COMPUTER SCIENCE

The Department of Computer Science at North Dakota State University offers course work leading to bachelor's, master's and doctoral degrees in computer science and, at the graduate level, in software engineering. Options in cybersecurity are available within the computer science and software engineering M.S. and Ph.D. programs. The department is a designated Center for Academic Excellence in cybersecurity research (CAE-R) by the National Security Agency (NSA) and the Department of Homeland Security (DHS).

Background Information

As an undergraduate student, an advisor is assigned to help in choosing electives in their particular area of interest. For students with no or very limited computer experience, we offer introductory courses in the standard curriculum for majors. Advanced undergraduate students may have the opportunity to take graduate courses while completing their undergraduate program. An extensive and varied set of elective courses in every aspect of computer science is available as well.

The Program

B.A. and B.S. degrees in Computer Science are offered. We offer several double majors, including Math and Computer Science, Physics and Computer Science, and Statistics and Computer Science. A 4+1 program is available for undergraduates with a 3.5 grade point average or better to complete a B.S. and an M.S. in as little as five years. In the 4+1 program, graduate courses taken while an undergraduate are used for both the B.S. and M.S. degree requirements.

We offer the most comprehensive and varied computer science programs in the region. In the core courses required of all majors, students are offered an opportunity to study concepts, applications and implementation techniques which provide a broad and practical base both for a satisfying, well-paying career in computer science and for advanced study. The curriculum offers an opportunity for an in-depth study of topics such as artificial intelligence, software engineering, cybersecurity, machine learning, data science, system simulation, computer communication networks, multimedia, operating systems and database management systems. A departmental recognition in cybersecurity is offered within the B.S. degree program. The department is expanding offerings in software engineering, data mining, and bioinformatics. Students are encouraged to choose courses from related areas, such as business, economics, engineering, mathematics, operations research and statistics to broaden their program of study. A senior capstone experience that provides a semester long project for the industry is required and provides an opportunity to add maturity to the computer science skill set before graduation. Starting with the junior year, students may pursue co-op and internship opportunities.

Career Opportunities

Computer scientists choose jobs in government, industry, teaching, research, agriculture, energy and other areas. A 2019 study showed that four of the eleven jobs with the most potential for growth are in areas taught by the Department. Graduates in computer science might choose a job any of these areas: artificial intelligence, systems analysis, software development/engineering, security, information assurance, cybersecurity, bioinformatics, data science, web development, networking, information system development, database management, technical support, automatic systems, robotics, simulation models, and internet of things.

According to the Federal Bureau of Labor Statistics, software engineers, cybersecurity analysts, network systems and data communication analysts, computer scientists and database administrators are expected to be among the fastest growing occupations. Employment of these computer specialists is expected to increase much faster than average. Our programs provide excellent foundations for successful careers in these areas. As an undergraduate student, you will find many opportunities to work part-time as a research assistant on campus, or as a paid intern with a local or regional business.

Graduates of our department have recently accepted employment in major national businesses, including Hewlett-Packard, IBM, AT&T, Apple, CISCO Systems, Google, Adesto, Cargill, SGI, FAST Enterprises, Medtronic, Microsoft, Bobcat, Facebook, Digi-key, John Deere, Amazon, Intel, Raytheon, Target Corp. and Thomson Reuters. Many have chosen positions in North Dakota and adjoining states. There is a large and growing need for computer professionals in North Dakota.

During the final semester of their senior year, students take part in a capstone program. The objective of the capstone program is to provide the students with an experience that brings together the technical knowledge they have acquired while fostering valuable teamwork skills. This is accomplished by working in small teams on real-life projects. Capstone projects are done in conjunction with corporate, industrial or government clients/sponsors. Recent sponsors include Adventium, Aeritae Consulting, Appareo, ATC, BargInns, BCBSND, Border States Electric, Botlink, Bushel, Capturis, Collins Aerospace, Fjorge, IBM, Inwerken, John Deere, Marvin Windows, Microsoft, NAU Country, Noridian, OpenStack, Pedigree Technologies, Scheels, and UGPTI.

