## University Core and Graduation Requirements

### University Core Requirements:

#### Requirements

<table>
<thead>
<tr>
<th>#Classes</th>
<th>Hours</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Religion Cornerstones</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachings and Doctrine of The Book of Mormon</td>
<td>1</td>
<td>2.0</td>
</tr>
<tr>
<td>Jesus Christ and the Everlasting Gospel</td>
<td>1</td>
<td>2.0</td>
</tr>
<tr>
<td>Foundations of the Restoration</td>
<td>1</td>
<td>2.0</td>
</tr>
<tr>
<td>The Eternal Family</td>
<td>1</td>
<td>2.0</td>
</tr>
<tr>
<td>The Individual and Society</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Heritage</td>
<td>1-2</td>
<td>3-6.0</td>
</tr>
<tr>
<td>Global and Cultural Awareness</td>
<td>1</td>
<td>3.0</td>
</tr>
<tr>
<td>Skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Year Writing</td>
<td>1</td>
<td>3.0</td>
</tr>
<tr>
<td>Advanced Written and Oral Communications</td>
<td>1</td>
<td>3.0</td>
</tr>
<tr>
<td>Quantitative Reasoning</td>
<td>1</td>
<td>4.0</td>
</tr>
<tr>
<td>Languages of Learning (Math or Language)</td>
<td>1</td>
<td>4.0</td>
</tr>
<tr>
<td>Arts, Letters, and Sciences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civilization 1</td>
<td>1</td>
<td>3.0</td>
</tr>
<tr>
<td>Civilization 2</td>
<td>1</td>
<td>3.0</td>
</tr>
<tr>
<td>Arts</td>
<td>1</td>
<td>3.0</td>
</tr>
<tr>
<td>Letters</td>
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<td>3.0</td>
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<tr>
<td>Biological Science</td>
<td>1</td>
<td>3.0</td>
</tr>
<tr>
<td>Physical Science</td>
<td>1</td>
<td>3.0</td>
</tr>
<tr>
<td>Social Science</td>
<td>1</td>
<td>3.0</td>
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<tr>
<td>Core Enrichment: Electives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religion Electives</td>
<td>3-4</td>
<td>6.0</td>
</tr>
<tr>
<td>Open Electives</td>
<td>Variable</td>
<td>Variable</td>
</tr>
</tbody>
</table>

*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (13–23 hours overlap)*

### Graduation Requirements:

- Minimum residence hours required: 30.0
- Minimum hours needed to graduate: 120.0

## JUNIOR YEAR

### 5th Semester

<table>
<thead>
<tr>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C S 142</td>
</tr>
<tr>
<td>STAT 211 or 201</td>
</tr>
<tr>
<td>First-Year Writing or American Heritage</td>
</tr>
<tr>
<td>MATH 112</td>
</tr>
<tr>
<td>Religion Cornerstone course</td>
</tr>
<tr>
<td>Total Hours</td>
</tr>
</tbody>
</table>

### 2nd Semester

<table>
<thead>
<tr>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>First-Year Writing or American Heritage</td>
</tr>
<tr>
<td>MATH 113</td>
</tr>
<tr>
<td>Religion Cornerstone course</td>
</tr>
<tr>
<td>Total Hours</td>
</tr>
</tbody>
</table>

## SENIOR YEAR

### 6th Semester

<table>
<thead>
<tr>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C S 235</td>
</tr>
<tr>
<td>Physics 121</td>
</tr>
<tr>
<td>MATH 113</td>
</tr>
<tr>
<td>Civilization 2 (ARTHC 202)</td>
</tr>
<tr>
<td>Global and Cultural Awareness</td>
</tr>
<tr>
<td>Total Hours</td>
</tr>
</tbody>
</table>

### 5th Semester

<table>
<thead>
<tr>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C S 240</td>
</tr>
<tr>
<td>C S 252</td>
</tr>
<tr>
<td>MATH 213</td>
</tr>
<tr>
<td>MATH 215</td>
</tr>
<tr>
<td>Social Science</td>
</tr>
<tr>
<td>Religion Cornerstone course</td>
</tr>
<tr>
<td>Total Hours</td>
</tr>
</tbody>
</table>

### Open Electives

- Computer Science Elective | 3.0
- CSANM Elective | 3.0
- Biological Science | 3.0
- CSANM Elective | 3.0
- Religion Elective | 2.0
- Open Elective | 1.0

