Computer Science
College of Engineering and Computer Science

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Emeritus Faculty
Philip Gilbert, Ruth Horgan, Larry Lichten, Dorothy Miller, John Motil, David Salomon, Brenda Timmerman

Programs
Undergraduate:
  • B.S., Computer Science
  • B.S., Computer Information Technology
  • Minor in Computer Science
Graduate:
  • M.S., Computer Science
  • M.S., Software Engineering

The Majors
Computing technology has an impact on almost every aspect of daily life. Computer applications abound in art, business, entertainment, science, engineering and medicine. For students who think logically, enjoy solving problems and have an interest in software development, Computer Science is a good study choice.

Students develop skills in logical thinking, creative problem-solving and communication. Classes often incorporate a team approach, requiring clear communication among members as they solve a problem and explain their solution to others.

Students gain both hands-on design experience as well as theoretical knowledge. This combination of skills provides an advantage to graduating students because of the broad range of skills possessed.

Computer Science focuses on the designing and building of software to create efficient solutions to real-world problems in fields such as robotics, networking, graphics, software engineering and security. Students frequently specialize in more than one of these fields.

Computer Information Technology is designed for students interested in professional careers involving the design of solutions to informational technology infrastructure needs for companies and organizations. Graduates of the CIT program will have an applied knowledge of such fields as web programming, system infrastructure, databases, networking, e-business, project management, data center management, security and information assurance.

Classes are generally small, with lab sessions averaging less than 25 students. Students work alongside faculty in department labs equipped with state-of-the-art computing equipment.

Students can gain extra experience in the Student Chapter of the ACM (affiliated with the national organization), which hosts technical and social activities as well as the Honors Co-op Program which provides paid internships during the senior year at local companies.

Academic Advisement
Contact the Department Office regarding undergraduate advisement. Graduate students are initially advised by the Graduate Coordinator, Richard Lorentz. After the formation of their Graduate Committees, graduate students are advised by the Committee Chair.

Educational Objectives for the Undergraduate Program in Computer Science
The education objectives of the Bachelor of Science in Computer Science are to ensure that each graduate:
1. Understands the principles of computer science and problem solving.
2. Has an awareness of computing practices in industry and emerging technologies, emphasizing a working knowledge of current software design and development techniques.
3. Understands the impact of computing technologies in a societal context.
4. Has an education that enables them to pursue rewarding professional careers, graduate studies and lifelong learning.

Educational Objectives of the Undergraduate Program in Computer Information Technology
The BS CIT program aims to provide Information Technology graduates with the skills and knowledge to take on appropriate professional positions in Information Technology upon graduation and grow into leadership positions or pursue research or graduate studies in the field. Specifically, the educational objectives of the Bachelor of Science in Computer Information Technology are to ensure that each graduate is able to:
1. Explain and apply appropriate information technologies and employ appropriate methodologies to help an individual or organization achieve its goals and objectives;
2. Manage the information technology resources of an individual or organization;
3. Anticipate the changing direction of information technology and evaluate and communicate the likely utility of new technologies to an individual or organization;
4. Understand and for some to contribute to the scientific, mathematical and theoretical foundations on which information technologies are built;
5. Live and work as a contributing, well-rounded member of society exhibiting intellectual breadth and lifelong intellectual curiosity required to practice IT management functions creatively, sensitively, and responsibly in contemporary global and societal environments.

Student Learning Outcomes of the Undergraduate Program in Computer Science
Graduates of the Bachelor of Science in Computer Science at California State University, Northridge will be able to:

a. Apply knowledge of computing and mathematics appropriate to the discipline
b. Analyze a problem, and identify and define the computing requirements appropriate to its solution
c. Design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
d. Function effectively on teams to accomplish a common goal
e. Understand professional, ethical, legal, security and social issues and responsibilities
f. Communicate effectively with a range of audiences
g. Analyze the local and global impact of computing on individuals, organizations, and society
h. Recognize the need for and engage in continuing professional development
Student Learning Outcomes of the Undergraduate Program in Computer Information Technology

