

Software Engineering, B.S.

Visit the Computer Science Department page (<https://www.uvu.edu/cs/>) for more information on the program and access to advising.

Program Description

Software Engineers design and develop large software systems. In addition, they may lead teams of software developers or quality assurance engineers. They also work with users and customers to understand their needs. Software systems we take for granted, such as Microsoft Office, are implemented by software engineers. Software engineers employ innovative software development approaches, such as Agile software development, to effectively manage software development projects.

Matriculation Requirements

1. Completion of CS 1400 Fundamentals of Programming, CS 1410 Object Oriented Programming, CS 2300 Discrete Mathematical Structures I, CS 2420 Introduction to Algorithms and Data Structures, and CS 2450 Software Engineering with a grade of C+ or better.
2. Completion of MATH 1210 Calculus I and (ENGL 1010 Introduction to Academic Writing or ENGH 1005 Literacies and Composition Across Contexts) with a grade of C or better.
3. Each of CS 1400, CS 1410, CS 2300, CS 2420, MATH 1210, and (ENGL 1010 or ENGH 1005) cannot be taken more than twice to obtain the required grade.
4. Overall GPA of 2.5 or higher.

Program Requirements

Code	Title	Credit Hours
Total Credit Hours		120
General Education Requirements		31 Credits
ENGL 1010 or ENGH 1005	Introduction to Academic Writing Literacies and Composition Across Contexts	3
ENGL 2010	Intermediate Academic Writing	3
MATH 1210	Calculus I ¹	4
American Institutions		3
HIST 1700	American History (3)	
HIST 1740	US Economic History (3)	
HIST 2700 & HIST 2710	US History to 1877 and US History since 1877 (6)	
POLS 1000	American Heritage (3)	
POLS 1100	American National Government (3)	
Arts		3
Humanities		3
Life Sciences		3
Physical Sciences		3
Social & Behavioral Sciences		3
Personal, Professional and Civic Growth		3
Discipline Core Requirements		74 Credits
Complete one of the following Science/Lab combinations		5
BIOL 1610 & BIOL 1615	College Biology I and College Biology I Laboratory (5)	
CHEM 1210 & CHEM 1215	Principles of Chemistry I and Principles of Chemistry I Laboratory (5)	
PHYS 2020 & PHYS 2025	College Physics II and College Physics II Lab (5)	
PHYS 2210 & PHYS 2215	Physics for Scientists and Engineers I and Physics for Scientists and Engineers I Lab (5)	

PHYS 2220 & PHYS 2225	Physics for Scientists and Engineers II and Physics for Scientists and Engineers II Lab (5)	
GEO 1010 & GEO 1015 & GEO 2020R	Introduction to Geology and Introduction to Geology Laboratory and Science Excursion (5)	
Complete one of the following:		6
CS 1400 & CS 1410	Fundamentals of Programming and Object Oriented Programming (6)	
CS 1420	Accelerated Introduction to Programming (undefined) (and an additional 3 credit CS elective not already completed) ²	
CS 2300	Discrete Mathematical Structures I	3
ECE 3710 or STAT 2050	Applied Probability and Statistics for Engineers and Scientists Introduction to Statistical Methods	3
CS 2370	C Plus Plus Programming	3
CS 2810	Computer Organization and Architecture	3
CS 2420	Introduction to Algorithms and Data Structures	3
CS 2450	Software Engineering	3
CS 2600	Computer Networks I	3
CS 2700	Causal Inference	3
CS 3050G	Global Social and Ethical Issues in Computing	3
CS 3060	Operating Systems Theory	3
CS 3100	Data Privacy and Security	3
CS 3240	Discrete Mathematical Structures II	3
CS 3310	Analysis of Algorithms	3
Complete one of the following:		3
CS 3250	Java Software Development (3)	
CS 3370	C Plus Plus Software Development (3)	
CS 3260	CsharpNET Software Development (3)	
CS 3270	Python Software Development (3)	
CS 3380	JavaScript Software Development (undefined)	
CS 3390R	Advanced Programming Language Other (3)	
CS 3450	Principles and Patterns of Software Design	3
CS 3410	Human Factors in Software Development	3
CS 3520	Database Theory	3
CS 4230	Software Testing and Quality Engineering	3
CS 4400	Software Engineering II	3
CS 4450	Analysis of Programming Languages	3
CS 4550	Software Engineering III	3
Elective Requirements		15
Complete 15 credits from the following:		15
Any CS course numbered 3000 or higher not already required.		

¹ Minimum grade of C- required.

² If students choose CS 1420, please see advisor.

