

# BS in Computer Science with Software Engineering Concentration

To earn a Bachelor of Science in Computer Science, Software Engineering Concentration degree from UIC, students need to complete university, college, and department degree requirements. The Department of Computer Science degree requirements are outlined below. Students should consult the *College of Engineering* section for additional degree requirements and college academic policies.

## Degree Requirements

Code	Title	Hours
<b>Summary of Requirements</b>		
Nonengineering and General Education Requirements		48
Required in the College of Engineering		51
Technical Electives		9
Required Mathematics Courses		6
Free Electives		14
Total Hours		128

## Nonengineering and General Education Requirements

Code	Title	Hours
<b>Required Courses</b>		
ENGL 160	Academic Writing I: Writing in Academic and Public Contexts	3
ENGL 161	Academic Writing II: Writing for Inquiry and Research	3
Exploring World Cultures Course <sup>a</sup>		3
Understanding the Creative Arts course <sup>a</sup>		3
Understanding the Past course <sup>a</sup>		3
Understanding the Individual and Society course <sup>a</sup>		3
Understanding U.S. Society course <sup>a</sup>		3
Humanities/Social Sciences/Art Electives <sup>b</sup>		6
MATH 180	Calculus I <sup>c</sup>	4
MATH 181	Calculus II <sup>c</sup>	4
MATH 210	Calculus III <sup>c</sup>	3
Science Electives (see below) <sup>d</sup>		10
Total Hours		48

<sup>a</sup> Students should consult the General Education (<http://catalog.uic.edu/ucat/degree-programs/general-education>) section of the catalog for a list of approved courses in this category.

<sup>b</sup> These electives must be selected from a list of approved courses provided by the CS department.

<sup>c</sup> This course is approved for the Analyzing the Natural World General Education category.

<sup>d</sup> All courses on the lab science sequence below are approved for the Analyzing the Natural World General Education category.

## Required in the College of Engineering

Code	Title	Hours
<b>Required Courses</b>		
ENGR 100	Engineering Orientation <sup>a</sup>	1
CS 111	Program Design I	3
CS 141	Program Design II	3
CS 151	Mathematical Foundations of Computing	3
CS 211	Programming Practicum	2
CS 251	Data Structures	4
CS 261	Machine Organization	3
CS 301	Languages and Automata	3
CS 341	Programming Language Design and Implementation	3
CS 342	Software Design	3
CS 361	Systems Programming	3
CS 362	Computer Design	3
CS 377	Communication and Ethical Issues in Computing	3
CS 401	Computer Algorithms I	3
CS 440	Software Engineering I	3
CS 442	Software Engineering II	3
CS 461	Operating Systems Design and Implementation	3
IE 342	Probability and Statistics for Engineers	3
CS 499	Professional Development Seminar	0
Total Hours		51

<sup>a</sup> ENGR 100 is a one-semester-hour course, but the hour does not count toward the total hours required for graduation.

## Technical Electives

Code	Title	Hours
<b>Courses</b>		
Students must complete at least 9 hours of courses from the following, only one of which may be outside the CS rubric. Two courses must be from CS 422, CS 480, CS 441, and CS 474.		9
CS 398	Undergraduate Design/Research	
CS 411	Artificial Intelligence I	
CS 412	Introduction to Machine Learning	
CS 421	Natural Language Processing	
CS 422	User Interface Design and Programming	
CS 424	Visualization and Visual Analytics	
CS 425	Computer Graphics I	
CS 426	Video Game Design and Development	
CS 441	Engineering Distributed Objects For Cloud Computing	
CS 450	Introduction to Networking	
CS 455	Design and Implementation of Network Protocols	
CS 473	Compiler Design	
CS 474	Object-Oriented Languages and Environments	

CS 476	Programming Language Design
CS 477	Public Policy, Legal, and Ethical Issues in Computing, Privacy, and Security
CS 478	Software Development for Mobile Platforms
CS 480	Database Systems
CS 485	Networked Operating Systems Programming
CS 486	Secure Operating System Design and Implementation
CS 487	Building Secure Computer Systems
CS 489	Human Augmentics
IE 345	Regression Applications and Forecasting in Engineering
MCS 425	Codes and Cryptography
STAT 471	Linear and Non-Linear Programming
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Total Hours	9

### Required Mathematics Courses

Code	Title	Hours
<b>Required Courses</b>		
Select two of the following:		6
MATH 215	Introduction to Advanced Mathematics	
MATH 220	Introduction to Differential Equations	
MATH 310	Applied Linear Algebra	
	or MATH 320 Linear Algebra I	
MATH 430	Formal Logic I	
MATH 435	Foundations of Number Theory	
MATH 436	Number Theory for Applications	
MCS 421	Combinatorics	
MCS 423	Graph Theory	
MCS 471	Numerical Analysis <sup>a</sup>	
STAT 473	Game Theory	
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Total Hours		6

<sup>a</sup> Students may choose to use MCS 471 as either a CS technical elective from outside the CS department or as a required mathematics course, but not both.

