



## COMPUTATIONAL BIOLOGY AND BIOINFORMATICS

An interdisciplinary minor in computational biology and bioinformatics prepares you to understand, use and develop advanced computational methods and tools for processing, visualizing, and analyzing biological data and for modeling biological processes. You can expect the coursework to involve biosciences, computer science, engineering, mathematics, and statistics.

You will be prepared for careers in biomedical, biotechnology, agricultural, pharmaceutical and engineering fields and for related graduate studies.

### Academics

#### PREREQUISITE COURSES

- **CHEM 109** General Chemistry I (or equivalent)
- **LIFE 120 & LIFE 120L** Fundamentals of Biology I and Fundamentals of Biology I laboratory
- **MATH 106** Calculus I (or equivalent)

#### CORE COURSES

- **CSCE 155T** Computer Science I: Informatics Focus
- **CSCE 311** Data Structures and Algorithms for Informatics or **CSCE 310** Data Structures and Algorithms
- **BIOS 337** Applications of Bioinformatics
- **STAT 218** Introduction to Statistics or **STAT / MATH 380** Statistics and Applications

#### LIFE SCIENCE COURSE

Select a course from either LS 1 or LS 2 choices, depending on your major.

LS 1 - For students in life science majors.

- **BIOS 426** Systems Biology
- **BIOS 427** Practical Bioinformatics Laboratory
- **BIOS / NRES 456** Mathematical Models in Biology
- **BIOS 477** Bioinformatics and Molecular Evolution

#### LS 2

- **BIOS / CHEM 431** Structure and Metabolism
- **BIOS / CHEM 432** Metabolism and Biological Information
- **BIOC / AGRO / BIOS / CHEM 434** Plant Biochemistry
- **BIOS 418** Advanced Genetics
- **BIOS / MBIO 420** Molecular Genetics
- **BIOS 425** Plant Biotechnology
- **BIOS 429** Phylogenetic Biology
- **BIOS 472** Evolution

#### COMPUTER SCIENCE / MATH / STATISTICS / ENGINEERING (CMSE) COURSE

Select a course from either CMSE 1 or CMSE 2 choices, depending on your major:

CMSE 1 - For students in computer science, math, engineering and related majors.

- **CSCE 471** Computational Methods in Bioinformatics

#### CMSE 2

- **BSEN 414** Medical Imaging Systems
- **CHME 473** Biochemical Engineering
- **CHME 474** Advanced Biochemical Engineering
- **CSCE 413** Database Systems
- **CSCE 421** Foundations of Constraint Processing
- **CSCE 423** Design and Analysis of Algorithms
- **CSCE 435** Cluster and Grid Computing
- **CSCE 456** Parallel Programming
- **CSCE 472** Digital Image Processing
- **CSCE 474** Introduction to Data Mining
- **CSCE 476** Introduction to Artificial Intelligence
- **CSCE 478** Introduction to Machine Learning
- **CSCE 479** Introduction to Deep Learning
- **ECEN 450** Bioinformatics
- **MATH 439** Mathematical Biology
- **MATH 452** Graph Theory
- **STAT 318** Advanced Statistical Design
- **STAT 450** Introduction to Regression Analysis

For a complete list of applicable courses see minor advisor.