

k-state

study guide

kansas state university

Computing and Information Sciences

An estimated half of all jobs now involve some use of or interaction with computers. The use of computers will continue to increase as computer terminals and small computers appear in even more stores, banks, schools, libraries, homes, and farm environments.

In spite of their important hardware (electronic) aspects, computers owe their power to people. People design and program computers. People create application systems. People supply data to and use information from computers.

Careers

Career possibilities in computers are as numerous and varied as the applications for which computers are used. Software engineering and related occupations are forecast to be one of the fastest growing fields over the next decade. Job opportunities are open in traditional software development and in operational specialties in all areas of the economy: entertainment, business, banking, communication, manufacturing, agriculture, education, and government.

Software is embedded everywhere: in the control systems of cars, airplanes, tractors, and even in implanted medical devices such as pacemakers. Software not only connects people and information through the Internet, it drives entertainment technology such as video games, music, and animation. It enables scientific research in areas such as bioinformatics, helping develop new drugs to enhance medical care; it enables telemedicine to reach rural communities; it implements the virtual worlds of medical diagnosis; and it secures mobile and personal medical records.

Software integrates geographical information systems (GIS) and farm machinery to implement precision agriculture. In short, pick an area of society in which you want to work and contribute, and software engineering skills will provide you an open door to that profession.

Job titles for computing and information sciences graduates might be:

- ▶ Software engineer
- ▶ Software developer
- ▶ Applications developer
- ▶ Systems analyst
- ▶ Database administrator
- ▶ Systems administrator
- ▶ Web developer
- ▶ Network analyst
- ▶ Information technologist
- ▶ Systems analyst
- ▶ Systems programmer

Programs

The Department of Computing and Information Sciences is located in the College of Engineering. The department offers two undergraduate majors: computer science and information systems.

Computer science

Emphasizes the design, construction, and use of computers for entertainment, medical, embedded systems, scientific and engineering applications.

Information systems

Emphasizes business and industry applications of computing.

Graduate degrees

The department also offers master of science and PhD degrees in computer science and a master's in software engineering.

Minors and graduate certificates

A minor in computer science is offered by the department. Also, a graduate certificate in embedded systems is offered in conjunction with the Department of Electrical and Computer Engineering.

Advising

Student advising is considered an essential department activity. Each student is assigned an undergraduate advisor who helps plan a program of study, develops each semester's class schedule, and helps with any academic or personal problems. Each student also has a faculty mentor who assists with development of future plans and goals, and with exploring job opportunities. Our student advising and mentoring emphasize the university's concern for the educational development of students.

Equipment

The department's workstation labs are among the best in the Midwest. Equipment in the labs consists of more than 200 workstations, including Sun workstations, Linux machines, and PCs. These stations provide access to a variety of servers maintained by the department and have a variety of software engineering and development packages. The lab machines are also connected to the Internet and to the campus network, giving users access to computing and information resources across campus and around the world.

Additionally, the entire building is wireless, which allows students to easily access resources from their own computers.

Additional campus computer facilities are provided by both the College of Engineering and by Computing and Network Services. These facilities include numerous labs throughout campus, with Sun workstations, Linux machines, PCs, and Apple Macintoshes. These facilities provide students with exceptional opportunities for hands-on computing experience with a wide range of operating systems and application software.

The Department of Computing and Information Sciences does not require that you own a personal computer, but most students do.

Professional affiliations

Students in computer science and information systems can qualify (and are encouraged) to join several computer science societies for contact with professionals in the field and to remain abreast of the latest developments in this fast-growing area. These organizations include the Student Chapter of the Association for Computing Machinery (ACM) and the Institute of Electrical and Electronics Engineers (IEEE) Society.

Curriculum

Summary of requirements

English and speech (4 courses)

Humanities and social science electives (5–6 courses)

Mathematics (2–4) courses

Statistics (1 course)

Natural science electives (3–4 courses, including a two-semester sequence)

Economics (1 course)

Free electives (7–8 courses)

Computer science core (10 courses)

Advanced courses (5 courses)

Technical electives (2 courses)

Core courses

CIS 015 Undergraduate Seminar

CIS 200 Fundamentals of Software Design

CIS 300 Data and Program Structures

CIS 301 Logical Foundations in Programming

CIS 308 C/C++ Language Laboratory

CIS 415 Computing and Society

CIS 450 Computer Architecture and Organization

CIS 501 Software Architecture and Design

EECE 241 Introduction to Computer Engineering

DEN 325 Personal and Professional Development

Computer science option advanced courses

CIS 505 Introduction to Programming Languages

CIS 520 Operating Systems I

CIS 560 Introduction to Data Management Systems

CIS 570 Formal Language Theory or

CIS 575 Introduction to Algorithm Analysis

CIS 598 Computer Science Project

Software engineering option advanced courses

CIS 540 Software Engineering Project I

CIS 541 Software Engineering Project II

CIS 544 Advanced Software Design and Development

CIS 562 Enterprise Information Systems

CIS 625 Parallel Programming

Information systems advanced courses

CIS 362 Introduction to Business Programming

CIS 525 Telecommunications and Data Communications Systems

CIS 543 Software Engineering Design Project

CIS 562 Enterprise Information Systems

CIS 597 Information Systems Project

Information systems students are also required to take a course in accounting.

Technical electives

Computer science majors (either option) will take specialized courses in areas such as cybersecurity, game programming, embedded systems, bioinformatics, artificial intelligence, computer graphics, and many more. Information systems majors will take courses in business.

Admission and financial assistance

ACT tests are required for admission. There are a limited number of academic scholarships available to qualified students. Many students work part-time. Student research and clerical positions are frequently open in computer science. There are also many software development positions available off-campus.

High school preparation

Problem solving is an important skill in computer science and information systems, so you should pursue any courses that develop this skill. It is also important to develop sound communication skills while in high school by taking rigorous composition classes. If your school has a computer science program, you should study problem solving, programming methodology, and the Java programming language.

If you are thinking of majoring in computer science, you should take at least two years of high school algebra, one semester of trigonometry, and a course in calculus if your school offers it.

If you are considering information systems, you should take at least two years of high school algebra.

For more information about computing and information sciences, contact:

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5512–55145–07/09–1MD-500C