

Computer Science

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Computer science is the study of processes and machines that describe and transform information. The fundamental quest underlying all of computing is a determination of all that can be automated. The roots of the discipline extend deeply into mathematics and engineering. Mathematics contributes methods of analysis to the field; engineering contributes methods of design. The discipline was born in the early 1940s with the joining of algorithm theory, mathematical logic, and the invention of the stored program electronic computer.

At present, nine areas cover the field of computing: algorithms and data structures, programming languages, computer architecture, numerical and symbolic computation, operating systems, software methodology and engineering, database and information retrieval systems, artificial intelligence and robotics, and human-computer communications. Each area is very broad. For example, human-computer communications includes computer graphics, user interface design and voice recognition. Computer architecture includes the design of personal computers, supercomputers, and extensively parallel computers. Some aspects of computing such as parallel and distributed computation pervade all of the areas.

Each area has a theoretical component, significant abstractions, and substantial design and implementation issues. The theory is the underlying mathematics. Abstraction deals with models of possible implementations. The models suppress details while retaining essential features, and provide means for predicting the future systems. Design deals with the process of specifying a problem, transforming the problem statement into a design specification, and repeatedly inventing and investigating alternative solutions until a reliable, maintainable, documented, and tested design that meets cost criteria is achieved. The design process must recognize social, legal, and ethical constraints.

Although change is constant in computing, the change in underlying concepts is gradual; therefore, students preparing for a career in computing need to develop a firm understanding of basic principles. The ability to grow and change requires more than just technical expertise. Communication skills and a sound general education are critical if one is to have the capacity and perspective to live with and manage change. Students must develop a good understanding of the social and economic setting in which they will live and work.

The major professional organizations for computing are the Association for Computing Machinery and the Computer Society of the Institute for Electrical and Electronic Engineering. Members of these organizations work together to define the goals and content of undergraduate programs in computing. Faculty members of the Department of Computer Science are members of both professional organizations, participate in the organizations, and are committed to maintaining a program that meets professional standards. The goals and content of the department's curricula reflect the recommendations of both professional organizations.

Career Opportunities

The outlook for a person with a Bachelor's degree in computer science remains good. Areas of application continue to expand, maintaining the demand. Departmental advisers can provide information about career possibilities in computer science and can suggest elective courses that would be appropriate for various career goals and interests, including graduate study.

Admission

Students who are considering Computer Science as a major should call or visit the Department of Computer Science (Engineering Building, room 2054, telephone 618-650-2386) as early as possible. They will be referred to a faculty adviser who will provide more information about the curricula and the Department and help them plan an academic program. Early advisement will enable students to complete their programs with minimal conflicts and within the shortest possible time.

To be admitted to the Bachelor of Science or Bachelor of Arts program, students must meet the following conditions:

1. Completion of all Academic Development courses required by the University
2. Completion of any courses required to address high school deficiencies
3. Completion of MATH 120 - College Algebra (or high school equivalents) with a grade of C or better, and
4. Cumulative grade point average of at least 2.0 (on a 4.0 scale).

Academic Status

Student must meet the following standards. Students who fail to do so will be placed on probation in the major.

1. Maintain a cumulative grade point average of 2.0.
2. Maintain a term grade point average above 1.0 in any term.
3. Maintain a cumulative grade point average of at least 2.0 in all mathematics and science courses.
4. Maintain a cumulative grade point average of at least a 2.0 in courses taught in the School of Engineering.
5. Maintain a cumulative grade point average of at least 2.0 in major courses numbered above 299.
6. Receive no more than two failure grades, incomplete, and/or withdrawals in any combination for a single course required in the major.

Students placed on probation should seek immediate advisement and will be informed of the conditions required for removal from probation. If the conditions are not met, students are dropped from the major and may not enroll in upper-division School of Engineering courses without written departmental permission. After one year, students are eligible to re-apply for admission to the major. Students dropped from the major may direct a written appeal to the departmental Academic Standards Committee.

