BIOCHEMISTRY AND MOLECULAR BIOLOGY:
PRE-MEDICAL OR PRE-VETERINARY SCIENCE, BSAG

Requirements for Students Matriculating in or before Academic Year 2018-2019. Learn more about University Academic Regulation 3.1 (http://catalog.okstate.edu/university-academic-regulations/#matriculation).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>General Education Requirements</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>English Composition</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>See Academic Regulation 3.5 (<a href="http://catalog.okstate.edu/">http://catalog.okstate.edu/</a> university-academic-regulations/#english-composition)</td>
<td></td>
</tr>
<tr>
<td>ENGL 1113</td>
<td>Composition I</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 1313</td>
<td>Critical Analysis and Writing I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 1213</td>
<td>Composition II</td>
<td></td>
</tr>
<tr>
<td>ENGL 1413</td>
<td>Critical Analysis and Writing II</td>
<td></td>
</tr>
<tr>
<td>ENGL 3323</td>
<td>Technical Writing</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>American History &amp; Government</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td>HIST 1103</td>
<td>Survey of American History</td>
<td></td>
</tr>
<tr>
<td>HIST 1483</td>
<td>American History to 1865</td>
<td></td>
</tr>
<tr>
<td>HIST 1493</td>
<td>American History Since 1865</td>
<td></td>
</tr>
<tr>
<td>POLS 1113</td>
<td>American Government</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Analytical &amp; Quantitative Thought (A)</strong></td>
<td></td>
</tr>
<tr>
<td>MATH 2144</td>
<td>Calculus I (A)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>Humanities (H)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Courses designated (H)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td><strong>Natural Sciences (N)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Must include one Laboratory Science (L) course</td>
<td></td>
</tr>
<tr>
<td>CHEM 1314</td>
<td>Chemistry I (LN)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>5 hours courses designated N</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td><strong>Social &amp; Behavioral Sciences (S)</strong></td>
<td></td>
</tr>
<tr>
<td>AGEC 1113</td>
<td>Introduction to Agricultural Economics (S)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Additional General Education</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Courses designated (A), (H), (N), or (S)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td><strong>Hours Subtotal</strong></td>
<td>40</td>
</tr>
<tr>
<td></td>
<td><strong>Diversity (D) &amp; International Dimension (I)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>May be completed in any part of the degree plan</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select at least one Diversity (D) course</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select at least one International Dimension (I) course</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>College/Departmental Requirements</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Agricultural Sciences and Natural Resources Core</strong></td>
<td></td>
</tr>
<tr>
<td>AG 1011</td>
<td>First Year Seminar</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>From two of the following groups, select one course:</td>
<td>6</td>
</tr>
</tbody>
</table>

Group 1:
- PLNT 1213 Introduction to Plant and Soil Systems
- HORT 1013 Principles of Horticultural Science (LN)
- NREM 1113 Elements of Forestry

Group 2:
- SOIL 1113 Land, Life and the Environment (N)
- SOIL 2124 Fundamentals of Soil Science (N)

Group 3:
- ANSI 1124 Introduction to the Animal Sciences
- FDSC 1133 Fundamentals of Food Science
- ENTO 2993 Introduction to Entomology (LN)

Group 4:
- NREM 1014 Introduction to Natural History (LN)
- NREM 2013 Ecology of Natural Resources
- ENVR 1113 Elements of Environmental Science
- BIOC 2344 Chemistry and Applications of Biomolecules
- BIOC 3713 Biochemistry I
- LA 1013 Introduction to Landscape Architecture and Landscape Management

Written and Oral Communications

Select one of the following: 3
- AGCM 3103 Written Communications in Agricultural Sciences and Natural Resources
- BCOM 3113 Written Communication
- BCOM 3443 Business Communication for International Students
- ENGL 3323 Technical Writing 2

Select one of the following: 3
- AGCM 3203 Oral Communications in Agricultural Sciences & Natural Resources (S) 3
- SPCH 2713 Introduction to Speech Communication (S) 3
- SPCH 3733 Elements of Persuasion (S) 3

Hours Subtotal 13

Major Requirements

Core Courses
- BIOC 3723 Biochemistry and Molecular Biology Laboratory 3
- BIOC 3813 Biochemistry II 3
- BIOL 1114 Introductory Biology (LN) 4
- BIOL 1604 Animal Biology 4
- CHEM 1515 Chemistry II (LN) 5
- CHEM 3053 Organic Chemistry I 3
- CHEM 3112 Organic Chemistry Laboratory 2
- CHEM 3135 Organic Chemistry II 3

Select one of the following: 3
- MATH 2153 Calculus II (A)
- STAT 2013 Elementary Statistics (A)
- STAT 4013 Statistical Methods I (A)

MICR 2123 Introduction to Microbiology 3
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICR 2132</td>
<td>Introduction to Microbiology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 1114</td>
<td>College Physics I (LN)</td>
<td>4</td>
</tr>
<tr>
<td>or PHYS 2014</td>
<td>University Physics I (LN)</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 1214</td>
<td>College Physics II (LN)</td>
<td>4</td>
</tr>
<tr>
<td>or PHYS 2114</td>
<td>University Physics II (LN)</td>
<td>4</td>
</tr>
</tbody>
</table>

### Related Courses

**Option:**

- Select an option (p. 2) 20

### Electives

- Select 4 hours or hours to complete required total for degree. 4

### Total Hours

120

1 College & Departmental requirements that may be used to meet GE requirements.

2 If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above; hours in this block are reduced by 3.

3 If used as (S) course above, hours in this block reduced by 3.

## Options

### Option 1

With the approval of the advisor, department head, and dean, hours of basic sciences from an accredited chiropractic, dental medial, optometry, osteopathic, pharmacy, podiatry, or veterinary medical school to total 57 hours.

