

COMPUTER SCIENCE MAJOR: ARTIFICIAL INTELLIGENCE OPTION (B.A.)

<https://www.unh.edu/program/bachelor-arts/computer-science-algorithms>

Description

The B.A. in Computer Science will allow students to combine the study of computer science with the study of another field. Given the emergence of computational approaches to virtually all areas of scholarship and creative expression, it is important to offer this flexibility. The three tracks in the B.A. program contain the same computer science core as the B.S. program, but give more control to the student to choose the complementary and advanced courses.

Requirements

Degree Requirements

Minimum Credit Requirement: 128 credits

Minimum Residency Requirement: 32 credits must be taken at UNH

Minimum GPA: 2.0 required for conferral*

Core Curriculum Required: Discovery & Writing Program Requirements

Foreign Language Requirement: Yes

All Major, Option and Elective Requirements as indicated.

*Major GPA requirements as indicated.

Major Requirements

Computer science majors must maintain an overall grade-point average of 2.0 or better in all required computer science, mathematics, and computer engineering courses in order to graduate. If at the end of any semester, including the first, a student's cumulative grade-point average in these courses falls below 2.0, the student may not be allowed to continue as a CS major.

The following courses or their equivalents must be completed with a grade of C- or better in order to meet the CS major requirements: CS 415, CS 416, CS 420, CS 515, CS 520, and IT 403.

Students are expected to demonstrate consistent progress towards the satisfaction of the core degree requirements and are allowed two repeats of the aforementioned courses before being subject to removal from the program. This can be a single class repeated twice or two classes repeated once. Students may petition to be reinstated after a one-year absence from the program.

If a student wishing to transfer into the computer science major has any coursework that is applicable to the major, the grades in those courses must satisfy the minimum grade requirements for the B.S. degree in computer science. The student must have an overall grade-point average of 2.0 or better in all courses taken at the university.

Code	Title	Credits
Computer Science Courses		
CS 400	Introduction to Computing	2
CS 415	Introduction to Computer Science I	4
or CS 410P	Introduction to Scientific Programming/Python	
or CS 410C	Introduction to Scientific Programming/C	
CS 416	Introduction to Computer Science II	4
CS 420	Foundations of Programming for Digital Systems	4
IT 403	Introduction to Internet Technologies	4
CS 501	Professional Ethics and Communication in Technology-related Fields	4
CS 515	Data Structures and Introduction to Algorithms	4
CS 518	Introduction to Software Engineering	4
CS 520	Computer Organization and System-Level Programming	4
CS 527	Fundamentals of Cybersecurity	4
CS 791 & CS 792 or CS 799	Senior Project I and Senior Project II Thesis	4
Computer Science Electives ¹		
Select four courses from the following:		16
CS 550	Foundations of Machine Learning	
CS 619	Introduction to Object-Oriented Design and Development	
CS 674	Fundamentals of Statistical Learning I	
CS 675	Fundamentals of Statistical Learning II	
CS 730	Introduction to Artificial Intelligence	
CS 733	Mobile Robotics	
CS 750	Machine Learning	
CS 751	Reinforcement Learning	
CS 752	Foundations of Neural Networks	
CS 753	Information Retrieval and Generation Systems	
CS 755	Computer Vision	
CS 757	Mathematical Optimization for Applications	
CS 758	Algorithms	
CS 759	Natural Language Processing	
CS 781	Data Science for Knowledge Graphs and Text	
Mathematics Courses		
MATH 425	Calculus I	4
MATH 531	Mathematical Proof	4
MATH 539	Introduction to Statistical Analysis	4
or MATH 540	Probability & Statistics	
or MATH 644	Statistics for Engineers and Scientists	
CS 659	Introduction to the Theory of Computation	4
Science Courses ²		
One Discovery Biological Science (BS) with Discovery Lab		4
One Discovery Physical Science (PS) with Discovery Lab		4
Discovery requirements not already covered by required courses		20

¹ CS 619, CS 757 and CS 758 cover computational and mathematical methods that are important in artificial intelligence.

² Courses must carry the Discovery attributes of Biological Science or Physical Science and include Discovery lab (DLAB).

Degree Plan

Sample Degree Plan

This sample degree plan serves as a general guide; students collaborate with their academic advisor to develop a personalized degree plan to meet their academic goals and program requirements.

First Year

Fall		Credits
CS 400	Introduction to Computing	2
CS 415	Introduction to Computer Science I	4
IT 403	Introduction to Internet Technologies	4

MATH 425	Calculus I	4
Discovery Course (or Foreign Language)		4
Credits		18

Spring

CS 416	Introduction to Computer Science II	4
CS 420	Foundations of Programming for Digital Systems	4
MATH 539 or MATH 531	Introduction to Statistical Analysis or Mathematical Proof	4
ENGL 401	First-Year Writing	4
Credits		16

Second Year**Fall**

CS 515	Data Structures and Introduction to Algorithms	4
CS 518 or CS 527	Introduction to Software Engineering or Fundamentals of Cybersecurity	4
CS 501	Professional Ethics and Communication in Technology-related Fields (or Discovery Course)	4
MATH 531 or MATH 539	Mathematical Proof or Introduction to Statistical Analysis	4
Credits		16

Spring

CS 520	Computer Organization and System-Level Programming	4
CS 527 or CS 518	Fundamentals of Cybersecurity or Introduction to Software Engineering	4
Discovery Course (or CS 501)		4
Discovery Course (or Foreign Language)		4
Credits		16

Third Year**Fall**

CS 659	Introduction to the Theory of Computation	4
CS Elective Course		4
General Elective Course		4
Discovery Course		4
Credits		16

Spring

CS Elective Course		4
Discovery Course		4
General Elective Course		4
General Elective Course		4
Credits		16

Fourth Year**Fall**

CS 791	Senior Project I	2
CS Elective Course		4
Discovery Course		4
General Elective Course		4
General Elective Course		4
Credits		18

Spring

CS 792	Senior Project II	2
CS Elective Course		4
Discovery Course		4
General Elective Course		4
Credits		14
Total Credits		130

Discovery Course: Historical Perspectives, Humanities, Fine and Performing Arts, Social Science, World Cultures, Physical Science Discovery Lab, Biological Science Discovery Lab.

One Discovery or General Elective course must have the Writing Intensive (WI) attribute.

Student Learning Outcomes

Program Learning Outcomes

Graduates of the UNH B.A. CS programs will have an ability to:

- Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
- Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
- Communicate effectively in a variety of professional contexts.
- Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
- Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
- Apply computer science theory and software development fundamentals to produce computing-based solutions.
- Learn independently about new technologies, and have the skills needed to understand them.