# 2019 - 2020 Major Map

**Earth and Space Exploration (Astrophysics), BS**

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

<table>
<thead>
<tr>
<th>Term 1</th>
<th>0 - 16 Credit Hours</th>
<th>Critical course signified by</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 270: Calculus with Analytic Geometry I (MA)</td>
<td>4</td>
<td>C</td>
<td></td>
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</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>
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<tr>
<td>LIA 101: Student Success in the College of Liberal Arts and Sciences</td>
<td>1</td>
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<tr>
<td>SES 121: Earth, Solar System and Universe (SQ) AND SES 123: Earth, Solar System and Universe Laboratory (SQ)</td>
<td>4</td>
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<tr>
<td>SES 191: Exploring SESE</td>
<td>1</td>
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<tr>
<td>Social-Behavioral Sciences (SB) AND Cultural Diversity in the U.S. (C)</td>
<td>3</td>
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<tr>
<td><strong>Term hours subtotal:</strong></td>
<td>16</td>
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</tbody>
</table>

- An SAT, ACT, Accuplacer, IELTS, or TOEFL score determines placement into first-year composition courses.
- Mathematics Placement Assessment score determines placement in mathematics course.
- LIA 101 is mandatory for all incoming freshmen.
- SESE will accept Calculus for Engineers I, II and III (MAT 265/266/267) as alternatives although MAT 270, 271 and 272 are encouraged.
- SESE requires freshmen and sophomores to seek faculty mentoring at least once during the academic year. Each student will be assigned a SESE faculty mentor. Students can find their faculty mentor on the SESE advising website.
- Select your career interest area and play me3@ASU.

<table>
<thead>
<tr>
<th>Term 2</th>
<th>16 - 31 Credit Hours</th>
<th>Critical course signified by</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>MAT 271: Calculus with Analytic Geometry II (MA)</td>
<td>4</td>
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<tr>
<td>PHY 150: Physics I (SQ)</td>
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<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>
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<tr>
<td>Complete ENG 101 OR ENG 105 OR ENG 107 course(s).</td>
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<tr>
<td><strong>Milestone: Complete SESE faculty mentoring.</strong></td>
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<tr>
<td><strong>Term hours subtotal:</strong></td>
<td>15</td>
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</tbody>
</table>

- Students in this major have a choice between taking SES 122 and SES 124 or SES 126 and SES 128 in their second semester. SES 122/124 has an earth-based focus and SES 126/128 has a space-based focus. Most astrophysics students should take SES 126/128.
- SESE will accept Calculus for Engineers I, II and III (MAT 265/266/267) as alternatives although MAT 270, 271 and 272 are encouraged.
- SESE will accept PHY 121/122 and PHY 131/132 as alternatives although PHY 150 and PHY 151 are encouraged.
- SESE requires freshmen and sophomores to seek faculty mentoring at least once during the academic year. Each student will be assigned a SESE faculty mentor. Students can find their faculty mentor on the SESE advising website.
- Join a student club or professional organization.

<table>
<thead>
<tr>
<th>Term 3</th>
<th>31 - 45 Credit Hours</th>
<th>Critical course signified by</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
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<tr>
<td>Requirements</td>
<td>Hours</td>
<td>Minimum Grade</td>
<td>Notes</td>
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<td>------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>MAT 272: Calculus with Analytic Geometry III (MA)</td>
<td>4</td>
<td>C</td>
<td>• SESE will accept Calculus for Engineers I, II and III (MAT 265/266/267) as alternatives although MAT 270, 271 and 272 are encouraged.</td>
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</tr>
<tr>
<td>PHY 151: University Physics II: Electricity and Magnetism (SQ)</td>
<td>4</td>
<td>C</td>
<td>• SESE will accept PHY 121/122 and PHY 131/132 as alternatives although PHY 150 and PHY 151 are encouraged.</td>
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</tr>
<tr>
<td>SES 130: Coding for Exploration (CS)</td>
<td>3</td>
<td>C</td>
<td>• SESE requires freshmen and sophomores to seek faculty mentoring at least once during the academic year. Each student will be assigned a SESE faculty mentor. Students can find their faculty mentor on the SESE advising website.</td>
<td></td>
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</tr>
<tr>
<td>Humanities, Arts and Design (HU)</td>
<td>3</td>
<td></td>
<td>• Develop your skills.</td>
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</tr>
<tr>
<td><strong>Complete First-Year Composition requirement.</strong></td>
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<tr>
<td><strong>Complete Mathematics (MA) requirement.</strong></td>
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<tr>
<td><strong>Term hours subtotal:</strong></td>
<td>14</td>
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</tbody>
</table>

