2019 - 2020 Major Map
Computational Mathematical Sciences, BS

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

<table>
<thead>
<tr>
<th>Term 1 0 - 14 Credit Hours</th>
<th>Critical course signified by</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
</table>
| CSE 110: Principles of Programming with Java (CS) | 3 | C | • An SAT, ACT, Accuplacer, IELTS, or TOEFL score determines placement into first-year composition courses
| MAT 270: Calculus with Analytic Geometry I (MA) | 4 | C | • Mathematics Placement Assessment score determines placement in mathematics course
| ENG 101 or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107 or ENG 108: First-Year Composition | 3 | C | • ASU 101 or college-specific equivalent First-Year Seminar required of all freshman students
| LIA 101: Student Success in the College of Liberal Arts and Sciences | 1 | | • Select your career interest area and play me3@ASU.
| Elective | 3 | | |

Maintain 2.50 GPA in Critical Tracking Courses.

Term hours subtotal: 14

<table>
<thead>
<tr>
<th>Term 2 14 - 31 Credit Hours</th>
<th>Critical course signified by</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
</table>
| CSE 205: Object-Oriented Programming and Data Structures (CS) | 3 | C | • Meet with your academic advisor to reflect on your first year of classes and map your coursework towards a timely graduation.
| MAT 271: Calculus with Analytic Geometry II (MA) | 4 | C | • Join a student club or professional organization, like Math Club
| ENG 101 or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107 or ENG 108: First-Year Composition | 3 | C | |
| Science Sequence Course AND Natural Science - Quantitative (SQ) | 4 | C | |
| Literacy and Critical Inquiry (L) (PHI 103 recommended) | 3 | | |
| Complete ENG 101 OR ENG 105 OR ENG 107 course(s). | | | |

Maintain 2.50 GPA in Critical Tracking Courses.

Minimum 2.00 GPA in MAT and STP.

Term hours subtotal: 17

<table>
<thead>
<tr>
<th>Term 3 31 - 47 Credit Hours</th>
<th>Critical course signified by</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
</table>
| CSE 240: Introduction to Programming Languages | 3 | C | • Minimum grade of C required in all MAT and STP classes; grade of B or better strongly correlated with timely graduation
| MAT 272: Calculus with Analytic Geometry III (MA) | 4 | C | • Meet with your academic advisor to discuss summer internship and/or Research Opportunities for Undergraduates (REU)
| MAT 275: Modern Differential Equations (MA) | 3 | C | • Visit Career and Professional Development Services and meet with a career advisor for assistance with career planning and networking.
| CLAS Science and Society Elective | 3 | C | |
| Humanities, Arts and Design (HU) AND Historical Awareness (H) | 3 | | |
| Complete First-Year Composition requirement. | | | |

Complete Mathematics (MA) requirement.

Maintain 2.50 GPA in Critical Tracking Courses.

Minimum 2.00 GPA in MAT and STP.

Term hours subtotal: 16
## Term 4 - 47 - 63 Credit Hours

<table>
<thead>
<tr>
<th>Critical course signified by</th>
<th>Hours</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 300: Mathematical Structures (L)</td>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>MAT 342: Linear Algebra OR MAT 343: Applied Linear Algebra</td>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>Science Sequence Course AND Natural Science - Quantitative (SQ) or Natural Science - General (SG)</td>
<td>4</td>
<td>C</td>
</tr>
<tr>
<td>Humanities, Arts and Design (HU) AND Cultural Diversity in the U.S. (C)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Social-Behavioral Sciences (SB) AND Global Awareness (G)</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Maintain 2.50 GPA in Critical Tracking Courses.

**Term hours subtotal:** 16

### Notes
- Minimum grade of C required in all MAT classes; grade of B or better strongly correlated with timely graduation
- Meet with your academic advisor to discuss options for adding a minor, certificate, or concurrent major to your degree program.
- Develop professional skills
- Upper division MAT/STP courses should be taken through the Tempe campus, unless approved by a SoMSS advisor.

## Term 5 - 63 - 77 Credit Hours

<table>
<thead>
<tr>
<th>Necessary course signified by ✺</th>
<th>Hours</th>
<th>Minimum Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 370: Intermediate Calculus OR MAT 371: Advanced Calculus I</td>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>MAT 420: Scientific Computing</td>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>Science Sequence Course</td>
<td>4</td>
<td>C</td>
</tr>
<tr>
<td>Elective</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Minimum 2.00 GPA in MAT and STP.

**Term hours subtotal:** 14

### Notes
- Minimum grade of C required in all MAT and STP classes; grade of B or better strongly correlated with timely graduation
- Meet with your academic advisor to discuss post-graduation plans, e.g. graduate school, career preparation.
- Develop your professional online presence.
- Upper division MAT/STP courses should be taken through the Tempe campus, unless approved by a SoMSS advisor.