### Option 2

#### Code | Title                                      | Hours |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOC 3223</td>
<td>Physical Chemistry for Biologists</td>
<td>3</td>
</tr>
<tr>
<td>or CHEM 3433</td>
<td>Physical Chemistry I</td>
<td></td>
</tr>
<tr>
<td>BIOC 4883</td>
<td>Senior Seminar in Biochemistry</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following: 3

- BIOL 3023 | General Genetics                            |       |
- ANSI 3423 | Animal Genetics                              |       |
- PLNT 3554 | Plant Genetics and Biotechnology            |       |

Select one of the following: 4

- BIOL 3204 | Physiology                                  |       |
- ENTO 3044 | Insect Morphology and Physiology            |       |
- PBIO 4463 | Plant Physiology                             |       |

Select a minimum of 6 hours of BIOC or courses related to BIOC, subject to Advisor approval, of the following: 7

- ANSI 3433 | Animal Breeding                             |       |
- ANSI 3443 | Animal Reproduction                         |       |
- ANSI 3543 | Principles of Animal Nutrition              |       |
- BIOC 1990 | Freshman Research in Biochemistry (up to 2 hours) |       |
- BIOC 2202 | Medicine and Molecules                      |       |
- BIOC 2352 | Fundamental Biochemistry                   |       |
- BIOC 3003 | Hypothesis-Driven Undergraduate Research    |       |
- BIOC 4113 | Molecular Biology                           |       |
- BIOC 4523 | Biochemistry of the Cell                   |       |
- BIOC 4723 | Introduction to Bioinformatics             |       |

**MICR 4990** | Undergraduate Research                      |       |
**BIOC 3034** | General Ecology                             |       |
**BIOC 3104** | Invertebrate Zoology                        |       |
**BIOC 3114** | Vertebrate Morphology                       |       |
**BIOC 3214** | Human Anatomy                               |       |
**BIOC 3233** | Human Reproduction                          |       |
**BIOC 4104** | General Parasitology                        |       |
**BIOC 4133** | Evolution                                  |       |
**BIOC 4134** | Embryology                                  |       |
**BIOC 4174** | Mammalogy                                   |       |
**BIOC 4215** | Mammalian Physiology                        |       |
**BIOC 4223** | Mammalian Physiology Laboratory             |       |
**BIOC 4283** | Endocrinology                               |       |
**BIOC 4293** | Behavioral Neuroendocrinology               |       |
**BIOC 4363** | Principles of Toxicology                   |       |
**CHEM 2113** | Principles of Analytical Chemistry          |       |
**CHEM 2122** | Quantitative Analysis Laboratory            |       |
**CHEM 3353** | Descriptive Inorganic Chemistry             |       |
**CHEM 3552** | Physico-Chemical Measurements               |       |
**CHEM 3553** | Physical Chemistry II                      |       |
**CHEM 4320** | Chemical and Spectrometric Identification of Organic Compounds |       |
**ENTO 4573** | Introduction to Forensic Entomology        |       |
**ENTO 4854** | Medical and Veterinary Entomology          |       |
**MATH 2163** | Calculus III                                |       |
**MATH 2233** | Differential Equations                      |       |
**MATH 3013** | Linear Algebra                              |       |
**MATH 3263** | Linear Algebra and Differential Equations   |       |
**MICR 3143** | Medical Mycology                            |       |
**MICR 3154** | Food Microbiology                           |       |
**MICR 3223** | Advanced Microbiology                       |       |
**MICR 3253** | Immunology                                  |       |
**MICR 4012** | Molecular Microbiology Laboratory I         |       |
**MICR 4013** | Microbial Physiology & Ecology              |       |
**MICR 4112** | Molecular Microbiology Laboratory II        |       |
**MICR 4123** | Virology                                    |       |
**MICR 4203** | Bioinformatics                              |       |
**MICR 4053** | Pathogenic Microbiology                     |       |
**MICR 4052** | Pathogenic Microbiology Lab                 |       |
**MICR 4233** | Advanced Cell and Molecular Biology         |       |
**MICR 4253** | Concepts in Medical Genetics                |       |
**MICR 4263** | Microbial Genetics: from Genes to Genomes   |       |
**MICR 4323** | Biological Energy Transduction              |       |
**MICR 4423** | Bacterial Cell Walls                        |       |
**NSCI 4023** | Nutrition in the Pathophysiology of Chronic Disease |       |
**NSCI 4123** | Human Nutrition and Metabolism I            |       |
**NSCI 4143** | Human Nutrition and Metabolism II           |       |
**PBIO 4233** | Plant Anatomy                               |       |
**PBIO 4462** | Plant Physiology Laboratory                 |       |
**PBIO 4423** | Plant Mineral Nutrition                     |       |
**PHYS 4313** | Molecular Biophysics                        |       |
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLNT 4353</td>
<td>Plant Breeding</td>
</tr>
<tr>
<td>STAT 4013</td>
<td>Statistical Methods I (A) (if not used as (A) above)</td>
</tr>
</tbody>
</table>

| Total Hours | 20 |

\(^1\) Total hours of BIOC 1990 Freshman Research in Biochemistry and BIOC 4990 Undergraduate Research may not exceed 10 hours.

**Other Requirements**

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

**Additional State/OSU Requirements**

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2024.