

COMPUTER SCIENCE, BACHELOR OF SCIENCE

The Bachelor of Science in Computer Science provides students with a solid background in the fundamentals of computing and prepares them for employment in a wide variety of positions and for graduate study in computer science. The content of the department's courses is continually monitored to ensure they are consistent with fast-changing developments in the discipline. Courses are offered in the day, evening, and some online sections for the convenience of our students. Appropriate university and departmental computing resources are available to students taking computer science courses.

Student Group

The Association of Computer Machinery (ACM) (<https://www.acm.org/>) is a major force in advancing the skills of information technology professionals and students worldwide, providing the industry's leading portal to computing literature and more. The College of Information Science & Technology has two student chapters: UNO ACM and UNO ACM-W.

Fast Track

The department of Computer Science has developed a Fast Track program for highly qualified and motivated students providing the opportunity to complete a bachelor's degree and a master's degree in an accelerated time frame. With Fast Track, students may count up to 9 graduate credit hours towards the completion of their undergraduate program as well as the graduate degree program. Students will work with both undergraduate and graduate advisors to ensure graduate classes selected will count toward both programs, should a student wish to earn a graduate degree in a separate College of Information Science & Technology (CIST) area than their undergraduate degree.

Program Specifics:

- This program is available for undergraduate students pursuing any CIST undergraduate degree desiring to pursue an MS in either the same or a related CIST field.
- Students must have completed no less than 60 undergraduate hours.
- Students must have a minimum undergraduate GPA of 3.0.
- Students must complete the Fast Track Approval form and obtain all signatures and submit to the Office of Graduate Studies prior to first enrollment in a graduate course.
- Students will work with their undergraduate advisor to register for the graduate courses.
- A minimum cumulative GPA of 3.0 is required for graduate coursework to remain in good standing.
- Students remain undergraduates until they meet all the requirements for the undergraduate degree and are eligible for all rights and privileges granted undergraduate status including financial aid.
- Near the end of the undergraduate program, formal application to the graduate program is required. All applicants will need to meet any other admission requirements established for the MS in selected CIST program. The application fee will be waived if the applicant contacts the Office of Graduate Studies for a fee waiver code prior to submitting the MS application.
 - Admission to Fast Track does NOT guarantee admission to the graduate program.
 - The admit term must be after the completion term of the undergraduate degree.

Requirements

A minimum of 120 credit hours is required for a Bachelor of Science degree in Computer Science. Thirty of the last 36 hours must be University of

Nebraska at Omaha courses. Registering for courses without having taken the stated prerequisites could result in administrative withdrawal. Students must have a C or better grade in CIST 1400 and CSCI 1620 to serve as the prerequisite for all subsequent Computer Science (CSCI) courses. For all other courses applied towards the major, a grade of C- or better will meet the prerequisite and degree requirements.

To obtain a computer science degree, a student must fulfill the University General Education, College, and Departmental requirements. Some courses may satisfy requirements in more than one area, but credit is awarded only once, thereby reducing the total number of credit hours for the degree to 120. (This total does not include prerequisites.)

Code	Title	Credits
University General Education (46 hours, 22 hours of which can be satisfied by courses in the required areas below)		24
College of IS&T Core		15
Mathematics		15
Computer Science Core		30
Computer Science Core Extension		21
Natural and Physical Science Courses		7
Electives		8
Total Credits		120