## Term 6 - 77 - 93 Credit Hours

<table>
<thead>
<tr>
<th>Necessary course signified by ✺</th>
<th>Hours</th>
<th>Minimum Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 421: Applied Computational Methods (CS)</td>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>Science Sequence Course</td>
<td>4</td>
<td>C</td>
</tr>
<tr>
<td>Social-Behavioral Sciences (SB)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Complete 2 courses:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Division Elective</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Complete Cultural Diversity in the U.S. (C) AND Global Awareness (G) AND Historical Awareness (H) course(s).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Minimum 2.00 GPA in MAT and STP.

**Term hours subtotal:** 16

### Notes
- Minimum grade of C required in all MAT and STP classes; grade of B or better strongly correlated with timely graduation
- Upper division MAT/STP courses should be taken through the Tempe campus, unless approved by a SoMSS advisor.
- Meet with a career counselor from ASU Career Services for a review of your resume and interviewing tips for success.

## Term 7 - 93 - 108 Credit Hours

<table>
<thead>
<tr>
<th>Necessary course signified by ✺</th>
<th>Hours</th>
<th>Minimum Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Division Internship/Research/Advanced Science Course</td>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>Upper Division Advanced Courses</td>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>Upper Division CLAS Science and Society Elective</td>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>Upper Division Elective</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Minimum 2.00 GPA in MAT and STP.

**Term hours subtotal:** 15

### Notes
- Minimum grade of C required in all MAT and STP classes; grade of B or better strongly correlated with timely graduation
- Upper division MAT/STP courses should be taken through the Tempe campus, unless approved by a SoMSS advisor.
- Meet with your academic advisor to discuss post-graduation plans, e.g. graduate school, career preparation.
- Gather professional references.

## Term 8 - 108 - 120 Credit Hours

<table>
<thead>
<tr>
<th>Necessary course signified by ✺</th>
<th>Hours</th>
<th>Minimum Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete 2 courses:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Division Advanced Courses</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

### Notes
- Minimum grade of C required in all MAT and STP classes; grade of B or better strongly correlated with timely graduation
- Upper division MAT/STP courses should be taken through the Tempe campus, unless approved by a SoMSS advisor.
### Science Sequence Courses

- **AST 111**: Introduction to Solar Systems (SQ)
- **AST 113**: Astronomy Laboratory I (SQ)
- **AST 112**: Introduction to Stars, Galaxies, and Cosmology (SQ) or **AST 321**: Introduction to Planetary and Stellar Astrophysics (SQ)
- **AST 114**: Astronomy Laboratory II (SQ)
- **AST Upper Division Elective**

### Internship, Research, or Advanced Science

- **AST Upper Division Elective**
- **BIO 320**: Fundamentals of Ecology
- **BME Upper Division Elective**
- **CEE Upper Division Elective**
- **CHE Upper Division Elective**
- **CHM Upper Division Elective**
- **CIS Upper Division Elective**
- **CSE Upper Division Elective**
- **EEE Upper Division Elective**
- **GLG 305**: Dynamic Earth
- **GLG 321**: Mineralogy
- **GLG 362**: Geomorphology
- **GLG 4** 
- **IEEE Upper Division Elective**
- **MAE Upper Division Elective**
- **MAT 484**: Internship
- **MAT 493**: Honors Thesis (L)
- **MAT 495**: Undergraduate Research
- **MIC Upper Division Elective**

### Advanced Courses

- **MAT 415**: Introduction to Combinatorics
- **MAT 416**: Introduction to Graph Theory
- **MAT 419**: Introduction to Linear Optimization (CS)
- **MAT 423**: Numerical Analysis I (CS)
- **MAT 425**: Numerical Analysis II (CS)
- **MAT 447**: Cryptography I
- **MAT 451**: Mathematical Modeling (CS)
- **MAT 452**: Introduction to Chaos and Nonlinear Dynamics
- **MAT 461**: Applied Complex Analysis
- **MAT 462**: Applied Partial Differential Equations
- **MAT 475**: Differential Equations
- **MAT 476**: Partial Differential Equations
- **STP 420**: Introductory Applied Statistics (CS)
- **STP 421**: Probability
- **STP 425**: Stochastic Processes
- **STP 427**: Mathematical Statistics
- **STP 429**: Experimental Statistics (CS)

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- **Upper Division Humanities, Arts and Design (HU) OR Upper Division Social-Behavioral Sciences (SB)**
  
- **Upper Division Elective**

- **Minimum 2.00 GPA in MAT and STP.**

**Term hours subtotal:** 12

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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/advising-and-academic-services/science-and-society](https://clas.asu.edu/advising-and-academic-services/science-and-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.

The Computational Mathematical Sciences degree requires students to select and complete two one-year lecture and lab combinations. Upon advisor approval, two advanced courses for which the first one-year science and lab sequence is a prerequisite may be substituted for the second one-year science and lab sequence.

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- **Minimum grade of C required in all MAT and STP classes; grade of B or better strongly correlated with timely graduation.**
- **Upper division MAT/STP courses should be taken through the Tempe campus, unless approved by a SoMSS advisor.**
- **Meet with your academic advisor for final degree check and apply for graduation through your My ASU.**
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.

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

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.