

2022 - 2023 Major Map

Computer Science (Software Engineering), BS

School/College: [Ira A. Fulton Schools of Engineering](#)
ESCSBS

Term 1 0 - 15 Credit Hours Critical course signified by 	Hours	Minimum Grade	Notes
 CSE 110: Principles of Programming (CS)	3	C	- ASU 101 or college-specific equivalent First-Year Seminar required of all first-year students and should be taken in the first semester. - If ENG 105 is taken, a three (3) credit hour elective must also be taken prior to graduation. - Prep for success using the First-Year Student Guide. - Join a Fulton community. - Explore engineering and technical professions.
ASU 101-CSE: The ASU Experience	1		
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	
FSE 100: Introduction to Engineering	2	C	
MAT 265: Calculus for Engineers I (MA)	3	C	
Social-Behavioral Sciences (SB) AND Global Awareness (G)	3		
 Complete Mathematics (MA) requirement.			
 Minimum 2.00 GPA ASU Cumulative.			
Term hours subtotal:	15		
Term 2 15 - 31 Credit Hours Critical course signified by 	Hours	Minimum Grade	Notes
 CSE 205: Object-Oriented Programming and Data Structures (CS)	3	C	- Three total (SQ) lab science courses are required. Two (SQ) courses must be from the same subject area and one (SQ) course must be from a different subject area. - Create a Handshake profile. - Get involved with EPICS, the Generator Labs, and the Fulton Start-Up Center.
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 266: Calculus for Engineers II (MA)	3	C	
Humanities, Arts and Design (HU) AND Cultural Diversity in the U.S. (C)	3		
Natural Science - Quantitative (SQ)	4		
 Complete ENG 101 OR ENG 105 OR ENG 107 course(s).			
 Complete MAT 170 OR MAT 171 OR MAT 265 OR MAT 270 course(s).			
 Minimum 2.00 GPA ASU Cumulative.			
Term hours subtotal:	16		
Term 3 31 - 47 Credit Hours Critical course signified by 	Hours	Minimum Grade	Notes

	CSE 120: Digital Design Fundamentals	3	C
	CSE 240: Introduction to Programming Languages	3	C
	MAT 243: Discrete Mathematical Structures	3	C
	MAT 267: Calculus for Engineers III (MA) OR CSE 259: Logic in Computer Science	3	C
	Natural Science - Quantitative (SQ)	4	
	Complete MAT 266 OR MAT 271 course(s).		
	Complete First-Year Composition requirement.		
	Minimum 2.00 GPA ASU Cumulative.		
	Complete Mathematics (MA) requirement.		
Term hours subtotal:		16	

- Three total (SQ) lab science courses are required. Two (SQ) courses must be from the same subject area and one (SQ) course must be from a different subject area.
- Prep for success using the [Sophomore Guide](#)

Term 4 47 - 63 Credit Hours  Critical course signified by 	Hours	Minimum Grade	Notes
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	CSE 230: Computer Organization and Assembly Language Programming	3	C
	CSE 310: Data Structures and Algorithms	3	C
	Humanities, Arts and Design (HU)	3	
	Natural Science - Quantitative (SQ)	4	
	Elective	3	
	Complete CSE 259 OR MAT 267 OR MAT 272 course(s).		
	Minimum 2.00 GPA ASU Cumulative.		
Term hours subtotal:		16	

- Three total (SQ) lab science courses are required. Two (SQ) courses must be from the same subject area and one (SQ) course must be from a different subject area.
- Pursue an [undergraduate research experience](#).
- Apply for [internships](#).
- Attend [career fairs and events](#).

Term 5 63 - 79 Credit Hours  Necessary course signified by 	Hours	Minimum Grade	Notes
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	CSE 355: Introduction to Theoretical Computer Science	3	C
	CSE 301: Computing Ethics	1	C
	CSE 360: Introduction to Software Engineering	3	C
	CSE 365: Information Assurance	3	C
	IEE 380: Probability and Statistics for Engineering Problem Solving (CS)	3	C
	Social-Behavioral Sciences (SB) AND Historical Awareness (H)	3	
Term hours subtotal:		16	

- Plan for success using the [Junior Guide](#).
- Network at [student organization](#) competitions or professional societies.

