# COMPUTER SCIENCE (BS)

**CIP:** 11.0701

## Program Description

Computer Science is a practical art that has led to revolutionary innovations in entertainment, the humanities, health, business, the news media, communications, education, scientific research, and the arts. It is also a science rooted in mathematics and engineering. Although it is a relatively young field, computer science has produced many of the advances in modern life that we now take for granted. It has given medical researchers tools to understand and cure diseases, enabled physicists to reshape our understanding of the universe, allowed neuroscientists to uncover the secrets of our brains, and helped biologists decipher the human genome. Computer Science has rewritten the rules of the entertainment industry and has transformed the way humans communicate with each other.

The goal of the Computer Science major is to train students both in the fundamental principles of computer science and in related aspects of technology, to broaden the knowledge base of computer science majors, and to demonstrate the relevance of computer technology to other disciplines. Computer Science majors must complete a minor or a major in one of the following areas: Applied Mathematics, Economics, Engineering, Interactive Media, Natural Sciences, or Sound and Music Computing. The Program in Computer Science embraces a rich variety of subjects and provides great flexibility, allowing students to tailor courses of study to their particular interests. Advanced undergraduate students can work on research projects with faculty members engaged in projects of mutual interest.

## Study Away

The study away pathway can be found on the NYUAD Student Portal at students.nyuad.nyu.edu/pathways (https://bulletins.nyu.edu/undergraduate/abu-dhabi/programs/computer-science-bs/students.nyuad.nyu.edu/pathways/). Students with questions should contact the Office of Global Education. The program strongly recommends that at least one Computer Science elective course be taken in Abu Dhabi.

## Admissions

New York University's Office of Undergraduate Admissions supports the application process for all undergraduate programs at NYU. For additional information about undergraduate admissions, including application requirements, see How to Apply (https://www.nyu.edu/admissions/undergraduate-admissions/how-to-apply.html).

## Program Requirements

| Course | Title | Credits |
|---|---|---|
| **General Education Requirements** | | |
| Physical Education (2 courses) | | |
| Quantitative Reasoning (1 course) | | |
| Experimental Inquiry (1 course) | | |
| Islamic Studies (1 course) | | |
| First-Year Writing Seminar | | 4 |
| Colloquia | | 4 |
| Field Colloquia (2 J-Term courses) | | 6 |
| *Core Competencies* | | |
| Arts, Design, and Technology | | 4 |
| Cultural Exploration Analysis | | 4 |
| Data and Discovery | | 4 |
| Structures of Thought and Society | | 4 |
| **Major Required Courses** | | |
| MATH-UH 1012Q | Calculus with Applications to Science and Engineering | 4 |
| CS-UH 1001 | Introduction to Computer Science (see note 1 below) | 4 |
| CS-UH 1002 | Discrete Mathematics | 4 |
| CS-UH 1050 | Data Structures | 4 |
| CS-UH 1052 | Algorithms | 4 |
| CS-UH 2010 | Computer Systems Organization | 4 |
| CS-UH 2012 | Software Engineering | 4 |
| CS-UH 3010 | Operating Systems | 4 |
| CS-UH 3012 | Computer Networks | 4 |
| CS-UH 3090 | Research Seminar in Computer Science | 2 |
| **Major Electives** | | |
| Complete 2 Computer Science electives (see list below) | | 8 |
| **Capstone** | | |
| CS-UH 4001 | Capstone Project in Computer Science 1 | 4 |
| CS-UH 4002 | Capstone Project in Computer Science 2 (see note 2 below) | 4 |
| **Required Minor** | | |
| Complete one of the following minors: (see note 3 below) | | 16-20 |
| Applied Mathematics | | |
| Economics | | |
| Engineering | | |
| Interactive Media (see note 4 below) | | |
| Natural Sciences | | |
| Sound and Music Computing | | |
| **Other Electives** | | |
| Complete enough courses to reach the minimum overall required 128 credits | | 28 |
| **Total Credits** | | **128-132** |

### Computer Science Electives

*Topics and credits for* ENGR-UH 4560 Selected Topics in Information and Computational Systems *may vary each term, therefore approval by the Computer Science Program Head is required for it to count as a CS elective.*

| Code | Title | Credits |
|---|---|---|
| CS-UH 2214 | Database Systems | 4 |
| CS-UH 2216 | Natural Language Processing | 4 |
| CS-UH 2218 | Algorithmic Foundations of Data Science | 4 |
| CS-UH 2219E | Computational Social Science | 4 |
| CS-UH 2220 | Machine Learning | 4 |
| CS-UH 2221 | Arabic Computational Linguistics | 4 |
| CS-UH 3210 | Computer Security | 4 |
| CS-UH 3211 | Quantum Computing | 4 |
| CS-UH 3212 | Advanced Topics in AI and Machine Learning | 4 |
| CS-UH 3260 | Special Topics in Computer Science | 4 |

| | | |
|---|---|---|
| ENGR-UH 3332 | Applied Machine Learning | 4 |
| ENGR-UH 4560 | Selected Topics in Information and Computational Systems | 2-4 |
| MATH-UH 3410 | Number Theory and Cryptography | 4 |

