BS in Computer Science with Computer Systems Concentration

To earn a Bachelor of Science in Computer Science with a Computer Systems 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
Summary of Requirements		
Nonengineering and General Education Requirements		46
Required in the College of Engineering		46
Technical Electives		18
Required Mathematics Courses		9
Free Electives		9
Total Hours		**128**

Nonengineering and General Education Requirements

Code	Title	Hours
Required Courses		
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 [a]		3
Understanding the Creative Arts course [a]		3
Understanding the Past course [a]		3
Understanding the Individual and Society course [a]		3
Understanding U.S. Society course [a]		3
Humanities/Social Sciences/Art Electives [b]		6
MATH 180	Calculus I [c]	4
MATH 181	Calculus II [c]	4
MATH 210	Calculus III [c]	3
Science Electives (See below) [d]		8
Total Hours		**46**

a *Students should consult the* General Education *section of the catalog for a list of approved courses in this category.*

b *These electives must be selected from a list of approved courses provided by the CS department.*

c *This course is approved for the Analyzing the Natural World General Education category.*

d *All courses on the science elective list below are approved for the Analyzing the Natural World General Education category.*

Required in the College of Engineering

Code	Title	Hours
Required Courses		
ENGR 100	Engineering Success Seminar [a]	1
Select one of the following:		3
CS 111	Program Design I	
CS 112	Program Design I in the Context of Biological Problems	
CS 113	Program Design I in the Context of Law and Public Policy	
CS 141	Program Design II	3
CS 151	Mathematical Foundations of Computing	3
CS 211	Programming Practicum	3
CS 251	Data Structures	4
CS 261	Machine Organization	4
CS 277	Technical and Professional Communication in Computer Science	3
CS 301	Languages and Automata	3
CS 341	Programming Language Design and Implementation	3
CS 342	Software Design	3
CS 361	Systems Programming	4
CS 362	Computer Design	4
CS 377	Ethical Issues in Computing	3
CS 401	Computer Algorithms I	3
CS 499	Professional Development Seminar	0
Total Hours		**46**

a *ENGR 100 is a one-semester-hour course, but the hour does not count toward the total required for graduation.*

Technical Electives

Code	Title	Hours
Courses		
Students must complete at least 18 hours of courses from among the following list of courses, only one of which may be outside the CS rubric. Four courses must be selected from: CS 450, CS 466, CS 473, CS 486, CS 487, and ECE 367.		18
CS 351	Advanced Data Structure Practicum	
CS 378	Framework-based Software Development for Hand-held Devices	
CS 398	Undergraduate Design/Research	
CS 402	Algorithms in Practice	
CS 407	Economics and Computation	
CS 411	Artificial Intelligence I	
CS 412	Introduction to Machine Learning	
CS 415	Computer Vision I	
CS 418	Introduction to Data Science	
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 427	Creative Coding
CS 428	Virtual, Augmented and Mixed Reality
CS 440	Software Engineering I
CS 441	Engineering Distributed Objects For Cloud Computing
CS 442	Software Engineering II
CS 450	Introduction to Networking
CS 453	Introduction to Parallel and Distributed Processing
CS 454	Principles of Concurrent Programming
CS 455	Design and Implementation of Network Protocols
CS 461	Operating Systems Design and Implementation
CS 463	Systems Performance and Concurrent Computing
CS 466	Computer Architecture
CS 468	Network Security
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 479	Wearables and Nearables Technology Laboratory
CS 480	Database Systems
CS 483	Big Data Mining
CS 484	Secure Web Application Development
CS 485	Networked Operating Systems Programming
CS 487	Building Secure Computer Systems
CS 488	Introduction to Cryptography
CS 489	Human Augmentics
ECE 367	Microprocessor-Based Design
ECE 467	Introduction to VLSI Design
ECE 469	Hardware Description Language Based Digital and Computer System Design
IT 301	Networks and Distributed Computing Technology
IT 302	Database Administration and Installation
MCS 320	Introduction to Symbolic Computation
MCS 425	Codes and Cryptography
MCS 471	Numerical Analysis
MCS 481	Computational Geometry
STAT 471	Linear and Non-Linear Programming
Total Hours	**18**

Required Mathematics Courses

Code	Title	Hours
Required Courses		
Select 9 hours from among the following courses, with at least one course taken from IE 342 or STAT 381.		9
IE 342	Probability and Statistics for Engineers [a]	
or STAT 381	Applied Statistical Methods I	
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 [b]	
STAT 401	Introduction to Probability	
STAT 473	Game Theory	
Total Hours		**9**

a *Students who take IE 342 will not receive credit for either STAT 381 or STAT 401.*

b 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.

Code	Title	Hours
Science Electives		
Select two of the following: [a]		8
BIOS 110	Biology of Cells and Organisms	
BIOS 120	Biology of Populations and Communities	
CHEM 122 & CHEM 123	Matter and Energy and Foundations of Chemical Inquiry I [b]	
or CHEM 116	Honors and Majors General and Analytical Chemistry I	
CHEM 124 & CHEM 125	Chemical Dynamics and Foundations of Chemical Inquiry II [b]	
or CHEM 118	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	
Total Hours		**8**

a *These courses are approved for the Analyzing the Natural World General Education category.*

b *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
Electives		
Select 9 hours of Free Electives		9
Total Hours		**9**

Sample Course Schedule

Course	Title	Hours
Freshman Year		
First Semester		
MATH 180	Calculus I	4
CS 111 or CS 112 or CS 113	Program Design I or Program Design I in the Context of Biological Problems or Program Design I in the Context of Law and Public Policy	3
ENGL 160	Academic Writing I: Writing in Academic and Public Contexts	3
Science Elective		4
ENGR 100	Engineering Success Seminar [a]	1
	Hours	**14**
Second Semester		
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
General Education Core course		3
	Hours	**16**
Sophomore Year		
First Semester		
MATH 210	Calculus III	3
Science Elective		4
CS 211	Programming Practicum	3
CS 251	Data Structures	4
General Education Core course		3
	Hours	**17**
Second Semester		
CS 261	Machine Organization	4
CS 301	Languages and Automata	3
Required Mathematics course		3
General Education Core course		3
Humanities/Social Sciences/Art Elective		3
	Hours	**16**
Junior Year		
First Semester		
CS 361	Systems Programming	4
CS 362	Computer Design	4
CS 342	Software Design	3
Required Mathematics course		3
General Education Core course		3
	Hours	**17**
Second Semester		
CS 341	Programming Language Design and Implementation	3
CS 461	Operating Systems Design and Implementation	3
Required Mathematics course		3
Humanities/Social Sciences/Art Elective		3
Free Elective		4
	Hours	**16**
Senior Year		
First Semester		
CS 377	Ethical Issues in Computing	3
CS 401	Computer Algorithms I	3
Technical Elective		3
Technical Elective		3
General Education Core course		3
Free Elective		2
	Hours	**17**
Second Semester		
Technical Elective		3
Technical Elective		3
Technical Elective		3
Technical Elective		3
Free Elective		3
CS 499	Professional Development Seminar	0
	Hours	**15**
	Total Hours	**128**

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