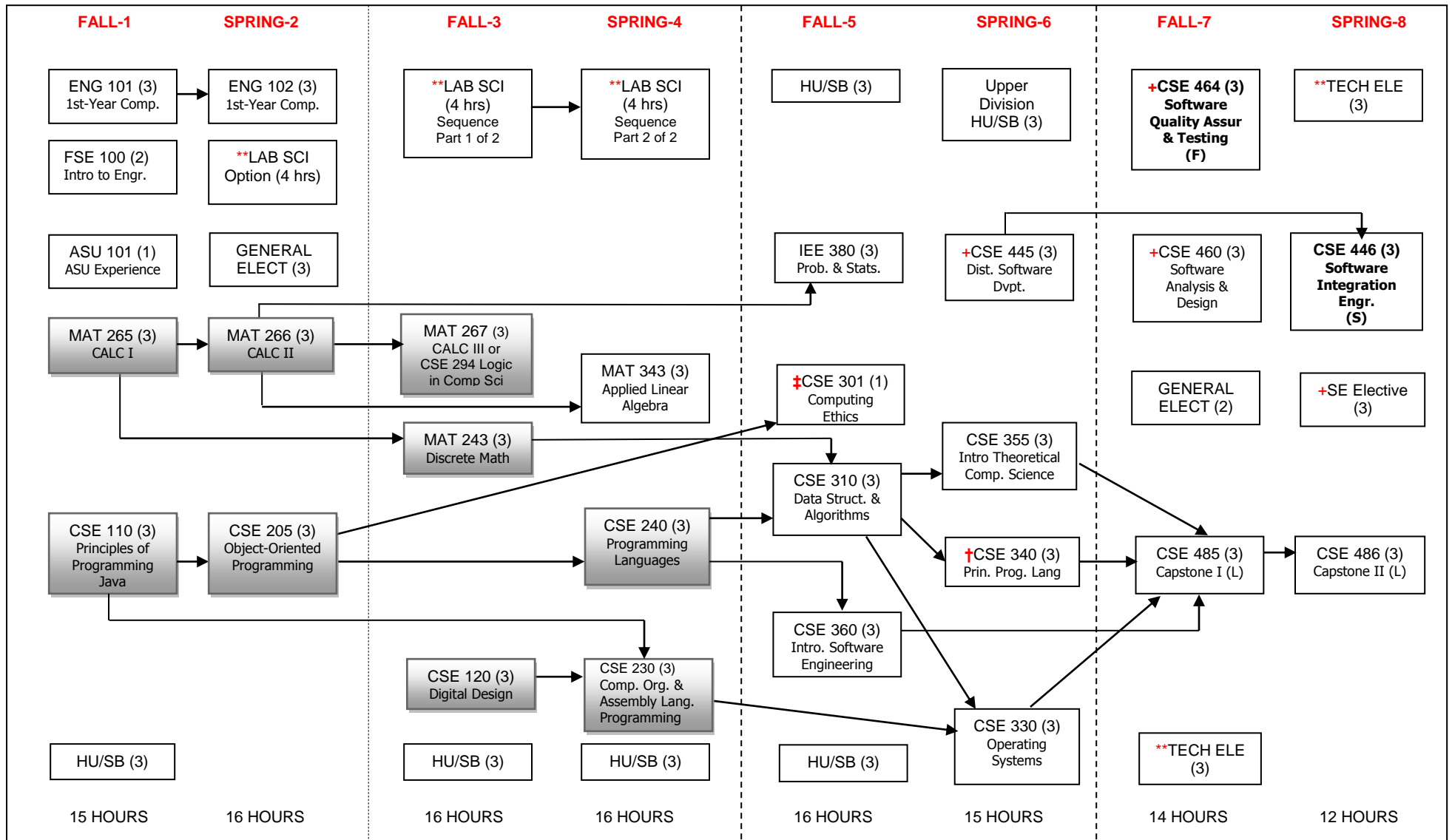


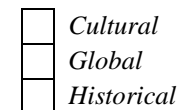
# Computer Science (Software Engineering), BS Bachelor of Science, 2016-2017 Catalog Year

ESCSESBS



Notes: \*\* See CIDSE Advising Center or CIDSE Website (<http://cidse.engineering.asu.edu/degree/requirementsbscs/>) 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**



Prerequisite →

### Term 1

**CSE 110: Principles of Programming with Java** -Concepts of problem solving using Java, algorithm design, structured programming, fundamental algorithms and techniques, and computer systems concepts. Social and ethical responsibility.

**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**

### 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 294: 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 & 131 **or** CHM113 & 116 **or** GLG 101 & 103 **or** BIO 181 & 182

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### Term 4

**CSE 230: Computer Organization & Assembly Language Programming**-Register-level computer organization. Instruction set architecture. Assembly language. Processor organization and design. Memory organization. IO programming, Exception/interrupt handling.

**CSE 240: Introduction to Programming Languages** -Introduces the procedural (C/C++), applicative (LISP/Scheme), and declarative (Prolog) languages.

**MAT 343: Applied Linear Algebra**-Solving linear systems, matrices, determinants, vector spaces, bases, linear transformations, eigenvectors, norms, inner products, decompositions, applications. Problem solving using MATLAB.

**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

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### Term 6

**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 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: Upper Division** 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 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 Elective

**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

**Technical Elective:** Upper Division Elective