Software Engineering, BS
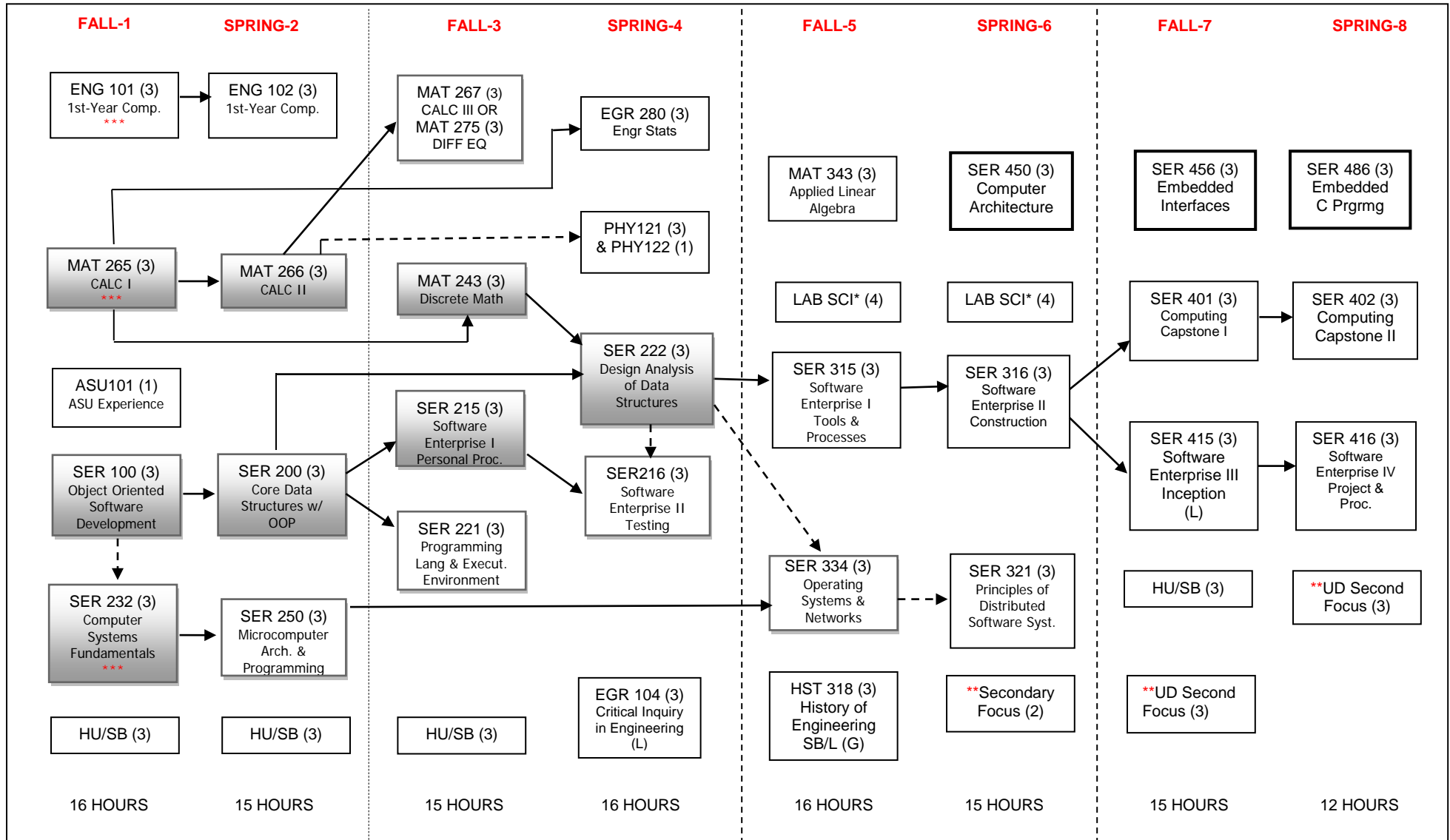# Bachelor of Science, 2016 Catalog Year
TSSERBS

Name:
ID:

Primary Focus:
Embedded Systems

FALL-1	SPRING-2	FALL-3	SPRING-4	FALL-5	SPRING-6	FALL-7	SPRING-8

FALL-1

- ENG 101 (3) 1st-Year Comp. ***
- MAT 265 (3) CALC I ***
- ASU101 (1) ASU Experience
- SER 100 (3) Object Oriented Software Development
- SER 232 (3) Computer Systems Fundamentals ***
- HU/SB (3)