Code	Title	Credits
College of IS&T Core Courses for Computer Science Majors		
The College of IS&T has developed a series of courses that are required for students wishing to obtain a degree from the College. The development and implementation of this core curriculum is unique; it serves as a basis for preparing students to enter more advanced courses. The core curriculum is as follows (students are accountable for prerequisites courses):		
CIST 1400	INTRODUCTION TO COMPUTER SCIENCE I	3
CSCI 1620	INTRODUCTION TO COMPUTER SCIENCE II	3
CSCI 2240	INTRODUCTION TO C PROGRAMMING	3
CIST 2100	ORGANIZATIONS, APPLICATIONS AND TECHNOLOGY ¹	3
CIST 3110	INFORMATION TECHNOLOGY ETHICS ²	3
Mathematics Courses		
MATH 1950	CALCULUS I ³	5
CSCI 2030	MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	3
CSCI 2040	INTRODUCTION TO MATHEMATICAL PROOFS	1
MATH 2050	APPLIED LINEAR ALGEBRA	3
CIST 2500	INTRODUCTION TO APPLIED STATISTICS FOR IS&T	3
Department Requirements for the BSCS Degree Computer Science Required Courses		
CSCI 3320	DATA STRUCTURES	3
CSCI 3550	COMMUNICATION NETWORKS	3
CSCI 3660	THEORY OF COMPUTATION	3
CSCI 3710	INTRODUCTION TO DIGITAL DESIGN AND COMPUTER ORGANIZATION	3
CSCI 4100	INTRODUCTION TO ALGORITHMS	3
CSCI 4220	PRINCIPLES OF PROGRAMMING LANGUAGES	3
CSCI 4350	COMPUTER ARCHITECTURE	3
CSCI 4500	OPERATING SYSTEMS	3

CSCI 4830	INTRODUCTION SOFTWARE ENGINEERING	3	CSCI 3830	ADVANCED JAVA PROGRAMMING	3	
CSCI 4970	CAPSTONE PROJECT	3	CSCI 3850	FOUNDATIONS OF WEB SEARCH TECHNOLOGIES	3	
CSCI 4000	ASSESSMENT (MFT) ⁴	0	CSCI/MATH 4010	INTRODUCTION TO THE THEORY OF RECURSIVE FUNCTIONS	3	
Computer Science Core Extension Courses			CSCI/MATH 4150	GRAPH THEORY & APPLICATIONS	3	
See "Computer Science Core Extension Courses" below.			21	CSCI/MATH 4200	NUMERICAL METHODS	3
Natural and Physical Science Courses			CSCI 4250	HUMAN COMPUTER INTERACTION	3	
Computer Science majors must successfully complete 7 credit hours from the following list, representing at least 2 disciplines with a minimum of 1 laboratory course:			7	CSCI 4260	USER EXPERIENCE DESIGN	3
PHYS 1110	GENERAL PHYSICS I		CSCI/MATH 4300	DETERMINISTIC OPERATIONS RESEARCH MODELS	3	
PHYS 1154	GENERAL PHYSICS LABORATORY I		CSCI/MATH 4310	PROBABILISTIC OPERATIONS RESEARCH MODELS	3	
PHYS 2110	GENERAL PHYSICS I - CALCULUS LEVEL		CSCI/MATH 4320	COMPUTATIONAL OPERATIONS RESEARCH	3	
CHEM 1170	GENERAL CHEMISTRY I-II		CSCI/CYBR 4380	DIGITAL FORENSICS	3	
CHEM 1180	GENERAL CHEMISTRY I		CSCI/CYBR 4430	QUANTUM COMPUTING AND CRYPTOGRAPHY	3	
CHEM 1184	GENERAL CHEMISTRY I LABORATORY		CSCI 4440	INTRODUCTION TO PARALLEL COMPUTING	3	
BIOL 1450	BIOLOGY I		CSCI 4450	INTRODUCTION TO ARTIFICIAL INTELLIGENCE	3	
BMCH 2400	HUMAN PHYSIOLOGY & ANATOMY I		CSCI 4470	PATTERN RECOGNITION	3	
GEOL 1170	INTRODUCTION TO PHYSICAL GEOLOGY		CSCI 4480	ALGORITHMS FOR ROBOTICS	3	
GEOL 1100	EARTH SYSTEM SCIENCE		CSCI/MATH 4560	NUMBER THEORY & CRYPTOGRAPHY	3	
GEOL 1104	EARTH SYSTEM SCIENCE LAB		CSCI 4620	COMPUTER GRAPHICS	3	
GEOG 3510	METEOROLOGY		CSCI 4650	INTRODUCTION TO CLOUD COMPUTING	3	
GEOG 3514	INTRODUCTION TO METEOROLOGY LABORATORY		CSCI/MATH 4660	AUTOMATA, COMPUTABILITY, AND FORMAL LANGUAGES	3	
Total Credits		88	CSCI 4700	COMPILER CONSTRUCTION	3	
			CSCI 4850	DATABASE MANAGEMENT SYSTEMS	3	
			CSCI 4890	DATA WAREHOUSING AND DATA MINING	3	
			CSCI 4900	INTERNET SYSTEMS DEVELOPMENT	3	
			CSCI 4950	INTERNSHIP IN COMPUTER SCIENCE	1-3	
			CSCI 4980	TOPICS IN COMPUTER SCIENCE	3	
			CSCI 4990	INDEPENDENT STUDIES	1-3	