### Note 1:
The sequence of courses 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.

FOR UNIVERSITY CORE OR PROGRAM QUESTIONS, CONTACT THE ADVISEMENT CENTER.
**BS in Computer Science: Animation (693223)**
**2020-2021 Program Requirements (77 - 80.5 Credit Hours)**

**Grades below C- are not allowed in major courses.**

**REQUIREMENT 1** Complete 3 courses
**PREEQUIPMENT COURSES:**
- C S 142 - Introduction to Computer Programming 3.0
- C S 235 - Data Structures and Algorithms 3.0
- CSANNM 150 - Introduction to Three-Dimensional Computer Graphics 1.5

**Be admitted to the program.**

**REQUIREMENT 2** Complete 20 courses

**COMPLETE THE FOLLOWING AFTER BEING ADMITTED TO THE PROGRAM:**

**PREREQUISITE COURSES:**
- STAT 201
- STAT 121
- CSANM 450R - Advanced Senior Film Production 1
- *WRTG 316
- PHSCS 121
- MATH 113
- CSANM 354
- CS 455
- CS 404
- CS 355
- CS 324
- CS 312
- CS 240
- CS 236
- CS 224 - Introduction to Computer Systems 3.0
- CS 236 - Discrete Structures 3.0
- CS 240 - Advanced Programming Concepts 4.0
- CS 252 - Introduction to Computational Theory 3.0
- CS 312 - Algorithm Design and Analysis 3.0
- CS 324 - Systems Programming 3.0
- CS 340 - Software Design 3.0
- CS 355 - Interactive Graphics and Image Processing 3.0
- CS 404 - Ethics and Computers in Society 2.0
- CS 455 - Computer Graphics 3.0

**REQUIREMENT 3** Complete 5 courses

**SUPPORTING COURSES:**
- CSANNM 354 - Shader Programming 3.0
- MATH 112 - Calculus 1 4.0
- MATH 113 - Calculus 2 4.0
- PHSCS 121 - Introduction to Newtonian Mechanics 3.0
- *WRTG 116 - Technical Communication 3.0

**REQUIREMENT 4** Complete 1 option

**OPTION 4.1** Complete 1 course
- MATH 113 - (Not currently offered)

**OPTION 4.2** Complete 2 courses
- MATH 213 - Elementary Linear Algebra 2.0
- MATH 215 - Computational Linear Algebra 1.0

**REQUIREMENT 5** Complete 1 course
- You may take this course up to 2 times
- CSANNM 459R - Video Game Production 1 3.0

**REQUIREMENT 6** Complete 1 course
- STAT 121 - Principles of Statistics 3.0
- STAT 201 - Statistics for Engineers and Scientists 3.0

**REQUIREMENT 7** Complete 1 course
**NOTE: IF C S 401R IS CHOSEN, IT MUST BE TAKEN FOR THREE HOURS.**
- 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 356 - Designing the User Experience 3.0
- C S 401R - Topics in Computer Science 3.0
- You may take this course up to 3 credit hours.
- C S 412 - Linear Programming and Convex Optimization 3.0
- C S 418 - (Not currently offered)
- 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 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)
- C S 486 - Verification and Validation 3.0
- You may take this course up to 3 credit hours.
- C S 491R - Undergraduate Special Projects 3.0
- You may take this course up to 3 credit hours.
- C S 501R - Advanced Topics in Computer Science 3.0

**REQUIREMENT 8** Complete 3 courses

**COURSES USED TO FULFILL REQUIREMENT 6 CANNOT BE DOUBLE COUNTED HERE. NOTE: IF C S 401R IS CHOSEN, IT MUST BE TAKEN FOR THREE HOURS.**
- C S 401R - Topics in Computer Science 3.0
- You may take this course up to 3 credit hours.
- C S 412 - Linear Programming and Convex Optimization 3.0
- C S 418 - (Not currently offered)
- 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

**REQUIREMENT 9** Complete 1 course
- ARTHC 111 - Introduction to Art History 3.0
- ARTHC 202 - World Civilization Since 1500 3.0
- TECH 201 - (Not currently offered)
- TMA 294 - History of Animation 3.0

**REQUIREMENT 10**
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
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Provo, UT 84602
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ADVISEMENT CENTER INFORMATION
Physical and Mathematical Sciences College Advisement Center
Brigham Young University
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Provo, UT 84602
Telephone: (801) 422-2674