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'll gain the skills needed to tackle complex biological questions and make a meaningful impact in the field. Read more...

Contact Information
• Program Coordinator: 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) 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, visit the graduate admission website. For more information on international admission, visit the Office of Global Education's admission website.

Application Deadlines
• Fall Semester
  • Rolling admissions
• Spring Semester
  • Rolling admissions
• Summer Term
  • Rolling admissions

Program Requirements
Major Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSCI 60104</td>
<td>BIOLOGICAL STATISTICS</td>
<td>4</td>
</tr>
<tr>
<td>BSCI 60110</td>
<td>CAREERS AND PROFESSIONAL SKILLS FOR BIOLOGISTS</td>
<td>2</td>
</tr>
<tr>
<td>BSCI 60184</td>
<td>RESPONSIBLE CONDUCT IN RESEARCH AND TEACHING-BIOLOGICAL SCIENCES</td>
<td>2</td>
</tr>
<tr>
<td>BSCI 60191</td>
<td>SEMINAR IN BIOLOGY (repeated for 2 credit hours total)</td>
<td>2</td>
</tr>
<tr>
<td>BSCI 60196</td>
<td>INDIVIDUAL INVESTIGATION</td>
<td>6</td>
</tr>
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</table>

Additional Requirements or Concentration
Choose from the following:

<table>
<thead>
<tr>
<th>Concentration</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Data Analytics Concentration</td>
<td></td>
</tr>
<tr>
<td>Cellular and Molecular Biology Concentration</td>
<td></td>
</tr>
<tr>
<td>Environmental Biology Concentration</td>
<td></td>
</tr>
<tr>
<td>Medical Biology Concentration</td>
<td></td>
</tr>
</tbody>
</table>

Minimum Total Credit Hours: 31

1 Students must enroll for 1-3 credit hours of BSCI 60196 each semester.
Students must enroll for 1 credit hour of BSCI 60191 each semester.

### Additional Requirements for Students Not Declaring a Concentration

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSCI 60142</td>
<td>BIOENERGETICS</td>
<td></td>
</tr>
<tr>
<td>BSCI 50143</td>
<td>EUKARYOTIC CELL BIOLOGY &amp; SELECTED READINGS IN EUKARYOTIC CELL BIOLOGY</td>
<td></td>
</tr>
<tr>
<td>BSCI 50158</td>
<td>MOLECULAR BIOLOGY</td>
<td></td>
</tr>
<tr>
<td>BSCI 50174</td>
<td>IMMUNOLOGY</td>
<td></td>
</tr>
<tr>
<td>BSCI 50432</td>
<td>ENDOCRINOLOGY</td>
<td></td>
</tr>
</tbody>
</table>

Students interested in cell-/molecular-/biomedical-/biotechnology-related areas are encouraged to choose from the following:

- BSCI 50142: BIOENERGETICS
- BSCI 50143: EUKARYOTIC CELL BIOLOGY
- & BSCI 60144: 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 50166: 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 50158: MOLECULAR BIOLOGY
- BSCI 50159: MOLECULAR BIOLOGY LABORATORY
- BSCI 60145: MEDICAL GENOMICS
- BSCI 60200: FOUNDATIONS OF NEUROSCIENCE

Minimum Total Credit Hours: 15

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Students may not use BSCI 50104 to fulfill degree requirements.

**Biological Data Analytics Concentration Requirements**

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSCI 50218</td>
<td>INTRODUCTION TO GENOMICS</td>
<td>3-4</td>
</tr>
<tr>
<td>or BSCI 50220</td>
<td>BIOINFORMATICS</td>
<td></td>
</tr>
<tr>
<td>or BSCI 60107</td>
<td>REPRODUCIBLE QUANTITATIVE METHODS FOR ECOLOGICAL DATA</td>
<td></td>
</tr>
</tbody>
</table>

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 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

Minimum Total Credit Hours: 15

**Cellular and Molecular Biology Concentration Requirements**

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>BSCI 50143</td>
<td>EUKARYOTIC CELL BIOLOGY</td>
<td>3</td>
</tr>
<tr>
<td>BSCI 50158</td>
<td>MOLECULAR BIOLOGY</td>
<td>3</td>
</tr>
</tbody>
</table>

Concentration Electives, choose from the following:

- 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**

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSCI 50374</td>
<td>CONSERVATION BIOLOGY</td>
<td>4</td>
</tr>
<tr>
<td>or BSCI 50375</td>
<td>ENVIRONMENTAL BIOLOGY AND MANAGEMENT</td>
<td></td>
</tr>
</tbody>
</table>

Concentration Requirements, choose from the following:

- 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

Minimum Total Credit Hours: 15
Students who declare the Biology major with no concentration will select courses toward the degree with one exception: Teachers 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.

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.
4. 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.