# 2022 - 2023 Major Map

**Computational Mathematical Sciences, BS**

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

## Term 1 - 14 Credit Hours

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE 110: Principles of Programming (CS)</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>MAT 270: Calculus with Analytic Geometry I (MA)</td>
<td>4</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>ENG 101 or ENG 102: First-Year Composition OR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENG 105: Advanced First-Year Composition OR</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>LIA 101: Student Success in The College of Liberal Arts and Sciences</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Maintain 2.50 GPA in Critical Tracking Courses.

**Term hours subtotal:** 14

## Term 2 - 14 - 31 Credit Hours

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE 205: Object-Oriented Programming and Data Structures (CS)</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>MAT 271: Calculus with Analytic Geometry II (MA)</td>
<td>4</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>ENG 101 or ENG 102: First-Year Composition OR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENG 105: Advanced First-Year Composition OR</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Science Sequence Course AND Natural Science - Quantitative (SQ)</td>
<td>4</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Literacy and Critical Inquiry (L) ( PHI 103 recommended)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Meet with your academic advisor to reflect on your first year of classes and map your coursework towards a timely graduation.  
Meet a studentOrganization, like Math Club.  
Minimum 2.00 GPA in MAT and STP.

**Term hours subtotal:** 17

## Term 3 - 31 - 47 Credit Hours

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE 240: Introduction to Programming Languages</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>MAT 272: Calculus with Analytic Geometry III (MA)</td>
<td>4</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>MAT 275: Modern Differential Equations (MA)</td>
<td>3</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Science and Society Elective</td>
<td>3</td>
<td></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>Complete First-Year Composition requirement.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Complete Mathematics (MA) requirement.

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 summer internship and/or Research Opportunities for Undergraduates (REU)  
Visit Career and Professional Development Services and meet with a career advisor for assistance with career planning and networking.
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>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 300: Mathematical Structures (L)</td>
<td>3</td>
<td>C</td>
<td>• Minimum grade of C required in all MAT classes; grade of B or better strongly correlated with timely graduation</td>
</tr>
<tr>
<td>MAT 342: Linear Algebra OR MAT 343: Applied Linear Algebra (SQ) or Natural Science - General (SG)</td>
<td>3</td>
<td>C</td>
<td>• Meet with your academic advisor to discuss options for adding a minor, certificate, or concurrent major to your degree program.</td>
</tr>
<tr>
<td>Science Sequence Course AND Natural Science - Quantitative</td>
<td>4</td>
<td>C</td>
<td>• Develop professional skills</td>
</tr>
<tr>
<td>Humanities, Arts and Design (HU) AND Cultural Diversity in the U.S. (C)</td>
<td>3</td>
<td></td>
<td>• Upper-division MAT/STP courses should be taken through the Tempe campus, unless approved by a SoMSS advisor.</td>
</tr>
<tr>
<td>Social-Behavioral Sciences (SB) AND Global Awareness (G)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Maintain 2.50 GPA in Critical Tracking Courses.

**Term hours subtotal:** 16

**Term 5 63 - 77 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>MAT 370: Intermediate Calculus OR MAT 371: Advanced Calculus I</td>
<td>3</td>
<td>C</td>
<td>• Minimum grade of C required in all MAT and STP classes; grade of B or better strongly correlated with timely graduation</td>
</tr>
<tr>
<td>MAT 420: Scientific Computing</td>
<td>3</td>
<td>C</td>
<td>• Meet with your academic advisor to discuss post-graduation plans, e.g. graduate school, career preparation.</td>
</tr>
<tr>
<td>Science Sequence Course</td>
<td>4</td>
<td>C</td>
<td>• Develop your professional online presence</td>
</tr>
<tr>
<td>Elective</td>
<td>4</td>
<td></td>
<td>• Upper-division MAT/STP courses should be taken through the Tempe campus, unless approved by a SoMSS advisor.</td>
</tr>
</tbody>
</table>

Minimum 2.00 GPA in MAT and STP.

**Term hours subtotal:** 14

**Term 6 77 - 93 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>MAT 421: Applied Computational Methods (CS)</td>
<td>3</td>
<td>C</td>
<td>• Minimum grade of C required in all MAT and STP classes; grade of B or better strongly correlated with timely graduation</td>
</tr>
<tr>
<td>Science Sequence Course</td>
<td>4</td>
<td>C</td>
<td>• Meet with a career counselor from ASU Career Services for a review of your resume and interviewing tips for success.</td>
</tr>
<tr>
<td>Social-Behavioral Sciences (SB)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete 2 courses: Upper Division Elective</td>
<td>6</td>
<td></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>
<td></td>
</tr>
</tbody>
</table>

Minimum 2.00 GPA in MAT and STP.

