COMPUTER SCIENCE MAJOR  
(B.S.)

https://ceps.unh.edu/computer-science/program/bs/computer-science

Description

Computer science focuses on problem solving with a particular emphasis on the design of computer-efficient solutions. Within a few years of obtaining a bachelor's degree alumni will have:

1. Engaged in successful careers in diverse areas of software development and will be pursuing advanced education in computer science or related fields;
2. Applied the full range of core computer science concepts and techniques to fill software development needs of an organization;
3. Adapted to changing directions of computing technology and used state-of-the-art techniques to confront new problems effectively;
4. Navigated the complex interconnections between software and the goals and constraints of the organization served;
5. Participated responsibly in the pervasive and changing role of computing technology in global society as both software engineers and citizens;
6. Operated collaboratively in a team environment and assumed leadership roles.

The B.S. in computer science program is accredited by the:

Computing Accreditation Commission of ABET  
111 Market Place  
Suite 1050  
Baltimore, MD 21202-4012  
(410) 347-7700

Requirements

Computer science majors must complete the following coursework in computer science, mathematics, computer engineering, and science. (all courses are 4 credits unless indicated otherwise):

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 415</td>
<td>Introduction to Computer Science I</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CS 416</td>
<td>and Introduction to Computer Science II</td>
<td></td>
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<tr>
<td>or CS 414</td>
<td>From Problems to Algorithms to Programs</td>
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<tr>
<td>&amp; CS 417</td>
<td>and From Programs to Computer Science</td>
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<tr>
<td>or CS 410</td>
<td>Introduction to Scientific Programming</td>
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<tr>
<td>&amp; CS 417</td>
<td>and From Programs to Computer Science</td>
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<tr>
<td>CS 400</td>
<td>Introduction to Computing</td>
<td>1</td>
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<tr>
<td>IT 403</td>
<td>Introduction to Internet Technologies</td>
<td>4</td>
</tr>
<tr>
<td>CS 501</td>
<td>Professional Ethics and Communication in Technology-related Fields</td>
<td>4</td>
</tr>
<tr>
<td>CS 515</td>
<td>Data Structures and Introduction to Algorithms</td>
<td>4</td>
</tr>
<tr>
<td>CS 520</td>
<td>Assembly Language Programming and Machine Organization</td>
<td>4</td>
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Computer Science Electives:

Select one course from the following implementation electives:  

- CS 712 Compiler Design
- CS 730 Introduction to Artificial Intelligence
- CS 735 Introduction to Parallel and Distributed Programming
- CS 770 Computer Graphics

Select one course from the following theory electives:  

- CS 723 Performance Evaluation of Computer Systems
- CS 745 Formal Specifications and Verification of Software Systems
- CS 750 Machine Learning
- CS 757 Mathematical Optimization for Applications

Select two additional CS courses numbered 690-799 as general electives  

Professional Electives

Select two courses from the following:  

- CS 700-level course
- IT 604 Server-side Web Development
- IT 605 Client-side Web Development
- IT 612 Scripting Languages
- IT 630 Data Science and Analytics
- IT 666 Computer Security
- IT 705 Project Management for Information Technology
- IT 780 Topics in Information Technology
- MATH 525 Linearity I
- MATH 526 Linearity II
- MATH 527 Differential Equations with Linear Algebra
- MATH 528 Multidimensional Calculus
- MATH 545 Introduction to Linear Algebra
- MATH 645 Linear Algebra for Applications
- MATH 647 Complex Analysis for Applications
- MATH #656 Introduction to Number Theory
- MATH 658 Topics in Geometry
- MATH 736 Advanced Statistical Methods for Research
- MATH 737 Statistical Methods for Quality Improvement and Design
- MATH 739 Applied Regression Analysis
- MATH 740 Design of Experiments I
- MATH 741 Survival Analysis
- MATH 743 Time Series Analysis
- MATH #744 Design of Experiments II
- MATH 745 Foundations of Applied Mathematics I
- MATH 746 Foundations of Applied Mathematics II
- MATH 747 Introduction to Nonlinear Dynamics and Chaos
- MATH 753 Introduction to Numerical Methods I
- MATH 755 Probability with Applications
MATH 756  Principles of Statistical Inference
MATH 760  Geometry
MATH 761  Abstract Algebra
MATH 762  Linear Algebra
MATH 767  One-Dimensional Real Analysis
MATH 776  Logic
MATH 783  Set Theory
MATH 784  Topology
MATH 788  Complex Analysis
ECE 649  Embedded Microcomputer Based Design
ECE 700 level course
ENGL 502  Professional and Technical Writing
GEN 604  Principles of Genetics
GEN 711  Genomics and Bioinformatics

Senior Capstone Experience:
CS 791  Senior Project I
CS 792  Senior Project II

Mathematics Courses
MATH 425  Calculus I
MATH 426  Calculus II
MATH 531  Mathematical Proof
MATH 539  Introduction to Statistical Analysis
or MATH 644  Statistics for Engineers and Scientists

Electrical and Computer Engineering courses
ECE 543  Introduction to Digital Systems
ECE 562  Computer Organization

Science courses
One Discovery Biological Science (BS) with Discovery Lab
One Discovery Physical Science (PS) with Discovery Lab

Other Courses
Discovery requirements not already covered by required courses

Total Credits 104-105

1  Professional electives must either be chosen from the list of approved courses or another non-introductory CEPS course with significant science and/or engineering focus approved on a per-course basis by the undergraduate studies committee.
2  Courses must carry the Discovery attributes of Biological Science or Physical Science and include Discovery lab (DLAB).
3  One of these courses must be writing intensive.

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 must be passed with a grade of C- or better: CS 410, CS 414, CS 415, CS 416, CS 417, CS 515, CS 520, IT 403

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.
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Professional Electives</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Credits</td>
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<tr>
<td><strong>Spring</strong></td>
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<tr>
<td>CS 792</td>
<td>2</td>
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<tr>
<td>Senior Project II</td>
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<td>CS 700 elective</td>
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<tr>
<td>Professional Elective</td>
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<tr>
<td>Other Requirements</td>
<td>4</td>
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<tr>
<td></td>
<td>Credits</td>
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<tr>
<td><strong>Total Credits</strong></td>
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