# BS in COMPUTER SCIENCE: Bioinformatics Emphasis (693222) MAP Sheet

Department of Computer Science

For students entering the degree program during the 2016–2017 curricular year.

## UNIVERSITY CORE AND GRADUATION REQUIREMENTS

### UNIVERSITY CORE REQUIREMENTS

<table>
<thead>
<tr>
<th>Requirements</th>
<th>#Classes</th>
<th>Hours</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Religion Cornerstones</td>
<td></td>
<td></td>
<td>Rel A 275</td>
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<tr>
<td>Teachings and Doctrine, Book of Mormon</td>
<td></td>
<td>2.0</td>
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<tr>
<td>Jesus Christ &amp; the Everlasting Gospel</td>
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<td>2.0</td>
<td>Rel A 250</td>
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<tr>
<td>Foundations of the Restoration</td>
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<td>2.0</td>
<td>Rel C 225</td>
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<tr>
<td>The Eternal Family</td>
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<td>Rel C 200</td>
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</table>

**The Individual and Society**
- Citizenship
  - American Heritage: 1–2, 3–6.0, from approved list
  - Global & Cultural Awareness: 1, 3.0, from approved list

**Skills**
- Effective Communication: 1, 3.0, from approved list
- First-Year Writing: 1, 3.0, from approved list
- Adv Written & Oral Communication: 1, 3.0, Eng 316*, from approved list
- Quantitative Reasoning: 0–1, 0–4.0, Math 112* or 113*
- Languages of Learning (Math or Language): 1, 4.0, Math 112* or 113*

**Arts, Letters, and Sciences**
- Civilization 1 and 2: 2, 6.0, from approved list
- Arts: 1, 3.0, from approved list
- Letters: 1, 3.0, from approved list
- Scientific Principles & Reasoning
  - Biological Science: 1, 4.0, Bio 130*
  - Physical Science: 2, 7.0, Chem 105* & Phscs 121*
  - Social Science: 1, 3.0, from approved list

**Core Enrichment: Electives**
- Religion Electives: 3–4, 6.0, from approved list
- Open Electives: Variable, Variable, personal choice

**GRADUATION REQUIREMENTS:**
- Minimum residence hours required: 30.0
- Minimum hours needed to graduate: 120.0

## PROGRAM REQUIREMENTS (88 total hours)

<table>
<thead>
<tr>
<th>Classes</th>
<th>Hours</th>
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<tbody>
<tr>
<td>C S 142</td>
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<td>C S 224</td>
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<td>C S 235</td>
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<td>C S 252</td>
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<td>C S 312*</td>
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<td>C S 340</td>
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<td>C S 360</td>
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<td>C S 404</td>
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<tr>
<td>C S 418</td>
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<tr>
<td>Bio 130*</td>
<td>4.0</td>
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<tr>
<td>Bio 463</td>
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<tr>
<td>Bio 465</td>
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<tr>
<td>Chem 105*</td>
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<tr>
<td>Eng 316*</td>
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<tr>
<td>Math 112*</td>
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<tr>
<td>Math 113*</td>
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<tr>
<td>Math 313</td>
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<tr>
<td>MMBio 240</td>
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<tr>
<td>Phscs 121*</td>
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<tr>
<td>PWS 340</td>
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<tr>
<td>Stat 121</td>
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<tr>
<td>Stat 201</td>
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**Note:** Grades below C- are not allowed in major courses. Hours of credit applied toward the major must be within 8 years of declaring the 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.

### Complete the following:

- 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 & Analysis: 3.0
- C S 340 Software Design and Testing: 3.0
- C S 360 Internet Programming: 3.0
- C S 404 Ethics and Computers in Society: 2.0
- C S 418 Bioinformatics: 3.0

### Complete the following supporting courses:

- Bio 130* Biology: 4.0
- Bio 463 Genetics of Human Disease: 3.0
- Bio 465 Bioinformatics and Proteomics: 3.0
- Chem 105* General College Chemistry: 4.0
- Eng 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

### Complete one course from the following:

- Stat 121 Principles of Statistics: 3.0
- Stat 201 Statistics for Engineers & Scientists: 3.0

**Note:** If C S 401R or 498R is chosen, it must be taken for three hours.

*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (18–22 hours overlap)*

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

**FACULTY ADVISOR:**
Paul Roper
3370 TMCB
Brigham Young University, Provo, UT 84602
Telephone: (801) 422-8149
<table>
<thead>
<tr>
<th>Suggested Sequence of Courses:</th>
<th>JUNIOR YEAR</th>
<th>THE DISCIPLINE:</th>
</tr>
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<tbody>
<tr>
<td>FRESHMAN YEAR</td>
<td></td>
<td>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.</td>
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<td>CAREER OPPORTUNITIES:</td>
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<td>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.</td>
</tr>
</tbody>
</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. |

**FRESHMAN YEAR**

**1st Semester**
- C S 142 (FWSpSu) 3.0
- 1st Year Writing 3.0
- or A Htg 100 (3.0)
- Bio 130 2.0
- Math 112 (FWSpSu) 4.0
- Religion Cornerstone course 2.0
- **Total Hours 14.0**

**2nd Semester**
- C S 224 (FWSpSu) 3.0
- C S 235 (FWSpSu) 3.0
- A Htg 100 3.0
- or 1st Year Writing (3.0)
- Math 113 (FWSpSu) 4.0
- Religion Cornerstone course 2.0
- **Total Hours 15.0**

**SOPHOMORE YEAR**

**3rd Semester**
- C S 236 (FWSpSu) 3.0
- Civilization 1 3.0
- Stat 121 or 201 (FWSpSu) 3.0
- Arts 3.0
- Religion Cornerstone course 2.0
- **Total Hours 14.0**

**4th Semester**
- C S 240 (FWSu) 4.0
- C S 252 (FWSp) 3.0
- Chem 105 (FWSpSu) 4.0
- Math 313 (FWSpSu) 3.0
- Religion Cornerstone course 2.0
- **Total Hours 16.0**

**5th Semester**
- C S 312 (FWSp) 3.0
- MMBio 240 (FWSp) 3.0
- Bio 463 3.0
- Engl 316 (FWSpSu) 3.0
- Religion Elective 2.0
- **Total Hours 14.0**

**6th Semester**
- C S 340 (FW) 3.0
- C S 404 (FW) 2.0
- PWS 340 (FWSp) 2.0
- C S 418 (W) 3.0
- C S 345 (FWSp) 3.0
- Religion Elective 2.0
- **Total Hours 15.0**

**SENIOR YEAR**

**7th Semester**
- C S 360 (FW) 3.0
- Computer Science Elective (400 level) 3.0
- Bio 465 3.0
- Phscs 121 (FWSpSu) 3.0
- Religion Elective 2.0
- C S Elective (400-level) 3.0
- **Total Hours 17.0**

**8th Semester**
- Computer Science Elective (400 level) 3.0
- Computer Science Elective (400 level) 3.0
- Civilization 2 (and Letters) 3.0
- Global and Cultural Awareness (& Soc. Sci.) 3.0
- C S Elective (400-level) 3.0
- **Total Hours 15.0**

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