### University Core and Graduation Requirements

#### University Core Requirements:

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Classes</th>
<th>Hours</th>
<th>Classes</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Religion Cornerstones</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachings and Doctrine of The Book of Mormon</td>
<td>1</td>
<td>2.0</td>
<td>REL A 275</td>
<td></td>
</tr>
<tr>
<td>Jesus Christ and the Everlasting Gospel</td>
<td>1</td>
<td>2.0</td>
<td>REL A 250</td>
<td></td>
</tr>
<tr>
<td>Foundations of the Restoration</td>
<td>1</td>
<td>2.0</td>
<td>REL C 225</td>
<td></td>
</tr>
<tr>
<td>The Eternal Family</td>
<td>1</td>
<td>2.0</td>
<td>REL C 200</td>
<td></td>
</tr>
<tr>
<td><strong>The Individual and Society</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Heritage</td>
<td>1-2</td>
<td>3-6.0</td>
<td>from approved list</td>
<td></td>
</tr>
<tr>
<td>Global and Cultural Awareness</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
<td></td>
</tr>
<tr>
<td><strong>Skills</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Year Writing</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
<td></td>
</tr>
<tr>
<td>Advanced Written and Oral Communications</td>
<td>1</td>
<td>3.0</td>
<td>WRTG 316</td>
<td></td>
</tr>
<tr>
<td>Quantitative Reasoning</td>
<td>1</td>
<td>4.0</td>
<td>MATH 112* or 113*</td>
<td></td>
</tr>
<tr>
<td>Languages of Learning (Math or Language)</td>
<td>1</td>
<td>4.0</td>
<td>MATH 112* or 113*</td>
<td></td>
</tr>
<tr>
<td><strong>Arts, Letters, and Sciences</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civilization 1</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
<td></td>
</tr>
<tr>
<td>Civilization 2</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
<td></td>
</tr>
<tr>
<td>Arts</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
<td></td>
</tr>
<tr>
<td>Letters</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
<td></td>
</tr>
<tr>
<td>Biological Science</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
<td></td>
</tr>
<tr>
<td>Physical Science</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
<td></td>
</tr>
<tr>
<td>Social Science</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
<td></td>
</tr>
<tr>
<td><strong>Core Enrichment: Electives</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religion Electives</td>
<td>3-4</td>
<td>6.0</td>
<td>from approved list</td>
<td></td>
</tr>
<tr>
<td>Open Electives</td>
<td>Variable</td>
<td>Variable</td>
<td>personal choice</td>
<td></td>
</tr>
</tbody>
</table>

#### Graduation Requirements:

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

### Suggested Sequence of Courses

#### FRESHMAN YEAR

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

**2nd Semester**
- C S 202 1.0
- C S 235 3.0
- PHSCS 121 3.0
- First-year Writing or American Heritage 3.0
- MATH 111 4.0
- Religion Cornerstone course 2.0
- Total Hours 16.0

#### SOPHOMORE YEAR

**3rd Semester**
- C S 203 1.0
- C S 224 3.0
- C S 236 3.0
- Biological Science 3.0
- Civilization 1 3.0
- Religion Cornerstone course 2.0
- Total Hours 15.0

**4th Semester**
- CS 240 4.0
- C S 260 or other C S elective 3.0
- MATH 213 2.0
- MATH 215 1.0
- Civilization 2 3.0
- Religion Cornerstone course 2.0
- Total Hours 15.0

#### JUNIOR YEAR

**5th Semester**
- C S 204 1.0
- C S 312 3.0
- C S 324 3.0
- Social Science 3.0
- STAT 121, STAT 201, or MATH 431 3.0
- Religion Elective 2.0
- Total Hours 15.0

**6th Semester**
- C S 329 3.0
- C S 340 3.0
- C S 452 3.0
- Letters 3.0
- Religion Elective 2.0
- Total Hours 14.0

#### SENIOR YEAR

**7th Semester**
- C S 204 1.0
- C S Elective 3.0
- WRTG 316 3.0
- Arts 3.0
- Religion Elective 2.0
- General education, university requirements, and/or general electives 2.0
- Total Hours 16.0

**8th Semester**
- C S 441 3.0
- C S Elective 3.0
- C S Elective 3.0
- C S Elective 3.0
- C S 404 2.0
- Global and Cultural Awareness 3.0
- Total Hours 14.0
# BS in Computer Science: Software Engineering (693225)

## 2021-2022 Program Requirements (74 - 76 Credit Hours)

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

#### REQUIREMENT 1

Complete 16 courses

**CORE COURSES:**
- C S 142 - Introduction to Computer Programming
- C S 202 - Software Engineering Lab 1
- C S 203 - Software Engineering Lab 2
- C S 204 - Software Engineering Lab 3
- C S 224 - Introduction to Computer Systems
- C S 235 - Data Structures and Algorithms
- C S 236 - Discrete Structures
- C S 240 - Advanced Programming Concepts
- C S 312 - Algorithm Design and Analysis
- C S 324 - Systems Programming
- C S 329 - Testing, Analysis, and Verification
- C S 340 - Software Design
- C S 404 - Ethics and Computers in Society
- C S 452 - Database Modeling Concepts
- C S 480 - Software Engineering Capstone 1
- C S 481 - Software Engineering Capstone 2

