The program offers a minor in computer science for students who wish to develop a strong competence in computer science while majoring in another area.

### Course Requirements

**Course** | **Title** | **Prerequisites**
--- | --- | ---
MATH 220-1 & MATH 220-2 | Single-Variable Differential Calculus and Single-Variable Integral Calculus | or MATH 218-1 & MATH 218-2 & MATH 218-3
MATH 230-1 | Multivariable Differential Calculus | or MATH 228-1
MATH 240-0 | Linear Algebra

**Minor Requirements (9 units)**

6 core courses

**Theory**

**Course** | **Title**
--- | ---
COMP SCI 111-0 | Fundamentals of Computer Programming
COMP SCI 150-0 | Fundamentals of Computer Programming 1.5
COMP SCI 211-0 | Fundamentals of Computer Programming II
COMP SCI 212-0 | Mathematical Foundations of Comp Science
COMP SCI 213-0 | Introduction to Computer Systems
COMP SCI 214-0 | Data Structures & Algorithms

3 breadth courses in 3 separate breadth areas (see below)

Students without programming experience may want to first take COMP SCI 110-0 Introduction to Computer Programming, ideally in the Python programming language.

### Majors Courses

Majors must take one course from each area. Minors must take one course from any three areas.

### Theory

**Course** | **Title**
--- | ---
COMP SCI 335-0 | Introduction to the Theory of Computation
COMP SCI 336-0 | Design & Analysis of Algorithms

**Systems**

**Course** | **Title**
--- | ---
COMP SCI 322-0 | Compiler Construction
COMP SCI 339-0 | Introduction to Database Systems
COMP SCI 340-0 | Introduction to Networking
COMP SCI 343-0 | Operating Systems
COMP SCI 345-0 | Distributed Systems
COMP SCI 350-0 | Introduction to Computer Security
COMP SCI 354-0 | Computer System Security
COMP SCI 440-0 | Advanced Networking
COMP SCI 441-0 | Resource Virtualization
COMP SCI 443-0 | Advanced Operating Systems
COMP SCI 446-0 | Kernel and Other Low-level Software Development
COMP SCI 450-0 | Internet Security
COMP ENG 303-0 | Advanced Digital Design
COMP ENG 346-0 | Microprocessor System Design

### Artificial Intelligence

**Course** | **Title**
--- | ---
COMP SCI 325-1 | Artificial Intelligence Programming
COMP SCI 337-0 | Natural Language Processing
COMP SCI 344-0 | Design of Computer Problem Solvers
COMP SCI 348-0 | Introduction to Artificial Intelligence
COMP SCI 349-0 | Machine Learning
COMP SCI 371-0 | Knowledge Representation and Reasoning
COMP SCI 372-0 | Designing & Constructing Models with Multi-Agent Language

### Interfaces

**Course** | **Title**
--- | ---
COMP SCI 313-0 | Tangible Interaction Design and Learning
COMP SCI 315-0 | Design, Technology, and Research
COMP SCI 330-0 | Human Computer Interaction
COMP SCI 331-0 | Introduction to Computational Photography
COMP SCI 351-1 | Introduction to Computer Graphics
COMP SCI 352-0 | Machine Perception of Music & Audio
COMP SCI 370-0 | Computer Game Design
COMP SCI 376-0 | Computer Game Design and Development
COMP SCI 377-0 | Game Design Studio
ELEC ENG 332-0 | Introduction to Computer Vision

### Software Development and Programming Languages

**Course** | **Title**
--- | ---
COMP SCI 310-0 | Scalable Software Architectures
COMP SCI 321-0 | Programming Languages
COMP SCI 338-0 | Practicum in Intelligent Information Systems
COMP SCI 377-0 | Game Design Studio
COMP SCI 393-0 | Software Construction
COMP SCI 394-0 | Agile Software Development
COMP SCI 473-1 | NUvention: Web - Part 1
COMP SCI 473-2 | NUvention: Web - Part 2

Students should begin the minor before the end of the first quarter of their junior year.