¹ CIST 2100 counts toward Social Science requirement.

² CIST 3110 counts toward Humanities requirement.

³ This course will satisfy UNO's General Education Quantitative Literacy requirement.

⁴ **MFT- Major Field Test** - The Computer Science Department uses the MFT to statistically compare our graduates to graduates from other institutions of higher education nationwide. The test consists of 60 multiple-choice questions. Individual scores on the MFT give an effective metric to measure levels of achievement and allow students to compare their scores with national comparative data. The Computer Science Department uses the scores to assist in its ongoing, detailed curriculum review and evaluation. All results are confidential.

Computer Science Core Extension Courses (21 hours)

A core extension of at least 21 semester hours must be completed to obtain a Bachelor of Science degree in Computer Science. At least 12 of the 21 hours selected must be approved upper-division computer science courses (courses with numbers of 3000 or higher). The remaining hours must be in an area of emphasis consistent with the computer science degree. They may include additional upper division computer science courses or courses selected from a different academic area. The computer science core extension area may be used to complete an approved concentration.

- 12 credit hours must be upper-division (3000+) Computer Science courses
- 9 credit hours must be related courses and can be selected from 2000 to 4000 level courses in CSCI, BIOI, CYBR, ISQA, ITIN, ECEN, or MATH (including MATH 1970).

Computer Science Upper-Division Courses (12 hours)

Code	Title	Credits
CSCI/MATH 3100	APPLIED COMBINATORICS	3
CSCI 3510	ADVANCED GAME PROGRAMMING	3
CSCI/CYBR 3450	NATURAL LANGUAGE PROCESSING	3
CSCI 3470	FUNDAMENTALS AND ALGORITHMS OF MACHINE LEARNING	3

Additional Computer Science Core Extension courses selected from the list above or 2000-level courses below (9 hours):

Code	Title	Credits
CSCI 2410	INTRODUCTION TO DATA ANALYTICS USING PYTHON	3
CSCI 2510	INTRODUCTION TO GAME PROGRAMMING	3
CSCI 2620	2D GRAPHICS: IMAGE PROCESSING	3
CSCI 2830	OBJECT-ORIENTED SOFTWARE ENGINEERING FUNDAMENTALS	3
CSCI 2840	C++ & OBJECT-ORIENTED PROGRAMMING	3
CSCI 2850	PROGRAMMING ON THE INTERNET	3
CSCI 2960	SHORT TOPICS FOR PROGRAMMERS	1
CSCI 2980	TOPICS IN COMPUTER SCIENCE	3

Writing in the Discipline

All UNO students are required to take a writing-in-the-discipline course within their major. Computer Science degree students must take CIST 3000

Second Bachelor's Degree

General Requirements

Students who have satisfied the requirements for a first bachelor's degree other than computer science at the University of Nebraska at Omaha must complete a minimum of 30 additional semester hours at the University for a second bachelor's degree.

Computer Science Requirements (88 hours)

To obtain computer science as a second bachelor's degree, students must complete academic requirements for the degree which include 15 credit hours of IS&T core courses, 30 credit hours of computer science core courses, 21 credit hours of a computer science core extension, 15 credit hours of Mathematics courses, and 7 credit hours of Natural and Physical Science, provided that the first bachelor's degree is not in computer science. Students who are admitted to a second-degree program in Computer Science must meet with an academic advisor in the College of IS&T before beginning the degree to make a plan of study. Some transfer coursework may apply; however, 30 of the last 36 hours must be University of Nebraska at Omaha courses.

