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 Title

**Prerequisites**
- MATH 220-1 & MATH 220-2
  Single-Variable Differential Calculus and Single-Variable Integral Calculus
- or MATH 218-1 & MATH 218-2
  Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus
- & MATH 218-3
  Single-Variable Calculus with Precalculus
- MATH 230-1
  Multivariable Differential Calculus
- or MATH 228-1
  Multivariable Calculus for Engineering
- MATH 240-0
  Linear Algebra

**Minor Requirements (9 units)**

**6 core courses**
- 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)

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

### Breadth Courses

Majors must take one course from each area. Minors must take one course from each of 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
  Game Design Studio
- 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.