-based programs that provide outstanding interdisciplinary education and research opportunities.

Our 24 Primary Faculty and Adjunct Faculty have well-funded programs studying the molecular basis of genetic, bacterial, viral and parasitic diseases in projects that include control of gene expression, DNA replication and rearrangement, cell migration, signaling mechanisms, membrane biology and membrane trafficking pathways, structural biology and assembly of macromolecular complexes, and glycobiology.

The campus is well-equipped with Core Facilities (http://basicsciences.ouhsc.edu/biochemmolbiol/DepartmentFacilities.aspx) to assist high-technology research, and all departments as well as Oklahoma Medical Research Foundation (http://www.omrf.org/) have active seminar programs. Seminars (http://basicsciences.ouhsc.edu/biochemmolbiol/SeminarsEvents.aspx) allow students the opportunity to meet distinguished visiting scientists from academic, technological and government institutions all over the country as well as international speakers.

Academic Program

Our Master of Science program is designed to qualify graduates for jobs as lab managers or research managers in academic research or biotechnology companies. The program is very flexible and course work is determined by the student's previous experience and career aspirations. The program is thesis-driven, with emphasis on research experimental planning and interpretation of results.

Areas of Specialization

Specific areas include studying the molecular basis of genetic, bacterial, viral and parasitic diseases in projects that include control of gene expression, DNA replication and rearrangement, cell migration, signaling mechanisms, membrane biology and membrane trafficking pathways, structural biology and assembly of macromolecular complexes, and glycobiology.

Career Opportunities

The MS program of the department of Biochemistry & Molecular Biology has been recently redesigned to provide enhanced education opportunities for students who wish to extend their knowledge, experience, and opportunities for advancement in research laboratories at universities, research institutes or biotechnology companies.

Admission Requirements

A baccalaureate degree and a 3.0 grade point average are required by the Graduate College. Applicants from foreign institutions whose primary language is not English must submit TOEFL scores.

A science-based undergraduate record including courses in chemistry (general and organic), biochemistry and/or molecular biology is expected.

Applications for the MS program may be submitted on-line at: https://admissions.ouhsc.edu/

Note: When filling out the application, please use Academic Plan Code 0429M.

In addition to the Application Form and official transcript submitted to the OUHC Recruitment and Admissions Office, applicants must send the following to the Department of Biochemistry & Molecular Biology:

1. a copy of the application
2. a copy of all transcripts
3. a statement of why you wish to enter the MS program and which faculty laboratory(ies) you would like to work in
4. three letters of recommendation from people familiar with your work
5. TOEFL scores if English is not your primary language

Master of Science Degree Requirements

Students complete at least 30 credit hours of study; 24 credit hours of coursework and at least 6 credit hours of research, under the direction of a faculty mentor, culminating in writing and defending a thesis.

The coursework includes a core biochemistry course, a course on techniques, instrumentation and experimental design, at least one advanced level course, a Current Issues course covering scientific ethics, report writing, regulatory issues, etc, and Journal Clubs. Students obtain practical experience in laboratory modules (5–8 weeks each) that will cover at least 5 different areas important in current biomedical research, such as molecular biology and informatics, protein purification and analysis, protein expression, immunology, cell culture and eukaryotic gene expression, and quantitative analysis. More specialized elective rotation topics include glycobiology, cell biology and virology, and biophysical methods such as mass spectrometry, calorimetry, Biacore, fluorescence spectroscopy and X-ray diffraction.

There is flexibility in the program to meet students' interests and aims, and the program for each student will be determined by the Advisory Committee in consultation with the student and mentor.

Fall year 1

Code	Title	Hours
BIOC 5104	Biochemistry	4
BIOC 5224	Principles of Biochemistry and Molecular Biology Laboratory Methods	4
BIOC 6220	Advanced Biochemistry Laboratory	1-4
BMSC 5001	Integrity in Scientific Research	1
BIOC 6221	Journal Club in Biochemistry and Molecular Biology	1
BIOC 5970	Graduate Student Seminar	1-6

Spring year 1

Code	Title	Hours
BIOC 6220	Advanced Biochemistry Laboratory	1-4
BIOC 6221	Journal Club in Biochemistry and Molecular Biology	1
BIOC 5970	Graduate Student Seminar	1-6
Elective		3

Summer Year 1

Code	Title	Hours
BIOC 5980	Research Master's Thesis	3

Fall year 2

Code	Title	Hours
BIOC 6220	Advanced Biochemistry Laboratory	1-4
BIOC 6221	Journal Club in Biochemistry and Molecular Biology	1
BIOC 5970	Graduate Student Seminar	1-6
BMSC 5001	Integrity in Scientific Research	1
Elective (if needed)		2-4

Spring year 2

Code	Title	Hours
BIOC 5980	Research Master's Thesis	2-6
BIOC 6221	Journal Club in Biochemistry and Molecular Biology	1
BIOC 5970	Graduate Student Seminar	1-6
Elective (if needed)		2-4

Prerequisites

- Bachelor's degree in a relevant major
- Grade point average of 3.0 in the last 60 hours of coursework applied to degree
- Proof of language proficiency for international applicants
- 3 letters of recommendation

Recommended Coursework

- Biochemistry
- Organic chemistry
- Upper division biology (one or more of the following):
  - Cell biology
  - Molecular biology
  - Microbiology
  - Physiology
- Calculus
- Physics

Program Objectives

Our recently redesigned MS program is also research-based, along with coursework designed to provide enhanced education opportunities for students who wish to extend their knowledge, experience, and opportunities for advancement in research laboratories at universities, research institutes or biotechnology companies. The curriculum, separate from that of the PhD program, emphasizes understanding of research procedures as well as development of technical and problem-solving skills.