

















2021 - 2022 Major Map


Computer Science (Software Engineering), BS





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

Term 1 0 - 15 Credit Hours Critical course signified by 	Hours	Minimum Grade	Notes
 CSE 110: Principles of Programming (CS)	3	C	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Three (3) lab science classes are required. Two of the three classes must be from the same subject area or discipline. 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	
Lab Science Requirement AND Natural Science - Quantitative (SQ)	4		
Humanities, Arts and Design (HU) AND Cultural Diversity in the U.S. (C)	3		
 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
Lab Science Requirement AND Natural Science - General (SG) or 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 (3) lab science classes are required. Two of the three classes must be from the same subject area or discipline.
- 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
Lab Science Requirement AND Natural Science - General (SG) or Natural Science - Quantitative (SQ)	4	
Humanities, Arts and Design (HU)	3	
Elective	3	
 Complete CSE 259 OR MAT 267 OR MAT 272 course(s).		
 Minimum 2.00 GPA ASU Cumulative.		
Term hours subtotal:	16	

- Three (3) lab science classes are required. Two of the three classes must be from the same subject area or discipline.
- 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	

- 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	

- Please see course lists below for Technical Electives. Contact CIDSE Advising or visit the [CIDSE website](#) for additional information.

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

Lab Science Requirement	Technical Electives	Technical Electives continued
BIO 181: General Biology I (SQ)	Students who plan to take CSE 468 in Term 8 should take CSE 434 as the Upper Division Technical Elective in Term 7. CSE 434 is a prerequisite for CSE 468.	NOTE: Maximum 3 hours CSE 484 or FSE 301. Maximum 6 hours of CSE 484, 492, 493 or 499. Some Technical Electives may require additional prerequisites.
BIO 182: General Biology II (SG)		
CHM 113: General Chemistry I (SQ)	AEE 415: Vibration Analysis	EEE 304: Signals and Systems II
CHM 116: General Chemistry II (SQ)	AEE 426: Design of Aerospace Structures	EEE 333: Hardware Design Languages and Programmable Logic
GLG 101: Introduction to Geology I (Physical) (SQ) AND GLG 103: Introduction to Geology I-Laboratory (SQ)	AEE 462: Space Vehicle Dynamics and Control	EEE 350: Random Signal Analysis
GLG 102: Introduction to Geology II (Historical) (SG & H) AND GLG 104: Introduction to Geology II-Laboratory (SG)	AEE 463: Aircraft Propulsion	EEE 360: Energy Systems and Power Electronics
GLG 110: Dangerous World (SQ & G) AND GLG 111: Dangerous World Laboratory (SQ)	AEE 465: Rocket Propulsion	EEE 404: Real-Time DSP Systems
PHY 121: University Physics I: Mechanics (SQ) AND PHY 122: University Physics Laboratory I (SQ)	AEE 468: Aircraft Systems Design	EEE 407: Digital Signal Processing
PHY 131: University Physics II: Electricity and Magnetism (SQ) AND PHY 132: University Physics Laboratory II (SQ)	AEE 471: Computational Fluid Dynamics	EEE 425: Digital Systems and Circuits
	AME 430: Mac Development for Media Arts	EEE 433: Analog Integrated Circuits
	AME 435: Mobile Development	EEE 434: Quantum Mechanics for Engineers
	BCH 361: Advanced Principles of Biochemistry	EEE 435: Fundamentals of CMOS and MEMS
	BCH 461: General Biochemistry	EEE 436: Fundamentals of Solid-State Devices
	BCH 462: General Biochemistry	EEE 437: Optoelectronics
	BIO 340: General Genetics	EEE 439: Semiconductor Facilities and Cleanroom Practices
	BIO 343: Genetic Engineering and Society (L)	EEE 443: Antennas for Wireless Communications
	BIO 345: Evolution	EEE 445: Microwaves
	BME 350: Signals and Systems for Bioengineers	EEE 448: Fiber Optics
	BME 413: Biomedical Instrumentation (L)	EEE 455: Communication Systems
	BME 416: Advanced Biomechanics	EEE 459: Communication Networks
	CEE 412: Pavement Analysis and Design	EEE 460: Nuclear Power Engineering
	CEE 432: Developing Software for Engineering Applications	EEE 463: Electrical Power Plants
	CEE 440: Hydrology	EEE 470: Electric Power Devices
	CEE 441: Water Resources Engineering	EEE 471: Power System Analysis
	CEE 452: Foundations	EEE 473: Electrical Machinery
	CEE 462: Unit Operations in Environmental Engineering	EEE 480: Feedback Systems
	CEE 466: Urban Water System Design	EEE 481: Computer-Controlled Systems
	CEE 467: Environmental Microbiology	FSE 301: Entrepreneurship and Value Creation
	CEE 474: Transportation Systems Planning	IEE 376: Operations Research Deterministic Techniques/Applications
	CEE 475: Highway Geometric Design	IEE 381: Lean Six Sigma Methodology

CEE 481: Civil Engineering Project Management	IEE 385: Engineering Statistics: Probability
CEE 483: Highway Materials, Construction, and Quality	IEE 412: Introduction to Financial Engineering
CEE 486: Integrated Civil Engineering Design (L)	IEE 426: Operations Research in Healthcare
CHE 342: Introduction to Applied Chemical Thermodynamics	IEE 431: Engineering Administration (L)
CHE 432: Principles of Chemical Engineering Design	IEE 456: Introduction to Systems Engineering
CHE 442: Introduction to Chemical Reactor Design	IEE 458: Project Management
CHE 461: Process Dynamic Control (CS)	IEE 461: Production Control
CHE 462: Process Design (L)	IEE 470: Stochastic Operations Research
CHE 469: Air Quality Engineering	IEE 474: Quality Control
CHE 475: Biochemical Engineering	IEE 475: Simulating Stochastic Systems (CS)
CIS 415: Big Data Analytics in Business	MAE 341: Mechanism Analysis and Design
CPI 311: Game Engine Development	MAE 404: Finite Elements in Engineering
CPI 350: Evaluation of Informatics Systems	MAE 417: System Dynamics and Control II
CPI 360: Decision Making and Problem Solving	MAE 436: Combustion
CPI 411: Graphics for Games	MAE 455: Polymers and Composites
CPI 460: Intelligent Interactive Instructional Systems	MAT Upper Division Elective
CPI 462: Design for Learning in Virtual Worlds	Except for: MAT 300, MAT 340, MAT 342, MAT 343 and MAT 485
CSE 320: Design and Synthesis of Digital Hardware	MEE 434: Internal Combustion Engines
CSE 325: Embedded Microprocessor Systems	MEE 446: Energy Systems Design
CSE 335: Principles of Mobile Application Development	PHY 302: Mathematical Methods in Physics II
CSE 4** Elective	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 2021 - 2022 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.