Software Engineering, BS
Bachelor of Science, 2017 Catalog Year

TSSERBS

15 HOURS 15 HOURS 15 HOURS 16 HOURS 16 HOURS 16 HOURS 15 HOURS 12 HOURS

Notes: ** See CIDSE website or Advisor for Secondary Focus requirements.
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

** Cultural
** Global
** Historical

Primary Focus: To Be Determined
Term 1:
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.
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.
ASU 101-CSE: The ASU Experience
ENG 101: First-Year Composition

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

Term 3:
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.
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 - Vector-valued functions of several variables, partial derivatives, multiple integration.
OR Mat 275: Modern Differential Equations - Solving linear systems, matrices, determinants, vector spaces, bases, linear transformations, eigenvectors, norms, inner products, decompositions, applications. Problem solving using MATLAB.

Term 4:
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.
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.

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.

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.
HST 318: History of Engineering - The history of engineering from the earliest record to modern times, examining the social, cultural, and economic effects on society.

Lab Science Sequence: PHY 131/132 or CHM 113 & 116 or GLG 101/103 & GLG 102/104 or BIO 181 & 182 or BIO 201 & 202. Students taking PHY 131/132 will need to select 4 more hours of lab science from approved list, i.e. CHM, BIO, GLG.

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.

Lab Science Sequence: PHY 131/132 or CHM 113 & 116 or GLG 101/103 & GLG 102/104 or BIO 181 & 182 or BIO 201 & 202. Students taking PHY 131/132 will need to select 4 more hours of lab science from approved list, i.e. CHM, BIO, GLG.

Term 7:
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 401: Computing Capstone Project I - First half of a comprehensive project experience based on cumulative knowledge and skills gained in earlier coursework.

Term 8:
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.
SER 420: Computing Capstone Project II - Second half of a comprehensive project experience based on cumulative knowledge and skills gained in earlier coursework.