

# BS in Computer Science (693220) MAP Sheet

Physical and Mathematical Sciences, Computer Science

For students entering the degree program during the 2018-2019 curricular year.



University Core and Graduation Requirements				Suggested Sequence of Courses				
<b>University Core Requirements:</b>				<b>FRESHMAN YEAR</b>				
<b>Requirements</b>	<b>#Classes</b>	<b>Hours</b>	<b>Classes</b>	<u>1st Semester</u>		<b>JUNIOR YEAR</b>		
<b>Religion Cornerstones</b>				C S 142	3.0	<u>5th Semester</u>		
Teachings and Doctrine of The Book of Mormon	1	2.0	REL A 275	First-year Writing or American Heritage	3.0	C S 312	3.0	
Jesus Christ and the Everlasting Gospel	1	2.0	REL A 250	MATH 112	4.0	C S 340	3.0	
Foundations of the Restoration	1	2.0	REL C 225	General Education courses, university requirements, and/or general electives	3.0	C S 324	3.0	
The Eternal Family	1	2.0	REL C 200	Religion Cornerstone course	2.0	ENGL 316	3.0	
<b>The Individual and Society</b>				<b>Total Hours</b>	<b>15.0</b>	Religion elective	2.0	
American Heritage	1-2	3-6.0	from approved list			General electives	2.0	
Global and Cultural Awareness	1	3.0	from approved list	<u>2nd Semester</u>		<b>Total Hours</b>	<b>16.0</b>	
<b>Skills</b>				C S 224	3.0	<u>6th Semester</u>		
First Year Writing	1	3.0	from approved list	C S 235	3.0	Computer Science Elective	3.0	
Advanced Written and Oral Communications	1	3.0	ENGL 316*	American Heritage or First-year Writing	3.0	Computer Science Elective	3.0	
Quantitative Reasoning	1	4.0	MATH 112* or 113*	MATH 113	4.0	C S 404	2.0	
Languages of Learning (Math or Language)	1	4.0	MATH 112* or 113*	Religion Cornerstone course	2.0	Letters	3.0	
<b>Arts, Letters, and Sciences</b>				<b>Total Hours</b>	<b>15.0</b>	Religion Elective	2.0	
Civilization 1	1	3.0	from approved list	<b>SOPHOMORE YEAR</b>		<b>Total Hours</b>	<b>16.0</b>	
Civilization 2	1	3.0	from approved list	<u>3rd Semester</u>		<u>7th Semester</u>		
Arts	1	3.0	from approved list	C S 236	3.0	Computer Science Elective	3.0	
Letters	1	3.0	from approved list	PHSCS 121	3.0	Computer Science Elective	3.0	
Biological Science	1	3-4.0	from approved list	STAT 121 or STAT 201 or MATH 431	3.0	Computer Science Elective	3.0	
Physical Science	1	3.0	CS 312*	Civilization 1	3.0	Computer Science Elective	3.0	
Social Science	1	3.0	from approved list	Religion Cornerstone course	2.0	Arts	3.0	
<b>Core Enrichment: Electives</b>				<b>Total Hours</b>	<b>14.0</b>	Religion Elective	2.0	
Religion Electives	3-4	6.0	from approved list	<u>4th Semester</u>		<b>Total Hours</b>	<b>14.0</b>	
Open Electives	Variable	Variable	personal choice	C S 240	4.0	<u>8th Semester</u>		
*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (13 hours overlap)				C S 252	3.0	CS/MATH/Science Elective	3.0	
<b>Graduation Requirements:</b>				Biological Science	3.0	Computer Science Elective	3.0	
Minimum residence hours required		30.0		MATH 313	3.0	Civilization 2	3.0	
Minimum hours needed to graduate		120.0		Religion Cornerstone course	2.0	Global and Cultural Awareness	3.0	
				<b>Total Hours</b>	<b>15.0</b>	Social Science	3.0	
				<b>Total Hours</b>				<b>15.0</b>

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.

## BS in Computer Science (693220)

### 2018-2019 Program Requirements (74 - 77 Credit Hours)

*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 computer science major. Any exceptions must be approved by the department. Students may choose to graduate under later requirements by updating their date of entry into the major at the college advisement center.*

*Note: No double counting is allowed within the major.*

**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 2 options

**SUPPORTING COURSES:**

**OPTION 2.1** Complete 5 courses

*ENGL 316 - Technical Communication	3.0
MATH 112 - Calculus 1	4.0
MATH 113 - Calculus 2	4.0
MATH 313 - Elementary Linear Algebra	3.0
PHSCS 121 - Introduction to Newtonian Mechanics	3.0

**OPTION 2.2** 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)

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

C S 330 - Concepts of Programming Languages	3.0
C S 345 - Operating Systems Design	3.0
C S 355 - Introduction to Graphics and Image Processing	3.0
C S 401R - Topics in Computer Science	3.0v
<i>You may take up to 3 credit hours.</i>	
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 478 - Tools for Machine Learning	3.0
C S 479 - (Not currently offered)	
C S 484 - Parallel Processing	3.0
C S 486 - Verification and Validation	3.0
C S 501R - Advanced Topics in Computer Science	3.0v
<i>You may take up to 3 credit hours.</i>	
C S 513 - Robust Control	3.0
C S 557 - (Not currently offered)	

**Note: If C S 401R or C S 501R is chosen, it must be taken for three 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. UP TO 3 OF THE EIGHT ELECTIVE COURSES COULD BE FROM THIS GROUP.**

C S 260 - Web Programming	3.0
C S 356 - Designing the User Experience	3.0

C S 405 - Creating and Managing a Software Business	3.0
EC EN 424 - Computer Systems	4.0
EC EN 425 - Real-Time Operating Systems	4.0
IT 567 - Cyber Security and Penetration Testing	3.0
MATH 411 - Numerical Methods	3.0
MATH 485 - Mathematical Cryptography	3.0

**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.**

**UP TO 2 OF THE EIGHT ELECTIVE COURSES COULD BE FROM THIS GROUP.**

C S 493R - Computing Competitions	3.0
<i>You may take up to 3 credit hours.</i>	
C S 494 - Capstone 1	3.0
C S 495 - Capstone 2	3.0
C S 497R - Undergraduate Research	3.0
<i>You may take up to 6 credit hours.</i>	
C S 498R - Undergraduate Special Projects	3.0v
<i>You may take up to 3 credit hours.</i>	

**Note: If C S 493R, C S 497R, C S 498R, or C S 501R is chosen, it must be taken for three 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

## **BS in Computer Science (693220)**

**2018-2019**

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