

# BIOLOGY - M.A.

College of Arts and Sciences  
Department of Biological Sciences  
www.kent.edu/biology/graduate

## About This Program

The Biology M.A. program is designed for students who want to deepen their knowledge in biology and prepare for advanced studies or careers in research, education or industry. With a focus on research and advanced coursework, you will gain the skills needed to tackle complex biological questions and make a meaningful impact in the field. Read more...

## Contact Information

- **Oscar Rocha** | bscigrad@kent.edu | 330-672-2297
- Connect with an Admissions Counselor: U.S. Student | International Student

## Program Delivery

- **Delivery:**
  - In person
- **Location:**
  - Kent Campus

## Examples of Possible Careers and Salaries\*

### Biological scientists, all other

- 2.2% slower than the average
- 44,700 number of jobs
- \$85,290 potential earnings

### Biological technicians

- 4.9% about as fast as the average
- 87,500 number of jobs
- \$46,340 potential earnings

### Food scientists and technologists

- 4.4% about as fast as the average
- 14,200 number of jobs
- \$73,450 potential earnings

### Secondary school teachers, except special and career/technical education

- 3.8% about as fast as the average
- 1,050,800 number of jobs
- \$62,870 potential earnings

\* Source of occupation titles and labor data comes from the U.S. Bureau of Labor Statistics' Occupational Outlook Handbook. Data comprises projected percent change in employment over the next 10 years; nation-wide employment numbers; and the yearly median wage at

which half of the workers in the occupation earned more than that amount and half earned less.

For more information about graduate admissions, visit the graduate admission website. For more information on international admissions, visit the international admission website.

## Admission Requirements

- Bachelor's degree from an accredited college or university
- Minimum 2.750 undergraduate GPA on a 4.000-point scale
- Official transcript(s) - copies of official transcripts can be used for initial application
- Goal statement
- One letter of recommendation
- English language proficiency - all international students must provide proof of English language proficiency (unless they meet specific exceptions to waive) by earning one of the following:<sup>1</sup>
  - Minimum 94 TOEFL iBT score
  - Minimum 7.0 IELTS score
  - Minimum 65 PTE score
  - Minimum 120 DET score

<sup>1</sup> International applicants who do not meet the above test scores will not be considered for admission.

## Application Deadlines

- **Fall Semester**
  - Rolling admissions
- **Spring Semester**
  - Rolling admissions
- **Summer Term**
  - Rolling admissions

## Program Requirements

### Major Requirements

Code	Title	Credit Hours
<b>Major Requirements</b>		
BSCI 60104	BIOLOGICAL STATISTICS	4
BSCI 60110	CAREERS AND PROFESSIONAL SKILLS FOR BIOLOGISTS	2
BSCI 60184	RESPONSIBLE CONDUCT IN RESEARCH AND TEACHING-BIOLOGICAL SCIENCES	2
BSCI 60191	SEMINAR IN BIOLOGY (repeated for 2 credit hours total) <sup>2</sup>	2
BSCI 60196	INDIVIDUAL INVESTIGATION	6
<b>Additional Requirements or Concentration</b>		
Choose from the following:		15
Additional Requirements for Students Not Declaring a Concentration		
Biological Data Analytics Concentration		
Cellular and Molecular Biology Concentration		
Environmental Biology Concentration		
Medical Biology Concentration		

**Minimum Total Credit Hours:** 31

<sup>1</sup> Students must enroll for 1-3 credit hours of BSCI 60196 each semester.

<sup>2</sup> Students must enroll for 1 credit hour of BSCI 60191 each semester.

Additional Requirements for Students Not Declaring a Concentration

Code	Title	Credit Hours
Major Requirements		
Courses selected in consultation with academic faculty advisor <sup>1</sup>		15-16
Students interested in cell-/molecular-/biomedical-/biotechnology-related areas are encouraged to choose from the following:		
BSCI 50142	BIOENERGETICS	
BSCI 50143 & BSCI 60144	EUKARYOTIC CELL BIOLOGY and SELECTED READINGS IN EUKARYOTIC CELL BIOLOGY	
BSCI 50158	MOLECULAR BIOLOGY	
BSCI 50174	IMMUNOLOGY	
BSCI 50432	ENDOCRINOLOGY	
Students interested in ecology are encouraged to choose from the following:		
BSCI 50163	EVOLUTION	
BSCI 50363	MICROBIAL ECOLOGY	
BSCI 50364	LIMNOLOGY	
BSCI 50368	WETLAND ECOLOGY AND MANAGEMENT	
BSCI 50374	CONSERVATION BIOLOGY	
BSCI 50556	VERTEBRATE ZOOLOGY	
BSCI 60371	EVOLUTIONARY BIOLOGY	
Teachers holding or pursuing K-12 licensure are encouraged to choose from the following:		
BSCI 50141	EXPERIMENTAL DESIGN AND ANALYSIS IN MOLECULAR BIOLOGY	
BSCI 50163	EVOLUTION	
Minimum Total Credit Hours:		15

<sup>1</sup> Students may not use BSCI 50104 to fulfill degree requirements.

