2013 - 2014 Major Map

Computational Mathematical Sciences, BS

School/College: The College of Liberal Arts and Sciences
LACMSBS

Term 1 0 - 14 Credit Hours Critical course signified by	Hours	Minimum Grade	Notes
CSE 110: Principles of Programming with Java (CS)	3	C	• An SAT, ACT, Accuplacer, or TOEFL score determines placement into first-year composition courses • ASU Math Placement Exam score determines placement in Mathematics course • ASU 101 or College specific equivalent First Year Seminar required of all freshman students. • CSE 110 will complete the Computer Science (CS) requirement and will count towards the Related Field area.
MAT 270: Calculus with Analytic Geometry I (MA)	4	C	
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	
MAT 191: First-Year Seminar OR LIA 101: Student Success in the College of Liberal Arts and Sciences	1		
Elective	3		
Maintain 2.50 GPA in Critical Tracking Courses.			
Term hours subtotal:	14		

Term 2 14 - 31 Credit Hours Critical course signified by	Hours	Minimum Grade	Notes
CSE 205: Object-Oriented Programming and Data Structures (CS)	3	C	• PHI 103 Principles of Sound Reasoning (L) recommended. • Students are required to complete 2 one-year sequences of lecture and lab courses. 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. • Meet with your academic advisor to reflect on your first year of classes and map our coursework towards a timely graduation.
MAT 271: Calculus with Analytic Geometry II (MA)	4	C	
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	
Literacy and Critical Inquiry (L) (PHI 103 recommended)	3		
Science Sequence Course AND Natural Science - Quantitative (SQ) or Natural Science - General (SG)	4	C	
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		

Term 3 31 - 47 Credit Hours Critical course signified by	Hours	Minimum Grade	Notes
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 • Meet with your academic advisor to discuss summer internship and/or Research Opportunities for Undergraduates (REU)
MAT 272: Calculus with Analytic Geometry III (MA)	4	C	
MAT 275: Modern Differential Equations (MA)	3	C	
MAT 342: Linear Algebra OR MAT 343: Applied Linear Algebra	3	C	
Social-Behavioral Sciences (SB) AND Cultural Diversity in the U.S. (C) OR Social-Behavioral Sciences (SB) AND Global Awareness (G) OR Social-Behavioral Sciences (SB) AND Historical Awareness (H)	3		
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 Critical course signified by	Hours	Minimum Grade	Notes
MAT 243: Discrete Mathematical Structures OR MAT 300: Mathematical Structures (L)	3	C	• Minimum grade of C required in all MAT classes; grade of B or better strongly correlated with timely graduation • Students are required to complete 2 one-year sequences of lecture and lab courses. 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. • Meet with your academic advisor to discuss options for adding a minor, certificate, or concurrent major to your degree program.
Humanities, Arts and Design (HU) AND Cultural Diversity in the U.S. (C) OR Humanities, Arts and Design (HU) AND Global Awareness (G) OR Humanities, Arts and Design (HU) AND Historical Awareness (H)	3		
Science Sequence Course AND Natural Science - Quantitative (SQ) or Natural Science - General (SG)	4	C	
Upper Division Elective	3		
Maintain 2.50 GPA in Critical Tracking Courses.			
CLAS Science and Society Elective	3	C	
Complete Mathematics (MA) requirement.			
Term hours subtotal:	16		

Term 5 63 - 80 Credit Hours Necessary course signified by	Hours	Minimum Grade	Notes
MAT 370: Intermediate Calculus OR MAT 371: Advanced Calculus I	3	C	• Minimum grade of C required in all MAT and STP classes; grade of B or better strongly correlated with timely graduation • Students are required to complete 2 one-year sequences of lecture and lab courses. 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. • Meet with your academic advisor to discuss post-graduation plans, e.g. graduate school, career preparation.
MAT 420: Scientific Computing	3	C	
Science Sequence Course AND Natural Science - Quantitative (SQ) or Natural Science - General (SG)	4	C	
Upper Division CLAS Science and Society Elective	3	C	
Elective	4		
Minimum 2.00 GPA in MAT and STP.			
Term hours subtotal:	17		

Term 6 80 - 96 Credit Hours Necessary course signified by	Hours	Minimum Grade	Notes
MAT 421: Applied Computational Methods (CS)	3	C	• Minimum grade of C required in all MAT and STP classes; grade of B or better strongly correlated with timely graduation • Students are required to complete 2 one-year sequences of lecture and lab courses. 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. • Meet with a career counselor from ASU Career Services for a review of your resume and interviewing tips for success.
Science Sequence Course AND Natural Science - Quantitative (SQ) or Natural Science - General (SG)	4	C	
Upper Division Literacy and Critical Inquiry (L) OR Upper Division Elective	3		
Social-Behavioral Sciences (SB) AND Cultural Diversity in the U.S. (C) OR Social-Behavioral Sciences (SB) AND Global Awareness (G) OR Social-Behavioral Sciences (SB) AND Historical Awareness (H)	3		
Upper Division Elective	3		
Minimum 2.00 GPA in MAT and STP.			
Term hours subtotal:	16		