**Term hours subtotal:** 16

**Term 7 93 - 108 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>Upper Division Advanced Courses</td>
<td>3</td>
<td>C</td>
<td>• Minimum grade of C required in all MAT and STP classes; grade of B or better strongly correlated with timely graduation</td>
</tr>
<tr>
<td>Upper Division Internship/Research/Advanced Science Course</td>
<td>3</td>
<td>C</td>
<td>• Upper-division MAT/STP courses should be taken through the Tempe campus, unless approved by a SoMSS advisor.</td>
</tr>
<tr>
<td>Upper Division Science and Society Elective</td>
<td>3</td>
<td>C</td>
<td>• Meet with your academic advisor to discuss post-graduation plans, e.g. graduate school, career preparation.</td>
</tr>
<tr>
<td>Upper Division Elective</td>
<td>3</td>
<td></td>
<td>• Gather professional references.</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Minimum 2.00 GPA in MAT and STP.

**Term hours subtotal:** 15
### Term 8 108 - 120 Credit Hours

Necessary course signified by ★

<table>
<thead>
<tr>
<th>Science Sequence Courses</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>Upper Division Advanced Courses</td>
<td>6</td>
<td>C</td>
<td>• Minimum grade of C required in all MAT and STP classes; grade of B or better strongly correlated with timely graduation.</td>
</tr>
<tr>
<td>Upper Division Humanities, Arts and Design (HU) OR Upper Division Social-Behavioral Sciences (SB)</td>
<td>3</td>
<td></td>
<td>• Upper-division MAT/STP courses should be taken through the Tempe campus, unless approved by a SoMSS advisor.</td>
</tr>
<tr>
<td>Upper Division Elective</td>
<td>3</td>
<td></td>
<td>• Meet with your academic advisor for final degree check and apply for graduation through your My ASU.</td>
</tr>
<tr>
<td>★ Minimum 2.00 GPA in MAT and STP.</td>
<td></td>
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</tr>
</tbody>
</table>

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### Internship, Research, or Advanced Science

<table>
<thead>
<tr>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Upper Division Elective

<table>
<thead>
<tr>
<th>Hours</th>
<th>Minimum Grade</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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### Term hours subtotal: 12

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- All students pursuing a BS or BSP degree in The College of Liberal Arts and Sciences must complete two courses from the Science and Society list found at https://thecollege.asu.edu/resources/science-society. At least one of the two courses must be upper-division and students must earn a C or better in the courses. Both Science and Society courses (i.e., all six credits) may count towards any major, minor, related fields, and ASU General Studies requirements.

- The Computational Mathematical Sciences degree requires students to select and complete two 1-year lecture and lab combinations. Upon advisor approval, two advanced courses for which the first 1-year science and lab sequence is a prerequisite may be substituted for the second 1-year science and lab sequence.

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### Science Sequence Courses

- CHM 113: General Chemistry I (SQ) AND CHM 116: General Chemistry II (SQ)
- CHM 114: General Chemistry for Engineers (SQ) AND CHM 231: Elementary Organic Chemistry (SQ) AND CHM 235: Elementary Organic Chemistry Laboratory (SQ)
- GLG 101: Introduction to Geology I (Physical) (SQ) AND GLG 103: Introduction to Geology I: Laboratory (SQ) AND GLG 102: Introduction to Geology II (Historical) (SG & H) AND GLG 104: Introduction to Geology II-Laboratory (SG)

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### 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** Elective
- IEE Upper Division Elective
- MAE Upper Division Elective
- MAT 484: Internship
- MAT 493: Honors Thesis (L)
- MAT 495: Undergraduate Research

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### Advanced Courses

- DAT 401: Statistical Modeling and Inference for Data Science
- DAT 402: Machine Learning for Data Science
- MAT 415: Introduction to Combinatorics
- MAT 416: 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 448: Cryptography II
- 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

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- Meet with your academic advisor for final degree check and apply for graduation through your My ASU.

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### 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** Elective
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- MAE Upper Division Elective
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- DAT 402: Machine Learning for Data Science
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- MAT 423: Numerical Analysis I (CS)
- MAT 425: Numerical Analysis II (CS)
- MAT 447: Cryptography I
- MAT 448: Cryptography II
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- GLG 4** Elective
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- 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.
First-Year Composition: All students are placed in ENG 101 unless submission of SAT, ACT, Accuplacer, IELTS, or TOEFL score, or college-level transfer credit or test credit equivalent to ASU's first-year composition course(s), determine otherwise. Students on Polytechnic, Downtown Phoenix and West Campuses are encouraged to complete the Directed Self-Placement survey to choose the first-year composition option they believe best suits their needs. Visit: https://cisa.asu.edu/DSP

Mathematics Placement Assessment score determines placement in first mathematics course.

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.

Notes:

- First-Year Composition: All students are placed in ENG 101 unless submission of SAT, ACT, Accuplacer, IELTS, or TOEFL score, or college-level transfer credit or test credit equivalent to ASU's first-year composition course(s), determine otherwise. Students on Polytechnic, Downtown Phoenix and West Campuses are encouraged to complete the Directed Self-Placement survey to choose the first-year composition option they believe best suits their needs. Visit: https://cisa.asu.edu/DSP
- Mathematics Placement Assessment score determines placement in first mathematics course.
- 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 2022 - 2023 academic year.