16 HOURS

SPRING-2

- ENG 102 (3) 1st-Year Comp.
- MAT 266 (3) CALC II
- SER 200 (3) Core Data Structures w/ OOP
- SER 250 (3) Microcomputer Arch. & Programming
- HU/SB (3)

15 HOURS

FALL-3

- MAT 267 (3) CALC III OR MAT 275 (3) DIFF EQ
- MAT 243 (3) Discrete Math
- SER 215 (3) Software Enterprise I Personal Proc.
- SER 221 (3) Programming Lang & Execut. Environment
- HU/SB (3)

15 HOURS

SPRING-4

- EGR 280 (3) Engr Stats
- PHY121 (3) & PHY122 (1)
- SER 222 (3) Design Analysis of Data Structures
- SER216 (3) Software Enterprise II Testing
- EGR 104 (3) Critical Inquiry in Engineering (L)

16 HOURS

FALL-5

- MAT 343 (3) Applied Linear Algebra
- LAB SCI* (4)
- SER 315 (3) Software Enterprise I Tools & Processes
- SER 334 (3) Operating Systems & Networks
- HST 318 (3) History of Engineering SB/L (G)

16 HOURS

SPRING-6

- SER 450 (3) Computer Architecture
- LAB SCI* (4)
- SER 316 (3) Software Enterprise II Construction
- SER 321 (3) Principles of Distributed Software Syst.
- **Secondary Focus (2)

15 HOURS

FALL-7

- SER 456 (3) Embedded Interfaces
- SER 401 (3) Computing Capstone I
- SER 415 (3) Software Enterprise III Inception (L)
- HU/SB (3)
- **UD Second Focus (3)

15 HOURS

SPRING-8

- SER 486 (3) Embedded C Prgrmg
- SER 402 (3) Computing Capstone II
- SER 416 (3) Software Enterprise IV Project & Proc.
- **UD Second Focus (3)

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
Color Coding Key: Completed Requirements   Enrolled   Need to Retake

Cultural
Global
Historical

Term 1:
SER100: Object- Oriented Software Development- Introduces problem solving with a state-of-the-art programming language. Expressions, statements, basic control flow and methods. Data, data aggregation and usage. Uses a structured personal software development process to implement solutions representative of common computing applications. Uses development kits for some course activities.
SER232: 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.
MAT265: Calculus for Engineers I - Limits and continuity, differential calculus of functions of one variable, introduction to integration.

Term 2:
SER 200: Core Data Structures with Object Oriented Programming - Design, implementation and use of core data structures; object-oriented software development: design, analysis and programming.
MAT266: Calculus for Engineers II - Methods of integration, applications of calculus, elements of analytic geometry, improper integrals, Taylor series.
SER250: Microcomputer Architecture and Programming - Microcomputer architecture, instruction set, assembly language programming and debugging, I/O considerations, memory interface, peripherals and busses, exception/interrupt handling.

Term 3:
MAT243: Discrete Mathematical Structures - Logic, sets, functions, elementary number theory and combinatorics, recursive algorithms, and mathematical reasoning, including induction. Emphasizes connections to computer science.
MAT267: 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.
SER215: Software Enterprise 1: Personal Process - Software engineering; personal software processes for individual professionalism; time and defect estimation, yield, and productivity. Software tools. Project based.
SER221: Programming Languages and Their Execution Environment - Introduces the fundamental programming language concepts of data, type, control, abstraction, and structure; software development and execution environments; programming language paradigms.

Term 4:.
SER216: 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.
SER222: 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.
SER234: 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.

EGR280: Engineering Statistics - Applications-oriented introduction to statistics with computer-based experience using statistical software for formulating and solving engineering problems.
PHY121/122: 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.
EGR104: Critical Inquiry in Engineering - Critical thinking. Systematic evaluation of information as input to well-informed decision making. Close reading and substantive writing in a technical setting

Term 5:
SER315: 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.
SER334: 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.
MAT343: Applied Linear Algebra - Solving linear systems, matrices, determinants, vector spaces, bases, linear transformations, eigenvectors, norms, inner products, decompositions, applications. Problem solving using MATLAB.4
HST318: History of Engineering - The history of engineering from the earliest record to modern times, examining the social, cultural, and economic effects on society.

Term 6:
SER316: 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.
SER321: 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.

Term 7:
SER415: 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:
SER416: 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.
SER402: Computing Capstone Project II – Second half of a comprehensive project experience based on cumulative knowledge and skills gained in earlier coursework.