**SUPPORTING COURSES:**

- MATH 112 - Calculus 1
- C S 142 - Introduction to Computer Programming
- C S 312 - Algorithm Design and Analysis
- C S 355 - Interactive Graphics and Image Processing
- C S 356 - Designing the User Experience
- C S 393 - Advanced Algorithms and Problem Solving
- C S 401R - Topics in Computer Science
- C S 405 - Computer Vision
- C S 412 - Linear Programming and Convex Optimization
- C S 415 - Computer Graphics
- C S 429 - Database Modeling Concepts
- C S 450 - Computer Vision
- C S 453 - Fundamentals of Information Retrieval
- C S 455 - Computer Graphics
- C S 456 - Introduction to User Interface Software
- C S 460 - Computer Communications and Networking
- C S 462 - Large-Scale Distributed System Design
- C S 465 - Computer Security
- C S 470 - Introduction to Artificial Intelligence
- C S 471 - Voice User Interfaces
- C S 472 - Introduction to Machine Learning
- C S 474 - Introduction to Deep Learning
- C S 486 - Verification and Validation
- C S 493R - Computing Competitions
- C S 497R - Undergraduate Research
- C S 498R - Undergraduate Special Projects
- C S 501R - Advanced Topics in Computer Science
- C S 513 - Robust Control

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>C S 456 - Introduction to User Interface Software</td>
<td>3.0</td>
</tr>
<tr>
<td>C S 460 - Computer Communications and Networking</td>
<td>3.0</td>
</tr>
<tr>
<td>C S 462 - Large-Scale Distributed System Design</td>
<td>3.0</td>
</tr>
<tr>
<td>C S 465 - Computer Security</td>
<td>3.0</td>
</tr>
<tr>
<td>C S 486 - Verification and Validation</td>
<td>3.0</td>
</tr>
<tr>
<td>C S 252 - Introduction to Computational Theory</td>
<td>3.0</td>
</tr>
<tr>
<td>C S 260 - Web Programming</td>
<td>3.0</td>
</tr>
<tr>
<td>C S 330 - Concepts of Programming Languages</td>
<td>3.0</td>
</tr>
<tr>
<td>C S 345 - Operating Systems Design</td>
<td>3.0</td>
</tr>
<tr>
<td>C S 356 - Designing the User Experience</td>
<td>3.0</td>
</tr>
<tr>
<td>C S 252 - Introduction to Computational Theory</td>
<td>3.0</td>
</tr>
<tr>
<td>C S 260 - Web Programming</td>
<td>3.0</td>
</tr>
<tr>
<td>C S 330 - Concepts of Programming Languages</td>
<td>3.0</td>
</tr>
<tr>
<td>C S 345 - Operating Systems Design</td>
<td>3.0</td>
</tr>
<tr>
<td>C S 356 - Designing the User Experience</td>
<td>3.0</td>
</tr>
</tbody>
</table>

### REQUIREMENT 2

Complete 4 courses

**OPTION 1.1 Complete 1 course**
- MATH 111 - Calculus 1

**OPTION 1.2 Complete 2 courses**
- MATH 213 - Elementary Linear Algebra
- MATH 215 - Computational Linear Algebra

**OPTION 1.3 Complete 3 courses**
- MATH 213 - Elementary Linear Algebra
- MATH 215 - Computational Linear Algebra
- MATH 314 - Calculus 2

**OPTION 2 Complete 1 course**
- MATH 113 - Calculus 2

**OPTION 3 Complete 1 course**
- MATH 313 - Calculus 2

### REQUIREMENT 3

Complete 1 course

- MATH 313 - Calculus 2

**REQUIREMENT 4**

Complete 1 course

- STAT 201 - Statistics for Engineers and Scientists

**REQUIREMENT 5**

Complete 2 courses

- C S 260 - Web Programming
- C S 330 - Concepts of Programming Languages
- C S 345 - Operating Systems Design
- C S 356 - Designing the User Experience
- C S 453 - Fundamentals of Information Retrieval
- C S 456 - Introduction to User Interface Software
- C S 460 - Computer Communications and Networking
- C S 462 - Large-Scale Distributed System Design
- C S 465 - Computer Security
- C S 470 - Introduction to Artificial Intelligence
- C S 471 - Voice User Interfaces
- C S 472 - Introduction to Machine Learning
- C S 474 - Introduction to Deep Learning
- C S 486 - Verification and Validation
- C S 493R - Computing Competitions
- C S 497R - Undergraduate Research
- C S 498R - Undergraduate Special Projects
- C S 501R - Advanced Topics in Computer Science
- C S 513 - Robust Control

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 411 - Numerical Methods</td>
<td>3.0</td>
</tr>
<tr>
<td>MATH 431 - Probability Theory</td>
<td>3.0</td>
</tr>
<tr>
<td>MATH 485 - Mathematical Cryptography</td>
<td>3.0</td>
</tr>
<tr>
<td>EC EN 424 - Computer Systems</td>
<td>4.0</td>
</tr>
<tr>
<td>EC EN 425 - Real-Time Operating Systems</td>
<td>4.0</td>
</tr>
<tr>
<td>IT &amp;C 567 - Cybersecurity and Penetration Testing</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**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