

**DEPARTMENT OF COMPUTER SCIENCE
UNIVERSITY OF ILLINOIS AT CHICAGO**

Requirements for BS in CS w/ Computer Systems Concentration – Total 128 credit hours

Non-engineering and General Education Requirements (48 Credit hours)

<u>Course #</u>	<u>Hours</u>	<u>Course Title</u>	<u>Pre-Requisites</u>
ENGL 160	3	Academic Writing I	Satisfactory performance on dept. placement test
ENGL 161	3	Academic Writing II	ENGL 160 or the equivalent
MATH 180	4	Calculus I	'C' or better in MATH 121 or appropriate performance on the dept. placement test
MATH 181	4	Calculus II	'C' or better in MATH 180
MATH 210	3	Calculus III	'C' or better in MATH 181
EWC	3	Exploring World Cultures course	See General Education section for approved list
UCA	3	Understanding the Creative Arts course	See General Education section for approved list
UP	3	Understanding the Past course	See General Education section for approved list
UIS	3	Understanding the Individual and Society course	See General Education section for approved list
UUSS	3	Understanding the U.S. Society course	See General Education section for approved list
H/SS/A	6	Humanities / Social Sciences / Art Electives	Must be selected from list approved by CS department
SE	10	Science Electives	See below for details

Required Courses in CS & COE (42 Credit hours)

<u>Course #</u>	<u>Hours</u>	<u>Course Title</u>	<u>Pre-Requisites</u>
ENGR 100	0	Engineering Orientation	Admission to the College of Engineering
CS 111	3	Program Design I	None
CS 141	3	Program Design II	CS 109 or CS 111; and credit/concurrent registration in MATH 180
CS 151	3	Mathematical Foundations of Computation	MATH 180; and 'C' or better in CS 111
CS 211	2	Programming Practicum	'C' or better in CS 141
CS 251	4	Data Structures	CS 151 or CS 201; and credit or concurrent registration in CS 211
CS 261	3	Machine Organization	Credit/concurrent registration in CS 211
CS 301	3	Languages and Automata	'C' or better in CS 151 or 201; and credit or concurrent registration in CS 251
CS 341	3	Programming Language Design and Implementation	CS 251 and CS 261; or approval of the department
CS 342	3	Software Design	CS 251
CS 361	3	Computer Systems	CS 251 and CS 261
CS 362	3	Computer Design	CS 261
CS 377	3	Communication and Ethical Issues in Computing	CS 251
CS 385/461	3	Operating Systems Concepts and Design	CS 361; or CS 201 & ECE 267
CS 401	3	Computer Algorithms I	'C' or better in CS 251 or MCS 360
CS 499	0	Professional Development Seminar	Senior & in last semester of study

Technical Electives (15 credit hours from the following – only one course maybe outside the CS rubric). Four courses must be chosen from the following: CS 450, CS 466, CS 469, CS 473, CS 486, CS 487 and ECE 367).

<u>Course #</u>	<u>Hours</u>	<u>Course Title</u>	<u>Pre-Requisites</u>
CS 398	3	Undergraduate Design/Research	Consent of the instructor
CS 411	3	Artificial Intelligence I	CS 251
CS 412	3	Introduction to Machine Learning	CS 251; & IE 342 / STAT 381; or consent of instructor
CS 421	3	Natural Language Processing	CS 301 or MCS 441
CS 422	3	User Interface Design and Programming	CS 342
CS 424	3	Visualization and Visual Analytics	CS 251; or consent of the instructor
CS 425	3	Computer Graphics I	CS 251
CS 426	3	Video Game Design and Development	CS 251; or consent of the instructor
CS 440	3	Software Engineering I	CS 342
CS 441	3	Distributed Object Programming Using Middleware	'C' or better in ((CS 341 or 342) and CS 361)
CS 442	3	Software Engineering II	CS 440
CS 450	3	Introduction to Networking	CS 361
CS 455	3	Design and Implementation of Network Protocols	CS 342 and CS 450
CS 466	3	Advanced Computer Architecture	CS 361 or ECE 366
CS 469	3	Computer Systems Design	CS 361; or ECE (366 & 368)
CS 473	3	Compiler Design	'C' or better in ((CS 301 or MCS 441) and (CS 251 or MCS 360) and (CS 261))
CS 474	3	Object-Oriented Languages and Environments	CS 342