### Science Electives

Every student must take two courses from the list below. If additional hours are necessary to complete the ten required hours, additional courses may be other courses on this list, courses that have any of these courses as prerequisites, or other sciences and quantitative social sciences courses from a list maintained by the Computer Science department.

Code	Title	Hours
<b>Electives</b>		
Select two courses from the following: <sup>a</sup>		10
BIOS 100	Biology of Cells and Organisms	
BIOS 101	Biology of Populations and Communities	
CHEM 122	General Chemistry I Lecture & CHEM 122a and General Chemistry Laboratory I <sup>b</sup>	
	or CHEM Honors and Majors General and Analytical Chemistry I	
CHEM 124	General Chemistry II Lecture & CHEM 124a and General Chemistry Laboratory II <sup>b</sup>	

	or CHEM Honors and Majors General and Analytical Chemistry II	
PHYS 141	General Physics I (Mechanics)	
PHYS 142	General Physics II (Electricity and Magnetism)	
EAES 101	Global Environmental Change	
EAES 111	Earth, Energy, and the Environment	
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Total Hours		10

- <sup>a</sup> If chosen courses total less than ten hours, remaining hours can be satisfied as described above. These courses are approved for the Analyzing the Natural World General Education category.
- <sup>b</sup> General Education credit is only given for successful completion of both CHEM 122 and CHEM 123 or both CHEM 124 and CHEM 125.

### Free Electives

Code	Title	Hours
<b>Electives</b>		
Select 14 hours of Free Electives		14
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Total Hours		14

### Sample Course Schedule

Course	Title	Hours
<b>Freshman Year</b>		
<b>First Semester</b>		
MATH 180	Calculus I	4
CS 111	Program Design I	3
ENGL 160	Academic Writing I: Writing in Academic and Public Contexts	3
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Science Elective		5
ENGR 100	Engineering Orientation <sup>a</sup>	1
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Hours		15
<b>Second Semester</b>		
MATH 181	Calculus II	4
ENGL 161	Academic Writing II: Writing for Inquiry and Research	3
CS 141	Program Design II	3
CS 151	Mathematical Foundations of Computing	3
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General Education Core course		3
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Hours		16
<b>Sophomore Year</b>		
<b>First Semester</b>		
MATH 210	Calculus III	3
Science Elective		5
CS 211	Programming Practicum	2
CS 251	Data Structures	4
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General Education Core course		3
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Hours		17
<b>Second Semester</b>		
CS 261	Machine Organization	3
CS 301	Languages and Automata	3
IE 342	Probability and Statistics for Engineers	3
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Humanities/Social Sciences/Art Elective		3

General Education Core course		3
	Hours	15
<b>Junior Year</b>		
<b>First Semester</b>		
CS 361	Systems Programming	3
CS 362	Computer Design	3
CS 342	Software Design	3
Required Mathematics course		3
General Education Core course		3
Free Elective		2
	Hours	17
<b>Second Semester</b>		
CS 341	Programming Language Design and Implementation	3
CS 461	Operating Systems Design and Implementation	3 or 4
Required Mathematics course		3
Humanities/Social Sciences/Art Elective		3
Free Elective		4
	Hours	16-17
<b>Senior Year</b>		
<b>First Semester</b>		
CS 377	Communication and Ethical Issues in Computing	3
CS 401	Computer Algorithms I	3
CS 440	Software Engineering I	3
Technical Elective		3
General Education Core course		3
Free Elective		2
	Hours	17
<b>Second Semester</b>		
CS 442	Software Engineering II	3
Technical Elective		3
Technical Elective		3
Free Elective		3
Free Elective		3
CS 499	Professional Development Seminar	0
	Hours	15
	Total Hours	128-129

<sup>a</sup> ENGR 100 is a one-semester-hour course, but the hour does not count toward the total hours required for graduation.