<table>
<thead>
<tr>
<th>University Core and Graduation Requirements</th>
<th>Suggested Sequence of Courses</th>
</tr>
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<tbody>
<tr>
<td><strong>University Core Requirements:</strong></td>
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<tr>
<td><strong>Requirements</strong></td>
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<tr>
<td>Classes</td>
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<tr>
<td>Hours</td>
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<tr>
<td>Classes</td>
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<tr>
<td><strong>Religion Cornerstones</strong></td>
<td></td>
</tr>
<tr>
<td>Teachings and Doctrine of The Book of The Book of Mormon</td>
<td>1</td>
</tr>
<tr>
<td>Jesus Christ and the Everlasting Gospel</td>
<td>1</td>
</tr>
<tr>
<td>Foundations of the Restoration</td>
<td>1</td>
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<tr>
<td>The Eternal Family</td>
<td>1</td>
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<tr>
<td><strong>The Individual and Society</strong></td>
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<tr>
<td>American Heritage</td>
<td>1-2</td>
</tr>
<tr>
<td>Global and Cultural Awareness</td>
<td>1</td>
</tr>
<tr>
<td><strong>Skills</strong></td>
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<tr>
<td>First Year Writing</td>
<td>1</td>
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<tr>
<td>Advanced Written and Oral Communications</td>
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</tr>
<tr>
<td>Quantitative Reasoning</td>
<td>1</td>
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<tr>
<td>Languages of Learning (Math or Language)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Arts, Letters, and Sciences</strong></td>
<td></td>
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<tr>
<td>Civilization 1</td>
<td>1</td>
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<tr>
<td>Civilization 2</td>
<td>1</td>
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<tr>
<td>Arts</td>
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<tr>
<td>Letters</td>
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<tr>
<td>Biological Science</td>
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<tr>
<td>Physical Science</td>
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<tr>
<td>Social Science</td>
<td>1</td>
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<tr>
<td><strong>Core Enrichment: Electives</strong></td>
<td></td>
</tr>
<tr>
<td>Religion Electives</td>
<td>3-4</td>
</tr>
<tr>
<td>Open Electives</td>
<td>Variable Variable personal choice</td>
</tr>
</tbody>
</table>

* THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (13 hours overlap)

<table>
<thead>
<tr>
<th>Graduation Requirements:</th>
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<tbody>
<tr>
<td>Minimum residence hours required</td>
<td>30.0</td>
</tr>
<tr>
<td>Minimum hours needed to graduate</td>
<td>120.0</td>
</tr>
</tbody>
</table>

| **FRESHMAN YEAR**                       |                              |
|                                        |                              |
|                                        |                              |
|                                        |                              |

| **JUNIOR YEAR**                         |                              |
|                                        |                              |
|                                        |                              |
|                                        |                              |

| **SOPHOMORE YEAR**                      |                              |
|                                        |                              |
|                                        |                              |
|                                        |                              |

| **SENIOR YEAR**                         |                              |
|                                        |                              |
|                                        |                              |
|                                        |                              |

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.
### REQUIREMENT 1
Complete 10 courses

**CORE COURSES:**
- C S 143 - 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 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
- MATH 112 - Calculus 1 4.0
- MATH 113 - Calculus 2 4.0
- PHSCS 121 - Introduction to Newtonian Mechanics 3.0
- WRTG 316 - Technical Communication 3.0

**OPTION 2.2**
Complete 1 group

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

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

### REQUIREMENT 2
Complete 8 courses (24 hours) from the following three groups:

**GROUP 2.2.1**
- C S 260 - Web Programming 3.0
- 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 393 - Advanced Algorithms and Problem Solving 3.0
- C S 401R - Topics in Computer Science 3.0

You may take up to 3 credit hours.

**GROUP 2.2.2**
- C S 405 - Introduction to Deep Learning 3.0
- 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 - 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 471 - Voice User Interfaces 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) 3.0v
- C S 486 - Verification and Validation 3.0
- C S 501R - Advanced Topics in Computer Science 3.0v

You may take up to 3 credit hours.

**GROUP 2.2.3**
- C S 493R - Computing Competitions 3.0
- C S 498R - Undergraduate Special Projects 3.0
- C S 501 - Robust Control 3.0

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

**COMPLETE 12-24 CREDIT HOURS FROM THE FOLLOWING COURSES. A MINIMUM OF 4 OF THE EIGHT ELECTIVE COURSES MUST BE FROM THIS GROUP:**

**OPTION 3.1**
Complete up to 24.0 hours from the following course(s)
- C S 513 - Ethics and Computers in Society 3.0
- C S 486 - Verification and Validation 3.0
- C S 479 - (Not currently offered) 3.0v
- C S 498R - Undergraduate Special Projects 3.0
- C S 493R - Computing Competitions 3.0
- C S 495R - Undergraduate Special Projects 3.0
- C S 497R - Undergraduate Research 3.0
- C S 498 - Data Science Capstone 2 3.0
- C S 501 - Robust Control 3.0

You may take up to 3 credit hours.

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

- C S 401R - Topics in Computer Science 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 471 - Voice User Interfaces 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) 3.0v
- C S 486 - Verification and Validation 3.0
- C S 501R - Advanced Topics in Computer Science 3.0v

You may take up to 3 credit hours.

**OPTION 3.3**
Complete up to 9.0 hours from the following course(s)

- C S 498 - Data Science Capstone 2 3.0
- C S 497R - Undergraduate Research 3.0
- C S 498 - Data Science Capstone 2 3.0
- C S 501 - Robust Control 3.0

You may take up to 3 credit hours.

**OPTION 3.4**
Complete 12-24 credit hours from the following courses. A minimum of 4 of the eight elective courses must be from this group.

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

## ADVISEMENT CENTER INFORMATION
Physical and Mathematical Sciences College Advisement Center
Brigham Young University
N-181 ESC
Provo, UT 84602
Telephone: (801) 422-2674