

Revised Computer Science Catalog Text

Bachelor of Science degree with a major in Computer Science

Minor in Computer Science

Certificate of Study in Bioinformatics

(see Certificates of Study)

Department Chair

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The Program

Students who graduate from this program will have demonstrated:

- Computational thinking, a way of problem solving which draws upon central computing concepts, such as abstraction, virtualization, algorithmic development and analysis, recursion, and induction
- Self-directed learning, whereby graduates may maintain their currency in the field by formulating their own learning goals, identifying learning strategies, identifying available resources, implementing learning strategies, and evaluating learning outcomes
- Communicating and collaborating, which pairs the written and oral skills to deliver information with the ability to respect and embrace the diversity others bring to a team
- The ability to produce and digest technical documents

The Computer Science program prepares students for roles across the breadth of computer science, in industry, service, and research. Our approach to computer science includes a rigorous and balanced core of mathematical, theoretical and practical knowledge about computation. Students in our department spend more instructional hours on topics central to computer science than at many similar institutions, while electives in topics like robotics and bioinformatics programming challenge students to deeply employ the tools of their discipline. Our approach also emphasizes active engagement of students in the learning

process both in and beyond the classroom. To support this approach, faculty vigorously pursue professional development.

Majors have access to a departmental lab, which provides dual-booting Linux and Windows platforms with many language compilers. Our Internet Teaching Laboratory (ITL) provides an isolated network for network design experimentation and student investigations in computer security. The ITL lab also serves as the department's center for robotics instruction by housing a collection of robot kits used for courses held in neighboring lab spaces. Servers for n-tier application development are also available to students.

Students participate in the Computer Science Club, affiliated with the national Association for Computing Machinery (ACM). Many students enjoy internship opportunities. Faculty typically hold memberships with professional organizations including the ACM, IEEE Computer Society, and the Consortium for Computing in Small Colleges.

Job Prospects

Numerous careers are available to graduates in this major, including software engineering and software development; network maintenance, implementation, and design; database design and web interface development; scientific computing; and innumerable more. Many of our students pursue graduate studies in areas such as computer graphics, parallel computing, man-machine interfaces, data communications, computational philosophy, expert systems, artificial intelligence, embedded computer applications, distributed systems, and networking.

The job forecast for computer specialists is outstanding. More than 750,000 new jobs will be created between 2008 and 2018, according to the Federal Bureau of Labor Statistics. An analysis of their data by Calvin College revealed that 71% of the anticipated increase in *all* science and engineering jobs will be in computing. The National Association of Colleges and Employers reports consistently high wage growth across the industry.

Preparation

Oral and written communication skills are central to success in college science majors, including computer science. Prospective students should take as many English, speech,

and mathematics courses as possible, as well as general science courses.

Students transferring from a community college should also take courses meeting the Lower Division Transfer Protocol (LDTP) for computer science. We strive to quickly graduate students meeting the LDTP and general education requirements.

REQUIREMENTS FOR THE MAJOR

Lower Division

CS 111	Computer Science Foundations 1
CS 112	Computer Science Foundations 2
CS 211	Data Structures
CS 212	Algorithms
CS 243	Architecture
CS 274	Operating Systems
STAT 108	Elementary Statistics
MATH 105 or	Calculus for the Biological Sciences & Natural Resources
MATH 109	Calculus I
MATH 253	Discrete Mathematics

Upper Division

CS 325	Database Design
CS 328	Web Apps Using Databases
CS 346	Telecommunications & Networks
CS 449	Computer Security
CS 458	Software Engineering
CS 461	Computational Models

Choose two of the following:

CS 232	Python Programming
CS 235	Java Programming
CS 237	Bioinformatics Programming
CS 279	Introduction to Linux
CS 280	Selected Topics in Computing
CS 444	Robotics
CS 475	Geographic Information Systems
CS 480	Advanced Topics in Computing
CS 482	Internship
CS 499	Directed Study
MATH 351	Introduction to Numerical Analysis

REQUIREMENTS FOR THE MINOR

CS 111	Computer Science Foundations 1
CS 112	Computer Science Foundations 2

Plus three additional approved Computer Science courses, at least two of which are upper division, with total units equal to at least 18 units. These courses may not include general education courses.

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