

SOFTWARE ENGINEERING (BS)

Department: Computer Science and Engineering (<https://snow-curr.courseleaf.com/divisions-departments/division-natural-science-mathematics/computer-science-engineering/>)

Program Contact: Keith Steurer

Phone: (435) 283-7515

Email: keith.steurer@snow.edu

Department Webpage: https://www.snow.edu/academics/science_math_engineering/index.html (https://www.snow.edu/academics/science_math/engineering/)

Advising Information (<https://snow.edu/offices/advisement/>)

Program Description & Outcomes

The Bachelor of Science in Software Engineering degree prepares software engineers: collaborative professionals working on a team to develop software products on time, within budget, and that meet customer requirements. Graduates of this program will possess the practical knowledge and skill of a defined engineering approach for complex systems analysis, planning, design and construction. The coursework builds upon computer science fundamentals and mathematical principles to cover the design, analysis, verification, validation, implementation, deployment, and maintenance of software systems.

The Snow College Software Engineering program provides students with an educational experience that builds upon traditional computer science and engineering principles and produces software engineers that create high-quality software in a systematic, controlled, and efficient manner. This is accomplished in the following ways:

- The degree has a strong emphasis on mathematics and engineering methods in software design.
- Courses place an emphasis on software processes and lifecycles and utilize a team approach to building software with active learning ("learning by doing") which also provides leadership opportunities, such as software development team lead roles, for every student.
- Courses include significant learning in management areas such as project planning, resource allocation, quality assurance, testing, metrics, maintenance and troubleshooting, configuration management and personnel management.
- Courses incorporate student teams to work on activities specifically designed to guide students to collaboratively construct their own understanding of key concepts, and, at the same time develop key process skills such as communication, teamwork, critical thinking and problem solving.

The software engineering curriculum culminates in a year-long capstone sequence where the students work in teams to build a software system reflective of current practices in the industry. Additionally, students are encouraged to participate in internships prior to and during enrollment in these capstone courses in order to gain direct industry experience and insight before embarking upon their own projects. Snow College partners

with businesses to develop these learning opportunities that will provide students with industry relevant experience.

Program Admission Admission Requirements

Students must apply for admission into this program.

Any student admitted to Snow College can begin the Software Engineering program and be classified as pre-major status. Students must apply to be admitted as a Software Engineering full-major. Full-major status is required to enroll in upper-division Software Engineering courses. Applications for the Software Engineering full-major can be submitted anytime. Candidates will only be considered for full-major status after completion of the pre-major coursework. Selection of candidates for full-major status will be determined by the review committee and will take place after January 31st each year. Students will be notified of their status by March 15th. Selection will be based on the following criterion:

- Evidence of ability to complete the academic program,
- Evidence of potential to be successful as a Software Engineer,
- Evidence of appropriate educational and career goals,
- Evidence of ability to work in teams and leadership potential.

Candidates from underrepresented populations will be given special consideration.

The procedure to be admitted as a Software Engineering full-major:

- Get admitted to Snow College (<https://snow.edu/admissions>).
- Declare your major as Software Engineering.
- Successfully complete the pre-major coursework:
 - CS 1410 Object-Oriented Programming/CS 1415 Object-Oriented Program Lab
 - CS 2420 Data Structures and Algorithms
 - CS 2700 Digital Circuits
 - CS 2860 Operating Systems
 - MATH 1210 Calculus I
- Apply for full-major status.

Requirements

Code	Title	Hours
General Education Requirements ¹		15
American Institutions GE Class (https://snow-curr.courseleaf.com/general-education/american-institutions/)		
English 1 GE Class (https://snow-curr.courseleaf.com/general-education/english1/)		
English 2 GE Class (https://snow-curr.courseleaf.com/general-education/english2/)		
Fine Arts GE Class (https://snow-curr.courseleaf.com/general-education/fine-arts/)		
Humanities GE Class (https://snow-curr.courseleaf.com/general-education/humanities/)		
Required Courses (83 credits)		
CS 1410	Object-Oriented Programming	3
CS 1415	Object-Oriented Program Lab	1
CS 1430	User Experience Design	1

CS 1810	Introduction to Web Development	3
CS 2420	Data Structures and Algorithms	3
CS 2450	Intro to Software Engineering	3
CS 2810	Computer Organization and Architecture	3
CS 2860	Operating Systems	3
MATH 1210	Calculus I	5
MATH 2270	Linear Algebra	3
MATH 3040	Statistics for Scientists and Engineers	3
MATH 3310	Discrete Mathematics	3
COMM 2110	Interpersonal Communication SS	3
ENGL 3260	Technical Communication	3
SE 3140	Ethics and Personal Software Process	3
SE 3250	Survey of Languages	3
SE 3520	Database Systems	3
SE 3630	Mobile Application Development	3
SE 3820	Back-End Web Development	3
SE 3830	Cloud Application Development	3
SE 3840	Web Telemetry & Operations	3
SE 4230	Advanced Algorithms	3
SE 4270	Software Maintenance Practices	3
SE 4340	Secure Coding Practices	3
SE 4400	Software Engineering Practicum I	1
SE 4450	SE Practicum II	6
SE 4620	Distributed Application Development	3
SE 4850	Advanced Front-end Development	3

Science and Math Elective Coursework² 19Physical Science Electives (3-16 credits)³

