Computer Science (Software Engineering), BS
Bachelor of Science, 2014-2015 Catalog Year
ESCSEBS

**Notes:** ** See CIDSE Advising Center or CIDSE Website (http://cidse.engineering.asu.edu/degreerequirementsbscs/) for approved technical electives and approved lab science sequence courses. Shaded courses designates critical requirements. Minimum ‘C’ grade required in all CSE courses.
+ CSE 4XX courses require CSE 310 and/or 360 as prerequisites
Bolded courses are offered in specific terms only

**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

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, GLG, CHM or PHY
General Elective: Elective cannot include CSE, MAT, PHY, BIO, CHM

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.
Lab Science: PHY 121 & 131 or CHM 113 & 116 or GLG 101 & 103 or BIO 181 & 182
HU/SB: Humanities, Fine Arts & Design or Social & Behavioral Sciences

Term 3

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 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.


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

Term 6

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.

Technical Elective: Upper Division Elective
HU/SB: Humanities, Fine Arts & Design or Social & Behavioral Sciences

Term 7

CSE 430: 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 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, tool 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.

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 Technical Elective: Upper Division Elective