# Program Notes

1. ENGR-UH 1000 Computer Programming for Engineers can be used in place of CS-UH 1001 Introduction to Computer Science, but only if a grade of A- or above is achieved.
2. CS-UH 4002 Capstone Project in Computer Science 2 can be replaced by an additional Computer Science elective.
3. Note that completing a **major** in Biology, Business Organizations & Society, Chemistry, Economics, Engineering, Interactive Media*, Mathematics, or Physics precludes the need to complete one of the listed minors.
4. Computer Science majors fulfilling their minor requirement with Interactive Media **minor**, must complete electives from within the Computational Media category. (CS-UH 1001 Introduction to Computer Science and ENGR-UH 1000 Computer Programming for Engineers cannot be used towards the Interactive Media minor).

*Computer Science majors fulfilling their minor requirement with **Interactive Media major**, must complete at least 2 of the 6 Interactive Media major electives from within the Computational Media category.

# Sample Plan of Study

| Course | Title | Credits |
|---|---|---|
| **1st Semester/Term** | | |
| First-Year Writing Seminar | | 4 |
| CS-UH 1001 | Introduction to Computer Science | 4 |
| CS-UH 1002 | Discrete Mathematics | 4 |
| MATH-UH 1012Q | Calculus with Applications to Science and Engineering | 4 |
| Physical Education | | |
| | **Credits** | **16** |
| **2nd Semester/Term** | | |
| Field Colloquia (J-Term) | | 3 |
| | **Credits** | **3** |
| **3rd Semester/Term** | | |
| CS-UH 1050 | Data Structures | 4 |
| CS-UH 1052 | Algorithms | 4 |
| Colloquia | | 4 |
| Core Competency | | 4 |
| Physical Education | | |
| | **Credits** | **16** |
| **4th Semester/Term** | | |
| CS-UH 2010 | Computer Systems Organization | 4 |
| Major Elective | | 4 |
| Minor Requirement | | 4 |
| Core Competency | | 4 |
| | **Credits** | **16** |
| **5th Semester/Term** | | |
| Field Colloquia (J-Term) | | 3 |
| | **Credits** | **3** |
| **6th Semester/Term** | | |
| CS-UH 2012 | Software Engineering | 4 |
| CS-UH 3010 | Operating Systems | 4 |
| Minor Requirement | | 4 |
| General Elective | | 4 |
| | **Credits** | **16** |
| **7th Semester/Term** | | |
| Major Elective | | 4 |
| General Elective | | 4 |
| General Elective | | 4 |
| General Elective | | 4 |
| | **Credits** | **16** |
| **8th Semester/Term** | | |
| CS-UH 3012 | Computer Networks | 4 |
| CS-UH 3090 | Research Seminar in Computer Science | 2 |
| Minor Requirement | | 4 |
| Core Competency | | 4 |
| | **Credits** | **14** |
| **9th Semester/Term** | | |
| CS-UH 4001 | Capstone Project in Computer Science 1 | 4 |
| Minor Requirement | | 4 |
| Core Competency | | 4 |
| General Elective | | 4 |
| | **Credits** | **16** |
| **10th Semester/Term** | | |
| CS-UH 4002 | Capstone Project in Computer Science 2 (or CS elective) | 4 |
| Major Elective | | 4 |
| General Elective | | 4 |
| | **Credits** | **12** |
| | **Total Credits** | **128** |

# Learning Outcomes

Upon successful completion of the program, graduates will:

1. Be able to analyze a problem, and identify, define, and verify the appropriate computational tools required to solve it.
2. Be able to apply up-to-date computational tools necessary in a variety of computing practices.
3. Be able to implement algorithms as programs using modern computer languages.
4. Be able to apply their mathematical knowledge to solve computational problems.
5. Be able to communicate computer science knowledge both orally and in writing.
6. Be able to collaborate in teams.

# Policies

## NYU Policies

University-wide policies can be found on the New York University Policy pages (https://bulletins.nyu.edu/nyu/policies/).

## NYU Abu Dhabi Policies

A full list of relevant policies can be found on NYU Abu Dhabi's undergraduate academic policies page (https://bulletins.nyu.edu/undergraduate/abu-dhabi/academic-policies/).