CHEM 1210 & CHEM 1215	Principles of Chemistry I PS and Principles of Chemistry Lab I	
CHEM 1220 & CHEM 1225	Principles of Chemistry II PS and Principles of Chemistry Lab II	
GEO 1110 & GEO 1115	Physical Geology PS and Physical Geology Lab LB	
GEO 1220 & GEO 1225	Historical Geology and Historical Geology Lab	
PHYS 2210 & PHYS 2215	Physics for Scientists and Engineers I and Physics for Scientists and Engineers I Lab	
PHYS 2220 & PHYS 2225	Physics for Scientists and Engineers II and Physics for Scientists and Engineers II Lab	
PHYS 2710	Introductory Modern Physics	

Life Science Electives (3-16 credits)³

BIOL 1610 & BIOL 1615	Biology I LS and Biology I Laboratory LB	
BIOL 1620 & BIOL 1625	Biology II and Biology II Laboratory	
BIOL 2030 & BIOL 2035	Introductory Genetics and Introductory Genetics Lab	
BIOL 2060 & BIOL 2065	Introductory Microbiology LS and Intro Microbiology Lab LB	
BIOL 2200 & BIOL 2205	General Microbiology and General Microbiology Lab	
BIOL 2320 & BIOL 2325	Human Anatomy and Human Anatomy Lab	

BIOL 2420 & BIOL 2425	Human Physiology and Human Physiology Lab	
Math Electives (0-11 credits)		
MATH 1220	Calculus II	
MATH 2210	Calculus III	
MATH 3080	Foundations of Data Science	
MATH 3280	Data Mining	
MATH 3480	Machine Learning	
Technical Elective (Choose one class)		3
CS 2700	Digital Circuits	
MATH 3080	Foundations of Data Science	
Any technical education class approved by the program		

Total Hours 120

¹ The remaining GE credits are satisfied with MATH 1210 and COMM 2110 in the required courses and in the life science and physical science electives.

² A typical selection of these electives is four credits in a physical science class and lab, four credits in a life science class and lab, and nine credits in math classes.

³ Students must complete at least one lab class in the Physical Science Electives or the Life Science Electives. Students who took a GE Life Science or GE Physical Science class that is not listed as a BSSE Science Elective may have that class fulfill the appropriate BSSE Elective requirement. However, both BSSE Science Elective categories cannot be fulfilled this way.

Note: To graduate, students must pass all courses for the Core and Elective areas with a C- grade or higher.

Suggested Plan of Study

Students needing preparation for MATH 1210 may choose to take MATH 1080, Pre-Calculus before semester 2.

Course	Title	Hours	
Freshman			
Fall			
CS 1410 & CS 1415	Object-Oriented Programming and Object-Oriented Program Lab	4	
CS 1430	User Experience Design	1	
Fine Arts GE Class (https://snow-curr.courseleaf.com/general-education/fine-arts/)			3
English 1 GE Class (https://snow-curr.courseleaf.com/general-education/english1/)			3
COMM 2110	Interpersonal Communication SS	3	
Hours		14	
Spring			
MATH 1210	Calculus I	5	
CS 1810	Introduction to Web Development	3	
Life Science Electives (https://snow-curr.courseleaf.com/program-details/bsse-life-science-electives/)			5
English 2 GE Class (https://snow-curr.courseleaf.com/general-education/english2/)			3
Hours		16	
Sophomore			
Fall			
MATH 3040	Statistics for Scientists and Engineers	3	
CS 2420	Data Structures and Algorithms	3	
CS 2810	Computer Organization and Architecture	3	

Physical Science Electives (https://snow-curr.courseleaf.com/program-details/bsse-physical-science-electives/)	5
Hours	14
Spring	
Technical Elective (https://snow-curr.courseleaf.com/program-details/bsse-technical-elective/)	3
CS 2450 Intro to Software Engineering	3
CS 2860 Operating Systems	3
MATH 2270 Linear Algebra	3
American Institutions GE Class (https://snow-curr.courseleaf.com/general-education/american-institutions/)	3
Hours	15
Junior	
Fall	
MATH 3310 Discrete Mathematics	3
SE 3250 Survey of Languages	3
SE 3520 Database Systems	3
SE 3820 Back-End Web Development	3
Math and Science Electives (https://snow-curr.courseleaf.com/program-details/bsse-math-electives/)	3
Hours	15
Spring	
Math and Science Electives (https://snow-curr.courseleaf.com/program-details/bsse-math-electives/)	3
SE 3140 Ethics and Personal Software Process	3
SE 3630 Mobile Application Development	3
SE 3830 Cloud Application Development	3
SE 3840 Web Telemetry & Operations	3
Hours	15
Senior	
Fall	
Math and Science Electives (https://snow-curr.courseleaf.com/program-details/bsse-math-electives/)	3
SE 4230 Advanced Algorithms	3
SE 4270 Software Maintenance Practices	3
SE 4400 Software Engineering Practicum I	1
SE 4850 Advanced Front-end Development	3
Humanities GE Class (https://snow-curr.courseleaf.com/general-education/humanities/)	3
Hours	16
Spring	
ENGL 3260 Technical Communication	3
SE 4340 Secure Coding Practices	3
SE 4450 SE Practicum II	6
SE 4620 Distributed Application Development	3
Hours	15
Total Hours	120