BS in Computer Science: Animation and Games (693223) MAP Sheet
Physical and Mathematical Sciences, Computer Science
For students entering the degree program during the 2022-2023 curricular year.
This is a limited-enrollment program requiring departmental admissions approval. Please see the department office for information regarding requirements for admission to this emphasis.
Application deadline: April 15 and December 15 after completing the prerequisite courses listed below.

University Core and Graduation Requirements

University Core Requirements:

Requirements
#Classes Hours Classes

Religion Cornerstones
Teachings and Doctrine of The Book of Mormon 12.0 REL A 275
Jesus Christ and the Everlasting Gospel 12.0 REL A 250
Foundations of the Restoration 12.0 REL C 225
The Eternal Family 12.0 REL C 200
The Individual and Society
American Heritage 1-2 3-6.0 from approved list
Global and Cultural Awareness 1 3.0 from approved list
Skills
First Year Writing 1 3.0 from approved list
Advanced Written and Oral Communications 13.0 WRTG 316*
Quantitative Reasoning 14.0 MATH 112* or 113*
Languages of Learning (Math or Language) 14.0 MATH 112* or 113*
Arts, Letters, and Sciences
Civilization 113.0 from approved list
Civilization 213.0 ARTHC 202* or from approved list
Arts 13.0 from approved list
Letters 13.0 from approved list
Biological Science 13-4.0 from approved list
Physical Science 13.0 CS 312*
Social Science 13.0 from approved list
Core Enrichment: Electives
Religion Electives 3-4.0 from approved list
Open Electives Variable Variable Variable personal choice

*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
Freshman Year
1st Semester
C S 1113.0
STAT 121 or 2013.0
First-year Writing or American Heritage 3.0
MATH 1124.0
Religion Cornerstone course 2.0
Total Hours 15.0
2nd Semester
First-year Writing or American Heritage 3.0
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>C S 235.0</td>
<td>Physics 1213.0</td>
<td>3.0</td>
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<tr>
<td>MATH 1134.0</td>
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<td>4.0</td>
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<td></td>
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<td>Total Hours</td>
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### Sophomore Year

#### 3rd Semester

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<td>C S 236.0</td>
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<tr>
<td>CSANM 1501.5</td>
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<tr>
<td>C S 2243.0</td>
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<td>3.0</td>
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<tr>
<td>Civilization 13.0</td>
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<td>3.0</td>
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<tr>
<td>Religion Cornerstone course</td>
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<td>2.0</td>
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<tr>
<td>Arts</td>
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#### 4th Semester

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<tr>
<td>C S 2404.0</td>
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<td>C S 2523.0</td>
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<tr>
<td>MATH 2132.0</td>
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<td>MATH 2151.0</td>
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<tr>
<td>Social Science</td>
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<tr>
<td>Religion Cornerstone course</td>
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### Junior Year

#### 5th Semester

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<tr>
<td>WRTG 3163.0</td>
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<td>C S 3243.0</td>
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<td>C S 3123.0</td>
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<td>CS 3553.0</td>
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<tr>
<td>Religion elective</td>
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<td>Open elective</td>
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#### 6th Semester

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<tr>
<td>CSANM 3543.0</td>
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<td>C S 4553.0</td>
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<td>C S 3403.0</td>
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<td>Civilization 2 (ARTH 202)</td>
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<td>Global and Cultural Awareness</td>
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### Senior Year

#### 7th Semester

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<tr>
<td>CSANM 450R or CSANM 459R</td>
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<td>CSANM Elective</td>
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<tr>
<td>Letters</td>
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<td>3.0</td>
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<tr>
<td>Religion Elective</td>
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<tr>
<td>Open Elective</td>
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<tr>
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#### 8th Semester

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<th>Course Code</th>
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<th>Hours</th>
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<tbody>
<tr>
<td>Computer Science Elective</td>
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</tbody>
</table>
CSANM Elective 3.0
Biological Science 3.0
CSANM Elective 3.0
Religion Elective 2.0
Open Elective 1.0
Total Hours 15.0

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 and Games (693223) 2022-2023 Program Requirements (77 - 80.5 Credit Hours)

Grades below C- are not allowed in major courses.

requirement 1 Complete 3 courses
Prerequisite Courses:
CS 111 - Introduction to Computer Science 3.0
CS 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:
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:
CSANM 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 316 - Technical Communication 3.0

requirement 4 Complete 1 option

option 4.1 Complete 1 course
MATH 313 - (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
CSANM 450R - Advanced Senior Film Production 1 3.0
You may take this course up to 2 times.

CSANM 459R - Video Game Production 1 3.0

You may take this course up to 2 times.

requirement 6 Complete 1 course

STAT 121 - Principles of Statistics 3.0

STAT 201 - Statistics for Engineers and Scientists 3.0

requirement 7 Complete 3.0 hours from the following course(s)

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 393 - Advanced Algorithms and Problem Solving 3.0
C S 401R - Topics in Computer Science 3.0v

You may take 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 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)
C S 486 - Verification and Validation 3.0
EC EN 425 - Real-Time Operating Systems 4.0

requirement 8 Complete 9.0 hours from the following course(s)

Courses used to fulfill Requirement 6 cannot be double counted here. 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 3.0v

You may take 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 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)
C S 486 - Verification and Validation 3.0
C S 498R - Undergraduate Special Projects 3.0v
You may take up to 3 credit hours.
C S 501R - Advanced Topics in Computer Science 3.0v
You may take up to 3 credit hours.
C S 513 - Robust Control 3.0
C S 557 - (Not currently offered)
C S 580 - Theory of Predictive Modeling 3.0
CSANM 252 - Introduction to Three-Dimensional Animation 3.0
CSANM 258 - Scripting for Animation 3.0
CSANM 340 - Introduction to Game Design 2.0
CSANM 342 - Real-time Techniques 3.0
CSANM 351R - Lighting for Three-Dimensional Graphics 3.0
CSANM 353 - Previsualization 3.0
CSANM 355 - Photography for Animation 3.0
CSANM 452R - Advanced Senior Film Production 2 3.0
CSANM 454 - Advanced Shading 3.0
CSANM 458 - Three-Dimensional Visual Effects 3.0
CSANM 460R - Video Game Production 2 3.0
DESAN 364R - Digital Sculpting 3.0
EC EN 425 - Real-Time Operating Systems 4.0
requirement 9 Complete 3.0 hours from the following course(s)
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.
BS in Computer Science: Animation and Games (693223)2022-2023
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

**Adviseement Center Information**

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