

COMPUTER SCIENCE DEPARTMENT

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

For freshmen beginning Fall 2006 and after

Computer Science Department
College of Engineering
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<http://www.cs.missouri.edu/>

The Bachelor of Science in Computer Science emphasizes the study of software systems and graphics, computational theories and algorithms, computer organization, networking, and multimedia, and programming methodology. Students who complete the BS in Computer Science can work for government agencies, academic institutions, or private industry creating and applying new technologies to solve complex problems.

To receive the BS CS, the candidate must successfully complete 120 semester hours of credit with the following distribution: CS course requirements – 54-57 hours, related course requirements - 22 hours, science course requirements - 12 hours, and general requirements – 30-36 hours. BS graduates with a GPA of 3.0 or better satisfies the undergraduate GPA entrance requirements for graduate work in Computer Science.

The BS CS requires the completion of at least six hours of mathematics beyond the 13-hour calculus sequence. Taking an additional 4000-level math course as a technical elective results in a minor in Math. Nine hours of the course work required for the minor must be completed at University of Missouri-Columbia. Application for the minor must be completed in the Math Department prior to graduation.

Computer Science students must get a C-range grade or better in all CS courses that are prerequisites for other CS courses that the student takes. To graduate, a student must earn an overall grade point average of 2.0 or better and a 2.0 grade point average or better in all courses that have an MU engineering prefix. See the MU Undergraduate Catalog for additional graduation requirements.

Course requirements listed apply to students beginning as freshmen in the Fall 2006 and after. A student who started college before Fall 2006 and who has been continuously enrolled as a full-time student may be pursuing the previous program and should contact the department for information on these degree requirements.

The Engineering Career Services Office, W1025 Lafferre Hall, can assist students in searching for employment opportunities upon graduation and for internship/co-op positions during the college years. Students can also visit www.hiremizzougrads.com for internships and full- or part-time jobs.

REQUIREMENTS FOR A BS DEGREE IN COMPUTER SCIENCE – 120 credit hours

The minimum requirements for the Bachelor of Science Degree in Computer Science are listed below. The following requirements apply to students who began college Fall 2006 or thereafter and who have been continuously enrolled. Courses in parentheses are prerequisites for the course listed.

Computer Science Courses (57 hours)

CS 1000: Introduction to Computer Science.....1
CS 1040: Introduction to Problem Solving and Programming.....3
CS 1050: Algorithm Design and Programming I (Math 1100 & CS 1040/entrance exam).....3
CS 2050: Algorithm Design and Programming II (CS 1050)3
CS 2110: Programming in C (CS 2050)3
CS 3270: Introduction to Digital Logic (CS 2050)3
CS 3280: Assembly Language and Computer Organization (CS 3270).....3
CS 3310: Systems Analysis I – writing intensive (CS 2050 and English 1000).....3
CS 3380: Database Applications and Information Systems (CS 2050)3
CS 4050: Design and Analysis of Algorithms I (CS 2050, Math 2320)3
CS 4320: Software Engineering I (CS 3310)3
CS 4520: Operating Systems I (CS 2110 in C)3
CS 4850: Computer Networks I (CS 3270 & Math 2320).....3
CS 4970: Senior Capstone Design – writing intensive (CS 4320, Senior Standing).....3
CS 4980: Senior Capstone Design II (CS 4970)2

Fifteen hours of CS courses chosen from the following list. At least nine hours of the CS electives must be numbered above 4000. One of the 4000-level courses must be CS 4410, 4430, or 4450. One 3000/4000 level IT course can be taken as a CS elective but it is counted as a lower level (below 4000) CS course. Students may also take six hours of problems or research courses.

