# Computer Science (Software Engineering), BS Bachelor of Science, 2013-2014 Catalog Year

**ESCSEBS**

<table>
<thead>
<tr>
<th>FALL-1</th>
<th>SPRING-2</th>
<th>FALL-3</th>
<th>SPRING-4</th>
<th>FALL-5</th>
<th>SPRING-6</th>
<th>FALL-7</th>
<th>SPRING-8</th>
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<tbody>
<tr>
<td>ENG 101 (3) 1st-Year Comp.</td>
<td>ENG 102 (3) 1st-Year Comp.</td>
<td><strong>LAB SCI</strong> (4 hrs) Sequence Part 1 of 2</td>
<td><strong>LAB SCI</strong> (4 hrs) Sequence Part 2 of 2</td>
<td>HU/SB (3)</td>
<td><strong>TECH ELE</strong> (3)</td>
<td>+CSE 464 (3) Software Quality Assur &amp; Testing</td>
<td><strong>TECH ELE</strong> (3)</td>
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<td>FSE 100 (2) Intro to Engr.</td>
<td><strong>LAB SCI</strong> Option (4 hrs)</td>
<td>ASU 101 (1) ASU Experience</td>
<td>GENERAL ELECT (3)</td>
<td>IEE 380 (3) Prob. &amp; Stats.</td>
<td>+CSE 445 (3) Dist. Software Dvpt.</td>
<td>+CSE 460 (3) Software Analysis &amp; Design</td>
<td>CSE 446 (3) Software Integration Engr.</td>
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<td>ASU 101 (1) ASU Experience</td>
<td><strong>MAT 265 (3) CALC I</strong></td>
<td><strong>MAT 266 (3) CALC II</strong></td>
<td><strong>MAT 267 (3) CALC III</strong></td>
<td>CSE 301 (1) Computing Ethics</td>
<td>CSE 355 (3) Intro Theoretical Comp. Science</td>
<td>GENERAL ELECT (2)</td>
<td>+SE Elective (3)</td>
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<td><em>MAT 265 (3) CALC I</em></td>
<td><em>MAT 266 (3) CALC II</em></td>
<td><em>MAT 243 (3) Discrete Math</em></td>
<td><em>CSE 240 (3) Programming Languages</em></td>
<td>CSE 310 (3) Data Struct. &amp; Algorithms</td>
<td>CSE 340 (3) Prin. Prog. Lang</td>
<td>CSE 485 (3) Capstone I (L)</td>
<td>CSE 486 (3) Capstone II (L)</td>
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<td><em>CSE 110 (3) Principles of Programming Java</em></td>
<td><em>CSE 205 (3) Object-Oriented Programming</em></td>
<td>MAT 343 (3) Applied Linear Algebra</td>
<td><em>CSE 240 (3) Programming Languages</em></td>
<td>CSE 355 (3) Intro Theoretical Comp. Science</td>
<td>CSE 360 (3) Prin. Prog. Lang</td>
<td>+CSE 430 (3) Operating</td>
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<td>HU/SB (3)</td>
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Notes:  
** See CIDSE Advising Center or CIDSE Website (http://cidse.engineering.asu.edu/degreerequirementsbscs/) for approved technical electives and approved lab science sequence courses.  
* Designates critical requirements for CS admits in the 2013-2014 academic year. Minimum ‘C’ grade required in all CSE courses.  
+CSE 4XX courses require CSE 310 and/or 360 as prerequisites.

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

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.
Lab Science: PHY 121 & 131 or CHM113 & 116 or GLG 101 & 103 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
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
HU/SB: Upper Division Humanities, Fine Arts & Design or Social & Behavioral Sciences
HU/SB: 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, 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.
General Elective(2 credit)

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 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