

# Department of Biological Sciences

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The Department of Biological Sciences provides an outstanding educational experience across the entire field of biology. Our expert faculty have diverse research and teaching interests that span molecular and cellular biology, microbiology, computational biology, evolutionary biology, genetics, and ecology, of all living organisms. Our faculty are actively engaged in highly interdisciplinary cutting-edge research and are committed to providing students with an extensive exposure to biological processes and systems and a deep understanding of biology at environmental, organismal, cellular, and molecular levels through engaging lectures and hands-on laboratory experiences. Graduates leave the department with the knowledge base and critical thinking skills to be successful in graduate programs leading to M.S. or Ph.D., medical, dental and veterinary schools, health professional schools, research, and teaching.

Majors offered in the department are the B.S. in Biological Sciences, B.S. in Medical Technology, and a B.S. in Microbiology. Students must earn a grade of C or higher in all BIO courses applied toward the biological sciences or microbiology major requirements.

Graduate programs offered in the department are the M.S. in Biological Sciences, Ph.D. in Biological Sciences, and an M.S. in General Biology, a distance program for science teachers. An accelerated Master's program is available to outstanding students engaged in undergraduate research.

## Medical Technology Major (MEDT)

**Major Advisor: Brandy Roberts, Dir. of Undergraduate Advising**

Office: 115 Harned Hall

Medical technologists are prepared for positions in hospital laboratories, clinics, research laboratories, the Public Health Service industry, and in various local, state and federal health organizations.

The medical technology curriculum leading to the Bachelor of Science degree from Mississippi State University includes three years of study at Mississippi State University and one year of study in a hospital School of Medical Technology accredited by the National Accrediting Agency for Clinical Laboratory Sciences. Admission to the hospital school is competitive. A student who has satisfactorily completed the three years on the campus and has gained admission to a hospital school will register for the hospital phase and will be considered to be enrolled at Mississippi State during the final year of study. Graduates are prepared for certification by several national agencies.

## Biological Sciences Major (BIO)

**Major Advisor: Brandy Roberts, Dir. of Undergraduate Advising**

Office: 115 Harned Hall

## General Education and College Requirements

### English Composition

EN 1103	English Composition I	3
or EN 1104	Expanded English Composition I	
EN 1113	English Composition II	3
or EN 1173	Accelerated Composition II	

### Foreign Language

Foreign Language I	3
Foreign Language II	3

### Humanities

Literature - A&S core	3
History - A&S core	3

### Mathematics

MA 1713	Calculus I	3
ST 2113	Introduction to Statistics	3
or ST 3123	Introduction to Statistical Inference	

### Fine Arts

A&S core	3
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### Natural Sciences

Satisfied with the major	
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### Social Sciences

A&S core <sup>1</sup>	6
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### Oral Communication

CO 1003	Fundamentals of Public Speaking	3
or CO 1013	Introduction to Communication	

**Jr/Sr Writing**

Satisfied with BIO 3104 in the major

**Major Core - Biological Sciences**

BIO 1111	Welcome to Biological Sciences	1
BIO 1134	Biology I	4
BIO 1144	Biology II	4
BIO 2103	Cell Biology	3
BIO 2113	Plant Biology	3
BIO 2513	Animal Diversity	3
BIO 3104	Ecology	4
BIO 3304	General Microbiology	4
BIO 4133	Human Genetics	3
BIO 4113	Evolution	3

Additional department requirements:

CH 1213	Chemistry I	3
CH 1223	Chemistry II	3
CH 1211	Investigations in Chemistry I	1
CH 1221	Investigations in Chemistry II	1
CH 4513	Organic Chemistry I	3
CH 4523	Organic Chemistry II	3
CH 4511	Organic Chemistry Laboratory I	1
CH 4521	Organic Chemistry Laboratory II	1
PH 1113	General Physics I	3
PH 1123	General Physics II	3
or PH 1133	General Physics III	

**Additional Science Electives**

Choose 5 courses from the following: 15-20

BCH 4013	Principles of Biochemistry	
BCH 4603	General Biochemistry I	
BCH 4613	General Biochemistry II	
BIO 2213	Survey Plant Kingdom	
Any BIO upper division course, excluding BIO 3004, BIO 3014, and BIO 4000		

**General Electives** 14-19**Total Hours** 124

Restriction: The following courses may not be used to satisfy any requirement for Biological Sciences majors: BIO 1004, BIO 1023, BIO 1123.

