

## Biotechnology M.S. 2016-2017

### **Biotechnology Core Requirements**

The M.S. degree requires the completion of 36 hours. All core requirements and Biotechnology electives must be completed with a grade of "C" or better and a GPA of  $\geq 3.0$  must be maintained. All graduate students in the Biotechnology program must complete a Candidate Plan of Study (CPS) with their assigned faculty adviser before they complete 9 hours of graduate credit. Courses completed past the initial 9 hours that are not on the approved CPS may not be counted toward the degree.

Although the M.S. in Biotechnology does not require independent study, co-op (internship), field experience (practicum), or thesis, these options are available and students are encouraged to participate in these courses.

In addition to the following required courses, there are additional required courses for each specialization:

[BIOT 5011](#) Methods of Biotechnology Discussions

[BIOT 5021](#) Methods of Biotechnology

[BIOT 5031](#) Applied Biotechnology

[BIOT 5733](#) Bioinformatics

[BIOT 5736](#) Bioethics

### **Biotechnology Extended Coursework Option**

Under the extended coursework option, a minimum of 33 hours of coursework in one of the three Specialization areas, of which 18-24 hours (depending on the specialization) must be biotechnology courses and three hours of [BIOT 6838](#) Research Project and Seminar taken in the last 12 hours.

Non-thesis students who take [BIOT 5530](#) as an elective will still be required to take [BIOT 6838](#).

### **Biotechnology Thesis Option**

The Thesis Option requires a minimum of 27 hours of Biotechnology in one of the three Specialization Areas and [BIOT 5530](#) Research Methods in Biotechnology and six hours of [BIOT 6939](#) Master's Thesis Option. Graduate students who are pursuing the master's thesis option are advised to consult with their faculty adviser early in their studies for guidance in preparation for beginning the thesis and register for [BIOT 5530](#) Research Methods in Biotechnology early in their studies.

If they take more than 6 hours of 6939, they are not able to count it toward their degree and they only receive a grade for 6 hours. Once they enroll in the course, they have to stay continually enrolled until they graduate. Any hours above the 6 will show a credit only with no grade.

## Biotechnology Program Specialization Areas and Electives

### Specialization Prerequisites

Please be informed that there are additional prerequisites for each specialization/concentration (see below under Specializations for details). In all cases for specialization requirements, evidence of completion of the course with a grade of "C" or better is required.

### Molecular Biotechnology Specialization

The M.S. in Biotechnology with a Specialization in Molecular Biotechnology requires 36 hours of coursework, of which 24 hours must be biotechnology (BIOT).

#### Specialization Prerequisites

Although laboratory courses in Molecular Biology and Biochemistry will greatly assist students, these skills will be reviewed and enhanced in [BIOT 5021](#), Methods of Biotechnology therefore none are required.

Additional required courses for Molecular Biotechnology Specialization:

[BIOT 5111](#) Advanced Methods of Biotechnology I Discussions

[BIOT 5112](#) Advanced Methods of Biotechnology II Discussions

[BIOT 5121](#) Advanced Methods of Biotechnology I

[BIOT 5122](#) Advanced Methods of Biotechnology II

Students must complete Methods of Biotechnology laboratory and discussion sections [BIOT 5021/BIOT 5011](#) before registering for laboratory and discussion sections [BIOT 5121/BIOT 5111](#) and [BIOT 5122/BIOT 5112](#). Students must be registered concurrently for both the laboratory and discussion courses ([BIOT 5021/BIOT 5011](#), sections [BIOT 5121/BIOT 5111](#) and [BIOT 5122/BIOT 5112](#)).

Molecular Biotechnology Specialization Electives (9-15 hours)

[BIOT 5231](#) Advanced Mammalian Tissue Culture

[BIOT 5235](#) Bacterial Taxonomy and Biotechnology Laboratory

[BIOT 5331](#) Stem Cell Biotechnology

[BIOT 5431](#) Plant Genomic Analysis

[BIOT 5433](#) Marine Biotechnology Seminar

[BIOT 5535](#) Environmental Biotechnology

[BIOT 5915](#) Cooperative Education Work Term

[BIOT 5921](#) Laboratory Topics in Biotechnology

[BIOT 5931](#) Research Topics in Biotechnology

[BIOT 5939](#) Independent Study in Biotechnology

[BIOT 6011](#) Biotechnology Practicum

[BIOT 6021](#) Biotechnology Practicum

[BIOT 6031](#) Biotechnology Practicum

[BIOL 5131](#) Membrane Biology  
[BIOL 5132](#) Cell Signaling  
[BIOL 5332](#) Toxicology  
[BIOL 5333](#) Industrial Microbiology  
[BIOL 5433](#) Enzymology  
[BIOL 5435](#) Advanced Immunology  
[BIOL 5634](#) Apoptosis  
[BIOL 5635](#) Neuroscience  
[BIOL 5732](#) Advanced Molecular Biology  
[BIOL 5734](#) Oncogenes  
[BIOL 5737](#) Molecular Vectors  
[BIOL 5738](#) Gene Therapy  
[BIOL 5833](#) Proteomics

### **Bioinformatics/Computational Biology Specialization**

The M.S. in Biotechnology with a Specialization in Bioinformatics/Computational Biology requires 36 hours of coursework, of which 18 hours must be in biotechnology (BIOT).