Biological Data Analytics Concentration Requirements

Code	Title	Credit Hours
Concentration Requirements		
BSCI 50218 or BSCI 50220 or BSCI 60107	INTRODUCTION TO GENOMICS BIOINFORMATICS REPRODUCIBLE QUANTITATIVE METHODS FOR ECOLOGICAL DATA	3-4
Concentration Electives, choose from the following:		12-13
BSCI 50141	EXPERIMENTAL DESIGN AND ANALYSIS IN MOLECULAR BIOLOGY	
BSCI 50158	MOLECULAR BIOLOGY	
BSCI 50159	MOLECULAR BIOLOGY LABORATORY	
BSCI 50218	INTRODUCTION TO GENOMICS	
BSCI 50220	BIOINFORMATICS	
BSCI 60107	REPRODUCIBLE QUANTITATIVE METHODS FOR ECOLOGICAL DATA	
BSCI 60145	MEDICAL GENOMICS	
BSCI 60371	EVOLUTIONARY BIOLOGY	
BSCI 60372	COMMUNITIES AND ECOSYSTEMS	
BSCI 60373	POPULATION AND COMMUNITY ECOLOGY	
CS 54202	MACHINE LEARNING AND DEEP LEARNING	

CS 63015	DATA MINING TECHNIQUES	
CS 63016	BIG DATA ANALYTICS	
CS 63017	BIG DATA MANAGEMENT	
CS 63018	PROBABILISTIC DATA MANAGEMENT	
LIS 60030	PEOPLE IN THE INFORMATION ECOLOGY	
<b>Minimum Total Credit Hours:</b>		<b>15</b>

Cellular and Molecular Biology Concentration Requirements

Code	Title	Credit Hours
Concentration Requirements		
BSCI 50143	EUKARYOTIC CELL BIOLOGY	3
BSCI 50158	MOLECULAR BIOLOGY	3
Concentration Electives, choose from the following:		9-10
BMS 60729	CELLULAR AND MOLECULAR NEUROSCIENCE	
BSCI 50141	EXPERIMENTAL DESIGN AND ANALYSIS IN MOLECULAR BIOLOGY	
BSCI 50148	PRINCIPLES OF INFECTIOUS DISEASE	
BSCI 50150	MOLECULAR MECHANISMS OF DISEASE: CANCER	
BSCI 50151	MECHANISMS OF DISEASE: OBESITY AND RELATED METABOLIC DISEASES	
BSCI 50152	MOLECULAR MECHANISMS OF DISEASE: NEUROLOGICAL DISORDERS	
BSCI 50154	DIABETES AND CARDIOVASCULAR DISEASE	
BSCI 50159	MOLECULAR BIOLOGY LABORATORY	
BSCI 50174	IMMUNOLOGY	
BSCI 50220	BIOINFORMATICS	
BSCI 60145	MEDICAL GENOMICS	
BSCI 60200	FOUNDATIONS OF NEUROSCIENCE	
Minimum Total Credit Hours:		15

Environmental Biology Concentration Requirements

Code	Title	Credit Hours
Concentration Requirements		
BSCI 50374 or BSCI 50375	CONSERVATION BIOLOGY ENVIRONMENTAL BIOLOGY AND MANAGEMENT	4
Concentration Requirements, choose from the following:		11-12
BSCI 50160	MARINE BIOLOGY	
BSCI 50162	SOIL BIOLOGY	
BSCI 50163	EVOLUTION	
BSCI 50170	STREAM BIOLOGY	
BSCI 50222	INVASION BIOLOGY	
BSCI 50363	MICROBIAL ECOLOGY	
BSCI 50364	LIMNOLOGY	
BSCI 50365	FIELD METHODS IN ORNITHOLOGY	
BSCI 50368	WETLAND ECOLOGY AND MANAGEMENT	
BSCI 50374	CONSERVATION BIOLOGY	
BSCI 50375	ENVIRONMENTAL BIOLOGY AND MANAGEMENT	
BSCI 50376	TROPICAL FIELD BIOLOGY AND CONSERVATION	
BSCI 50380	BIOGEOCHEMISTRY	
BSCI 50556	VERTEBRATE ZOOLOGY	
BSCI 60370	ECOLOGICAL AND EVOLUTIONARY GENETICS	
BSCI 60371	EVOLUTIONARY BIOLOGY	

BSCI 60372	COMMUNITIES AND ECOSYSTEMS
BSCI 60373	POPULATION AND COMMUNITY ECOLOGY
ESCI 53042	ENVIRONMENTAL GEOCHEMISTRY
GEOG 51077	WATER AND SOCIETY
GEOG 56080	URBAN SUSTAINABILITY
GEOG 59070	GEOGRAPHIC INFORMATION SCIENCE
GEOG 59230	REMOTE SENSING
or ESCI 52030	REMOTE SENSING

