Software Engineering, BS
Bachelor of Science, 2020 Catalog Year

Notes: Shaded courses designate critically tracked requirements.
Prerequisite: Co-requisite
*** Requires placement exam score and may require additional courses dependent on placement.
* Lab Science Options: CHM113 & CHM116, BIO181 & BIO182, BIO201 & BIO 202, GLG101/103 & GLG102/104, PHY131/132
Color Coding Key: Completed Requirements Enrolled Need to Retake
+Pre-requisite is FSE100
Term 1:
ENG 101: First-Year Composition
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
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.

Term 2:
ENG 102: First-Year Composition
MAT 266: Calculus for Engineers II - Methods of integration, applications of calculus, elements of analytic geometry, improper integrals, Taylor series

Term 3:
MAT 276: Calculus for Engineers - Vector-valued functions of several variables, partial derivatives, multiple integration. OR Mat 275: Modern Differential Equations - Introduces differential equations, theoretical and practical solution techniques. Applications. Problem solving using MATLAB.
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.
CSE 240: Introduction to Programming Languages - Introduces the procedural (C/C++), applicative (LISP/Scheme), and declarative (Prolog) languages.
SER 232: Systems Fundamentals I - Logic design and computer organization; number systems and arithmetic, boolean algebra; digital systems components; assembly language and instruction set concepts and application.

Lab Science Sequence. Refer to course options outlined on the flow chart.

Term 4:
PHY 121/122: University Physics Mechanics 1 Mechanics and laboratory - Kinematics; Newton’s laws; work, energy, momentum, conservation laws; dynamics of particles, solids, and fluids. Both PHY 121 and PHY 122 must be taken to secure SQ General Studies credit.
SER 222: Data Analysis of Data Structures and Algorithms - Data structures and related algorithms for their specification, complexity analysis, implementation and application. Sorting and searching. Professional responsibilities that are part of program development, documentation and testing.

SER 216: Software Enterprise II - Project-centered course covering testing and quality in software engineering; concepts, tools, and methods in testing and quality management; teamwork and communication in software engineering. Project based.

Term 5:
SER 315: Software Enterprise I: Tools and Process - Introduces tools and techniques used in software enterprise/development, including coding, design, testing, configuration management, and personal process management.
SER 334: Operating Systems and Networks - Fundamentals of operating systems, process management, scheduling, synchronization techniques and file management. Network technology, topologies, protocols, application control; network and operating system security.
Lab Science Sequence. Refer to course options outlined on the flow chart.

Term 6:
SER 316: Software Enterprise II - Construction and Transition – Best practices in Software construction in the context of a team project, including refactoring, defensive programming, unit testing, and configuration and release management.
SER 321: Software Systems - Design and implementation of distributed software components; process and memory management underlying software applications; sockets, protocols, threads, XML, serialization, reflection, security, and events.
SER 335: Engineering Secure Software Systems - SE principles applied to securing software systems. Software lifecycle processes, requirements analysis, verification.

Term 7:
SER 401: Computing Capstone Project I – First half of a comprehensive project experience based on cumulative knowledge and skills gained in earlier coursework.
SER 415: Software Enterprise III: Inception and Elaboration - Third course in the four-course enterprise sequence. Students perform inception (project launch) and elaboration (requirements analysis) activities in project teams.
SER 4** Elective (3 credits)
TECHNICAL ELECTIVE: Select from upper division SER, CSE or IFT prefix courses.

Term 8:
SER 402: Computing Capstone Project II – Second half of a comprehensive project experience based on cumulative knowledge and skills gained in earlier coursework.
SER 416: Software Enterprise IV: Project and Process – Project-centric course focusing on applying software process project management, and technical leadership. Final course in the software enterprise sequence.
Two (2) - SER** Elective courses (6 credits)