### Term 4

#### 45 - 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>PHY 201: Mathematical Methods in Physics I (CS)</td>
<td>3</td>
<td>C</td>
<td>• To access the requirements and the list of approved courses for Science and Society, click here.</td>
</tr>
<tr>
<td>PHY 252: Physics III (SQ)</td>
<td>4</td>
<td>C</td>
<td>• SESE requires freshmen and sophomores to seek faculty mentoring at least once during the academic year. Each student will be assigned a SESE faculty mentor. Students can find their faculty mentor on the SESE advising website.</td>
</tr>
<tr>
<td>CLAS Science and Society Elective</td>
<td>3</td>
<td>C</td>
<td>• Students should meet with faculty to discuss research opportunities</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 Global Awareness (G)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Milestone: Complete SESE faculty mentoring.</strong></td>
<td></td>
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<tr>
<td><strong>Term hours subtotal:</strong></td>
<td>16</td>
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</tbody>
</table>

### Term 5

#### 61 - 76 Credit Hours

<table>
<thead>
<tr>
<th>Necessary course signified by ⭐</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>AST 321: Introduction to Planetary and Stellar Astrophysics (SQ)</td>
<td>3</td>
<td>C</td>
<td>• Students should meet with faculty to discuss research opportunities</td>
</tr>
<tr>
<td>MAT 275: Modern Differential Equations (MA)</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>PHY 314: Quantum Physics I</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Humanities, Arts and Design (HU) AND Historical Awareness (H)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Term hours subtotal:</strong></td>
<td>15</td>
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</table>

### Term 6

#### 76 - 91 Credit Hours

<table>
<thead>
<tr>
<th>Necessary course signified by ⭐</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>AST 322: Introduction to Galactic and Extragalactic Astrophysics (SQ)</td>
<td>3</td>
<td>C</td>
<td>• The suggested list of electives are highly recommended but not required. Students who plan to take the physics GRE are encouraged to choose electives from the PHY options. There is also the option to choose an elective in other GLG, AST, SES, PHY or MAT areas as long as the subject is relevant to Astrophysics and the course is upper division. Students should consult with a SESE advisor if they have questions about which courses would satisfy this requirement.</td>
</tr>
<tr>
<td>AST 421: Astrophysics I</td>
<td>3</td>
<td>C</td>
<td>• Students interested in graduate school should be researching programs and preparing application materials. Continue to meet with faculty for input along the way.</td>
</tr>
<tr>
<td>Upper Division Earth and Space Exploration Astrophysics major elective</td>
<td>3</td>
<td>C</td>
<td>• Students should meet with an advisor to do a graduation check.</td>
</tr>
<tr>
<td>Upper Division Literacy and Critical Inquiry (L)</td>
<td>3</td>
<td></td>
<td>• Research career opportunities.</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td>Complete Cultural Diversity in the U.S. (C) AND Global Awareness (G) AND Historical Awareness (H) course(s).</td>
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</tr>
<tr>
<td><strong>Term hours subtotal:</strong></td>
<td>15</td>
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</tbody>
</table>
• Explore an internship. In order to earn credits for an internship, students should work with their SESE advisor for approval. Students who hope to go to graduate school should consider getting involved in research. Students can talk to faculty mentors about how to find research opportunities.

• Students interested in graduate school should be researching programs and preparing application materials. Continue to meet with faculty for input along the way.

• To access the requirements and the list of approved courses for Science and Society, click here.

• If not already completed, students should meet with an advisor to do a graduation check.

• Apply for full-time career opportunities.

**Upper Division Elective**

Term 7 91 - 106 Credit Hours

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>AST 422: Astrophysics II</td>
<td>3</td>
<td>C</td>
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<tr>
<td>SES 410: Senior Exploration Project I</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>AST 498: Pro-Seminar</td>
<td>1</td>
<td>C</td>
<td></td>
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<tr>
<td>Upper Division Humanities, Arts and Design (HU) OR Upper Division Social-Behavioral Sciences (SB)</td>
<td>3</td>
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</tr>
<tr>
<td>Upper Division Elective OR GLG 484: Internship OR SES 499: Individualized Instruction</td>
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<tr>
<td>Elective</td>
<td>2</td>
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</table>

Term hours subtotal: 15

- Explore an internship. In order to earn credits for an internship, students should work with their SESE advisor for approval. Students who hope to go to graduate school should consider getting involved in research. Students can talk to faculty mentors about how to find research opportunities.

- Students interested in graduate school should be researching programs and preparing application materials. Continue to meet with faculty for input along the way.

- To access the requirements and the list of approved courses for Science and Society, click here.

- If not already completed, students should meet with an advisor to do a graduation check.

- Apply for full-time career opportunities.

**Upper Division Humanities, Arts and Design (HU)**

**Upper Division Social-Behavioral Sciences (SB)**

**Upper Division Elective OR GLG 484: Internship OR SES 499: Individualized Instruction**

**Elective**

**Upper Division CLAS Science and Society Elective**

**Complete 3 courses:**

- Upper Division Elective

Term hours subtotal: 14

- Explore an internship. In order to earn credits for an internship, students should work with their SESE advisor for approval. Students who hope to go to graduate school should consider getting involved in research. Students can talk to faculty mentors about how to find research opportunities.

- Students interested in graduate school should be researching programs and preparing application materials. Continue to meet with faculty for input along the way.

- To access the requirements and the list of approved courses for Science and Society, click here.

- If not already completed, students should meet with an advisor to do a graduation check.

- Apply for full-time career opportunities.

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.
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
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

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)

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.