Graduation Requirements

1. Completion of a minimum of 120 semester credits, with a minimum of 40 upper-division credits.
2. Overall grade point average of 2.0 or above. Must have a minimum grade of C- with a combined GPA of 2.5 or higher in all discipline core and elective requirements and the General Education requirements marked with a footnote 1.
3. Residency hours -- minimum of 30 credit hours through course attendance at UVU. Ten of these hours must be within the last 45 hours earned. At least 12 of the credit hours earned in residence must be in approved CSE Department courses.
4. No more than 80 semester hours and no more than 20 hours of transfer credit from a two-year college may be applied to the core or elective courses.

5. No more than 6 semester hours may be earned through independent study.
6. Successful completion of at least one Global/Intercultural course.
7. Successful completion of at least two Writing Enriched (WE) courses.

Graduation Plan

This graduation plan is a sample plan and is intended to be a guide. Your specific plan may differ based on your Math and English placement and/or transfer credits applied. You are encouraged to meet with an advisor and set up an individualized graduation plan in Wolverine Track (<http://www.uvu.edu/wolverinetrack/>).

First Year

Semester 1		Credit Hours
CS 1400	Fundamentals of Programming	3
MATH 1210	Calculus I	4
ENGL 1010 or ENGH 1005	Introduction to Academic Writing or Literacies and Composition Across Contexts	3
GE		3
GE		3
Credit Hours		16

Semester 2

CS 1410	Object Oriented Programming	3
CS 2810	Computer Organization and Architecture	3
ENGL 2010	Intermediate Academic Writing	3
GE		3
GE		3
Credit Hours		15

Second Year

Semester 3

CS 2420	Introduction to Algorithms and Data Structures	3
CS 2300	Discrete Mathematical Structures I	3
CS 2370	C Plus Plus Programming	3
Core Science		4
Core Science Lab		1
Credit Hours		14

Semester 4

CS 2450	Software Engineering	3
CS 2600	Computer Networks I	3
Complete one of the following:		3
CS 3250	Java Software Development	
CS 3260	CsharpNET Software Development	
CS 3270	Python Software Development	
CS 3370	C Plus Plus Software Development	
CS 3380	JavaScript Software Development	
CS 3390R	Advanced Programming Language Other	
GE		3
GE		3
Credit Hours		15

Third Year

Semester 5

CS 3410	Human Factors in Software Development	3
CS 3100	Data Privacy and Security	3
ECE 3710 or STAT 2050	Applied Probability and Statistics for Engineers and Scientists or Introduction to Statistical Methods	3
CS 3520	Database Theory	3
GE		3
Credit Hours		15

Semester 6

CS 3060	Operating Systems Theory	3
CS 3240	Discrete Mathematical Structures II	3
CS 3450	Principles and Patterns of Software Design	3
CS Elective		3

CS Elective		3
Credit Hours		15
Fourth Year		
Semester 7		
CS 4450	Analysis of Programming Languages	3
CS 4400	Software Engineering II	3
CS 4230	Software Testing and Quality Engineering	3
CS Elective		3
CS Elective		3
Credit Hours		15
Semester 8		
CS 2700	Causal Inference	3
CS 3050G	Global Social and Ethical Issues in Computing	3
CS 3310	Analysis of Algorithms	3
CS 4550	Software Engineering III	3
CS Elective		3
Credit Hours		15
Total Credit Hours		120

Program Learning Outcomes

1. Graduates are proficient in using data structures and algorithms. They understand how to implement them, when to apply them, and the abstractions associated with their use.
2. Graduates understand the foundations of computer architecture.
3. Graduates are able to develop solutions to significant software development problems.
4. Graduates will be able to provide internal and external software documentation.
5. Graduates are able to function effectively on teams to accomplish a common goal.
6. Graduates understand software project lifecycles and development processes, and can follow standard processes.
7. Graduates can elicit and write software specifications.
8. Graduates understand principles of software quality assurance and testing, and can test software effectively.

Architectural and engineering managers

- Total Positions 210,200
- Field Growth 5.5%
- Median Salary \$165,370
- Average Openings 15.0

Database architects

- Total Positions 61,400
- Field Growth 10.8%
- Median Salary \$134,700
- Average Openings 4.2

Software developers

- Total Positions 1,692,100
- Field Growth 17.9%
- Median Salary \$132,270
- Average Openings 125.1

Software quality assurance analysts and testers

- Total Positions 205,000
- Field Growth 11.8%
- Median Salary \$101,800
- Average Openings 15.0

Engineering teachers, postsecondary

- Total Positions 48,800
- Field Growth 9.2%
- Median Salary \$106,910
- Average Openings 4.2