Computer Science (BS) with an Emphasis in Software Engineering

This program is offered by the George Herbert Walker School of Business and Technology/Computer and Information Sciences Department. It is offered at the St. Louis main campus.

Program Description

Digital skills are in demand across all industries and almost all functions and software engineers are highly sought after as developers of smart solutions and managers of critical systems. They play a central role in developing interactive mobile applications or embedded routines for the Internet of Things, understand the ethical and social relevance of interactive systems development and human/computer interfaces, and apply that knowledge as they develop, analyze and design software, and ensure its quality.

The Bachelor of Science in Software Engineering is designed around identified core knowledge areas of computer science from theories and methods to data analysis, program and system verification, usability, modeling and project management. Building upon a strong multi-year foundation in computer science including modern techniques in programming, object-oriented methodology, software design, validation and verification, security, and networks, students delve deeper into software engineering, learning various programming and coding paradigms and languages. The program includes theoretical and practical hands-on approaches preparing students to enter the software engineering workforce or continue their education in graduate degree programs.

Webster University is designated as a National Center of Academic Excellence in Cyber Defense Education (CAE-CDE).

Learning Outcomes

Upon completion of the program, students will be able to:

- Demonstrate mastery of computer science in the following core knowledge areas:
  - Software development.
  - Algorithms and data structures.
  - Computer organization, hardware, and architecture.
  - Data and information management.
- Describe how technological advances impact social issues and professional practice.
- Write and orally communicate technical material effectively and professionally.
- Apply problem-solving skills and the knowledge of computer science to solve problems.

Emphasis Specific Learning Objectives

- Work as an individual and as part of a team to develop and manage software development projects, including demonstrating the essential techniques for quality assurance and maintenance of software.
- Demonstrate theoretical and practical aspects along the data – information – knowledge process chain, including decision support systems.
- Demonstrate ability to implement fundamental concepts in software paradigms, including object-oriented software design, software architectures, as well as database design.

Degree Requirements

For information on the general requirements for a degree, see Baccalaureate Degree Requirements under the Academic Policies and Information section of this catalog.

- 63 required credit hours
- 30 Applicable University Global Citizenship Program hours
- 27 Elective credit hours

At least 30 of the required 57 hours must be taken at Webster University.

All upper-level (3000 and above) courses must be taken at Webster University.

Required Courses

- COSC 1550 Computer Programming I (3 hours)
- COSC 1560 Computer Programming II (3 hours)
- COSC 1570 Math for Computer Science (3 hours)
- COSC 2610 Operating Systems (3 hours)
- COSC 2670 Network Principles (3 hours)
- COSC 2710 Social Engineering and Society (3 hours)
- COSC 2810 Systems Analysis and Design (3 hours0
- COSC 3050 Data Structures I (3 hours)
- COSC 3100 Data Structures II (3 hours)
- COSC 3230 Human-Computer Interaction (3 hours)
- COSC 3410 Computer and Information Security (3 hours)
- COSC 3510 Computer Architecture (3 hours)
- COSC 4110 Database Concepts (3 hours)
- COSC 4120 Database Applications (3 hours)
- MATH 2410 Discrete Mathematics (3 hours)

Emphasis Specific Required Courses

- CSIS 4300 Database Systems (3 hours)
- CSIS 4310 Decision Support Systems (3 hours)
- MATH 3210 Data Mining Foundations (3 hours)
- COSC 3810 Principles of Programming Languages (3 hours)
- COSC 4250 Object-Oriented Analysis & Design (3 hours)
- COSC 4260 Object-Oriented Programming (3 hours)