Computer Science (Software Engineering), BS
Bachelor of Science, 2018-2019 Catalog Year
ESCSEBS

**FALL-1**
- ENG 101 (3) 1st-Year Comp.
- FSE 100 (2) Intro to Engr.
- ASU 101 (1) ASU Experience
- MAT 265 (3) CALC I
- CSE 110 (3) Principles of Programming Java

**SPRING-2**
- ENG 102 (3) 1st-Year Comp.
- MAT 266 (3) CALC II
- CSE 205 (3) Object-Oriented Programming

**FALL-3**
- **LAB SCI** (4) Sequence Part 1 of 2
- MAT 267 (3) CALC III or CSE 259 Logic in Comp Sci
- CSE 120 (3) Digital Design
- HU/SB (3)
- 15 HOURS

**SPRING-4**
- **LAB SCI** (4) Sequence Part 2 of 2
- MAT 243 (3) Discrete Math
- CSE 230 (3) Comp. Org. & Assembly Lang. Programming
- HU/SB (3)
- 16 HOURS

**FALL-5**
- CSE 365 (3) Information Assurance
- CSE 301 (1) Computing Ethics
- CSE 340 (3) Prin. Prog. Lang
- HU/SB (3)
- 16 HOURS

**SPRING-6**
- Upper Division HU/SB (3)
- CSE 355 (3) Intro Theoretical Comp. Science
- CSE 345 (3) Dist. Software Engr.
- HU/SB (3)
- 15 HOURS

**FALL-7**
- +CSE 464 (3) Software Quality Assurance & Testing (F)
- CSE 485 (3) Capstone I (L)
- CSE 486 (3) Capstone II (L)
- CSE 360 (3) Intro. Software Engineering
- CSE 365 (3) Information Assurance
- HU/SB (3)
- **TECH ELE** (3)
- 14 HOURS

**SPRING-8**
- **TECH ELE** (3)
- GENERAL ELECT (2)
- HU/SB (3)
- 12 HOURS

Notes:
- ** See CIDSE Advising Center or CIDSE Website (http://cidse.engineering.asu.edu/degerequirementsbscs/) for approved technical electives and approved lab science sequence courses.
- † CSE 301 requires FSE 100 as an additional prerequisite
- † CSE 340 requires CSE 230 as an additional prerequisite
- + CSE 4XX courses require CSE 310 and/or 360 as prerequisites
- Shaded courses designate critical requirements. Minimum “C” grade required in all CSE major courses
- Bolded courses are offered in specific terms only
- Cultural
- Global
- Historical

Prerequisite

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

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 expansions, decompositions, applications. Problem solving using MATLAB.

MAT 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

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


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

CSE 365: Information Assurance - Concepts of information assurance (IA); basic IA techniques, policies, risk management, administration, legal and ethics issues.

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.


General Elective

CSE 330: Operating Systems - Operating system structure and services, processor scheduling, concurrent processes, synchronization techniques, memory management, virtual memory, input/output, storage management, 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.

CSE 445: Distributed Software Development - Distributed system architectures and design, service-oriented computing, and frameworks for development of distributed applications and software components.

HU/SB: Humanities, Fine Arts & Design or Social & Behavioral Sciences

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 464: Software Quality Assurance and Testing - Software quality assurance (SQA), software quality metrics, software configuration management, software verification and validation, reviews, inspections, understanding software testing process, functional testing, structural testing, model-based testing, integration, system, and regression testing techniques, software life cycle models and software testing, testing distributed software, bug management, and use of testing tools.

CSE 460: Software Analysis and Design - Object-oriented and structured analysis and design; software architecture and design patterns; component-based development; software safety and reliability.

Technical Elective - Upper Division Technical Elective from list on DARS/major map

General Elective (2 credit)

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 446: Software Integration Engineering - Software development using architecture design, composition, workflow, services, data resources, data representations, data management, and development tools.

Software Engineering Elective: Choose from CSE 463, CSE 466, CSE 467 or CSE 468

Technical Elective - Upper Division Technical Elective from list on DARS/major map