Note: Students must complete 31 upper division hours in A&amp;S in residence at MSU.

<sup>1</sup> Social Science courses must cover two disciplines and come from A&S core.**Minor in Biological Sciences**

A minor in Biological Sciences is an exceptional accompaniment to many academic majors, as well as students pursuing pre-professional programs. Courses required for the minor provide students with specialized knowledge in the life sciences and enhance understanding of current developments in science.

BIO 1134	Biology I	4
BIO 1144	Biology II	4
BIO 2103	Cell Biology	3
BIO 4113	Evolution	3
BIO 4133	Human Genetics	3
Choose one of the following:		3-4

BIO 2213 Survey Plant Kingdom  
 Any 3000- or 4000- level BIO course excluding BIO 3004, BIO 3014, and BIO 4000

**Total Hours** **20-21**

## Microbiology Major (MIC)

**Major Advisor:** Brandy Roberts, Dir. of Undergraduate Advising

Office: 115 Harned Hall

### General Education and College Requirements

#### English Composition

EN 1103	English Composition I	3
or EN 1104	Expanded English Composition I	
EN 1113	English Composition II	3
or EN 1173	Accelerated Composition II	

#### Foreign Language

Foreign Language I		3
Foreign Language II		3

#### Humanities

Literature - A&S core		3
History - A&S core		3

#### Mathematics

MA 1713	Calculus I	3
ST 2113	Introduction to Statistics	3
or ST 3123	Introduction to Statistical Inference	

#### Fine Arts

A&S core		3
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#### Natural Sciences

Satisfied within the major

#### Social Sciences

A&S core <sup>1</sup>		6
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#### Oral Communication

CO 1003	Fundamentals of Public Speaking	3
or CO 1013	Introduction to Communication	

#### Jr/Sr Writing

Satisfied with BIO 4405, BIO 4442, and BIO 4463 in the major

#### Departmental Core

BIO 1111	Welcome to Biological Sciences	1
BIO 1134	Biology I	4
BIO 1144	Biology II	4
BIO 2103	Cell Biology	3

#### Major Core

BIO 3304	General Microbiology	4
BIO 4405	Pathogenic Microbiology	5
BIO 4413	Immunology	3
BIO 4433	Principles of Virology	3
BIO 4443	Bacterial Genetics	3
BIO 4442	Bacterial Genetics Laboratory	2
BIO 4463	Bacterial Physiology	3
Microbiology Upper Division Electives, excluding BIO 3004, BIO 3014, and BIO 4000 <sup>2</sup>		8

#### Additional department requirements

CH 1213	Chemistry I	3
CH 1223	Chemistry II	3

CH 1211	Investigations in Chemistry I	1
CH 1221	Investigations in Chemistry II	1
CH 4513	Organic Chemistry I	3
CH 4523	Organic Chemistry II	3
CH 4511	Organic Chemistry Laboratory I	1
CH 4521	Organic Chemistry Laboratory II	1
PH 1113	General Physics I	3
PH 1123	General Physics II	3
or PH 1133	General Physics III	
<b>BCH Course - Choose One:</b> <sup>3</sup>		
BCH 4013	Principles of Biochemistry	
BCH 4603	General Biochemistry I	
BCH 4613	General Biochemistry II	
<b>General Electives</b> <sup>4</sup>		
Consult advisor		20
<b>Total Hours</b>		<b>124</b>

Restriction: The following courses may not be used to satisfy any requirement for Biological Sciences majors: BIO 1004, BIO 1023, BIO 1123.

Note: Students must complete 31 upper division hours in A&S in residence at MSU.

- <sup>1</sup> Social Science courses must cover two disciplines and come from A&S core.
- <sup>2</sup> Applied microbiology courses are strongly recommended, regardless of the department in which they are offered (for example, Food Micro, Environmental Micro, or Soil Micro). Upper division courses in Medical Technology or Biochemistry are also acceptable. Students should see their advisor for assistance in selecting courses for microbiology elective credit. Hours in excess of 8 will reduce the general electives requirement by an equal number.
- <sup>3</sup> Students in the pre-professional/graduate track must take BCH 4603. Students in the career track may take BCH 4013.
- <sup>4</sup> Students planning to attend professional schools should check with the faculty advisor for that program to identify additional courses that may be needed. Such courses can be taken for general elective credit.

