

# Science

---

Scientific Computing is the field of study concerned with modeling and analyzing natural and engineered processes using computational techniques. Scientific Computing is a multidisciplinary field of study, both contributing to and benefiting from computer science, mathematics, and the natural and physical sciences.

The Applied Scientific Computing minor offers students a foundation in scientific computing. The program is designed to encourage students in all scientific disciplines with an interest in a multidisciplinary perspective on the sciences.

## Minor in Applied Scientific Computing

17 credits minimum; 9 credits upper division

|   |                                       |       |
|---|---------------------------------------|-------|
| SCI 370   | Scientific Inquiry in the Digital Age | 4     |
| SCI 470   | Scientific Computing Seminar          | 2     |
| MATH 251  | Calculus I                            | 4     |
| or MATH 252   | Calculus II                           |       |
| SCI/CSC 205   | Programming for Scientists            | 4     |
| or CSC 210  | Introduction to Computer Programming  |       |
| Any course in the natural and physical sciences numbered 200 or higher with a lab section |                                       | 3-4   |
| Total Hours   |                                       | 17-18 |

### Notes:

MATH 252 can be replaced with any Math course with MATH 252 as a prerequisite.

CSC 210 can be replaced with any Computer Science course with CSC 210 as a prerequisite.

All courses must be approved by a faculty advisor associated with the scientific computing program at CLU.

## Courses

### Lower Division

#### SCI 101. Exploring Research Through STEM. (3).

In SCI-101 students are introduced to research in STEM by participating in research experiences in the laboratory and the field. Typically, research areas will include biology, chemistry, computer science, exercise science, mathematics, and physics. Faculty from a variety of STEM disciplines provide instruction through active learning, and students build collaboration skills working in teams and with peer mentors. Student teams present their final products at a poster session open to the campus community. By permission only.

#### SCI 205. Programming for Scientists. (4).

This course introduces the principles of computer programming, problem-solving methods, and algorithm development from a scientific perspective. The programming languages covered are C (a compiled language popular among engineers and mathematicians), and Perl (a scripting language popular among bioengineers) both in wide use in scientific fields. Also covered are introductory software engineering techniques and tools necessary to convert a functional specification to a properly functioning program. Examples and assignments will be drawn from the natural sciences. (Cross listed with CSC 205).

### Upper Division

#### SCI 370. Scientific Inquiry in the Digital Age. (4).

A team-taught seminar on the philosophy of the sciences - natural, physical, and mathematical - and the practical application of these philosophies. Emphasis will be placed on the role of scientific computing in the sciences. Prerequisites: MATH 251, SCI 205 / CSC 205 or CSC 210, and a course in the natural or physical sciences with lab work.

#### SCI 470. Scientific Computing Seminar. (2).

A research seminar with content designed to fit student need. Students will engage in the modeling and analysis of processes. Students will be expected to synthesize their experiences from all areas of the minor, culminating in a report using scientific computing methods and tools to analyze a sufficiently complex real world data set or process. Prerequisite: SCI 370.

**SCI 496. Directed Research. (0).**

**SCI 496A. Arcadia University. (6).**

**SCI 496F. School for Field Studies Fellowship. (4).**

**SCI 496I. Absolute Internship. (1).**

**SCI 496O. Off Campus Research/Internships. (0).**