BIOLOGY - M.A.

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

Examples of Possible Careers*

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

Contact Information
- Program Coordinator: John Johnson | jjohns72@kent.edu | 330-672-3849
- Chat with an Admissions Counselor

Fully Offered
- Kent Campus

Admission Terms
- Fall
- Spring
- Summer

Admission Requirements
- Bachelor's degree from an accredited college or university for unconditional admission
- Minimum 3.000 undergraduate GPA on a 4.000 point scale for unconditional admission
- Official transcript(s)
- Goal statement
- Three letters of recommendation
- English language proficiency - all international students must provide proof of English language proficiency (unless they meet specific exceptions) by earning one of the following:
  - Minimum 587 TOEFL PBT score (paper-based version)
  - Minimum 94 TOEFL IBT score (Internet-based version)
  - Minimum 82 MELAB score
  - Minimum 7.0 IELTS score
  - Minimum 65 PTE score
  - Minimum 120 Duolingo English Test score

For more information about graduate admissions, please visit the Graduate Studies admission website. For more information on international admission, visit the Office of Global Education's admission website.

Program Learning Outcomes
Graduates of this program will be able to:
1. 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.
2. Apply scientific principles and appreciate work outside of their particular field.
3. Effectively communicate about science with colleagues as well as those outside of the student’s area of expertise.

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.
4. Develop the necessary laboratory skills that will allow testing of hypotheses.

Program Requirements

Major Requirements

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>BSCI 50196</td>
<td>INDIVIDUAL INVESTIGATION (repeated for 6 credit hours total) 1</td>
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<tr>
<td>BSCI 60104</td>
<td>BIOLOGICAL STATISTICS</td>
<td>4</td>
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<td>BSCI 60110</td>
<td>CAREERS AND PROFESSIONAL SKILLS FOR BIOLOGISTS</td>
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<td>BSCI 60184</td>
<td>RESPONSIBLE CONDUCT IN RESEARCH AND TEACHING-BIOLOGICAL SCIENCES</td>
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<tr>
<td>BSCI 60191</td>
<td>SEMINAR IN BIOLOGY (repeated for 2 credit hours total) 2</td>
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Additional Requirements or Concentration

Choose from the following:

- 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

1 Students must enroll for 1-3 credit hours of BSCI 50196 each semester.

2 Students must enroll for 1 credit hour of BSCI 60191 each semester.

Additional Requirements for Students Not Declaring a Concentration

<table>
<thead>
<tr>
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<tr>
<td>BSCI 50432</td>
<td>MOLECULAR MECHANISMS OF DISEASE: CANCER</td>
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<td>BSCI 50433</td>
<td>MOLECULAR MECHANISMS OF DISEASE: NEUROLOGICAL DISORDERS</td>
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<tr>
<td>BSCI 50434</td>
<td>MOLECULAR MECHANISMS OF DISEASE: OBESITY AND RELATED METABOLIC DISEASE</td>
<td>3</td>
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Minimum Total Credit Hours: 15

Teachers holding or pursuing K-12 licensure are encouraged to choose from the following:

- BSCI 50163 EVOLUTION
- BSCI 50196 INDIVIDUAL INVESTIGATION
- BSCI 60080 EXPERIMENTAL METHODS IN BIOLOGY

Biological Data Analytics Concentration Requirements

<table>
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<tr>
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<td>BSCI 50218</td>
<td>INTRODUCTION TO GENOMICS</td>
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<tr>
<td>or BSCI 50220</td>
<td>BIOINFORMATICS</td>
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<tr>
<td>or BSCI 60107</td>
<td>REPRODUCIBLE QUANTITATIVE METHODS FOR ECOLOGICAL DATA</td>
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Concentration Electives, choose from the following:

- 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 50371 EVOLUTIONARY BIOLOGY
- BSCI 50372 COMMUNITIES AND ECOSYSTEMS
- BSCI 50373 POPULATION AND COMMUNITY ECOLOGY
- BSCI 60107 REPRODUCIBLE QUANTITATIVE METHODS FOR ECOLOGICAL DATA
- BSCI 60145 MEDICAL GENOMICS
- 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 60010 THE INFORMATION LANDSCAPE
- LIS 60030 PEOPLE IN THE INFORMATION ECOLOGY