CS 2830: Introduction to the Internet, WWW and Multimedia Systems (CS 2050).....3
CS 3530: UNIX Operating System (CS 2050 and C language)3
CS 3940: Internship in Computer Science (CS 2050).....3
CS 4001: Topics3
CS 4060: String Algorithms (CS 4050)3
CS 4085: Problems in CS varies
CS 4270: Computer Architecture I (CS 3270)3
CS 4330: Object Oriented Design I (CS 2050)3
CS 4380: Database Management Systems I (CS 3380).....3
CS 4410: Theory of Computation I (CS 3270 & Math 2320)3
CS 4430: Compilers I (CS 3270 & Math 2320)3
CS 4450: Principles of Programming Languages (CS 2050)3
CS 4610: Computer Graphics I (CS 2050, Math 1500 or Math 1300 & 1320).....3
CS 4620: Physically Based Modeling & Animation (CS 4610, good knowledge of C/C++ programming)3
CS 4650: Image Processing (CS 2050, Stat 4710 or instructor’s consent)3
CS 4670: Digital Image Compression (CS 2050)3
CS 4730: Building Intelligent Robots (CS 2050 and ECE 2210/CS 3270 or instructor’s consent)4
CS 4750: Artificial Intelligence I (CS 2050 and at least junior standing).....3
CS 4770: Intro to Computational Intelligence.....3
CS 4830: Science and Engineering of the World Wide Web (CS 2830)3
CS 4860: Network Security (CS 4850).....3
CS 4870: Wireless and Mobile Networks (CS 4850)3

CS 4990: Undergraduate Research in CS	varies
CS 4995: Undergraduate Research in CS – Honors.....	varies

Related Courses (22 hours)

MATH 1500: Analytic Geometry and Calculus I (Math 1160)	5
MATH 1700: Calculus II (Math 1500).....	5
MATH 2300: Calculus III (Math 1700)	3
MATH 2320: Discrete Math (Math 1700).....	3
STAT 4710/MATH 4315: Introduction to Mathematical Statistics (Math 2300).....	3

Technical Elective 3

Technical electives can be 2000 level and above CS courses, 4000 level Math courses, 2000 level and above Engineering courses, Management 3000, Marketing 3000, Finance 3000, and other courses that meet the prior approval of the students’ CS advisor. An IT course at the 2000 level or above can be taken as a technical elective. However, students cannot take the IT Fundamentals of Network Technology or Cyber Security course as a technical elective if they have already taken the higher level CS 4850 Computer Networks I class. **All technical electives taken outside the CS Department must meet the prior approval of the students’ CS advisor.**

Science Courses (12 hours minimum)

Twelve hours in science courses are required including one of the following 2-semester sequences. At least one of the courses must include a lab. Labs listed separately are not considered a 2nd science course (for example, Bio 1010 and 1020 = one science course).

Science Sequences (choose **one** of the following 4 sequences)

Physics Sequence (credit not given for both Physics 1210 & 2750 and Physics 1220 & 2760)

Physics 2750 University Physics I (Math 1500, corequisite Math 1700).....	5
Physics 2760 University Physics II (Math 1700 and Physics 2750, corequisite Math 2300).....	5
Or	
Physics 1210 College Physics I (Math 1100).....	4
Physics 1220 College Physics II (Physics 1210).....	4

Chemistry Sequence

Chemistry 1310 General Chem I (Math 100).....	2
Chemistry 1320 General Chem II (Chem 1310, Math 1100)	3

Biology Sequence Two courses in Biology/Biochemistry. One must be Bio 1010 and 1020.

Biology 1010 & 1020 General Biology I & Lab (Math 1100 or concurrent enrollment).....	5
And one of the following courses	
Biology 1200 General Botany	5
Anthropology 2050 or 2051 & 2052 Intro to Biological Anthropology with Lab (Math 1100/sophomore) .5	
Biology 2100 Infectious Diseases (Bio Sc 1010)	3
Biology 2600 Ornithology (5 hours biology or instructor’s consent).....	4
Biology 3050 Genetics & Human Affairs (science course).....	3
Biology 3210 Plant Taxonomy (1 semester biology/botany)	4
Biochemistry 2110 The Living World: Molecular Scale.....	3
Biochemistry 2112 Biotechnology in Society	3

Geology Sequence

Geology 1100 or 1200 Principles of Geology or Environmental Geology.....	4
And one of the following courses	
Geology 2150 The Age of the Dinosaurs (1000 level science course).....	3
Geology 2200 Oceanography (Math 1100).....	3
Geology 2300 Earth Systems & Global Change (1000 level science course)	3

Geology 2350 Historical Geology (Geol 1100/1200 and English 1000).....	3
Geology 2400 Surficial Earth Processes and Products (Geol 1100/1200 and Math 1100).....	4
Geology 2450 Global Water Cycle (Geol 1100/1200 and Math 1100).....	3
Geology 3110 & 3115 Geology of Missouri and Lab (Geol 2350).....	4

Courses to Complete 12 Hours in Science

Astronomy 1010 Intro to Astronomy I (Math 1100)	4
Astronomy 1020 Intro to Laboratory Astronomy (Astron 1010)	2
Any science sequence courses outside the student’s selected sequence.	
Any Biology, Biochemistry, Chemistry, Geology, or Physics courses beyond the levels listed above.	
Other science courses pre-approved by your advisor.	

