Computational Life Sciences, Certificate

LACLSICERT

Do you have a curious mind and a passion for solving problems in new ways? You can make a powerful impact in today's fast-changing research landscape by using new technologies to mine life-changing answers from science data.

Description

In the computational life sciences certificate program, students discover a burgeoning new field where huge leaps in processing technologies have thrown open the doors for new research techniques and interdisciplinary collaborations.

Students engage with a suite of tools and approaches that enable them to uncover correlations, glean new understanding and help solve scientific problems.

Using their mastery of these new techniques, students examine data generated from a range of fields, including ecology, botany, evolutionary biology, neuroscience, molecular and cellular biology and animal behavior. Students investigate topics such as DNA, RNA, protein, imaging, conservation and historical data, and explore the ethical implications of collecting, storing, analyzing and sharing the results of computational life science data.

At a glance

- **College/School:** The College of Liberal Arts and Sciences
- **Location:** Tempe or Online

Program requirements

2024 - 2025 Certificate Map
Certificate Map (Archives)

The certificate in computational life sciences requires a minimum of 15 credit hours, of which at least 12 credit hours must be upper division. The core consists of one computing course and one ethics course. A minimum of nine credit hours in elective courses complete the certificate. The computing course not used toward the core requirements may be used toward the elective credit hours. A grade of "C" (2.00 on a 4.00 scale) or higher is required for all courses used toward the certificate.

Required Courses -- 6 credit hours

BIO 312 / PHI 320: Bioethics (HUAD OR HU) or BIO 316 / HPS 330: History of Biology: Conflicts and Controversies (HUAD OR H) or BIO 317 / HPS 323: History of Science II (HUAD OR HU & H) or BIO 318 / HPS 331: History of Medicine (HUAD OR HU & H) or BIO 416 / HPS 410: Biomedical Research Ethics (L) (3)
BIO 439: Computing for Research or BIO 440 / MBB 440: Functional Genomics (3)

Electives -- 9 credit hours

BIO 355 / MAT 355 / MBB 355: Introduction to Computational Molecular Biology (CS) (3)
BIO 411: Quantitative Methods in Conservation and Ecology (4)
BIO 415: Statistical Models for Biology (QTRS OR CS) (4)
BIO 439: Computing for Research (3)
BIO 440 / MBB 440: Functional Genomics (3)
BIO 479: Data Analysis and Visualization in R (3)
BIO 494: Computational Genomic Analysis (3)
BIO 494: Data Analysis in Neuroscience (3)
BIO 498: Programming for biologists (3)
BME 494: Systems Biology of Disease (3)
BMI 311: Modeling Biomedical Knowledge (3)
BMI 312: Modeling Biomedical Data (3)
BMI 330: Topics in Translational Bioinformatics (3)
DAT 301: Exploring Data in R and Python (4)
GIS 469 / SOC 469: Multivariate Statistics for Social Sciences (3)
GIS 471: Spatial Statistics for Geography and Planning (3)
MAT 353: Mathematics and Cancer (3)
MAT 451: Mathematical Modeling (CS) (3)

If not used as the required computing course, students may include BIO 439 or BIO 440 as a certificate elective.

Prerequisite courses may be needed in order to complete the requirements of this certificate.

Enrollment requirements

A student pursuing an undergraduate certificate must be enrolled as a degree-seeking student at ASU. Undergraduate certificates are not awarded prior to the award of an undergraduate degree. A student already holding an undergraduate degree may pursue an undergraduate certificate as a nondegree-seeking graduate student.

Attend online

ASU Online

ASU offers this program in an online format with multiple enrollment sessions throughout the year. Applicants may view the program's ASU Online page for program descriptions and to request more information.

Program learning outcomes

Program learning outcomes identify what a student will learn or be able to do upon completion of their program. This program has the following program outcomes:

- Able to summarize key computational concepts, such as algorithms and relational databases, and their applications in the life sciences, and apply statistical concepts used in computational life sciences.
- Use bioinformatics tools and command line bioinformatics tools, and write simple computer scripts to find, retrieve, and organize various types of biological data.
- Interpret the ethical, legal, medical, and social implications of biological data.

Career opportunities

The computational life sciences certificate program provides students with data interpretation skills and experience using new computational approaches and programs. When combined with a major program of study, graduates will be in high demand for roles identifying and interpreting data in a variety of fields, including ecology, medicine, botany, evolutionary biology and animal behavior.

Advanced degrees or certifications may be required for academic or clinical positions.

Contact information

School of Life Sciences | LSC 104
SOLS.advising@asu.edu | 480-727-6277