BS in Computer Science (693220) MAP Sheet
Physical and Mathematical Sciences, Computer Science
For students entering the degree program during the 2019-2020 curricular year.

<table>
<thead>
<tr>
<th>University Core and Graduation Requirements</th>
<th>Suggested Sequence of Courses</th>
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<tbody>
<tr>
<td><strong>University Core Requirements:</strong></td>
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<td><strong>Requirements</strong></td>
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<td><strong>#Classes</strong></td>
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<td><strong>Hours</strong></td>
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<td><strong>Classes</strong></td>
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<tr>
<td><strong>Religion Cornerstones</strong></td>
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<tr>
<td>Teachings and Doctrine of The Book of Mormon</td>
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<tr>
<td>2.0 REL A 275</td>
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<tr>
<td>Jesus Christ and the Everlasting Gospel</td>
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<td>2.0 REL A 250</td>
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<tr>
<td>Foundations of the Restoration</td>
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<td>2.0 REL C 225</td>
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<tr>
<td>The Eternal Family</td>
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<td>2.0 REL C 200</td>
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<td><strong>The Individual and Society</strong></td>
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<tr>
<td>American Heritage</td>
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<td>3-6.0 from approved list</td>
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<tr>
<td>Global and Cultural Awareness</td>
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<td>3.0 from approved list</td>
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<td><strong>Skills</strong></td>
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<tr>
<td>First Year Writing</td>
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<td>3.0 from approved list</td>
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<tr>
<td>Advanced Written and Oral Communications</td>
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<tr>
<td>3.0 ENGL 316*</td>
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<td>Quantitative Reasoning</td>
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<tr>
<td>4.0 MATH 112* or 113*</td>
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<td>Languages of Learning (Math or Language)</td>
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<tr>
<td>4.0 MATH 112* or 113*</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>3.0 from approved list</td>
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<td>Civilization 2</td>
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<td>Letters</td>
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<tr>
<td>Biological Science</td>
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<td>3-4.0 from approved list</td>
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<tr>
<td>Physical Science</td>
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<td>3.0 CS 312*</td>
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<td>Social Science</td>
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<td>3.0 from approved list</td>
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<td><strong>Core Enrichment: Electives</strong></td>
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<tr>
<td>Religion Electives</td>
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<td>6.0 from approved list</td>
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<td>Open Electives</td>
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<td>Variable</td>
<td>personal choice</td>
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<td>*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (13 hours overlap)</td>
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</tbody>
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**Graduation Requirements:**
- Minimum residence hours required: 30.0
- Minimum hours needed to graduate: 120.0

**Suggested Sequence of Courses**

**FRESHMAN YEAR**

1st Semester
- C S 142 3.0
- First-year Writing or American Heritage 3.0
- MATH 112 4.0
- General Education courses, university requirements, and/or general electives 3.0
- Religion Cornerstone course 2.0
- Total Hours 15.0

2nd Semester
- C S 236 3.0
- MATH 113 4.0
- Religion Cornerstone course 2.0
- Total Hours 15.0

**SOPHOMORE YEAR**

3rd Semester
- C S 224 3.0
- STAT 121 or STAT 201 or MATH 431 3.0
- Civilization 1 3.0
- Religion Cornerstone course 2.0
- Total Hours 14.0

4th Semester
- C S 240 4.0
- C S 252 3.0
- Biological Science 3.0
- MATH 213 2.0
- MATH 215 1.0
- Religion Cornerstone Course 2.0
- Total Hours 15.0

**JUNIOR YEAR**

5th Semester
- C S 312 3.0
- C S 340 3.0
- ENGL 316 3.0
- Religion elective 2.0
- General electives 2.0
- Total Hours 16.0

6th Semester
- Computer Science Elective 3.0
- Computer Science Elective 3.0
- Computer Science Elective 3.0
- Letters 3.0
- Religion Elective 2.0
- Total Hours 16.0

**SENIOR YEAR**

7th Semester
- Computer Science Elective 3.0
- Computer Science Elective 3.0
- Computer Science Elective 3.0
- Arts 3.0
- Religion Elective 2.0
- Total Hours 14.0

8th Semester
- Computer Science Elective 3.0
- CS/MATH/Science Elective 3.0
- Global and Cultural Awareness 3.0
- Social Science 3.0
- Total Hours 15.0

Note: 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.
Computer science majors, especially those planning graduate work, are advised to acquire a strong background in mathematics, possibly a minor.

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 major.

Any exceptions must be approved by the Department.