In order to achieve the educational objectives listed above students graduating from the BS CIT program will acquire the following skills and abilities:

a. An ability to apply knowledge of computing and mathematics appropriate to the discipline
b. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
c. An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
d. An ability to function effectively on teams to accomplish a common goal
e. An understanding of professional, ethical, legal, security and social issues and responsibilities
f. An ability to communicate effectively with a range of audiences
g. An ability to analyze the local and global impact of computing on individuals, organizations, and society
h. Recognition of the need for and an ability to engage in continuing professional development
i. An ability to use current techniques, skills, and tools necessary for computing practice.
j. An ability to use and apply current technical concepts and practices in the core information technologies.
k. An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.
l. An ability to effectively integrate IT-based solutions into the user environment.
m. An understanding of best practices and standards and their application.
n. An ability to assist in the creation of an effective project plan.

Student Learning Outcomes of the Graduate Program in Computer Science

Graduates of the Master of Science in Computer Science at California State University, Northridge will be able to:

a. Demonstrate a knowledge and competence in fundamental areas of computer science such as: algorithms, design and analysis, computational theory, computer architecture and software based systems.
b. Demonstrate the analytic skills necessary to effectively evaluate the relative merits of software and computer systems, and algorithmic approaches.
c. Demonstrate a breadth of knowledge in a choice of application areas in computer science, including: networks, artificial intelligence, graphics, human computer interfaces, databases, embedded applications and information security.
d. Understand computer science topics (such as database management, data security, program efficiency, etc.) in a global context (ethics, privacy, human expectations, etc.)
e. Effectively communicate in both written and oral form, especially in areas related to computer science.
f. Work productively in team or collaborative settings to achieve common goals or purposes including the ability to lead a team.

g. Analyze, evaluate and synthesize research and apply theoretical ideas to practical settings.
h. Independently continue their studies in computer science throughout their life.

Student Learning Outcomes of the Graduate Program in Software Engineering

Graduates of the Master of Science in Software Engineering at California State University, Northridge will be able to:

a. Understand software engineering concepts, techniques, practices and tools, and apply them to real problems in a variety of contexts.
b. Define and apply a software process to large-scale real-world problems including requirements analysis and specification, software design and implementation, verification, validation and quality assurance, and the maintenance of software.
c. Analyze and estimate software process costs and manage software development from concept to delivery.
d. Identify, analyze and apply software standards in software engineering practice.
e. Analyze, assess and interpret professional codes of ethics and regulatory documents pertaining to software engineering and under stand societal issues.
f. Generate and apply appropriate solutions to solve problems based on reasoned rationale.
g. Work productively in term or collaborative settings to achieve common goals or purposes including the ability to lead a team.
h. Analyze, evaluate and synthesize research and apply theoretical ideas to practical settings.
i. Effectively present ideas, designs and solutions in a logical framework in a variety of forms with proper language structure and mechanics, and to produce appropriate written documentation.
j. Recognize the need for, and show an ability for, dealing with constantly changing technology and continuing professional development.

Careers

A degree in computer science can lead to a career as a software engineer, designing, implementing, testing and maintaining large software systems, or a career in such specialized fields as computer graphics, computer security, robotics, expert systems, distributed systems, embedded applications, network applications, and networking. The degree can lead to a career in almost any industry, including aerospace, manufacturing, banking, health, research, entertainment and education.

A degree in computer information technology can lead to a career in such fields as computer system administration, database administration, website development and administration, enterprise network administration, computer system analysis, computer system planning, computer forensic analysis, and IT management.

Department Programs

The B.S. degree is Computer Science provides a broad knowledge of computing and is designed for students who desire: (a) to pursue graduate work in computer science; (b) to work on the development and support of software projects in a diverse range of specialized areas. The Computer Science degree consists of a pre-major followed by additional foundation courses and a 15-unit Senior Electives package. The core of the program covers programming languages, computer system organization, operating systems, data structures, computation theory and societal implications in computing. The Senior Electives package allows students to specialize in such fields as artificial intelligent, embedded applications, networking, gaming, graphics, software engineering and security.

The B.S. degree in Computer Information Technology is designed for students interested in a professional career involving solving the