Term 6 79 - 94 Credit Hours Necessary course signified by ★	Hours	Minimum Grade	Notes
★ CSE 330: Operating Systems	3	C	- Research and prepare for graduate school. - Apply for an engineering 4+1 program. - Develop a professional profile online.
★ CSE 340: Principles of Programming Languages	3	C	
CSE 445: Distributed Software Development	3	C	
MAT 343: Applied Linear Algebra	3	C	
Upper Division Humanities, Arts and Design (HU) OR Upper Division Social-Behavioral Sciences (SB)	3		
★ Complete Cultural Diversity in the U.S. (C) AND Global Awareness (G) AND Historical Awareness (H) course(s).			
Term hours subtotal:		15	

Term 7 94 - 108 Credit Hours Necessary course signified by ★	Hours	Minimum Grade	Notes
★ CSE 485: Computer Science Capstone Project I (L)	3	C	- Please see course lists below for Technical Electives. Contact CIDSE Advising or visit the CIDSE website for additional information. - Students should take CSE 434 as the Upper Division Technical Elective in Term 7 if they plan taking CSE 468 in Term 8. CSE 434 is a prerequisite for CSE 468. - Plan for success using the Senior Guide. - Use Handshake to apply for full-time positions. - Complete an in person or virtual practice interview.
CSE 460: Software Analysis and Design	3	C	
CSE 464: Software Quality Assurance and Testing	3	C	
Upper Division Technical Elective	3	C	
Elective	2		
Term hours subtotal:		14	

Term 8 108 - 120 Credit Hours Necessary course signified by ★	Hours	Minimum Grade	Notes
★ CSE 486: Computer Science Capstone Project II (L)	3	C	- CSE 468 requires CSE 434 as a prerequisite. - Please see course lists below for Technical Electives. Contact CIDSE Advising or visit the CIDSE website for additional information.
CSE 446: Software Integration and Engineering	3	C	
CSE 463: Introduction to Human Computer Interaction OR CSE 466: Computer Systems Security OR CSE 467: Data and Information Security OR CSE 468: Computer Network Security	3	C	
Upper Division Technical Elective	3	C	
Term hours subtotal:		12	

- Maximum 3 hours of FSE 301 or FSE 404 can be applied towards major requirements.
 - Maximum 6 hours of CSE 484, CSE 492, CSE 493, CSE 499, FSE 301, and FSE 404 can be applied towards major requirements.
 - CSE 475 or DAT 402 can be applied towards major requirements but not both.
 - Technical Electives may require additional prerequisites.
 - For additional information on major curriculum please visit the [Computer Science Degree Requirements website](#) and the [Concentration Requirements Website](#).

