**Computer Science (Cybersecurity Concentration), BS**  
Bachelor of Science, 2019-2020 Catalog Year

ESCSEIBS

### FALL-1
- ENG 101 (3)  
  1st-Year Comp.
- FSE 100 (2)  
  Intro to Engin.
- ASU 101 (1)  
  ASU Exper.
- MAT 265 (3)  
  CALC I
- CSE 110 (3)  
  Principles of Programming
  Java
- HU/SB (3)

16 HOURS

### SPRING-2
- ENG 102 (3)  
  1st-Year Comp.
- **LAB SCI** Option (4)
- MAT 266 (3)  
  CALC II
- CSE 205 (3)  
  Object-Oriented Programming
- HU/SB (3)

15 HOURS

### FALL-2
- **LAB SCI** (4)  
  Sequence Part 1 of 2
- **LAB SCI** (4)  
  Sequence Part 2 of 2
- MAT 267 (3)  
  CALC III or CSE 259 Logic in Comp Sci
- MAT 243 (3)  
  Discrete Math

16 HOURS

### SPRING-3
- **LAB SCI** (4)  
  Sequence Part 1 of 2
- **LAB SCI** (4)  
  Sequence Part 2 of 2
- MAT 343 (3)  
  Applied Linear Algebra
- CSE 120 (3)  
  Digital Design

16 HOURS

### FALL-3
- CSE 204 (3)  
  Programming Languages
- HU/SB (3)

16 HOURS

### SPRING-4
- CSE 240 (3)  
  Programming Languages
- CSE 230 (3)  
- HU/SB (3)

16 HOURS

### FALL-4
- CSE 306 (3)  
  Intro. Software Eng.
- CSE 360 (3)  
  Prin. Prog. Lang

16 HOURS

### SPRING-5
- CSE 365 (3)  
  Information Assurance
- IEE 380 (3)  
  Prob. & Stats.
- **TECH ELE** (3)

16 HOURS

### FALL-5
- CSE 355 (3)  
- #CSE 340 (3)  
  Prin. Prog. Lang

15 HOURS

### SPRING-6
- CSE 310 (3)  
  Data Struc. & Algorithms
- CSE 315 (3)  
  Operating Systems
- GENERAL ELE (3)
- HU/SB (3)

15 HOURS

### FALL-6
- CSE 455 (3)  
  Operating Systems
- GENERAL ELE (3)
- HU/SB (3)

15 HOURS

### SPRING-7
- CSE 485 (3)  
  Capstone I (L)
- CSE 492 (3)  
  Capstone II (L)

14 HOURS

### FALL-7
- CSE 486 (3)  
  Capstone II (L)
- **TECH ELE** (3)

14 HOURS

### SPRING-8
- CSE 469 (3)  
  Computer Network Security (F)
- CSE 469 (3)  
  Computer and Network Forensics (S)
- **Cybersecurity Elective** (3)

12 HOURS

**Notes:**
- ** See CIDSE Advising Center or CIDSE Website (http://cidse.engineering.asu.edu/degreerequirementsbscscs/) for approved technical electives and approved lab science sequence courses.
- † CSE 301 requires FSE 100 as an additional prerequisite
- ‡ CSE 340 and CSE 434 require CSE 230 as an additional prerequisite
- + Cybersecurity Concentration and other CSE 4XX courses require CSE 310 and/or CSE 360 as a prerequisite.
- Shaded courses designate critical requirements. Minimum ‘C’ grade required in all CSE major courses.
- **Bolded courses are offered in specific terms only**

Prerequisite
Term 1
FSE 100: Introduction to Engineering - Introduces the engineering design process; working in engineering teams; the profession of engineering; engineering models, written and oral technical communication skills.
MAT 265: Calculus for Engineers I - Limits and continuity, differential calculus of functions of one variable, introduction to integration. Not open to students with credit in MAT 270.
ASU 101-CSE: The ASU Experience
ENG 101: First-Year Composition
HU/SB: Humanities, Fine Arts & Design or Social & Behavioral Sciences

Term 2
CSE 205: Object-Oriented Programming & Data Structures - Problem solving by programming with an object-oriented programming language. Introduces data structures. Overview of computer science topics.
MAT 266: Calculus for Engineers II - Methods of integration, applications of calculus, elements of analytic geometry, improper integrals, Taylor series
ENG 102: First-Year Composition
Lab Science Option: choose from BIO 181, GLG 101 & 103, GLG 110 & 111, CHM 113 or 114, OR PHY 121 & 122
HU/SB: Humanities, Fine Arts & Design or Social & Behavioral Sciences

