2022 - 2023 Major Map

Computer Science, BS

School/College: Ira A. Fulton Schools of Engineering
ESCSEBS

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 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	• 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.
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	

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

Term 5 63 - 79 Credit Hours Necessary course signified by	Hours	Minimum Grade	Notes
CSE 355: Introduction to Theoretical Computer Science	3	C	• Plan for success using the Junior Guide. • Network at student organization competitions or professional societies.
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		

Term 6 79 - 94 Credit Hours Necessary course signified by	Hours	Minimum Grade	Notes
CSE 340: Principles of Programming Languages	3	C	• Research and prepare for graduate school. • Apply for an engineering 4+1 program . • Develop a professional profile online.
CSE 330: Operating Systems	3	C	
CSE 412: Database Management OR CSE 434: Computer Networks OR 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. • Plan for success using the Senior Guide. • Use Handshake to apply for full-time positions. • Complete an in person or virtual practice interview.
Complete 2 courses: CSE 4** Elective	6	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
Complete 2 courses: CSE 4** Elective	6	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.

- 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 theComputer Science Degree Requirements website.

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

Technical Electives
AEE 415: Vibration Analysis
AEE 426: Design of Aerospace Structures
AEE 462: Space Vehicle Dynamics and Control
AEE 463: Aircraft Propulsion
AEE 465: Rocket Propulsion
AEE 468: Aircraft Systems Design
AEE 471: Computational Fluid Dynamics
AME 430: Mac Development for Media Arts
AME 435: Mobile Development
BCH 361: Advanced Principles of Biochemistry
BCH 461: General Biochemistry
BCH 462: General Biochemistry
BIO 340: General Genetics
BIO 343: Genetic Engineering and Society (L)
BIO 345: Evolution
BME 350: Signals and Systems for Bioengineers
BME 413: Biomedical Instrumentation (L)
BME 416: Advanced Biomechanics
BME 494: Applied Computational Behavioral Science
CEE 412: Pavement Analysis and Design
CEE 432: Developing Software for Engineering Applications

Technical Electives continued
EEE 360: Energy Systems and Power Electronics
EEE 404: Real-Time DSP Systems
EEE 407: Digital Signal Processing
EEE 425: Digital Systems and Circuits
EEE 433: Analog Integrated Circuits
EEE 434: Quantum Mechanics for Engineers
EEE 435: Fundamentals of CMOS and MEMS
EEE 436: Fundamentals of Solid-State Devices
EEE 437: Optoelectronics
EEE 439: Semiconductor Facilities and Cleanroom Practices
EEE 443: Antennas for Wireless Communications
EEE 445: Microwaves
EEE 448: Fiber Optics
EEE 455: Communication Systems
EEE 459: Communication Networks
EEE 460: Nuclear Power Engineering
EEE 463: Electrical Power Plants
EEE 470: Electric Power Devices
EEE 471: Power System Analysis
EEE 473: Electrical Machinery
EEE 480: Feedback Systems

CEE 440: Hydrology

CEE 441: Water Resources Engineering

CEE 452: Foundations

CEE 462: Unit Operations in Environmental Engineering

CEE 466: Urban Water System Design

CEE 467: Environmental Microbiology

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

EEE 481: Computer-Controlled Systems

FSE 301: Entrepreneurship and Value Creation

FSE 394: Engineering for Humanity

FSE 404: EPICS Gold: EPICS in Action

IEE 376: Operations Research Deterministic Techniques/Applications

IEE 381: Lean Six Sigma Methodology

IEE 385: Engineering Statistics: Probability

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 340, 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

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

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.