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

Technical Electives	Technical Electives continued
AEE 415: Vibration Analysis	EEE 360: Energy Systems and Power Electronics
AEE 426: Design of Aerospace Structures	EEE 404: Real-Time DSP Systems
AEE 462: Space Vehicle Dynamics and Control	EEE 407: Digital Signal Processing
AEE 463: Aircraft Propulsion	EEE 425: Digital Systems and Circuits
AEE 465: Rocket Propulsion	EEE 433: Analog Integrated Circuits
AEE 468: Aircraft Systems Design	EEE 434: Quantum Mechanics for Engineers
AEE 471: Computational Fluid Dynamics	EEE 435: Fundamentals of CMOS and MEMS
AME 430: Mac Development for Media Arts	EEE 436: Fundamentals of Solid-State Devices
AME 435: Mobile Development	EEE 437: Optoelectronics
BCH 361: Advanced Principles of Biochemistry	EEE 439: Semiconductor Facilities and Cleanroom Practices
BCH 461: General Biochemistry	EEE 443: Antennas for Wireless Communications
BCH 462: General Biochemistry	EEE 445: Microwaves
BIO 340: General Genetics	EEE 448: Fiber Optics
BIO 343: Genetic Engineering and Society (L)	EEE 455: Communication Systems
BIO 345: Evolution	EEE 459: Communication Networks
BME 350: Signals and Systems for Bioengineers	EEE 460: Nuclear Power Engineering
BME 413: Biomedical Instrumentation (L)	EEE 463: Electrical Power Plants
BME 416: Advanced Biomechanics	EEE 470: Electric Power Devices
BME 494: Applied Computational Behavioral Science	EEE 471: Power System Analysis
CEE 412: Pavement Analysis and Design	EEE 473: Electrical Machinery
CEE 432: Developing Software for Engineering Applications	EEE 480: Feedback Systems
CEE 440: Hydrology	EEE 481: Computer-Controlled Systems
CEE 441: Water Resources Engineering	FSE 301: Entrepreneurship and Value Creation
CEE 452: Foundations	FSE 394: Engineering for Humanity
CEE 462: Unit Operations in Environmental Engineering	FSE 404: EPICS Gold: EPICS in Action
CEE 466: Urban Water System Design	IEE 376: Operations Research Deterministic Techniques/Applications
CEE 467: Environmental Microbiology	IEE 381: Lean Six Sigma Methodology
	IEE 385: Engineering Statistics: Probability

CEE 474: Transportation Systems Planning
CEE 475: Highway Geometric Design
CEE 481: Civil Engineering Project Management
CEE 483: Highway Materials, Construction, and Quality
CEE 486: Integrated Civil Engineering Design (L)
CHE 342: Introduction to Applied Chemical Thermodynamics
CHE 432: Principles of Chemical Engineering Design
CHE 442: Introduction to Chemical Reactor Design
CHE 461: Process Dynamic Control (CS)
CHE 462: Process Design (L)
CHE 469: Air Quality Engineering
CHE 475: Biochemical Engineering
CIS 415: Big Data Analytics in Business
CPI 311: Game Engine Development
CPI 350: Evaluation of Informatics Systems
CPI 360: Decision Making and Problem Solving
CPI 411: Graphics for Games
CPI 460: Intelligent Interactive Instructional Systems
CPI 462: Design for Learning in Virtual Worlds
CSE 320: Design and Synthesis of Digital Hardware
CSE 325: Embedded Microprocessor Systems
CSE 335: Principles of Mobile Application Development
CSE 4** Elective
DAT 300: Mathematical Tools for Data Science
DAT 301: Exploring Data in R and Python
DAT 401: Statistical Modeling and Inference for Data Science
DAT 402: Machine Learning for Data Science
EEE 304: Signals and Systems II
EEE 333: Hardware Design Languages and Programmable Logic
EEE 335: Analog and Digital Circuits
EEE 350: Random Signal Analysis

IEE 412: Introduction to Financial Engineering
IEE 426: Operations Research in Healthcare
IEE 431: Engineering Administration (L)
IEE 456: Introduction to Systems Engineering
IEE 458: Project Management
IEE 461: Production Control
IEE 470: Stochastic Operations Research
IEE 474: Quality Control
IEE 475: Simulating Stochastic Systems (CS)
MAE 341: Mechanism Analysis and Design
MAE 404: Finite Elements in Engineering
MAE 417: System Dynamics and Control II
MAE 436: Combustion
MAE 455: Polymers and Composites
MAT Upper Division Elective
Except for: MAT 300, MAT 342, MAT 343, and MAT 485
MEE 351: Manufacturing Processes
MEE 434: Internal Combustion Engines
MEE 446: Energy Systems Design II
MSE 335: Materials Kinetics
MSE 415: Mathematical and Computer Methods in Materials (CS)
PHY 302: Mathematical Methods in Physics II
PHY 361: Introductory Modern Physics
PHY 462: Particle and Nuclear Physics
SER 421: Web-Based Applications
SER 422: Web Application Programming
SER 423: Mobile Systems
STP 421: Probability
STP 425: Stochastic Processes
STP 427: Mathematical Statistics
STP 429: Applied Regression (CS)

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.

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 2022 - 2023 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.