CS 476	3	Programming Language Design	CS 341 or MCS 360
CS 477	3	Public Policy, Legal, & Ethical Issues in Computing, Privacy and Security	Consent of the instructor
CS 478	3	Software Development for Mobile Platforms	CS 342
CS 480	3	Database Systems	CS 251
CS 485	4	Networked Operating Systems Programming	CS 385
CS 486	3	Secure Operating System Design and Implementation	Credit / concurrent registration in CS 385 and 450; or consent of instructor
CS 487	3	Building Secure Computer Systems	'C' or better in CS 385 and senior standing; or consent of the instructor
CS 489	3	Human Augmentics	Senior standing; or consent of instructor
ECE 367	4	Microprocessor-Based Design	ECE 267 and "C" or better in (ECE 265 or CS 361)
MCS 320	3	Introduction to Symbolic Computation	'C' or better in ((MATH 210) and (MCS 260 or CS 107 or CS 109))
MCS 425	3	Codes and Cryptography	'C' or better in ((MATH 215) and (MATH 310 or 320)); or consent of the instructor
MCS 471	3	Numerical Analysis	'C' or better in (MCS 275 or CS 107 or CS 109); or consent of the instructor
MCS 481	3	Computational Geometry	'C' or better in CS/MCS 401 or cons. of instructor
STAT 471	3	Linear and Non-Linear Programming	'C' or better in MATH 310

Required Mathematics Courses (9 credit hours - one must be IE 342 or STAT 381). Students who take IE 342 will not receive credit for either STAT 381 or STAT 401; students may take both STAT 381 and 401. MCS 471 may be used to satisfy only of the Mathematical and Technical elective requirements (student may choose where it is applied).

<u>Course #</u>	<u>Hours</u>	<u>Course Title</u>	<u>Pre-Requisites</u>
IE 342 or STAT 381	3	Probability and Statistics for Engineers Applied Statistical Methods I	MATH 181 'C' or better in MATH 210; or approval of department
MATH 215	3	Introduction to Advanced Mathematics	'C' or better in MATH 181 & approval of the dept
MATH 220	3	Introduction to Differential Equations	'C' or better in MATH 210
MATH 310 or MATH 320	3	Applied Linear Algebra Linear Algebra I	'C' or better in MATH 210 'C' or better in MATH 215
MATH 430	3	Formal Logic I	'C' or better in (CS 251 / MCS 261 / MATH 215)
MATH 435	3	Foundations of Number Theory	'C' or better in MATH 215
MATH 436	3	Number Theory for Applications	'C' or better in MATH 435
MCS 421	3	Combinatorics	'C' or better in ((MATH 215) and (MATH 310 or 320)); or consent of the instructor
MCS 423	3	Graph Theory	'C' or better in ((MATH 215) and (MATH 310 or 320)); or consent of the instructor
MCS 471	3	Numerical Analysis	'C' or better in (MCS 275 or CS 102 or CS 108); or consent of the instructor
STAT 401	3	Introduction to Probability	'C' or better in MATH 210; approval of department
STAT 473	3	Game Theory	STAT 381; or ECON 270; or equivalents

Humanities / Social Science / Arts Electives (Must complete 6 credit hours total. DARS sometimes does not automatically recognize these classes, in those cases submit a petition in the college office SEO 123)

(i). Any of the courses contained in the EWC, UCA, UP, UIS and /or UUSS general education requirement course lists. (ii) Any course for which either a course in (1) or English 161 is a prerequisite. (iii) All courses in foreign languages; and (iv) All courses in the College of Architecture and Art (with some exceptions).

Science Electives (10 hours total. Must choose 2 courses from 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.

<u>Course #</u>	<u>Hrs</u>	<u>Course Title</u>	<u>Course #</u>	<u>Hrs</u>	<u>Course Title</u>
BIOS 100	5	Biology of Cells and Organisms	EAES 101	4	Global Environmental Change
BIOS 101	5	Biology of Populations & Communities	EAES 111	4	Earth, Energy and the Environment
CHEM 122 & 123 or CHEM 116	5	General College Chemistry I Honors General College Chemistry I	PHYS 141	4	General Physics I (Mechanics)
CHEM 124 & 125 or CHEM 118	5	General College Chemistry II Honors General College Chemistry II	PHYS 142	4	General Physics II (Electr. & Magnet.)

Free Electives (14 credit hours)