## 2019 - 2020 Major Map
### Biological Sciences, BS

**School/College:** The College of Liberal Arts and Sciences  
**Location:** Tempe campus  
**LABSCBS**

### Term 1 0 - 15 Credit Hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Minimum Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critical course signified by 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIA 101: Student Success in the College of Liberal Arts and Sciences</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>BIO 281: Conceptual Approaches to Biology for Majors I (SQ)</td>
<td>4</td>
<td>C</td>
</tr>
<tr>
<td>CHM 113: General Chemistry I (SQ)</td>
<td>4</td>
<td>C</td>
</tr>
<tr>
<td>ENG 101 or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107 or ENG 108: First-Year Composition</td>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>STP 231: Statistics for Life Science (CS)</td>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td><strong>Term hours subtotal:</strong></td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

**Notes:**
- Mathematics Placement Assessment score determines placement in mathematics and science courses
- LIA 101, ASU 101, or other First-Year Seminar required of all freshman students
- AN SAT, ACT, Accuplacer, IELTS, or TOEFL score determines placement into first-year composition courses
- Students transferring General Biology I (BIO 181) will fulfill BIO 281 requirement
- Students transferring General Statistics (STP 226 or PSY 230) will fulfill STP 231 requirement
- Select your career interest area and play me3@ASU

### Term 2 15 - 32 Credit Hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Minimum Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 282: Conceptual Approaches to Biology for Majors II</td>
<td>4</td>
<td>C</td>
</tr>
<tr>
<td>CHM 116: General Chemistry II (SQ)</td>
<td>4</td>
<td>C</td>
</tr>
<tr>
<td>ENG 101 or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107 or ENG 108: First-Year Composition</td>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>MAT 251: Calculus for Life Sciences (MA)</td>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>Social-Behavioral Sciences (SB) AND Global Awareness (G)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Complete BIO 281 AND BIO 282 course(s).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete ENG 101 OR ENG 105 OR ENG 107 course(s).</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Term hours subtotal:</strong></td>
<td></td>
<td>17</td>
</tr>
</tbody>
</table>

**Notes:**
- Join a student organization
- Create a resume & Handshake account with the Career & Professional Development Center
- Explore extracurriculars (i.e. service learning, community service, internships, research, student involvement, shadowing, etc.)
- Attend a Pre-Health 101 session
- Students transferring General Biology II (BIO 182) will fulfill BIO 282 requirement
- Students transferring Calculus (MAT 270 or MAT 210) will fulfill MAT 251 requirement

### Term 3 32 - 46 Credit Hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Minimum Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 340: General Genetics</td>
<td>4</td>
<td>C</td>
</tr>
<tr>
<td>CHM 231: Elementary Organic Chemistry (SQ) AND CHM 235: Elementary Organic Chemistry Laboratory (SQ)</td>
<td>4</td>
<td>C</td>
</tr>
<tr>
<td>CLAS Science and Society Elective</td>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>Humanities, Arts and Design (HU) AND Historical Awareness (H)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Complete First-Year Composition requirement.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete Mathematics (MA) requirement.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Term hours subtotal:</strong></td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>

**Notes:**
- Pre-health students should take CHM 233 and CHM 237 instead of CHM 231 and CHM 235. See the pre-health website for more information
- If CHM 233 and 237 are taken, then CHM 234 and 238 must be taken the following semester
- Explore extracurriculars (i.e. service learning, community service, internships, research, student involvement, shadowing, etc.)
- Attend a Study Abroad 101 Session
- Explore minors or certificates
## Term 4 46 - 61 Credit Hours

<table>
<thead>
<tr>
<th>Critical course signified by</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 345: Organic Evolution</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Additional Major Requirement Course</td>
<td>3-4</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Literacy and Critical Inquiry (L)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social-Behavioral Sciences (SB) AND Cultural Diversity in the U.S. (C)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Term hours subtotal: 15-16

- Pre-health students should take CHM 234 and CHM 238 instead of the elective in this term. See the pre-health website for more information.
- If CHM 233 and 237 are taken, then CHM 234 and 238 must be taken the following semester.
- Explore extracurriculars (i.e. service learning, community service, internships, research, student involvement, shadowing, etc.)
- Explore or pursue internship opportunities.
- Meet with the Career & Professional Development Center to learn how to develop professional skills.

### Pre-health students

- Take CHM 234 and CHM 238 instead of the elective in this term.
- See the pre-health website for more information.

### Major Laboratory/Research Course

<table>
<thead>
<tr>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
</table>
| PHY 101: Introduction to Physics (SQ) OR PHY 111: General Physics (SQ) AND PHY 113: General Physics Laboratory (SQ) | 4 | C | Pre-health students should take PHY 111 and PHY 113 instead of PHY 101 in this term. See the pre-health website for more information.
| Upper Division Additional Major Requirement Course | 3 | C | Meet with your advisor to discuss ways to maximize your remaining time at ASU (i.e. pre-health; 4+1 Masters Programs; study abroad).
| Humanities, Arts and Design (HU) | 3 | | Explore graduate school or full-time opportunities.
| Upper Division Elective OR BIO 484: Internship OR MIC 484: Internship OR MBB 484: Internship | 3 | | |

Term hours subtotal: 14-17

### Explore extracurriculars

- Explore extracurriculars (i.e. service learning, community service, internships, research, student involvement, shadowing, etc.)

### Explore or pursue internship opportunities

- Explore or pursue internship opportunities.

