# COMPUTATIONAL SCIENCE MINOR - BIOLOGY/GENETICS (MATHEMATICS AND COMPUTER SCIENCE)

A minor in Computational Science is offered to those who wish to combine their knowledge of Biology, Chemistry, Physics or Psychology with Mathematics and Computer Science. This minor allows students to have the skills to work in cross disciplinary teams to solve challenging scientific problems. This minor is intended for students majoring in Biology, Chemistry, Computer Science, Mathematics, Physics or Psychology.

## Core Courses for Biology/Genetics Emphasis

### Biology Major

| Code | Title | Units |
|---|---|---|
| **Lower-Division Requirements** | | |
| BIO 2010 and BIO 2010L | Cell Biology and Biochemistry (FE) and Cell Biology and Biochemistry Laboratory (FE) | 4 |
| CSC 1043 and CSC 1043L | Introduction to Computer Programming and Introduction to Computer Programming Lab | 3 |
| **Upper-Division Requirements** | | |
| BIO 3045 and BIO 3045L | Genetics and Genetics Laboratory | 4 |
| CSC 3002 | UNIX and Python Scripting for Computational Science | 2 |
| CSC 3011 or CSC 3031 | Machine Learning and Multivariate Modeling in R Data Visualization and Communication with R | 1 |
| **Project** | | |
| Choose at least three (3) units of the following: | | 3 |
| CSC 4133 | Service Learning in Computer Science | |
| HON 4098 and HON 4099 | Honors Project I and Honors Project II | |
| MTH 4133 | Service Learning in Mathematics | |
| **Biology Major - Required Courses** | | |
| CSC 3022 | Data Management for Computational Science | 2 |
| MTH 1044 | Calculus with Applications (FE) | 4 |
| MTH 3063 | Calculus Based Statistics with R | 3 |
| **Total Units** | | **26** |

### Computer Science Majors

| Code | Title | Units |
|---|---|---|
| **Lower-Division Requirements** | | |
| BIO 2010 and BIO 2010L | Cell Biology and Biochemistry (FE) and Cell Biology and Biochemistry Laboratory (FE) | 4 |
| CSC 1043 and CSC 1043L | Introduction to Computer Programming and Introduction to Computer Programming Lab | 3 |
| **Upper-Division Requirements** | | |
| BIO 3045 and BIO 3045L | Genetics and Genetics Laboratory | 4 |
| CSC 3002 | UNIX and Python Scripting for Computational Science | 2 |
| CSC 3011 or CSC 3031 | Machine Learning and Multivariate Modeling in R Data Visualization and Communication with R | 1 |
| **Project** | | |
| Choose at least three (3) units of the following: | | 3 |
| CSC 4133 | Service Learning in Computer Science | |
| HON 4098 and HON 4099 | Honors Project I and Honors Project II | |
| MTH 4133 | Service Learning in Mathematics | |
| **Computer Science Majors - Required Courses** | | |
| ISS 4014 | Data Base Systems and Web Integration | 4 |
| MTH 1064 and MTH 1064L | Calculus I (FE) and Calculus I Lab (FE) | 4 |
| MTH 3083 | Mathematical Probability and Statistics | 3 |
| **Total Units** | | **28** |

## Mathematics Majors

| Code | Title | Units |
|---|---|---|
| **Lower-Division Requirements** | | |
| BIO 2010 and BIO 2010L | Cell Biology and Biochemistry (FE) and Cell Biology and Biochemistry Laboratory (FE) | 4 |
| CSC 1043 and CSC 1043L | Introduction to Computer Programming and Introduction to Computer Programming Lab | 3 |
| **Upper-Division Requirements** | | |
| BIO 3045 and BIO 3045L | Genetics and Genetics Laboratory | 4 |
| CSC 3002 | UNIX and Python Scripting for Computational Science | 2 |
| CSC 3011 or CSC 3031 | Machine Learning and Multivariate Modeling in R Data Visualization and Communication with R | 1 |
| **Project** | | |
| Choose at least three (3) units of the following: | | 3 |
| CSC 4133 | Service Learning in Computer Science | |
| HON 4098 and HON 4099 | Honors Project I and Honors Project II | |
| MTH 4133 | Service Learning in Mathematics | |
| **Mathematics Majors - Required Courses** | | |
| CSC 3022 | Data Management for Computational Science | 2 |
| MTH 1064 and MTH 1064L | Calculus I (FE) and Calculus I Lab (FE) | 4 |
| MTH 3083 | Mathematical Probability and Statistics | 3 |
| **Total Units** | | **26** |