



Bioinformatics is a rapidly expanding, innovative field of study that merges computer & information science with biological data. Bioinformaticians work with the collection, storage, retrieval, manipulation, and modeling of large data sets such as genetic sequences for analysis, visualization, or prediction through the development of algorithms and software. Bioinformatics is fundamentally an interdisciplinary science, and there is an immense and increasing need for experts in this field.

The College of Arts and Sciences at UNO offers a Bioinformatics major through the Biology Department, which emphasizes biological applications of algorithms to answer biological research questions. This program requires courses in bioinformatics, biology, computer science, mathematics, and chemistry.

A graduate of the Bioinformatics program will have the background to pursue a wide variety of positions in the biomedical and biotechnology industries, graduate studies in Bioinformatics or related areas, or, with the addition of only a few courses, medical school. The major is a good fit for students who take an analytical approach to real world problems, so if this describes you, check out Bioinformatics!

Course Highlights in Bioinformatics:

- Introduction to Bioinformatics
- Applied Bioinformatics
- Advanced Bioinformatics Programming
- Bioinformatics Algorithms
- Database Search & Discovery in Bioinformatics
- Genome Technology and Analysis

Knowledge & Skills gained as a Bioinformatics major:

Knowledge

- Knowledge of fundamental biological processes at organism, physiological, cellular, and molecular levels
- Basic principles of chemistry and their applications to living systems; properties of biomolecules and their contribution to structure and function of cells
- Computer programming methodology, including algorithm design and program development; capability of designing and applying software tools for biological data analysis
- Proficiency in the use of mathematical tools including discrete mathematics, calculus, and statistics
- Comprehension of key problems, possible solutions, and latest advances in bioinformatics
- Understand the process of scientific inquiry to prepare for rigorous research; employ quantitative problem solving skills, data analysis, and interpretation of results

Skills

- Design, conduct, and interpret bioinformatics research
- Conduct genomic data analysis and mining
- Apply computational approaches to biological problems
- Communicate findings using models and charts
- Communicate new research findings to lay audiences

Bioinformatics Major at a glance:

Number of majors: 12 Credit hours needed: 79

Degrees offered: B.S. Minors offered: Yes (College of IS&T)

Concentrations: No



Career Opportunities:

By nature, Liberal Arts majors make great employees in any field because of their ability to communicate effectively, think critically and solve complex problems. These timeless skills make them attractive to employers in a variety of professions. Specifically though, Bioinformatics majors often pursue careers as:

- Bioinformatics Analyst
- Data Scientist
- Computational Biologist
- Genomic Analyst
- Computational Research Engineer
- Cheminformatician
- Medical Informatics Analyst
- Chief Medical Information Officer
- Network Analyst
- Research Scientist
- Structural Analyst
- Biostatistician

When the Bioinformatics major is matched with complementary minors and thoughtful internships, new possibilities arise. A few examples are:

- **Bioinformatics** + Computer Science = High-tech Biological research
- **Bioinformatics** + Statistics = Health care related data research in biotech or pharmaceuticals
- **Bioinformatics** + Business = Industry jobs of all types that collect and interpret data
- **Bioinformatics** + English = Technical Writer

Student Opportunities:

- Maverick Club for Bioinformatics—UNO's bioinformatics students, or those interested in bioinformatics
- Pre-Health Professionals Club
- Women in Science Technology Engineering & Mathematics
- Undergraduate research opportunities with UNO faculty
- Several student scholarships available

Did you know?

If written out, the human genome, which consists of 3 billion base pairs (ATGC), would stretch 5,592 miles (9,000 km) and would take a typist working 8 hours per day 50 years to type out.

For more information:

For program information and course requirements:

<https://www.unomaha.edu/college-of-arts-and-sciences/biology/academics/bioinformatics.php>

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