## Minor in Microbiology

The minor in microbiology provides a strong complement for students who are majoring in related scientific disciplines. This is particularly true for those who have an interest in the role of microorganisms in industry, agriculture, or health. Students will develop a comprehensive understanding of microbial processes and interactions, including infectious agents of plants and animals as well as host responses to those pathogens.

BIO 1134	Biology I	4
BIO 3304	General Microbiology	4
BIO 4405	Pathogenic Microbiology	5
Choose two of the following:		6-7
BIO 4413	Immunology	
BIO 4433	Principles of Virology	
BIO 4443	Bacterial Genetics	
BIO 4463	Bacterial Physiology	
BIO 4414	Microbiology of Foods	
<b>Total Hours</b>		<b>19-20</b>

## Medical Technology Major (MEDT) <sup>1</sup>

**Major Advisor:** Brandy Roberts, Dir. of Undergraduate Advising

Office: 117 Harned Hall

## General Education and College Requirements

### English Composition

EN 1103	English Composition I	3
EN 1113	English Composition II	3
or EN 1173	Accelerated Composition II	

<b>Foreign Language</b>		
2 semesters - one Foreign Language (see advisor)		6
<b>Humanities</b>		
Literature - see A&S requirements		3
History - see A&S requirements		3
<b>Mathematics</b>		
MA 1313	College Algebra	3
MA 1323	Trigonometry	3
or ST 3123	Introduction to Statistical Inference	
<b>Fine Arts</b>		
See A&S requirements		3
<b>Natural Sciences</b>		
See Major Core - Consult Advisor for specifics		9-12
<b>Social Sciences</b>		
Must be from 2 different areas - See University/A&S Core		6
<b>Major Core</b>		
BIO 1134	Biology I	4
BIO 3004	Human Anatomy	4
BIO 3303	Parasitology	3
BIO 3304	General Microbiology	4
BIO 4133	Human Genetics	3
BIO 4303	Bioinstrumentation	3
BIO 4405	Pathogenic Microbiology	5
BIO 4413	Immunology	3
BIO 4610	Urinalysis	2-6
BIO 4620	Hematology	2-9
BIO 4630	Special Topics	1-9
BIO 4640	Clinical Micro	2-9
BIO 4650	Immunochemistry	2-9
BIO 4660	Serology/Immunology	2-9
BIO 4670	Clinical Chemistry	2-9
BCH 4013	Principles of Biochemistry	3
CH 1213	Chemistry I	3
CH 1211	Investigations in Chemistry I	1
CH 1223	Chemistry II	3
CH 1221	Investigations in Chemistry II	1
CH 4513	Organic Chemistry I	3
CH 4523	Organic Chemistry II	3
General and Science Electives		9
<b>Oral Communication Requirement</b>		
CO 1003	Fundamentals of Public Speaking	3
or CO 1013	Introduction to Communication	
<b>Computer Literacy Requirement</b>		
Satisfied by successful completion of BIO 3303, BIO 4303, and BIO 4405		
<b>Writing Requirement</b>		
Satisfied by successful completion of BIO 3303, BIO 4303, and BIO 4405		
<b>Total Hours</b>		<b>124</b>

<sup>1</sup> In affiliated hospital schools of Medical Technology, admission is on a competitive basis.

## Program Consultants in Cooperating Hospitals

Mississippi State University maintains close contact with the teaching personnel in medical technology at the following hospitals in the area:

- Jennifer Knight, MHS, MLS(ASCP), affiliate faculty and Program Director, Mississippi Baptist Medical Center, Jackson, Miss.
- Lee Montgomery, MT (ASCP), affiliate faculty and Program Director, North Mississippi Medical Center, Tupelo, Miss.
- Holly Covas, MT (ASCP), affiliate faculty and Program Director, Vanderbilt University Medical Center, Nashville, Tenn.
- Dr. Nathan Johnson, Chair and Professor, Department of Laboratory Sciences at the University of Arkansas for Medical Sciences