# 2019 - 2020 Major Map

**Biological Sciences (Genetics, Cell and Developmental Biology), BS**

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

## Term 1 - 15 Credit Hours

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIA 101</td>
<td>Student Success in the College of Liberal Arts and Sciences</td>
<td>1</td>
<td></td>
<td>Mathematics Placement Assessment score determines placement in mathematics and science courses</td>
</tr>
<tr>
<td>BIO 281</td>
<td>Conceptual Approaches to Biology for Majors I (SQ)</td>
<td>4</td>
<td>C</td>
<td>LIA 101, ASU 101, or other First Year Seminar required of all freshman students</td>
</tr>
<tr>
<td>CHM 113</td>
<td>General Chemistry 1 (SQ)</td>
<td>4</td>
<td>C</td>
<td>An SAT, ACT, Accuplacer, IELTS, or TOEFL score determines placement into first-year composition courses</td>
</tr>
<tr>
<td>ENG 101 or ENG 102</td>
<td>First-Year Composition OR</td>
<td>3</td>
<td>C</td>
<td>Students transferring General Biology I (BIO 181) will fulfill BIO 281 requirement</td>
</tr>
<tr>
<td>ENG 105</td>
<td>Advanced First-Year Composition OR</td>
<td>3</td>
<td>C</td>
<td>Students transferring General Statistics (STP 226 or PSY 230) will fulfill STP 231 requirement</td>
</tr>
<tr>
<td>ENG 107 or ENG 108</td>
<td>First-Year Composition</td>
<td>3</td>
<td>C</td>
<td>Students transferring Calculus (MAT 270 or MAT 210) will fulfill MAT 251 requirement</td>
</tr>
<tr>
<td>STP 231</td>
<td>Statistics for Life Science (CS)</td>
<td>3</td>
<td>C</td>
<td>Select your career interest area and play me3@ASU.</td>
</tr>
</tbody>
</table>

**Term hours subtotal:** 15

## Term 2 - 15 - 32 Credit Hours

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 282</td>
<td>Conceptual Approaches to Biology for Majors II</td>
<td>4</td>
<td>C</td>
<td>Join a student organization</td>
</tr>
<tr>
<td>CHM 116</td>
<td>General Chemistry II (SQ)</td>
<td>4</td>
<td>C</td>
<td>Create a resume &amp; <a href="http://handshake.com">Handshake</a> account with the Career &amp; Professional Development Center</td>
</tr>
<tr>
<td>ENG 101 or ENG 102</td>
<td>First-Year Composition OR</td>
<td>3</td>
<td>C</td>
<td>Explore extracurriars (i.e. service learning, community service, internships, research, student involvement, shadowing, etc.)</td>
</tr>
<tr>
<td>ENG 105</td>
<td>Advanced First-Year Composition OR</td>
<td>3</td>
<td>C</td>
<td>Attend a <a href="http://pre-health.session">Pre-Health 101 Session</a></td>
</tr>
<tr>
<td>ENG 107 or ENG 108</td>
<td>First-Year Composition</td>
<td>3</td>
<td>C</td>
<td>Students transferring General Biology II (BIO 182) will fulfill BIO 282 requirement</td>
</tr>
<tr>
<td>MAT 251</td>
<td>Calculus for Life Sciences (MA)</td>
<td>3</td>
<td>C</td>
<td>Students transferring Calculus (MAT 270 or MAT 210) will fulfill MAT 251 requirement</td>
</tr>
<tr>
<td>Social-Behavioral Sciences (SB) AND Global Awareness (G)</td>
<td>3</td>
<td></td>
<td>Pre-health students should take CHM 233 and CHM 237 instead of CHM 231 and CHM 235 this term. See pre-health website for more information</td>
<td></td>
</tr>
<tr>
<td>Complete BIO 281 AND BIO 282 course(s).</td>
<td></td>
<td></td>
<td></td>
<td>If CHM 233 and 237 are taken, then CHM 234 and 238 must be taken the following semester</td>
</tr>
<tr>
<td>Complete ENG 101 OR ENG 105 OR ENG 107 course(s).</td>
<td></td>
<td></td>
<td></td>
<td>Explore extracurriars (i.e. service learning, community service, internships, research, student involvement, shadowing, etc.)</td>
</tr>
</tbody>
</table>

