

COMPUTER SCIENCE

COLLEGE OF ARTS AND SCIENCES

The Department of Computer Science at Kent State University offers coursework and curriculum leading to the Bachelor of Science degree in Computer Science. This program meets the needs of both students wishing to pursue a career immediately upon graduation and students planning for graduate studies in computer science. The curriculum is aligned with the most recent ACM/IEEE-CS curriculum guidelines and as such offers a good balance of practical skills and underlying knowledge necessary for adapting to the ever-changing needs of technology.

MISSION STATEMENT

The mission of the Bachelor of Science program in computer science at Kent State University is to instill the student with a system level perspective that transcends the implementation details of individual software components, to appreciate the structure of such software systems, and understand the processes involved in their construction. Graduates of the program understand not only the theoretical underpinnings of the discipline but also how that theory influences and is applied in practice. The program emphasizes the key themes of abstraction, complexity and evolutionary change as applied to development and analysis of software. The program provides a solid foundation that allows the student to maintain his or her skills in this rapidly evolving field.

CAREERS FOR GRADUATES

Computers impact the lives and business practices of almost everyone in the industrialized world. Many careers in computer science involve a large amount of social interaction with users and customers to determine product requirements or problems. Careers often require creativity and drive to develop and apply new technology. Software is seldom developed alone but is instead built by teams of bright, social and creative individuals. Certainly, computer science is one of the most exciting and rewarding career choices for the future.

FACULTY

The department has 18 professors at the Kent Campus and one professor at Kent State University at Stark. The department's professional undergraduate advisors and faculty assist students in planning short-range and long-range coursework to meet the students' career goals. Most faculty members are active researchers. Many faculty members are nationally and internationally recognized in their research. They regularly apply their research experience and knowledge to enhance the curriculum directly in the classrooms.

DEGREE REQUIREMENTS

The degree program has a total of 70 credit hours in the major and around 19-22 credit hours for minors. The course sequence is divided in five categories: foundational, core topics, senior-level required courses, open electives for special topics and a capstone course that integrates knowledge from various courses using a term-long team-oriented software development project. In addition, the department has an industrial internship program that provides aspiring students with real-world experience.

Students begin with foundation courses that focus on programming and problem solving. The foundational courses are delivered with highly coordinated lecture and laboratory components, where lab instructors assist and direct students in a hands-on interactive learning environment.

Foundational courses include:

- Introduction to Computer Science (4)
- Discrete Structures (3)
- Computer Science I: Programming and Problem Solving (4)
- Computer Science II: Data Structures and Abstraction (3)

Three courses in mathematics complement the computer science material:

- Calculus I (5)
- Calculus II (5)
- Linear Algebra (3)

The foundational courses are followed by a set of core topics that prepares students for the senior-level courses:

- Computer Architecture (3)
- Operating Systems (3)
- Structure of Programming Languages (3)
- Social and Ethical Issues in Computers (3)

Five senior-level required courses then prepare student with specialized knowledge and integrative experience:

- Algorithms (3)
- Computer Networks (3)
- Database (3)
- Software Engineering (3)
- Capstone Project (4)

Career Opportunities

- **Computer science majors have an average salary of \$56,000 a year (in 2010). The current job market is one of the best in five years with very good long-term growth potential.**
- **Contrary to the myth of jobs being lost to offshore outsourcing, the federal government, the state of Ohio and the Northeast Ohio Technology Coalition (NORTECH) have projected significant job growth in computing. The demand for the skilled computer programmers and the computer specialists will significantly exceed the supply for years to come.**
- **Out of every 100 new technical jobs filled in the USA, 71 will go to the computer specialists.**

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To provide flexibility and to allow for a tailored program consistent with the market demands and students' aspirations, students also choose five elective courses (15 credit hours) in subjects such as:

- Artificial Intelligence (3)
- Automata Theory (3)
- Bioinformatics (3)
- Compilers (3)
- Computer Graphics (3)
- Cryptology (3)
- Formal Logic (3)
- Game Design (3)
- Human Computer Interaction (3)
- Information Security (3)
- Internet Engineering (3)
- Industrial Internship (3)
- Multimedia Systems and Languages (3)
- Numerical Computing (3)
- Parallel and Distributed Computing (3)
- Scientific Visualization (3)
- System Administration (3)
- Systems Programming (3)
- Unix Tools (3)
- VLSI Design (3)
- Web Development and Programming (3)

In addition to the electives, the students are offered timely special topics courses such as Game Design, Mobile Ad hoc Networks and Generic Software and Library Design in the last two semesters to meet the market demands. Undergraduates with a good GPA may also take graduate-level classes.

UNDERGRADUATE RESEARCH

Undergraduate research is a great experience for burgeoning scholars to explore new directions or to choose research/teaching as a profession. The department provides ample opportunities through federally funded, state of Ohio funded projects and through internships to national laboratories to provide junior/senior-level students with undergraduate research experience.

GRADUATE STUDIES

The department has offered the degrees of Master of Science and Doctor of Philosophy in computer science since 1986. Most of the faculty are active researchers involved in publishing, attracting external funding and training graduate students.

FACILITIES

The department facilities include a large number of servers supported by a state-of-the-art network infrastructure (wired and wireless) with a gigabit (billion bits/second) backbone. This facility is in addition to the universitywide connectivity provided by the university. Four system staff members maintain and support these facilities.

Three instructional laboratories (each with approximately 22 machines and a projection system) are available in the building for use by students. Both Linux and Windows operating system platforms are supported. Additionally, there are a number of special purpose research laboratories that support the learning environment.

STUDENT ORGANIZATION

The department sponsors local student chapters of two major computer science organizations: ACM (Association of Computing Machinery) and IGDA (International Game Developers Association). These chapters hold numerous seminars interesting to students.

CAREER OPPORTUNITIES

Professionals in the following areas need a deep understanding of all aspects of computer science and the system development skills that only computer science graduates have.

- Bioinformatics and Medical Informatics
- Computer Design and Development
- Computer Graphics and Visualization
- Information Security/Data Integrity
- Database Administration/Programming
- Game Design and Development
- Human Computer Interaction
- Image Processing/Multimedia Systems
- Information Technology
- Intelligent Systems
- Internet Engineering/Computer Security
- K-12 Teaching in Computer Technology
- Network Design and Administration

- Parallel and Distributed Computing
- Software Development/Programming
- Software Engineering
- Software Project Management
- System Administration
- System Analysis and Management
- Web Development/Administration
- Wireless/Sensor Network Development

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