Computer Science Elective Concentrations

- Artificial Intelligence Concentration (<http://catalog.unomaha.edu/undergraduate/college-information-science-technology/computer-science/computer-science-bs/artificialintelligence-concentration/>)
- Game Programming Concentration (<http://catalog.unomaha.edu/undergraduate/college-information-science-technology/computer-science/computer-science-bs/game-programming-concentration/>)
- Internet Technologies (IT) Concentration for Computer Science Majors (<http://catalog.unomaha.edu/undergraduate/college-information-science-technology/computer-science/computer-science-bs/internet-technologies-it-concentration-computer-science-majors/>)
- Information Assurance Concentration (<http://catalog.unomaha.edu/undergraduate/college-information-science-technology/computer-science/computer-science-bs/information-assurance-concentration/>)
- Software Engineering Concentration (<http://catalog.unomaha.edu/undergraduate/college-information-science-technology/computer-science/computer-science-bs/software-engineering-concentration/>)

Computer Science - Start 1300-1200-1280

First Year

Fall		Credits
ENGL 1150	ENGLISH COMPOSITION I	3
CMST 1110 or CMST 2120	PUBLIC SPEAKING FUNDS or ARGUMENTATION AND DEBATE	3
CIST 1300 or CSCI 1200 or CSCI 1280	INTRODUCTION TO WEB DEVELOPMENT or COMPUTER SCIENCE PRINCIPLES or INTRODUCTION TO COMPUTATIONAL SCIENCE	3
MATH 1950	CALCULUS I ¹	5
Free Elective		1
Credits		15

Spring

ENGL 1160	ENGLISH COMPOSITION II	3
CIST 1400	INTRODUCTION TO COMPUTER SCIENCE I	3
US Diversity/Social Science Requirement		3
Natural/Physical Science Requirement with Lab		4
Free Elective		1
Credits		14

Second Year

Fall

CSCI 1620	INTRODUCTION TO COMPUTER SCIENCE II	3
CSCI 2030	MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	3
CSCI 2040	INTRODUCTION TO MATHEMATICAL PROOFS	1
CIST 2100	ORGANIZATIONS, APPLICATIONS AND TECHNOLOGY	3
CIST 3110	INFORMATION TECHNOLOGY ETHICS	3
Natural/Physical Sciences Requirement		3
Credits		16

Spring

CIST 2500	INTRODUCTION TO APPLIED STATISTICS FOR IS&T	3
CSCI 2240	INTRODUCTION TO C PROGRAMMING	3
CSCI 3320	DATA STRUCTURES	3
Core Extension/Specialization Elective		3
Social Sciences Requirement		3
Credits		15

Third Year

Fall

MATH 2050	APPLIED LINEAR ALGEBRA	3
CIST 3000	ADVANCED COMPOSITION FOR IS&T	3
CSCI 3710	INTRODUCTION TO DIGITAL DESIGN AND COMPUTER ORGANIZATION	3
Core Extension/Specialization Elective		3
Humanities & Fine Arts Requirement		3
Credits		15

Spring

CSCI 3550	COMMUNICATION NETWORKS	3
CSCI 3660	THEORY OF COMPUTATION	3
CSCI 4100	INTRODUCTION TO ALGORITHMS	3
CSCI 4350	COMPUTER ARCHITECTURE	3
Global Diversity/ Humanities & Fine Arts Requirement		3
Credits		15

Fourth Year

Fall

CSCI 4220	PRINCIPLES OF PROGRAMMING LANGUAGES	3
CSCI 4500	OPERATING SYSTEMS	3
CSCI 4830	INTRODUCTION SOFTWARE ENGINEERING	3
Core Extension/ Specialization Elective		3
Core Extension/ Specialization Elective		3
Credits		15

