## 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>
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</tr>
<tr>
<td>Teachings and Doctrine of The Book of Mormon</td>
<td>1</td>
<td>2.0</td>
<td>REL A 275</td>
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<tr>
<td>Jesus Christ and the Everlasting Gospel</td>
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<td>REL A 250</td>
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<tr>
<td>Foundations of the Restoration</td>
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<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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<td>The Individual and Society</td>
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<tr>
<td>American Heritage</td>
<td>1-2</td>
<td>3-6.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Global and Cultural Awareness</td>
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<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Skills</td>
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</tr>
<tr>
<td>First Year Writing</td>
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<td>from approved list</td>
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<tr>
<td>Advanced Written and Oral Communications</td>
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<td>ENGL 316*</td>
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<tr>
<td>Quantitative Reasoning</td>
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<td>4.0</td>
<td>MATH 112* or 113*</td>
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<tr>
<td>Languages of Learning (Math or Language)</td>
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<td>MATH 112* or 113*</td>
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<tr>
<td>Arts, Letters, and Sciences</td>
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<tr>
<td>Civilization 1</td>
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<td>3.0</td>
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<tr>
<td>Civilization 2</td>
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<td>3.0</td>
<td>ARTHC 202* or from approved list</td>
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<tr>
<td>Arts</td>
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<td>TMA 102*</td>
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<tr>
<td>Letters</td>
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<td>Biological Science</td>
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<td>Physical Science</td>
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<td>CS 312*</td>
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<tr>
<td>Social Science</td>
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<td>Core Enrichment: Electives</td>
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<tr>
<td>Religion Electives</td>
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<td>Open Electives</td>
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<td>Personal choice</td>
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<td>personal choice</td>
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</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

### Suggested Sequence of Courses

<table>
<thead>
<tr>
<th>Time Period</th>
<th>1st Semester</th>
<th>2nd Semester</th>
<th>3rd Semester</th>
<th>4th Semester</th>
<th>5th Semester</th>
<th>6th Semester</th>
<th>7th Semester</th>
<th>8th Semester</th>
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<tbody>
<tr>
<td>Freshman</td>
<td>C S 142</td>
<td>C S 235</td>
<td>C S 236</td>
<td>C S 240</td>
<td>C S 355</td>
<td>C S 340</td>
<td>C S 404</td>
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<td></td>
<td>First-year Writing or American Heritage</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
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<tr>
<td></td>
<td>MATH 112</td>
<td>MATH 211</td>
<td>MATH 313</td>
<td>MATH 112</td>
<td>MATH 312</td>
<td>MATH 312</td>
<td>MATH 211</td>
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<td>4.0</td>
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<td></td>
<td>Religion Cornerstone course</td>
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<td></td>
<td>Total Hours</td>
<td>13.5</td>
<td>15.0</td>
<td>16.0</td>
<td>15.0</td>
<td>14.0</td>
<td>15.0</td>
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</table>

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.
BS in Computer Science: Animation (693223)
2017-2018 Program Requirements (78.5 - 79.5 Credit Hours)

Grades below C- are not allowed in major courses.

REQUIREMENT 1 Complete 3 courses

PREREQUISITE COURSES:
C S 142 - Introduction to Computer Programming 3.0
C S 235 - Data Structures and Algorithms 3.0
CSANM 150 - Introduction to Three-Dimensional Computer Graphics 1.5
Be admitted to the program.

REQUIREMENT 2 Complete 10 courses

COMPLETE THE FOLLOWING AFTER BEING ADMITTED TO THE PROGRAM:
C S 224 - Introduction to Computer Systems 3.0
C S 226 - 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 355 - Interactive Graphics and Image Processing 3.0
C S 404 - Ethics and Computers in Society 2.0
C S 455 - Computer Graphics 3.0

REQUIREMENT 3 Complete 8 courses

SUPPORTING COURSES:
CSANM 354 - Shader Programming 3.0
*ENGL 316 - Technical Communication 3.0
MATH 112 - Calculus 1 3.0
MATH 113 - Calculus 2 4.0
MATH 313 - Elementary Linear Algebra 3.0
PHCS 121 - Introduction to Newtonian Mechanics 3.0
*TMA 102 - Introduction to Film 3.0
TMA 294 - History of Animation 3.0

REQUIREMENT 4 Complete 1 course

CSANM 450R - Advanced Senior Film Production 1 3.0
CSANM 459R - Interactive Animation Technology 3.0

REQUIREMENT 5 Complete 1 course

STAT 121 - Principles of Statistics 3.0
STAT 201 - Statistics for Engineers and Scientists 3.0

REQUIREMENT 6 Complete 1 course

NOTE: IF C S 401R IS CHOSEN, IT MUST BE TAKEN FOR THREE HOURS.
C S 256 - Designing the User Experience 3.0
C S 260 - Web Programming 3.0

C S 330 - Concepts of Programming Languages 3.0
C S 345 - Operating Systems Design 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 418 - Bioinformatics 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 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
EC EN 425 - Real-Time Operating Systems 4.0

REQUIREMENT 7 Complete 1 course

NOTE: IF C S 401R, C S 498R, OR C S 501R IS CHOSEN, IT MUST BE TAKEN FOR THREE HOURS.
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 418 - Bioinformatics 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 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
EC EN 425 - Real-Time Operating Systems 4.0

REQUIREMENT 8 Complete 1 course

ARThC 111 - Introduction to Art History 3.0
ARThC 202 - World Civilization Since 1500 3.0
TECH 201 - History of Creativity and Innovation in the Arts, Science, and... 3.0

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

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