The Facilities

The department is located in the Quentin Burdick Building along with Information Technology Services. Students have free access to a wide range of computer systems.

Equipment includes running a cluster of Linux workstations, cyber range, drones, microcomputers, and 3D printers, running virtual machines, Windows, Macs, and peripheral equipment including visualization systems. The department and the University have assumed a leadership role in computer networking through the acquisition and implementation of high-bandwidth network switches on campus. The University also has entered into a six-state consortium for extremely high-level networking in the Upper Midwest. The high-perfomance Center for Computationally Assisted Science and Technology (CCAST) is available, We are also a charter member of Internet2 and have connectivity to the national vBNS research network. The department maintains several Web servers with class assignments and other information which are accessed by thousands of users each day. The University provides more than 600 computers for student use. Internet usage is unlimited for students.

High School Preparation

You should have the basic college preparatory courses in high school. Courses that develop the ability to think logically, to organize and to analyze are especially recommended (e.g., algebra, geometry, trigonometry, statistics and calculus).

Computer Science Plan of Study – Calculus Ready

Please note this is a sample plan of study and not an official curriculum. Actual student schedules for each semester will vary depending on start year, education goals, applicable transfer credit, and course availability. Students are encouraged to work with their academic advisor on a regular basis to review degree progress and customize an individual plan of study.

Freshman			
Fall	**Credits**	**Spring**	**Credits**
CSCI 160 Computer Science I	4	CSCI 161 Computer Science II	4
MATH 165 Calculus I	4	MATH 166 Calculus II	4
Gen Ed Science & Technology and Lab	4	ENGL 120 College Composition II	3
ENGL 110 College Composition I	4	Gen Ed Science & Technology	3
		Gen Ed Humanities & Fine Arts/Gen Ed Global Perspectives	3
	16		**17**
Sophomore			
Fall	**Credits**	**Spring**	**Credits**
CSCI 213 Modern Software Development	3	CSCI 313 Advanced Software Development	3
CSCI 222 Discrete Mathematics	3	CSCI 336 Theoretical Computer Science	3
COMM 110 Fundamentals of Public Speaking	3	Gen Ed Social & Behavioral Sciences/Gen Ed Cultural Diversity	3
Gen Ed Social & Behavioral Sciences	3	Gen Ed Wellness	2-3
Gen Ed Science & Technology	3	Elective	3
	15		**14-15**
Junior			
Fall	**Credits**	**Spring**	**Credits**
CSCI 372 Comparative Programming Languages	3	CSCI 467 Algorithm Analysis	3
STAT 367 Probability	3	STAT 368 Statistics	3
CSCI 366 Database Systems	3	CSCI 374 Computer Organization and Architecture	3
Gen Ed Humanities & Fine Arts	3	Gen Ed Upper Level English	3
CSCI Elective I	3	(ENGL 321 Writing in the Technical Professions or ENG 324 Writing in the Sciences strongly recommended)	
		Elective	3
	15		**15**
Senior			
Fall	**Credits**	**Spring**	**Credits**
CSCI 489 Social Implications of Computers	3	CSCI 415 Networking and Parallel Computation	3
CSCI 474 Operating Systems Concepts	3	CSCI 445 Software Projects Capstone	3
CSCI Elective II	3	CSCI Elective III	3
Additional Electives	4	Additional Elective	6
	13		**15**
Total Credits: 120-121			

Computer Science Plan of Study – Preparatory Math Plan

For students who may not feel "calculus ready", another degree path to completing a B.S. in Computer Science is available. A sample plan of study can be found here: https://bulletin.ndsu.edu/programs-study/undergraduate/computer-science/

View NDSU equivalencies of transfer courses at: www.ndsu.edu/transfer/equivalencies

For Further Information

MAILING ADDRESS: Computer Science | NDSU Dept 2455 QBB 258 | PO Box 6050 | Fargo, ND 58108-6050
DEPT LOCATION: Quentin Burdick Building 258
DEPT EMAIL: ndsu.computer.science@ndsu.edu
DEPT PHONE: (701) 231-8562
DEPT WEBSITE: www.ndsu.edu/cs/