Specialization Prerequisites

UHCL course or equivalent.

[CSCI 1320](#) C Programming

Or

[CSCI 1370](#) Software Development with Java

[CSCI 3303](#) Fundamentals of Programming

[CSCI 4333](#) Design of Database Systems

In all cases for specialization requirements, evidence of completion of the course with a grade of "C" or better is required.

Additional required courses for Bioinformatics/ Computational Biology Specialization

[CSCI 5833](#) Data Mining: Tools and Techniques

[CSCI 5933](#) Computational Bioinformatics

[CSCI 5833](#) must be taken prior to [CSCI 5933](#).

Bioinformatics/Computational Specialization Electives (9-15 hours)

[BIOT 5111](#) Advanced Methods of Biotechnology I Discussions

[BIOT 5112](#) Advanced Methods of Biotechnology II Discussions

[BIOT 5121](#) Advanced Methods of Biotechnology I  
[BIOT 5122](#) Advanced Methods of Biotechnology II  
[BIOT 5235](#) Bacterial Taxonomy and Biotechnology Laboratory  
[BIOT 5431](#) Plant Genomic Analysis  
[BIOT 5915](#) Cooperative Education Work Term  
[BIOT 5919](#) Independent Study in Biotechnology  
[BIOT 5921](#) Laboratory Topics in Biotechnology  
[BIOT 5931](#) Research Topics in Biotechnology  
[BIOT 5939](#) Independent Study in Biotechnology  
[BIOT 6011](#) Biotechnology Practicum  
[BIOT 6031](#) Biotechnology Practicum  
[BIOL 5737](#) Molecular Vectors  
[BIOL 5833](#) Proteomics  
[CSCI 5530](#) Pattern Classification  
[CSCI 5532](#) Pattern Recognition and Image Processing  
[CSCI 5633](#) Web Database Development

### **Biotechnology Management and Marketing Specialization**

The M.S. in Biotechnology with a Specialization in Management and Marketing Biology requires 36 hours of coursework, of which 18 hours must be in biotechnology (BIOT) or biology (BIOL).

Specialization Prerequisites  
UHCL course or equivalent.

If students have not taken [MGMT 3301](#), [MGMT 4354](#) and [MKTG 3301](#) they may take [MGMT 5032](#) and [MKTG 5031](#) to fulfill the foundation requirements of this specialization.

[MGMT 3301](#) Management Theory and Practice  
[MGMT 4354](#) Organizational Behavior Theory and Application  
[MKTG 3301](#) Principles of Marketing

In all cases for specialization requirements, evidence of completion of the course with a grade of "C" or better is required.

Additional required courses for Biotechnology Management and Marketing Specialization

[BIOT 5111](#) Advanced Methods of Biotechnology I Discussions  
Or  
[BIOT 5112](#) Advanced Methods of Biotechnology II Discussions  
[BIOT 5121](#) Advanced Methods of Biotechnology I  
Or

[BIOT 5122](#) Advanced Methods of Biotechnology II

[EMGT 5430](#) Professional Project Management

Students must complete Methods of Biotechnology laboratory and discussion sections [BIOT 5011/BIOT 5021](#) before registering for laboratory and discussions sections [BIOT 5111/BIOT 5121](#) and [BIOT 5112/BIOT 5122](#). Students must be registered concurrently for both the laboratory and discussion courses ([BIOT 5011/BIOT 5021](#), sections [BIOT 5111/BIOT 5121](#) and [BIOT 5112/BIOT 5122](#)).

Designated Electives:

Students are required to take 3 of the following electives:

[MGMT 5032](#) Human Behavior in Organizations

[MGMT 5133](#) Teamwork and Leadership Skills: Theory in Practice

[MGMT 5434](#) Negotiation Skills and Strategies

[MGMT 5636](#) Management of Technology

[MGMT 5638](#) Leading Technology

Students enrolled in the Management and Marketing Specialization cannot take more than 15 hours of Management and/or Marketing courses.

Biotechnology Management and Marketing Specialization Electives (9-15 hours)

[BIOT 5111](#) Advanced Methods of Biotechnology I Discussions

[BIOT 5112](#) Advanced Methods of Biotechnology II Discussions

[BIOT 5121](#) Advanced Methods of Biotechnology I

[BIOT 5122](#) Advanced Methods of Biotechnology II

[BIOT 5915](#) Cooperative Education Work Term

[BIOT 5919](#) Independent Study in Biotechnology

[BIOT 5921](#) Laboratory Topics in Biotechnology

[BIOT 5929](#) Independent Study in Biotechnology

[BIOT 5931](#) Research Topics in Biotechnology

[BIOT 5939](#) Independent Study in Biotechnology

[BIOT 6011](#) Biotechnology Practicum

[BIOT 6021](#) Biotechnology Practicum

[BIOT 6031](#) Biotechnology Practicum

[INDH 6135](#) Radiation Protection

[MGMT 6332](#) International Management

Students enrolled in the Management and Marketing specialization cannot take more than 15 hours of Management and/or Marketing courses.