### Meet with the Career & Professional Development Center

- Meet with the Career & Professional Development Center to learn how to develop professional skills.
Major Laboratory/Research Courses

- BIO 308: Plant Physiology
- BIO 342: General Genetics Laboratory
- BIO 343: Genetic Engineering and Society (L) or MBB 343: Genetic Engineering and Society (L)
- BIO 352: Laboratory in Vertebrate Developmental Anatomy
- BIO 354: Cell Biology Laboratory
- BIO 361: Animal Physiology Laboratory
- BIO 370: Vertebrate Zoology
- BIO 385: Comparative Invertebrate Zoology
- BIO 386: General Entomology
- BIO 435: Research Techniques in Animal Behavior
- BIO 451: Cell Biotechnology: Cell Culture, Immunocytochemistry and Bioimaging
- BIO 453: Introduction to Computational Molecular Biology (CS) or MAT 355: Introduction to Computational Molecular Biology (CS)
- MBB 350: Applied Genetics
- MIC 302: Advanced Bacteriology Laboratory (L)
- MIC 220: Biology of Microorganisms AND MIC 206: Microbiology Laboratory (SG)

Major Elective Courses

- BCH 361: Advanced Principles of Biochemistry
- BIO 302: Cancer—Mother of All Diseases (L)
- BIO 304: Plants and Civilization (L) or ENV 302: Plants and Civilization (L)
- BIO 313: The Flora of Arizona
- BIO 314: History of Biology: Conflicts and Controversies (H) or HPS 330: History of Biology: Conflicts and Controversies (H)
- BIO 317: History of Medicine (HU & H) or HPS 331: History of Medicine (HU & H)
- BIO 322: Conservation of Biodiversity
- BIO 323: Ecosystem Restoration and Management
- BIO 325: Oceanography
- BIO 355: Introduction to Computational Molecular Biology (CS) or MAT 355: Introduction to Computational Molecular Biology (CS)
- BIO 412: Conservation in Practice or SOS 412: Conservation in Practice
- BIO 415: Biometry (CS)
- BIO 416: Biomedical Research Ethics (L) or HPS 410: Biomedical Research Ethics (L)
- BIO 423: Population and Community Ecology
- BIO 427: Fire (H)
- BIO 431: Genes, Development, and Evolution (L)
- BIO 436: Sociobiology and Behavioral Ecology
- BIO 440: Functional Genomics or MBB 440: Functional Genomics

Additional Major Requirements Courses

- BIO 303: Plant Diversity and Evolution (L or SG) or ENV 300: Plant Diversity and Evolution (L or SG)
- BIO 308: Plant Physiology
- BIO 312: Bioethics (HU) or PHI 320: Bioethics (HU) or BIO 311: Biology and Society or HPS 340: Biology and Society or PHI 314: Philosophy of Science (HU) or HPS 314: Philosophy of Science (HU)
- BIO 320: Fundamentals of Ecology
- BIO 331: Animal Behavior
- BIO 351: Developmental Biology
- BIO 353: Cell Biology
- BIO 360: Animal Physiology
- BIO 370: Vertebrate Zoology
- MIC 220: Biology of Microorganisms AND MIC 206: Microbiology Laboratory (SG)

• Continue to apply for full-time career opportunities or graduate school

Upper Division Additional Major Requirement Course 3-4 C
Upper Division Major Elective Course 3 C
Upper Division Elective 2
Complete 2 courses: 6
Elective 6

Term hours subtotal: 14-15
### General University Requirements Legend

**General Studies Core Requirements:**

- Literacy and Critical Inquiry (L)
- Mathematical Studies (MA)
- Computer/Statistics/Quantitative Applications (CS)
- Humanities, Arts and Design (HU)
- Social-Behavioral Sciences (SB)
- Natural Science - Quantitative (SQ)
- Natural Science - General (SG)

### Total Hours: 120

**Upper Division Hours:** 45 minimum

**Major GPA:** 2.00 minimum

**Cumulative GPA:** 2.00 minimum

**Total hrs at ASU:** 30 minimum

**Hrs Resident Credit for Academic Recognition:** 56 minimum

**Total Community College Hrs:** 64 maximum

**Total College Residency Hrs:** 12 minimum

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### Notes:

- Please keep in mind that the applicability of a specific transfer course toward an ASU degree program depends on the requirements of the department, division, college or school in which you are enrolled at ASU. Transfer agreements that guarantee the completion of university level requirements do not necessarily meet college and major requirements. Please consult with an advisor for more information.

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<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 446</td>
<td>Principles of Human Genetics (L) or ASM 446: Principles of Human Genetics (L)</td>
</tr>
<tr>
<td>BIO 461</td>
<td>Comparative Animal Physiology</td>
</tr>
<tr>
<td>BIO 462</td>
<td>Endocrine Physiology</td>
</tr>
<tr>
<td>BIO 467</td>
<td>Neurobiology</td>
</tr>
<tr>
<td>BIO 484</td>
<td>Internship or MBB 484: Internship or MIC 484: Internship</td>
</tr>
<tr>
<td>BIO 495</td>
<td>Undergraduate Research or MBB 495: Undergraduate Research</td>
</tr>
<tr>
<td>BMI 465</td>
<td>Introduction to Comparative Genomics</td>
</tr>
<tr>
<td>CHM 435</td>
<td>Medicinal Chemistry</td>
</tr>
<tr>
<td>HPS 322</td>
<td>History of Science (HU &amp; H)</td>
</tr>
<tr>
<td>HPS 323</td>
<td>History of Science (HU &amp; H) or BIO 317: History of Science (HU &amp; H)</td>
</tr>
<tr>
<td>MIC 360</td>
<td>Bacterial Physiology</td>
</tr>
<tr>
<td>MIC 420</td>
<td>Immunology: Molecular and Cellular Foundations or BIO 420: Immunology: Molecular and Cellular Foundations</td>
</tr>
<tr>
<td>MIC 485</td>
<td>General Virology</td>
</tr>
</tbody>
</table>
General Studies designations listed on the major map are current for the 2019 - 2020 academic year.