**Term hours subtotal:** 17

## Term 3 - 32 - 46 Credit Hours

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 340</td>
<td>General Genetics</td>
<td>4</td>
<td>C</td>
<td>Pre-health students should take CHM 233 and CHM 237 instead of CHM 231 and CHM 235 this term. See pre-health website for more information</td>
</tr>
<tr>
<td>CHM 231</td>
<td>Elementary Organic Chemistry (SQ) AND CHM 235: Elementary Organic Chemistry Laboratory (SQ)</td>
<td>4</td>
<td>C</td>
<td>If CHM 233 and 237 are taken, then CHM 234 and 238 must be taken the following semester</td>
</tr>
<tr>
<td>CLAS Science and Society Elective</td>
<td></td>
<td>3</td>
<td>C</td>
<td>Explore extracurriars (i.e. service learning, community service, internships, research, student involvement, shadowing, etc.)</td>
</tr>
<tr>
<td>Humanities, Arts and Design (HU) AND Historical Awareness (H)</td>
<td></td>
<td>3</td>
<td></td>
<td>Attend a <a href="http://study.abroad.session">Study Abroad 101 Session</a></td>
</tr>
<tr>
<td>Complete First-Year Composition requirement.</td>
<td></td>
<td></td>
<td></td>
<td>Explore minors or certificates</td>
</tr>
<tr>
<td>Complete Mathematics (MA) requirement.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Term hours subtotal:** 14
### Term 4  46 - 61 Credit Hours

<table>
<thead>
<tr>
<th>Course Description</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>Pre-health students should take CHM 234 and CHM 238 instead of an elective this term. See pre-health website for more information.</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>If CHM 233 and 237 are taken, then CHM 234 and 238 must be taken the following semester.</td>
</tr>
</tbody>
</table>

**Complete 2 courses:**

| Elective | 6 | | |

Term hours subtotal: 15

- **Explore extracurriculars (i.e. service learning, community service, internships, research, student involvement, shadowing, etc.)**
- **Meet with the Career & Professional Development Center to learn how to develop professional skills.**

### Term 5  61 - 77 Credit Hours

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete 2 courses:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>★ BIO 351: Developmental Biology OR BIO 353: Cell Biology OR BCH 361: Advanced Principles of Biochemistry</td>
<td>6</td>
<td>C</td>
<td>Pre-health students should take PHY 111 and PHY 113 instead of PHY 101 this term. See pre-health website for more information.</td>
</tr>
<tr>
<td>PHY 101: Introduction to Physics (SQ)</td>
<td>4</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Humanities, Arts and Design (HU)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Division Elective</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Term hours subtotal: 16

- **BIO 351 is only taught in the Fall semester**
- **Meet with your advisor to discuss ways to maximize your remaining time at ASU (i.e. pre-health; 4+1 Masters Programs; study abroad)**
- **Explore graduate school or full-time opportunities**

### Term 6  77 - 92 Credit Hours

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>★ BIO 351: Developmental Biology OR BIO 353: Cell Biology OR BCH 361: Advanced Principles of Biochemistry</td>
<td>3</td>
<td>C</td>
<td>Pre-health students should take PHY 112 and PHY 114 instead of an elective this term. See pre-health website for more information.</td>
</tr>
<tr>
<td>Upper Division Social-Behavioral Sciences (SB) OR Upper Division Humanities, Arts and Design (HU)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Complete 2 courses:**

| Elective | 6 | | |

**Complete Cultural Diversity in the U.S. (C) AND Global Awareness (G) AND Historical Awareness (H) course(s).**

Term hours subtotal: 15

### Term 7  92 - 107 Credit Hours

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>★ Upper Division Major Laboratory/Research Course</td>
<td>3</td>
<td>C</td>
<td>Explore or apply for full-time career opportunities or graduate school.</td>
</tr>
<tr>
<td>Upper Division Major Elective</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Upper Division CLAS Science and Society Elective</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Upper Division Literacy and Critical Inquiry (L)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Meet with your advisor to verify remaining degree requirements have been met prior to Term 8.*
<table>
<thead>
<tr>
<th>Major Laboratory/Research Course</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 360: Animal Physiology OR BIO 446: Principles of Human Genetics (L) or ASM 446: Principles of Human Genetics (L) OR MBB 440: Functional Genomics or BIO 440: Functional Genomics OR MIC 420: Immunology: Molecular and Cellular Foundations</td>
<td>3</td>
<td>C</td>
<td>• Continue to apply for full-time career opportunities or graduate school</td>
</tr>
</tbody>
</table>