Minimum Total Credit Hours: 15

## Medical Biology Concentration Requirements

Code	Title	Credit Hours
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### Concentration Requirements

Medical Biology Electives, choose from the following: 6

BSCI 50148	PRINCIPLES OF INFECTIOUS DISEASE
BSCI 50150	MOLECULAR MECHANISMS OF DISEASE: CANCER
BSCI 50151	MECHANISMS OF DISEASE: OBESITY AND RELATED METABOLIC DISEASES
BSCI 50152	MOLECULAR MECHANISMS OF DISEASE: NEUROLOGICAL DISORDERS
BSCI 50154	DIABETES AND CARDIOVASCULAR DISEASE
BSCI 50460	ADVANCED HUMAN PHYSIOLOGY

Concentration Electives, choose from the following: 9-10

BSCI 50143	EUKARYOTIC CELL BIOLOGY
BSCI 50146	DEVELOPMENTAL BIOLOGY
BSCI 50147	DEVELOPMENTAL NEUROBIOLOGY
BSCI 50148	PRINCIPLES OF INFECTIOUS DISEASE
BSCI 50150	MOLECULAR MECHANISMS OF DISEASE: CANCER
BSCI 50151	MECHANISMS OF DISEASE: OBESITY AND RELATED METABOLIC DISEASES
BSCI 50152	MOLECULAR MECHANISMS OF DISEASE: NEUROLOGICAL DISORDERS
BSCI 50154	DIABETES AND CARDIOVASCULAR DISEASE
BSCI 50157	NEUROBIOLOGY OF DRUG ADDICTION
BSCI 50174	IMMUNOLOGY
BSCI 50431	NEUROENDOCRINOLOGY
BSCI 50432	ENDOCRINOLOGY
BSCI 50450	BIOLOGICAL CLOCKS
BSCI 50460	ADVANCED HUMAN PHYSIOLOGY
BSCI 50462	ADVANCED HUMAN PHYSIOLOGY: READINGS AND CASE STUDIES
BSCI 50517	MEDICAL HISTOLOGY
BSCI 50519	HORMONES AND BEHAVIOR
BSCI 60145	MEDICAL GENOMICS
BSCI 60200	FOUNDATIONS OF NEUROSCIENCE
HED 64050	HEALTH BEHAVIOR
PHIL 50005	HEALTH CARE ETHICS
SOC 62332	SOCIAL CONTROL OF MENTAL ILLNESS

Minimum Total Credit Hours: 15

## Graduation Requirements

Minimum Major GPA	Minimum Overall GPA
-	3.000

- Students must complete a minimum of 23 credit hours of biological science (BSCI) courses toward the degree with one exception: Teachers holding or pursuing K-12 licensure who do not declare a concentration may complete a minimum 18 credit hours of biological sciences (BSCI) courses toward the degree.
- The Department of Biological Sciences frequently offers special topics classes in specialized areas of interest, which can count towards the degree when approved to be part of a student's program of study. Coursework in other fields within the natural and physical sciences may be used to meet credit hour requirements when approved to be part of the student's program of study.
- No more than one-half of a graduate student's coursework may be taken in 50000-level courses.
- Grades below C are not counted toward completion of requirements for the degree.

## Program Learning Outcomes

Graduates of this program will be able to:

- Understand advanced biological concepts beyond the scope of the typical undergraduate degree and to increase the depth of their knowledge through coursework and hands-on experiences.
- Apply scientific principles and appreciate work outside of their particular field.
- Effectively communicate about science with colleagues as well as those outside of the student's area of expertise.
- Develop the necessary laboratory skills that will allow testing of hypotheses.

## Full Description

The Master of Arts degree in Biology is for students wishing to gain additional knowledge in any area of the biological sciences. This is a non-thesis master's degree designed for secondary school science teachers, individuals looking for additional background or preparation for professional school (e.g. medicine, dentistry or Ph.D. programs) and those seeking employment in life science industries in a non-research capacity.

The Biology major includes the following optional concentrations:

- The **Biological Data Analytics** concentration combines required courses in data analytics and elective options in biology to provide students with the understanding of the type of data collected while conducting biological research and how to analyze it.
- The **Cellular and Molecular Biology** concentration provides a heavy focus on cell-to-cell interactions and signaling pathways to give students a deep understanding of the cellular and molecular processes that occur within cells and physiological systems.
- The **Environmental Biology** concentration provides students with a balance between better understanding the relationships between organisms and the environment and how this balance can be sustained through environmental management and conservation.
- The **Medical Biology** concentration provides students with a deep understanding of physiological systems and the mechanisms that underlie various disorders and disease pathologies.

Students who declare the Biology major with no concentration will select their area of specialization in consultation with an academic faculty advisor.