General Requirements (30-36 hours)

1. English 1000 - Exposition and Argumentation - 3 hours "C" range grade is required
2. Complete at least 9 hours in each of the following categories. One course in one of the categories must be numbered 2000 or higher. A list of MU courses that count for social sciences, behavioral sciences, and humanities can be found at: <http://generaleducation.missouri.edu/requirements/dc-306b.pdf>.
 - (1) Humanities/Fine Arts - Must include Comm 1200 Public Speaking and courses from at least 2 departments
 - (2) Social/Behavioral Sciences - Must include a course from at least two different departments. One of the following courses is required for the Missouri Constitutional Requirement: History 1100, 1200, 1400, 2440, 2210, 4000, 4220, 4230 or Poli Sci 1100, 1700, 2100
3. Complete 9 hours of non-science electives (to complete 30-hour non-science requirement). Non-science courses cannot include math, science, computer science, or engineering courses.
4. Complete enough elective hours to bring the total credit hours that count towards the degree to 120. The electives may not include remedial courses (i.e., Math 1100, Math 1160), courses in PE, and some courses in Education.
5. Two courses must be designated “Writing Intensive.” A C-range grade in English 1000 is a prerequisite for all WI courses. A C-range grade is required in the WI courses.

Additional Graduation Requirements

1. A cumulative GPA of 2.0
2. A 2.0 GPA in all Engineering courses
3. A C-range grade in all Engineering courses that are prerequisites for other courses that the student takes

Don't Forget To

Work with your advisor on your graduation requirements

1. Fill out the Request-to-Graduate form the semester before you plan to graduate
2. Submit your Math Minor form (see www.math.missouri.edu) and forms for any other minors for which you qualify before your graduation date

COMPUTER SCIENCE BS SAMPLE DEGREE PROGRAM (Prerequisites are in parentheses)

First Semester (15 hours)

CS 1000: Introduction to Computer Science	1
CS 1040: Introduction to Problem Solving and Programming	3
MATH 1500: Analytic Geometry and Calculus I (Math 1160)	5
Constitutional Elective	3
Comm 1200: Public Speaking	3

Second Semester (14 hours)

CS 1050: Algorithm Design and Programming I (Math 1100 & CS 1040/entrance exam)	3
MATH 1700: Calculus II (Math 1500)	5
English 1000	3
Social/Behavioral Science	3

Third Semester (15-17 hours)

CS 2050: Algorithm Design & Programming II (CS 1050)	3
MATH 2300: Calculus III (Math 1700)	3
Non-Science Elective	3
Science Sequence	3-5
Humanities/Fine Art	3

Fourth Semester (15-17 hours)

CS 3270: Introduction to Digital Logic (CS 2050)	3
CS 2110: Programming in C (CS 2050)	3
CS 2xxx/3xxx Elective	3
MATH 2320: Discrete Math (Math 1700)	3
Science Sequence	3-5

Fifth Semester (15 hours)

CS 3280: Assembly Language and Computer Organization (CS 3270)	3
CS 3310: Systems Analysis I (CS 2050 and English 1000)	3
CS 2xxx/3xxx Elective	3
STAT 4710: Introduction to Mathematical Statistics (Math 2300)	3
Social/Behavioral Science	3

Sixth Semester (14-18 hours)

CS 4050: Design and Analysis of Algorithms I (CS 2050, Math 2320)	3
CS 3380: Database Applications and Information Systems (CS 2050)	3
CS 4320: Software Engineering I (CS 3310)	3
Science Elective	2-6
Technical Elective	3

Seventh Semester (15 hours)

CS 4970: Senior Capstone Design (CS 4320 and Senior Standing)	3
CS 4410 or 4430 or 4450 (prerequisites vary)	3
CS 4850: Computer Networks I (CS 3270 and Math 2320)	3
CS 4xxx Elective	3
Humanities/Fine Art	3

Eighth Semester (14 hours)

CS 4980: Senior Capstone Design II (CS 4970)	2
CS 4520: Operating Systems I (CS 2110)	3
CS 4xxx Elective	3
Non-Science Elective	3
Non-Science Elective	3