Software Engineering, BS

Program Description

The Bachelor of Science degree in Software Engineering (SE) is designed to emphasize learning the practical elements of producing reliable software in a professional setting. Building on the core foundations of computer science, this degree instructs students in the tools, techniques, and practices used to produce robust software in a variety of settings and to solve a broad range of problems.

Program Curriculum

120 credits

Utah Tech General Education Requirements

All Utah Tech General Education requirements must be fulfilled. A previously earned degree may fulfill those requirements, but courses must be equivalent to Utah Tech's minimum General Education standards in American Institutions, English, and Mathematics.

General Education Core Requirements (catalog.utahtech.edu/programs/generaleducation/#gerequirementstext)

Code	Title	Hours
English		3-7
Mathematics		3-5
American Institutions		3-6
Life Sciences		3-10
Physical Sciences		3-5
Fine Arts		3
Literature/Humanities		3
Social & Behavioral Sciences		3

Code	Title	Hours
Core Discipline Requirements		
CS 1400	Fundamentals of Programming	3
CS 1410	Object Oriented Programming	3
CS 2100	Discrete Structures	3
CS 2420	Introduction to Algorithms and Data Structures	3
CS 2810	Computer Organization and Architecture	3
CS 3005	Programming in C++	3
CS 3150	Computer Networks	3
CS 3510	Algorithms	3
CS 4307	Database Systems	3
or IT 2300	Database Design & Management	
IT 1100	Introduction to Unix/Linux	3
SE 1400	Web Design Fundamentals (ALCS)	3
CS 2450	Software Engineering	3
SE 3010	Mobile Application Development for Android	3
or SE 3020	Mobile Application Development for iOS	
SE 3100	Software Practices	3
SE 3150	Software Quality	3
SE 3200	Web Application Development I	3
SE 3400	Human-Computer Interaction	3
SE 4200	Web Application Development II	3
SE 4600	Senior Project	3
ENGL 2100	Technical Writing (ALCS)	3
MATH 1100	Business Calculus (MA)	3

or MATH 1210	Calculus I (MA)	
MATH 2050	Applied Statistics with Programming	3
Complete six (6) credits from the following list of elective courses: [1]		6
CS 2500	Data Wrangling	
CS 3400	Operating Systems	
CS 3410	Distributed Systems	
CS 3520	Programming Languages	
CS 3500	Game Development	
CS 3530	Computational Theory	
CS 3600	Graphics Programming	
CS 4300	Artificial Intelligence	
CS 4320	Machine Learning	
CS 4400	Data Mining	
CS 4410	Data Visualization	
CS 4550	Compilers	
CS 4800R	Undergraduate Research (up to 6 credits)	
CS 4990	Special Topics in Computer Science	
CS 4991R	Competitive Programming	
CS 4992R	Computer Science Seminar (up to 4 credits)	
DES 2100	Design Thinking	
IT 2700	Information Security	
IT 3100	Systems Design and Administration	
IT 3110	System Automation	
IT 3300	DevOps Virtualization	
IT 4070	Data Visualization and Storytelling	
IT 4200	DevOps Lifecycle Management	
MKTG 4200	Entrepreneurial Marketing	
SE 3010	Mobile Application Development for Android	
SE 3020	Mobile Application Development for iOS	
SE 3250	Internet of Things Programming	
SE 3450	User Experience Design	
SE 3500	Tech Entrepreneurship	
SE 3550	Online Marketing and SEO (ALCS)	
SE 4920	Internship (ALPP)	
SE 4930R	Software Entrepreneurial Exploration	
SE 4990	Special Topics in Software Engineering	

Complete all courses from one of the following tracks:[1]

Code	Title	Hours
Entrepreneurial and Marketing Track		
DES 2100	Design Thinking	3
SE 3500	Tech Entrepreneurship	3
SE 3550	Online Marketing and SEO (ALCS)	3

Code	Title	Hours
DevOps Track		
IT 3110	System Automation (Prerequisites: IT 3100 and IT 2400)	3
IT 3300	DevOps Virtualization (Prerequisites: IT 2400)	3
IT 4200	DevOps Lifecycle Management	3

Code	Title	Hours
Application Track		
SE 3010	Mobile Application Development for Android (Must be different than course used for core requirement)	3

or SE 3020	Mobile Application Development for iOS	
SE 3250	Internet of Things Programming	3
SE 3450	User Experience Design	3

Code	Title	Hours
Data Science Track		
CS 4300	Artificial Intelligence	3
or CS 4400	Data Mining	
CS 4320	Machine Learning	3
CS 4410	Data Visualization	3

Code	Title	Hours
Game Development Track		
CS 3500	Game Development	3
CS 3600	Graphics Programming	3
CS 4995	Programming for VR/XR Internship 01	3

[1] A course may only be used to fulfill one program requirement. Dual-listed courses may only be used once to fill requirements. Consult course descriptions in the current catalog to verify dual-listed courses.

Graduation Requirements

1. Complete a minimum of 120 college-level credits (1000 and above).
2. Complete at least 40 upper-division credits (3000 and above).
3. Complete at least 30 upper-division credits at Utah Tech for institutional residency.
4. Cumulative GPA 2.0 or higher.
5. Grade C or higher in each Core Requirement, Elective Requirement, and Track Requirement course.

Graduation Plan

1st Year

Fall Semester	Hours	Spring Semester	Hours
CS 1400	3	CS 1410	3
General Education (Fine Arts)	3	ENGL 2010	3
IT 1100	3	SE 1400	3
ENGL 1010 or 1010D	3	MATH 1100	3
MATH 1050	4	General Education (Life Sciences)	3
	16		**15**

2nd Year

Fall Semester	Hours	Spring Semester	Hours
CS 2420	3	CS 2450	3
CS 2810	3	General Education (American Institutions)	3
MATH 2050	3	General Education (Humanities)	3
ENGL 2100	3	General Education (Social and Behavioral Sciences)	3
General Education (Physical Sciences)	3	General Elective	3
	15		**15**

3rd Year

Fall Semester	Hours	Spring Semester	Hours
CS 2100	3	CS 3150	3
CS 3005	3	CS 4307	3
SE 3100	3	SE 4200	3
SE 3200	3	SE 3150	3

General Elective	3	CS 3510	3
	15		**15**

4th Year

Fall Semester	**Hours**	**Spring Semester**	**Hours**
SE 3020	3	SE 4600	3
SE 3400	3	SE Track Requirement (3 of 3)	3
SE Track Requirement (1 of 3)	3	Software Engineering Elective (1 of 2)	3
SE Track Requirement (2 of 3)	3	Software Engineering Elective (2 of 2)	3
General Elective	3	General Elective	2
	15		**14**

Total Hours 120

Software Engineering Program Learning Outcomes

At the successful completion of this program, students will be able to:

1. Plan, design, create, measure, and deliver robust software solutions that address contemporary real-world problems.
2. Differentiate and evaluate modern techniques, skills, and tools necessary for professional practice.
3. Weigh and apply ethical, legal, and social responsibilities in all aspects of practice.
4. Construct effective solutions in teams to accomplish a common goal.
5. Author effective visual, oral, and written communication for a range of audiences.