BS in Computer Science: Bioinformatics (693222) MAP Sheet
Physical and Mathematical Sciences, Computer Science
For students entering the degree program during the 2017-2018 curricular year.

<table>
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<tr>
<th>University Core and Graduation Requirements</th>
<th>Suggested Sequence of Courses</th>
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<td><strong>University Core Requirements:</strong></td>
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<td><strong>Requirements</strong></td>
<td><strong>JUNIOR YEAR</strong></td>
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<td><strong>#Classes</strong></td>
<td><strong>1st Semester</strong></td>
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<td><strong>Hours</strong></td>
<td>C S 142</td>
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<td><strong>Classes</strong></td>
<td>3.0</td>
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<td><strong>Religion Cornerstones</strong></td>
<td>First-year Writing or American Heritage</td>
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<td>Teachings and Doctrine of The Book of Mormon</td>
<td>3.0</td>
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<tr>
<td>Jesus Christ and the Everlasting Gospel</td>
<td>C S 324</td>
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<tr>
<td>Foundations of the Restoration</td>
<td>3.0</td>
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<tr>
<td>The Eternal Family</td>
<td>MMBIO 240</td>
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<td>The Individual and Society</td>
<td>4.0</td>
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<tr>
<td>American Heritage</td>
<td>ENGL 316</td>
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<tr>
<td>Global and Cultural Awareness</td>
<td>3.0</td>
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<tr>
<td><strong>Skills</strong></td>
<td>Religion Cornerstone course</td>
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<tr>
<td>First Year Writing</td>
<td>2.0</td>
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<tr>
<td>Advanced Written and Oral Communications</td>
<td>Religion Elective</td>
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<tr>
<td>Quantitative Reasoning</td>
<td>2.0</td>
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<tr>
<td>Languages of Learning (Math or Language)</td>
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<tr>
<td><strong>Arts, Letters, and Sciences</strong></td>
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<tr>
<td>Civilization 1</td>
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<td>Civilization 2</td>
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<td>Arts</td>
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<td>Biological Science</td>
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<td>Social Science</td>
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<td><strong>Core Enrichment: Electives</strong></td>
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<td>Religion Electives</td>
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<td>Open Electives</td>
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<td><strong>Total Hours</strong></td>
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<td><strong>Core Enrichment: Electives</strong></td>
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<td><strong>Graduation Requirements:</strong></td>
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<tr>
<td>Minimum residence hours required</td>
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<tr>
<td>Minimum hours needed to graduate</td>
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</table>

Note 1: The sequence of courses suggested may not fit the circumstances of every student.
Students should contact their college advisement center for help in outlining an efficient schedule.
Note 2: Students are encouraged to complete an average of 15 credit hours each semester or 30 credit hours each year, which could include spring and/or summer terms. Taking fewer credits substantially increases the cost and the number of semesters to graduate.
BS in Computer Science: Bioinformatics (693222)
2017-2018 Program Requirements (85 Credit Hours)

Personnel in the College of Physical and Mathematical Sciences Advisement Center will advise regarding core courses and suggested general education. Questions regarding curriculum and career decisions should be directed to the undergraduate advisor in the Computer Science Department.

Note: All hours of credit applied toward a major in computer science must be of C- or better and must be taken within eight years of declaring the computer science major. Any exceptions must be approved by the department. Students may choose to graduate under later requirements by updating their date of entry into the major at the college advisement center.

REQUIREMENT 1 Complete 11 courses
CORE COURSES:
- C S 142 - Introduction to Computer Programming 3.0
- C S 224 - Introduction to Computer Systems 3.0
- C S 235 - Data Structures and Algorithms 3.0
- C S 236 - Discrete Structures 3.0
- C S 240 - Advanced Programming Concepts 4.0
- C S 252 - Introduction to Computational Theory 3.0
- C S 312 - Algorithm Design and Analysis 3.0
- C S 324 - Systems Programming 3.0
- C S 340 - Software Design and Testing 3.0
- C S 404 - Ethics and Computers in Society 2.0
- C S 418 - Bioinformatics 3.0

