Computer Science (Software Engineering), BS
Bachelor of Science, 2020-21 Catalog Year

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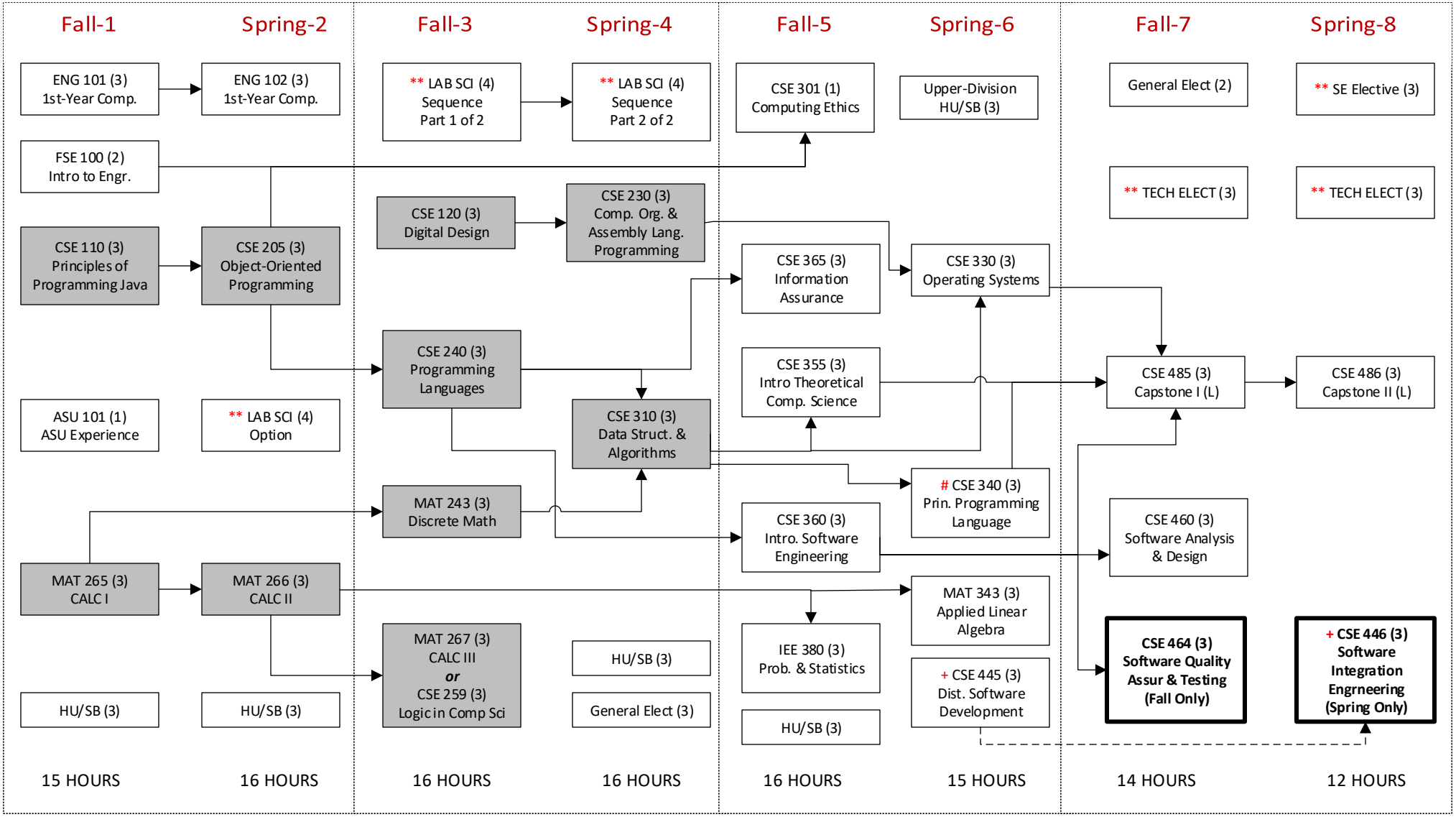

NOTES:

** See CIDSE Advising Center or CIDSE Website (http://cidse.engineering.asu.edu/degreerequirementsbscs/) for approved technical electives, software engineering electives and approved lab science sequence courses.

\# CSE 340 requires CSE 230 as an additional prerequisite

Shaded courses designate "Critical Requirements"

Minimum "C" grade required in all CSE major courses

Bolded courses are offered in specific terms only

Prerequisite ——→ Co-requisite - - - - - - - - →

Cultural

Global

Historical

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 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

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

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 CHM113 & 116 or GLG 101/103 & GLG 102/104 or BIO 181 & 182

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 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.

Lab Science: complete sequence from above

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

General Elective

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 355: Introduction to Theoretical Computer Science-Introduces formal language theory and automata, Turing machines, decidability/undecidability, recursive function theory, and complexity theory.

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

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

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

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

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.

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 460: Object-oriented and structured analysis and design; software architecture and design patters; component-based development; software safety and reliability.

CSE 464: 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, 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.

Technical Elective: Upper Division Elective

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 4 Elective**

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