Term 7 96 - 108 Credit Hours Necessary course signified by	Hours	Minimum Grade	Notes
Upper Division Internship/Research/Advanced Science Course	3		• Minimum grade of C required in all MAT and STP classes; grade of B or
Upper Division Advanced Courses	3	C	

Humanities, Arts and Design (HU) AND Cultural Diversity in the U.S. (C) OR Humanities, Arts and Design (HU) AND Global Awareness (G) OR Humanities, Arts and Design (HU) AND Historical Awareness (H)	3	
Upper Division Elective	3	
Minimum 2.00 GPA in MAT and STP.		
Term hours subtotal:	12	

better strongly correlated with timely graduation
- Students are required to complete 2 one-year sequences of lecture and lab courses. 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.
- Meet with your academic advisor to discuss post-graduation plans, e.g. graduate school, career preparation.

Term 8 108 - 120 Credit Hours Necessary course signified by ★	Hours	Minimum Grade	Notes
★ Upper Division Advanced Courses	6	C	
Upper Division Humanities, Arts and Design (HU) OR Upper Division Social-Behavioral Sciences (SB)	3		
Upper Division Elective	3		
★ Minimum 2.00 GPA in MAT and STP.			
Term hours subtotal:	12		

- Minimum grade of C required in all MAT and STP classes; grade of B or better strongly correlated with timely graduation.
- Students are required to complete 2 one-year sequences of lecture and lab courses. 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.
- Meet with your academic advisor for final degree check and apply for graduation through your My ASU.

- 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. 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.

Hide Course List(s)/Track Group(s)

Internship, Research, or Advanced Science	Science Sequence Courses	Advanced Courses
MAT 484: Internship	AST 321: Introduction to Planetary and Stellar Astrophysics (SQ)	MAT 351: Mathematical Methods for Genetic Analysis (CS)
MAT 493: Honors Thesis (L)	AST 113: Astronomy Laboratory I (SQ)	MAT 415: Introduction to Combinatorics
MAT 494: Computational Sci Trning for Undergrad in Mth Sci, Problem Seminar, Undergraduate Research in Math	AST 322: Introduction to Galactic and Extragalactic Astrophysics (SQ)	MAT 416: Introduction to Graph Theory
AST Upper Division Elective	AST 114: Astronomy Laboratory II (SQ)	MAT 419: Introduction to Linear Optimization (CS)
BIO 320: Fundamentals of Ecology	BIO 181: General Biology I (SQ)	MAT 423: Numerical Analysis I (CS)
BME Upper Division Elective	BIO 182: General Biology II (SG)	MAT 425: Numerical Analysis II (CS)
CEE Upper Division Elective	CHM 111: General Chemistry Laboratory for Majors I	MAT 447: Cryptography
CHE Upper Division Elective		MAT 451: Mathematical Modeling (CS)

- CHM Upper Division Elective
- CIS Upper Division Elective
- CSE Upper Division Elective
- ECE 3** 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
- MIC Upper Division Elective
- MSE Upper Division Elective
- PHI 413: Advanced Symbolic Logic
- PHY Upper Division Elective
- PLB Upper Division Elective

- CHM 112: General Chemistry Laboratory for Majors II
- CHM 113: General Chemistry I (SQ)
- CHM 114: General Chemistry for Engineers (SQ)
- CHM 116: General Chemistry II (SQ)
- CHM 117: General Chemistry for Majors I (SQ)
- CHM 118: General Chemistry for Majors II (SQ)
- CHM 231: Elementary Organic Chemistry (SQ)
- CHM 235: Elementary Organic Chemistry Laboratory (SQ)
- GLG 101: Introduction to Geology I (Physical) (SQ & G)
- GLG 102: Introduction to Geology II (Historical) (SG & H)
- GLG 103: Introduction to Geology I-Laboratory (SQ)
- GLG 104: Introduction to Geology II-Laboratory (SG)
- MIC 205: Microbiology (SG)
- MIC 206: Microbiology Laboratory (SG)
- MIC 220: Biology of Microorganisms
- MBB 245: Principles of Molecular and Cellular Biology I (SQ)
- PHY 121: University Physics I: Mechanics (SQ)
- PHY 122: University Physics Laboratory I (SQ)
- PHY 131: University Physics II: Electricity and Magnetism (SQ)
- PHY 132: University Physics Laboratory II (SQ)
- PHY 150: Physics I (SQ)
- PHY 151: Physics II (SQ)
- PLB 200: Biology of Plants (SQ)

- 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)

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

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 next to courses on the major map were valid for the 2013 - 2014 academic year. Please refer to the course catalog for current General Studies designations at time of class registration. General Studies credit is applied according to the designation the course carries at the time the class is taken.