REQUIREMENT 2 Complete 2 options
SUPPORTING COURSES:
- OPTION 2.1 Complete 10 courses
  * BIO 130 - Biology 4.0
  * BIO 465 - Bioinformatics 3.0
  - CHEM 105 - General College Chemistry 1 with Lab (Integrated) 4.0
  * ENGL 316 - Technical Communication 3.0
  - MATH 112 - Calculus 1 4.0
  - MATH 113 - Calculus 2 4.0
  - MATH 313 - Elementary Linear Algebra 3.0
  - MMBIO 240 - Molecular Biology 3.0
  - PHSCS 121 - Introduction to Newtonian Mechanics 3.0
  - PWS 340 - Genetics 3.0
- OPTION 2.2 Complete 1 course
  - STAT 121 - Principles of Statistics 3.0
  - STAT 201 - Statistics for Engineers and Scientists 3.0

REQUIREMENT 3 Complete 18.0 hours from the following option(s)
COMPLETE A TOTAL OF 6 ELECTIVE COURSES (18.0 CREDIT HOURS) FROM THE FOLLOWING OPTIONS. NOTE: IF C S 401R, 497R, OR 498R IS CHOSEN, IT MUST BE TAKEN FOR 3 HOURS.

OPTION 3.1 Complete up to 18.0 hours from the following course(s)
COMPLETE 4-6 ELECTIVE COURSES (12-18 CREDIT HOURS) FROM THE FOLLOWING LIST:
- BIO 463 - Genetics of Human Disease 3.0
- C S 260 - Web Programming 3.0
- C S 401R - Topics in Computer Science 3.0
  You may take up to 3 credit hours.
- C S 412 - Linear Programming and Convex Optimization 3.0
- C S 428 - Software Engineering 3.0
- C S 431 - Algorithmic Languages and Compilers 3.0
- C S 450 - Introduction to Digital Signal and Image Processing 3.0
- C S 452 - Database Modeling Concepts 3.0
- C S 453 - Fundamentals of Information Retrieval 3.0
- C S 455 - Computer Graphics 3.0
- C S 456 - Introduction to User Interface Software 3.0
- C S 460 - Computer Communications and Networking 3.0
- C S 462 - Large-Scale Distributed System Design 3.0
- C S 465 - Computer Security 3.0
- C S 470 - Introduction to Artificial Intelligence 3.0
- C S 478 - Tools for Machine Learning 3.0
- C S 479 - Natural Language Processing 3.0
- C S 484 - Parallel Processing 3.0
- C S 486 - Verification and Validation 3.0

OPTION 3.2 Complete up to 6.0 hours from the following course(s)
COMPLETE 0-2 ELECTIVE COURSES (0-6 CREDIT HOURS) FROM THE FOLLOWING LIST:
- C S 493R - Computing Competitions 3.0
  You may take up to 3 credit hours.
- C S 494 - Capstone 1 3.0
- C S 495 - Capstone 2 3.0
- C S 497R - Undergraduate Research 3.0
  You may take up to 6 credit hours.
- C S 498R - Undergraduate Special Projects 3.0
  You may take up to 3 credit hours.

THE DISCIPLINE:
Computer science touches virtually every area of human endeavor. Software is responsible for everything from the control of kitchen appliances to sophisticated climate models used in predicting future environmental change. Students in computer science learn to approach complex problems in business, science, and entertainment using their strong background in mathematics, algorithms, and data structures. The degree programs in the Computer Science Department prepare students to be confident software developers and technical problem solvers. The curriculum also trains students for research into new avenues where computers will have a significant impact. The BS curriculum is accredited by the Computing Accreditation Commission of ABET.

CAREER OPPORTUNITIES:
Graduates pursue exciting opportunities in graphics, artificial intelligence, software engineering, database design, scientific programming, systems administration, and research at universities and national laboratories. Students completing the animation emphasis will be prepared for technical positions at animation and game programming studios. Students will learn both the technical and artistic side of creating and implementing digital animations and games. The bioinformatics emphasis is designed for students who are interested in building software to assist in analyzing biological systems. Students will graduate with a significant background in biology coupled with the software development and analysis skills necessary to implement large bioinformatics applications.

MAP DISCLAIMER
While every reasonable effort is made to ensure accuracy, there are some student populations that could have exceptions to listed requirements. Please refer to the university catalog and your college advisement center/department for complete guidelines.

DEPARTMENT INFORMATION
Computer Science Department
ADVISEMENT CENTER INFORMATION
FOR UNIVERSITY CORE OR PROGRAM QUESTIONS CONTACT THE ADVISEMENT CENTER
Physical and Mathematical Sciences College Advisement Center
Brigham Young University
N-181 ESC
Provo, UT 84602
Telephone: (801) 422-2674