Program of Study

The Department of Computer Science offers a Bachelor of Science curriculum and a Bachelor of Arts curriculum. The Bachelor of Arts curriculum has fewer computing, mathematics, and science requirements than the Bachelor of Science curriculum; it allows students to design a program of study that will include a minor in another discipline or, with an appropriate selection of courses, a second major.

Both curricula require students to complete a senior project during their last year of study. Department advisers can provide detailed information about the senior project requirement.

Most Computer Science courses have other courses as prerequisites. Before enrolling in a course in Computer Science, students must complete the prerequisite(s) with a grade of C or better. A grade of D in a prerequisite course implies inadequate preparation to continue to the next course.

To graduate, students must complete the specific program requirements and meet the following conditions: (1) complete at least 12 hours of computer science credits at SIUE in courses numbered above 299 and with a cumulative GPA of 2.0 or above, (2) have a GPA of 2.0 or above in all Computer Science courses numbered above 299, and (3) complete at least 6 hours of credit in major courses numbered above 299 at SIUE within two years preceding graduation.

Degree Requirements Bachelor of Science Computer Science

Natural Science and Mathematics Courses	30–31
MATH 150, 152, 224 and one course in MATH from 250, 305, 321, 423	16
Laboratory Science Sequence: Either PHYS 211a, 211b, 212a, 212b or CHEM 121a, 121b, 125a, 125b	10
Natural Sciences Electives — One additional laboratory course selected from BIOL 120; CHEM 121a and 125a; PHYS 211a and 212a; or PHYS 302 and 308	4–5
Computing Core	38
CS 111, 140, 150, 240, 275, 312, 321, 325, 330, 340, 414, ECE 382	
Computing Electives	15
Five courses selected from: CS 423, 434, 438, 447, 454, 456, 482, 490, 495, ECE 481, 482, 483, MATH 465	
Senior Project	6
CS 425, 499	
General Education: Introductory Courses	9
One Fine Arts/Humanities Course and Two Social Science Courses or vice versa	9
General Education: Distribution Courses	6
Distribution Fine Arts/Humanities	3
Distribution Social Science	3
Skills Courses	15
ENG 101, 102	6
FL 106, IME 106, MATH 106, or PHIL 106	3
SPC 103, 104, or 105	3

STAT 380	3
Interdisciplinary Studies Course	3
Free Electives	1-2
Minimum Total Credit Hours Required	124
Effective, Fall 2004	

To view a sample program for a Bachelor of Science degree in Computer Science, see the School of Engineering website: www.siu.edu/ENGINEER.

Degree Requirements Bachelor of Arts Computer Science

Natural Science and Mathematics Courses	10–11
MATH 125, 130 or 150, 224	
Computing Core	34
CS 111, 140, 150, 240, 275, 312, 321, 325, 330, 340, 414	
Computing Electives	9
Three courses selected from: CS 423, 434, 438, 447, 454, 456, 482, 490, 495, MATH 465	
Senior Project	6
CS 425, 499	
Introductory GER Courses	12
2 Social Sciences & 2 Fine Arts/Humanities, or 1 Nat Sci/Math, 1 Soc Sci, & 2 Fine Arts/Hum, or 1 Nat Sci/Math, 2 Soc Sci, & 1 Fine Arts/Hum	
Distribution GER Courses	6
Distribution Fine Arts/Humanities	3
Distribution Social Science	3
Skills Courses	17
ENG 101, 102	6
Foreign Languages	8
STAT 244	3
Interdisciplinary Studies Course	3
Minor	21
Free Electives	12
Minimum Total Credit Hours Required	124

To view a sample program for a Bachelor of Arts degree in Computer Science, visit the School of Engineering website at www.siu.edu/ENGINEER.

Minor Requirements

The minor in Computer Science requires 22 semester hours consisting of CS 111, CS 140, CS 150, CS 240, CS 312, and two additional CS courses which have at least one of the above five required courses as a prerequisite. The required courses must be completed with a GPA of 2.0 or above. At least six semester hours must be earned at SIUE.