| Upper Division Major Elective | 3 | C |
| Upper Division Elective | 2 |

**Complete 2 courses:**
- Elective

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**Term hours subtotal:** 13

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*All students pursuing a B.S. or B.S.P. degree in the College of Liberal Arts and Sciences must complete two courses from the Science and Society list found at [https://clas.asu.edu/resources/science-society](https://clas.asu.edu/resources/science-society). At least one of the two courses must be upper division. Students must earn a C or better in the courses, and no more than one of the two can also be used to simultaneously fill a requirement of the major, minor or related area. Science and Society courses cannot also be used to fill the general studies HU, SB, SQ or SG requirements.*
<table>
<thead>
<tr>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCH 367: Elementary Biochemistry Laboratory</td>
</tr>
<tr>
<td>BIO 431: Genes, Development, and Evolution</td>
</tr>
<tr>
<td>(L)</td>
</tr>
<tr>
<td>BIO 440: Functional Genomics or MBB 440:</td>
</tr>
<tr>
<td>Functional Genomics</td>
</tr>
<tr>
<td>BIO 446: Principles of Human Genetics (L)</td>
</tr>
<tr>
<td>or ASM 446: Principles of Human Genetics (L)</td>
</tr>
<tr>
<td>BIO 451: Cell Biotechnology: Cell Culture,</td>
</tr>
<tr>
<td>Immunocytochemistry and Bioimaging</td>
</tr>
<tr>
<td>BIO 453: Animal Histology</td>
</tr>
<tr>
<td>BIO 462: Endocrine Physiology</td>
</tr>
<tr>
<td>BMI 465: Introduction to Comparative</td>
</tr>
<tr>
<td>Genomics</td>
</tr>
<tr>
<td>BIO 467: Neurobiology</td>
</tr>
<tr>
<td>HPS 322: History of Science (HU &amp; H) or</td>
</tr>
<tr>
<td>BIO 317: History of Science (HU &amp; H)</td>
</tr>
<tr>
<td>HPS 323: History of Science (HU &amp; H)</td>
</tr>
<tr>
<td>HPS 330: History of Biology: Conflicts and</td>
</tr>
<tr>
<td>Controversies (H) or BIO 316: History of</td>
</tr>
<tr>
<td>Biology: Conflicts and Controversies (H)</td>
</tr>
<tr>
<td>HPS 331: History of Medicine (HU &amp; H) or</td>
</tr>
<tr>
<td>BIO 318: History of Medicine (HU &amp; H)</td>
</tr>
<tr>
<td>MBB 343: Genetic Engineering and Society</td>
</tr>
<tr>
<td>(L) or BIO 343: Genetic Engineering and</td>
</tr>
<tr>
<td>Society (L)</td>
</tr>
<tr>
<td>MBB 350: Applied Genetics</td>
</tr>
<tr>
<td>MIC 302: Advanced Bacteriology Laboratory</td>
</tr>
<tr>
<td>(L)</td>
</tr>
<tr>
<td>MIC 420: Immunology: Molecular and</td>
</tr>
<tr>
<td>Cellular Foundations or BIO 420:</td>
</tr>
<tr>
<td>Immunology: Molecular and Cellular</td>
</tr>
<tr>
<td>Foundations</td>
</tr>
<tr>
<td>MIC 421: Experimental Immunology</td>
</tr>
<tr>
<td>MIC 485: General Virology</td>
</tr>
</tbody>
</table>

**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.

**Total Hours:** 120  
**Upper Division Hours:** 45 minimum  
**Major GPA:** 2.00 minimum  
**Cumulative GPA:** 2.00 minimum  

**General University Requirements Legend**

General Studies Core Requirements:

- Literacy and Critical Inquiry (L)
General Studies Awareness Requirements:

- Cultural Diversity in the U.S. (C)
- Global Awareness (G)
- Historical Awareness (H)

First-Year Composition

General Studies designations listed on the major map are current for the 2019 - 2020 academic year.