2021 - 2022 Major Map

Computer Science (Cybersecurity), BS

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

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 (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	• 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.
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 - Quantitative (SQ) or Natural Science - General (SG)	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 (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.
CSE 310: Data Structures and Algorithms	3	C	
Lab Science Requirement AND Natural Science - Quantitative (SQ) or Natural Science - General (SG)	4		
Complete 2 courses: Elective	6		
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**
IEE 380: Probability and Statistics for Engineering Problem Solving (CS)	3	C	• Plan for success using the Junior Guide. • Network at student organization competitions or professional societies.
CSE 301: Computing Ethics	1	C	
CSE 355: Introduction to Theoretical Computer Science	3	C	
CSE 360: Introduction to Software Engineering	3	C	
CSE 365: Information Assurance	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 330: Operating Systems	3	C	• CSE 434 is a prerequisite for CSE 468 which is an option for the Cybersecurity Focus Courses requirement. • 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 412: Database Management OR CSE 434: Computer Networks OR CSE 445: Distributed Software Development	3	C	
MAT 343: Applied Linear Algebra	3	C	
Humanities, Arts and Design (HU)	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	• Plan for success using the Senior Guide . • Use Handshake to apply for full-time positions. • Complete an in person or virtual practice interview.
Upper Division Cybersecurity Elective	3	C	
Upper Division Cybersecurity Focus Courses	3	C	
Upper Division Humanities, Arts and Design (HU) OR Upper Division Social-Behavioral Sciences (SB)	3		
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	• Please see course lists below for Technical Electives. Contact CIDSE Advising or visit the CIDSE website for additional information.
Upper Division Cybersecurity Elective	3	C	
Upper Division Cybersecurity Focus Courses	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
BIO 181: General Biology I (SQ)
BIO 182: General Biology II (SG)
CHM 113: General Chemistry I (SQ)
CHM 116: General Chemistry II (SQ)
GLG 101: Introduction to Geology I (Physical) (SQ) AND GLG 103: Introduction to Geology I-Laboratory (SQ)
GLG 102: Introduction to Geology II (Historical) (SG & H) AND GLG 104: Introduction to Geology II-Laboratory (SG)
GLG 110: Dangerous World (SQ & G) AND GLG 111: Dangerous World Laboratory (SQ)
PHY 121: University Physics I: Mechanics (SQ) AND PHY 122: University Physics Laboratory I (SQ)
PHY 131: University Physics II: Electricity and Magnetism (SQ) AND PHY 132: University Physics Laboratory II (SQ)

Cybersecurity Focus Courses
CSE 466: Computer Systems Security
CSE 468: Computer Network Security
CSE 469: Computer and Network Forensics
CSE 494: Artificial Intelligence for Cyber Security
NOTE: CSE 468 requires CSE 434 as a prerequisite.

Cybersecurity Electives
CSE 460: Software Analysis and Design
CSE 463: Introduction to Human Computer Interaction
CSE 464: Software Quality Assurance and Testing
CSE 466: Computer Systems Security
CSE 468: Computer Network Security
CSE 469: Computer and Network Forensics
CSE 471: Introduction to Artificial Intelligence
CSE 494: Artificial Intelligence for Cyber Security

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

Technical Electives continued
EEE 304: Signals and Systems II
EEE 333: Hardware Design Languages and Programmable Logic
EEE 350: Random Signal Analysis
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

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

CEE 412: Pavement Analysis and Design

CEE 432: Developing Software for Engineering Applications

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

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

EEE 481: Computer-Controlled Systems

FSE 301: Entrepreneurship and Value Creation

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

CPI 350: Evaluation of Informatics Systems	MAE 455: Polymers and Composites
CPI 360: Decision Making and Problem Solving	MAT Upper Division Elective
CPI 411: Graphics for Games	Except for: MAT 300, MAT 340, MAT 342, MAT 343 and MAT 485
CPI 460: Intelligent Interactive Instructional Systems	MEE 434: Internal Combustion Engines
CPI 462: Design for Learning in Virtual Worlds	MEE 446: Energy Systems Design
CSE 320: Design and Synthesis of Digital Hardware	PHY 302: Mathematical Methods in Physics II
CSE 325: Embedded Microprocessor Systems	PHY 361: Introductory Modern Physics
CSE 335: Principles of Mobile Application Development	PHY 462: Particle and Nuclear Physics
CSE 4** Elective	SER 421: Web-Based Applications
Except for: CSE 485 and CSE 486	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)
	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.

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.