

Bioinformatics, BS

Program Description

The BS in Bioinformatics Degree is designed for students interested in the interdisciplinary fields of Biology, Chemistry, Mathematics, and Computer Science. Students will have the opportunity to develop methods and software tools for understanding and analyzing biological data and to apply it to medical research.

Program Curriculum

120 credits

Utah Tech General Education Requirements

All Utah Tech General Education requirements must be fulfilled. A previously earned degree may fulfill those requirements, but courses must be equivalent to Utah Tech's minimum General Education standards in American Institutions, English, and Mathematics.

General Education Core Requirements (catalog.utahtech.edu/programs/generaleducation/#gerequirementstext)

| Code | Title | Hours |
|------------------------------|-------|-------|
| English | | 3-7 |
| Mathematics | | 3-5 |
| American Institutions | | 3-6 |
| Life Sciences | | 3-10 |
| Physical Sciences | | 3-5 |
| Fine Arts | | 3 |
| Literature/Humanities | | 3 |
| Social & Behavioral Sciences | | 3 |

Bioinformatics Core Requirements

Complete the following 68 credits of Program Core Requirements

| Code | Title | Hours |
|--------------------------|---|-------|
| BIOL 1610 & BIOL 1615 | Principles of Biology I (LS) and Principles of Biology I Lab (LAB) | 5 |
| BIOL 1620 & BIOL 1625 | Principles of Biology II and Principles of Biology II Lab | 5 |
| BIOL 3300 | Introduction to Bioinformatics | 3 |
| BIOL 3030 | Principles of Genetics | 3 |
| BIOL 3150 | Biostatistics and the Scientific Method | 3 |
| BIOL 3155 | Scientific Method and Experimental Design | 1 |
| BIOL 4010 | Molecular Evolution | 3 |
| BIOL 4300 & BIOL 4305 | Molecular Biology and Molecular Biology Laboratory | 4 |
| BIOL 4310 | Advanced Bioinformatics | 3 |
| BIOL 4320 | Scripting for Biologists | 3 |
| BIOL 4810R | Independent Research | 1 |
| BIOL 4910 | Senior Seminar | 1 |
| CHEM 1210 & CHEM 1215 | Principles of Chemistry I (PS) and Principles of Chemistry I Lab (LAB) | 5 |
| CHEM 1220 & CHEM 1225 | Principles of Chemistry II and Principles of Chemistry II Lab | 5 |
| CS 1400 | Fundamentals of Programming | 3 |
| CS 1410 | Object Oriented Programming | 3 |
| CS 2450 | Software Engineering | 3 |

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| CS 2100 | Discrete Structures | 3 |
| IT 1100 | Introduction to Unix/Linux | 3 |
| IT 2300 | Database Design & Management | 3 |
| MATH 1210 | Calculus I (MA) ¹ | 4 |
| Pick one (1) of the following Technical Laboratory Course | | |
| BTEC 2010 | DNA Methods and Analysis | 2 |
| BTEC 2020 | Protein Purification and Analysis | 2 |
| BTEC 2030 | Cell Culture Techniques | 2 |
| BTEC 2050 | Zebrafish Maintenance & Methodology | 2 |
| BIOL 2300 | Fundamentals of Bioinformatics | 2 |

¹ Course may be used to meet both Bioinformatics Core and General Education requirements.

Bioinformatics Program elective courses

Complete a total of 15 credits from the following list of approved Program Elective courses

| Code | Title | Hours |
|--|--|-------|
| BIOL 3040 | General Ecology | 3 |
| BIOL 3100 | Bioethics | 3 |
| BIOL 3250 | Cancer Biology | 3 |
| BIOL 3450 & BIOL 3455 | General Microbiology and General Microbiology Lab | 4 |
| BIOL 3460 | Biology of Infectious Disease | 3 |
| BIOL 3470 | Introduction to Immunology | 3 |
| BIOL 3550 & BIOL 3555 | Eukaryotic Cell Biology and Eukaryotic Cell Biology Lab | 4 |
| BIOL 4810R | Independent Research | 1-6 |
| BIOL 4890R | Life Science Internship | 1-8 |
| BIOL 4930R | Senior Thesis | 1-4 |
| CHEM 2310 & CHEM 2315 | Organic Chemistry I and Organic Chemistry I Lab | 5 |
| CHEM 2320 & CHEM 2325 | Organic Chemistry II and Organic Chemistry II Lab | 5 |
| CHEM 3510 & CHEM 3515 | Biochemistry I and Biochemistry I Lab | 4 |
| CHEM 3520 & CHEM 3525 | Biochemistry II and Biochemistry II Lab | 4 |
| CS 2450 | Software Engineering | 3 |
| CS 3005 | Programming in C++ | 3 |
| CS 3510 | Algorithms | 3 |
| CS 4300 | Artificial Intelligence | 3 |
| CS 4307 | Database Systems | 3 |
| CS 4320 | Machine Learning | 3 |
| SE 3100 | Software Practices | 3 |
| SE 3150 | Software Quality | 3 |
| MATH 1220 | Calculus II (MA) | 4 |
| MATH 2270 | Linear Algebra | 3 |
| MATH 2280 | Ordinary Differential Equations | 3 |
| MATH 3400 | Probability & Statistics | 3 |
| MATH 3500 | Numerical Analysis | 3 |
| Any BTEC 3000+ | | |
| A maximum of one of the following courses/course sets: | | |
| BIOL 4200 & BIOL 4205 | Plant Taxonomy (ALPP) and Plant Taxonomy Lab (ALPP) | 4 |

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| BIOL 4260 & BIOL 4265 | Herpetology and Herpetology Lab | 3 |
| BIOL 4270 & BIOL 4275 | Ichthyology and Ichthyology Lab | 3 |
| BIOL 4280 | Marine Biology | 3 |
| BIOL 4350 & BIOL 4355 | Animal Behavior and Animal Behavior Lab | 4 |
| BIOL 4380 & BIOL 4385 | Ornithology and Ornithology Lab | 3 |
| BIOL 4411 & BIOL 4415 | Mammalogy and Mammalogy Lab | 4 |
| BIOL 4440 & BIOL 4445 | General Entomology and General Entomology Lab | 4 |

BIOINFORMATICS PROGRAM ELECTIVE COURSES

Complete a total of 16 credits of general elective courses.

It is highly recommended that students complete one of the following certificates: Functional Genomics, Genetic Sequencing, Protein Characterization, Biological mathematical Modeling, Cell Culture.

Graduation Requirements

1. Complete a minimum of 120 college-level credits (1000 and above).
2. Complete at least 40 upper-division credits (3000 and above).
3. Complete at least 30 upper-division credits at Utah Tech for institutional residency, with at least 15 credits earned in the last 45 credits
4. Cumulative GPA 2.0 or higher.
5. Grade C- or higher required in each of the Bioinformatics Core courses and Program Elective courses
6. Maximum 6 total credits of BIOL 4810R, and/or BIOL 4890R, and/or BIOL 4930R may be used toward Biology requirements.