Term 3
CSE 120: Digital Design Fundamentals - Number systems, conversion methods, binary and complement arithmetic, Boolean algebra, circuit minimization, ROMs, PLAs, flipflops, synchronous sequential circuits
MAT 243: Discrete Mathematical Structures - Logic, sets, functions, elementary number theory and combinatorics, recursive algorithms, and mathematical reasoning, including induction. Emphasizes connections to computer science.
MAT 267: Calculus for Engineers III - Vector-valued functions of several variables, partial derivatives, multiple integration OR
CSE 259: Logic in Computer Science - This course is a mathematically solid introduction to propositional logic, first order logic, logic programming, and their applications in computer science.
Lab Science: PHY 121/122 & PHY 131/132 or CHM 113 & 116 or GLG 101/103 & GLG 102/104 or BIO 181 & 182
HU/SB: Humanities, Fine Arts & Design or Social & Behavioral Sciences

Term 4
CSE 240: Introduction to Programming Languages - Introduces the procedural (C/C++), applicative (LISP/Scheme), and declarative (Prolog) languages.
Lab Science: complete sequence from above
HU/SB: Humanities, Fine Arts & Design or Social & Behavioral Sciences

Term 5
CSE 301: Computing Ethics - Ethics for computing majors: history of computing, intellectual property, privacy, ethical frameworks, professional ethical responsibilities, and risks of computer-based systems.
CSE 310: Data Structures and Algorithms - Advanced data structures and algorithms, including stacks, queues, trees (B, B+, AVL), and graphs. Searching for graphs, hashing, external sorting.
CSE 360: Introduction to Software Engineering - Software life cycle models; project management, team development environments and methodologies; software architectures; quality assurance and standards; legal, ethical issues
IA Core - CSE 365: Information Assurance - Concepts of information assurance (IA); basic IA techniques, policies, risk management, administration, legal and ethics issues.
IEE 380: Probability and Statistics for Engineering Problem Solving - Applications-oriented course with computer-based experience using statistical software for formulating and solving engineering problems
General Elective

Term 6
CSE 330: Operating Systems - Operating system structure and services, processor scheduling, concurrent processes, synchronization techniques, memory management, virtual memory, input/output, storage management, and file systems.
CSE 340: Principles of Programming Languages - Formal syntactic and semantic descriptions, compilation and implementation issues, and theoretical foundations for several programming paradigms.
CSE 355: Introduction to Theoretical Computer Science - Introduces formal language theory and automata, Turing machines, decidability/undecidability, recursive function theory, and complexity theory.
Technical Elective: Upper Division Technical Elective from list on DARS/major map
HU/SB: Humanities, Fine Arts & Design or Social & Behavioral Sciences

Term 7
CSE 485: Computer Science Capstone Project I - First course in capstone sequence for computer science majors emphasizing development process, technical skills, teamwork, and communication.
CSE 466: Computer Systems Security - Countermeasures to attacks to computer systems from miscreants (or hackers) and basic topics of cryptography and network security.
CSE 468: Computer Network Security - Practical network security exposure and hands-on experience about basic concepts, case studies, and useful tools.
HU/SB: Upper Division Humanities, Fine Arts & Design or Social & Behavioral Sciences General Elective (2 credits)

Term 8
CSE 486: Computer Science Capstone Project II - Second course in capstone sequence for computer science majors continuing the development process, technical skills, teamwork, and communication.
CSE 469: Computer and Network Forensics - Identification, extraction, documentation, interpretation, and preservation of computer media for evidentiary purposes, file system forensics, and network forensics.
Cybersecurity Elective (choose from CSE 460, CSE 463 or CSE 471)
CSE 412 Database Management - Introduces DBMS concepts. Data models and languages. Relational database theory. Database security/integrity and concurrency OR CSE 434
Computer Networks - Network architecture and protocols, principles of network applications, socket programming, flow and congestion control, switching and routing, link-layer technologies, traffic capture and analysis, security) OR CSE 445 Distributed Software Development - Distributed system architectures and design, service-oriented computing, and frameworks for development of distributed applications and software components