Personnel in the College of Physical and Mathematical Sciences Advisement Center is advised to acquire a strong background in mathematics, possibly a minor.

Computer science majors, especially those planning graduate work, are advised to prepare for research into new frontiers.

The degree programs in the Computer Science Department require students to be confident software developers and technical problem solvers. The curriculum also trains students for research into new domains.

**SUPPORTING COURSES:**

- C S 404 - Ethics and Computers in Society 2.0

**REQUIREMENT 1** Complete 10 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

**REQUIREMENT 2** Complete 3 options

**SUPPORTING COURSES:**

- OPTION 2.1 Complete 4 courses
  - *ENGL 316 - Technical Communication 3.0
  - MATH 112 - Calculus I 4.0
  - MATH 113 - Calculus II 4.0
  - PHSCS 121 - Introduction to Newtonian Mechanics 3.0

- OPTION 2.2 Complete 1 group

  **GROUP 2.2.1** Complete 1 course
  - MATH 313 - (Not currently offered) 3.0

  **GROUP 2.2.2** Complete 2 courses
  - MATH 213 - Elementary Linear Algebra 2.0
  - MATH 215 - Computational Linear Algebra 1.0

**OPTION 2.3** Complete 1 course

- MATH 431 - Probability Theory 3.0
- STAT 121 - Principles of Statistics 3.0
- STAT 201 - Statistics for Engineers and Scientists 3.0

**REQUIREMENT 3** Complete 24.0 hours from the following option(s)

**COMPLETE A TOTAL OF 8 COURSES (24 HOURS) FROM THE FOLLOWING THREE GROUPS:**

- **OPTION 3.1** Complete up to 24.0 hours from the following course(s)
  - A MINIMUM OF 4 OF THE EIGHT ELECTIVE COURSES MUST BE FROM THIS GROUP.
  - C S 329 - Testing, Analysis, and Verification 3.0
  - C S 330 - Concepts of Programming Languages 3.0
  - C S 345 - Operating Systems Design 3.0
  - C S 355 - Interactive Graphics and Image Processing 3.0
  - C S 356 - Designing the User Experience 3.0
  - C S 401R - Topics in Computer Science 3.0
  - C S 412 - Linear Programming and Convex Optimization 3.0
  - C S 418 - Bioinformatics 3.0
  - C S 428 - Software Engineering 3.0
  - C S 431 - Algorithmic Languages and Compilers 3.0
  - C S 450 - Computer Vision 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 472 - Introduction to Machine Learning 3.0
  - C S 474 - Introduction to Deep Learning 3.0
  - C S 479 - (Not currently offered) 3.0
  - C S 486 - Verification and Validation 3.0
  - C S 501R - Advanced Topics in Computer Science 3.0
  - C S 513 - Robust Control 3.0
  - C S 557 - (Not currently offered) 3.0

  *Note: If C S 401R or C S 501R is chosen, it must be taken for three credit hours.*

**OPTION 3.2** Complete up to 9.0 hours from the following course(s)

**COMPLETE UP TO 9.0 CREDIT HOURS FROM THE FOLLOWING COURSES.**

- TOUp TO 3 OF THE EIGHT ELECTIVE COURSES COULD BE FROM THIS GROUP.
  - C S 493R - Computing Competitions 3.0
  - C S 495 - Capstone 1 3.0
  - C S 495 - Capstone 2 3.0
  - C S 497R - Undergraduate Research 3.0
  - C S 498R - Undergraduate Special Projects 3.0

  *You may take up to 3 credit hours.*

**OPTION 3.3** Complete up to 6.0 hours from the following course(s)

**COMPLETE UP TO 6.0 CREDIT HOURS FROM THE FOLLOWING COURSES.**

- TOUp TO 2 OF THE EIGHT ELECTIVE COURSES COULD BE FROM THIS GROUP.
  - C S 493R - Computing Competitions 3.0
  - C S 495 - Capstone 1 3.0
  - C S 495 - Capstone 2 3.0
  - C S 497R - Undergraduate Research 3.0
  - C S 498R - Undergraduate Special Projects 3.0

  *You may take up to 6 credit hours.*

**REQUIREMENT 4** Complete Senior Exit Interview with the CS department during your last semester or term.

**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**

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Brigham Young University
3361 Talmage Building
Provo, UT 84602
Telephone: (801) 422-3027

**ADVISEMENT CENTER INFORMATION**

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Brigham Young University
N-181 ESC
Provo, UT 84602
Telephone: (801) 422-2674