Spring

CSCI 4000	ASSESSMENT	0
CSCI 4970	CAPSTONE PROJECT	3
Core Extension/ Specialization Elective		3
Core Extension/ Specialization Elective		3
Core Extension/ Specialization Elective		3
Free Elective		3
Credits		15
Total Credits		120

Computer Science - Start 1400**First Year**

		Credits
Fall		
ENGL 1150	ENGLISH COMPOSITION I	3
CMST 1110 or CMST 2120	PUBLIC SPEAKING FUNDS or ARGUMENTATION AND DEBATE	3
CIST 1400	INTRODUCTION TO COMPUTER SCIENCE I	3
MATH 1950	CALCULUS I ¹	5
Free Elective		1

Credits **15**

Spring

ENGL 1160	ENGLISH COMPOSITION II	3
CSCI 1620	INTRODUCTION TO COMPUTER SCIENCE II	3
US Diversity/ Social Science Requirement		3
Natural/Physical Sciences Requirement with Lab		4
Free Elective		1

Credits **14**

Second Year

		Credits
Fall		
CSCI 2240	INTRODUCTION TO C PROGRAMMING	3
CSCI 2030	MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	3
CSCI 2040	INTRODUCTION TO MATHEMATICAL PROOFS	1
CIST 2100	ORGANIZATIONS, APPLICATIONS AND TECHNOLOGY	3
CIST 3110	INFORMATION TECHNOLOGY ETHICS	3
Natural/Physical Sciences Requirement		3

Credits **16**

Spring

MATH 2050	APPLIED LINEAR ALGEBRA	3
CIST 2500	INTRODUCTION TO APPLIED STATISTICS FOR IS&T	3
CSCI 3320	DATA STRUCTURES	3
Social Sciences Requirement		3
Free Elective		3

Credits **15**

Third Year

		Credits
Fall		
CIST 3000	ADVANCED COMPOSITION FOR IS&T	3
CSCI 3710	INTRODUCTION TO DIGITAL DESIGN AND COMPUTER ORGANIZATION	3
Core Extension/Specialization Elective		3
Core Extension/Specialization Elective		3
Humanities & Fine Arts Requirement		3

Credits **15**

Spring

CSCI 3550	COMMUNICATION NETWORKS	3
CSCI 3660	THEORY OF COMPUTATION	3
CSCI 4100	INTRODUCTION TO ALGORITHMS	3
CSCI 4350	COMPUTER ARCHITECTURE	3
Global Diversity/Humanities & Fine Arts Requirement		3

Credits **15**

Fourth Year

		Credits
Fall		
CSCI 4220	PRINCIPLES OF PROGRAMMING LANGUAGES	3
CSCI 4500	OPERATING SYSTEMS	3
CSCI 4830	INTRODUCTION SOFTWARE ENGINEERING	3
Core/Specialization Elective		3
Core/Specialization Elective		3

Credits **15**

Spring

CSCI 4000	ASSESSMENT	0
CSCI 4970	CAPSTONE PROJECT	3
Core/Specialization Elective		3
Core/Specialization Elective		3
Core/Specialization Elective		3
Free Elective		3

Credits **15**

Total Credits **120**

¹ MATH 1950 - Satisfies General Education Quantitative Literacy requirement

This roadmap is a suggested plan of study and does not replace meeting with an advisor. Please note that students may need to adjust the actual sequence of courses based on course availability. Please consult an advisor in your major program for further guidance.

This plan is not a contract and curriculum is subject to change.

Additional Information About this Plan:

University Degree Requirements: The minimum number of hours for a UNO undergraduate degree is 120 credit hours. Please review the requirements for your specific degree program to determine all requirements for the program. In order to graduate on time (four years for an undergraduate degree), you need to take 30 credit hours each year.

Placement Exams: For Math, English, and Foreign Languages, a placement exam may be required. More information on these exams can be found at <https://www.unomaha.edu/enrollment-management/testing-center/placement-exams/information.php>

Please note that transfer credit or placement exam scores may change a suggested plan of study.