Minimum Total Credit Hours: 12-13

Cellular and Molecular Biology Concentration Requirements

<table>
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<th>Credit Hours</th>
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<tr>
<td>BSCI 50143</td>
<td>EUKARYOTIC CELL BIOLOGY</td>
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<tr>
<td>&amp; BSCI 60144</td>
<td>and SELECTED READINGS IN EUKARYOTIC CELL BIOLOGY</td>
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<tr>
<td>BSCI 50158</td>
<td>MOLECULAR BIOLOGY</td>
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<td>BSCI 50174</td>
<td>IMMUNOLOGY</td>
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<td>BSCI 50432</td>
<td>ENDOCRINOLOGY</td>
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<td>BSCI 50433</td>
<td>MAMMALIAN PHYSIOLOGY I</td>
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<tr>
<td>BSCI 50434</td>
<td>MAMMALIAN PHYSIOLOGY II</td>
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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 50371 EVOLUTIONARY BIOLOGY
- BSCI 50374 CONSERVATION BIOLOGY
- BSCI 50556 VERTEBRATE ZOOLOGY

Minimum Total Credit Hours: 15

Concentration Requirements

- 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

Minimum Total Credit Hours: 9-10
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

<table>
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<tr>
<td>BSCI 50374</td>
<td>CONSERVATION BIOLOGY</td>
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<tr>
<td>or BSCI 50375</td>
<td>ENVIRONMENTAL BIOLOGY AND MANAGEMENT</td>
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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 50370 ECOLOGICAL AND EVOLUTIONARY GENETICS
- BSCI 50371 EVOLUTIONARY BIOLOGY
- BSCI 50372 COMMUNITIES AND ECOSYSTEMS
- BSCI 50373 POPULATION AND COMMUNITY ECOLOGY
- BSCI 50374 CONSERVATION BIOLOGY
- BSCI 50375 ENVIRONMENTAL BIOLOGY AND MANAGEMENT
- BSCI 50376 TROPICAL FIELD BIOLOGY AND CONSERVATION
- BSCI 50380 BIOGEOCHEMISTRY
- BSCI 50556 VERTEBRATE ZOOLOGY
- GEOG 51077 WATER AND SOCIETY
- GEOG 56080 URBAN SUSTAINABILITY
- GEOG 59070 GEOGRAPHIC INFORMATION SCIENCE
- GEOG 59230 REMOTE SENSING
  or GEOL 52030 REMOTE SENSING
- GEOL 52069 HYDROGEOCHEMISTRY

Minimum Total Credit Hours: 15

### Medical Biology Concentration Requirements

<table>
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<tr>
<td>BSCI 50146</td>
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<td>BSCI 50147</td>
<td>DEVELOPMENTAL NEUROBIOLOGY</td>
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<tr>
<td>BSCI 50148</td>
<td>PRINCIPLES OF INFECTIOUS DISEASE</td>
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<td>BSCI 50150</td>
<td>MOLECULAR MECHANISMS OF DISEASE: CANCER</td>
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<td>BSCI 50151</td>
<td>MECHANISMS OF DISEASE: OBESITY AND RELATED METABOLIC DISEASES</td>
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<td>BSCI 50152</td>
<td>MOLECULAR MECHANISMS OF DISEASE: NEUROLOGICAL DISORDERS</td>
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<td>BSCI 50154</td>
<td>DIABETES AND CARDIOVASCULAR DISEASE</td>
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<tr>
<td>BSCI 50157</td>
<td>NEUROBIOLOGY OF DRUG ADDICTION</td>
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<td>BSCI 50174</td>
<td>IMMUNOLOGY</td>
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<tr>
<td>BSCI 50431</td>
<td>NEUROENDOCRINOLOGY</td>
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<td>BSCI 50450</td>
<td>BIOLOGICAL CLOCKS</td>
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<td>ADVANCED HUMAN PHYSIOLOGY</td>
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<td>BSCI 50516</td>
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<td>BSCI 50519</td>
<td>HORMONES AND BEHAVIOR</td>
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<td>HED 64050</td>
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<td>PHIL 50005</td>
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<td>SOC 62332</td>
<td>SOCIAL CONTROL OF MENTAL ILLNESS</td>
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</table>

Minimum Total Credit Hours: 15

### Graduation Requirements

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.