Welcome to the

Computer Science Major
Animation Emphasis
in the College of Physical and Mathematical Sciences

College Advisement Center
  Website:  https://science.byu.edu/advisement
  Email: science.math.advisement@byu.edu
  Phone:  801-422-2674
  Office:  N-181 ESC

Computer Science Department
  Website:  cs.byu.edu
  Email:  csoffice@cs.byu.edu
  Phone:  801-422-3027
  Office:  3361 TMCB

Undergraduate Department Advisor – Lynnette Nelson
  Email:  lnelson@cs.byu.edu
  Phone:  801-422-9439
  Office:  2250 TMCB

Internship Coordinator – Dennis Ng (International Students only)
  Email:  ng@compsci.byu.edu
  Phone:  801-422-2835
  Office:  3322 TMCB

University Career Services – Lane Muranaka
  Website:  careers.byu.edu (Handshake--see flyer in packet)
  Email:  lane_muranaka@byu.edu
  Phone:  801-422-9360, or 801-422-2674 (schedule appointment)
  Office:  N221-J ESC

STEM Alliance--Connect with STEM employers, mentors, and clubs:  stemalliance.byu.edu

  ACM – Kimball Germaine, kimball@cs.byu.edu, and visit acm.byu.edu to join and learn more
  AI— Porter Jenkins, pjenkins@cs.byu.edu
  Developers Club – Kimball Germaine, kimball@cs.byu.edu, and visit dev.byu.edu to join and learn more
  BYU Competitive Programming Club—Ryan Farrell (2216 TMCB), farrell@cs.byu.edu, 422-3222
  Gaming – Seth Holladay (2220 TMCB), seth_holladay@byu.edu, 422-6490
  Linux Users Group – Casey Deccio (3368 TMCB), linuxclub.cs.byu.edu, 422-5319
  Women in Computer Science – Nancy Fulda - nfulda@cs.byu, and visit wics.byu.edu to join and learn more

Learning outcomes can be found here:  https://learningoutcomes.byu.edu/Courses/program-courses/693223/Computer+Science+BS+Animation/1323
Things to Know

Resources for Graduation Planning

- Flow Charts and Major Academic Plans (MAPs) can be found here: [https://science.byu.edu/advisement/flowcharts](https://science.byu.edu/advisement/flowcharts).
- Academic advisors in N-181 ESC will help you understand course sequencing and help you plan classes to efficiently fill requirements. They can also help you with study skills and initial career exploration as well as connecting you with correct resources.
- Plan and register from your plan on MyMAP. Your academic advisor can help you understand how to best utilize this resource.
- Evaluate your current program. Periodically major programs are updated. An academic advisor would be happy to review the differences between the programs with you to help you determine what would be best for you.
- Consider meeting with a faculty advisor in your department. Contact info is found on first page of this packet.

Tutoring Resources and Research

- Volunteer peer tutors are available through Y Serve if you need help with a class. Also, if you excel in a subject, consider serving your fellow students by becoming a tutor. Find out more here: [https://tutoring.byu.edu/](https://tutoring.byu.edu/).
- Many departments provide TA Tutorial Labs and research opportunities. Check your department for details:
  - Chemistry and Biochemistry: C-100 BNSN, 801-422-3667, [https://www.chem.byu.edu/](https://www.chem.byu.edu/)
  - Computer Science: 3361 TMCB, 801-422-3027, csoffice@cs.byu.edu
  - Geological Sciences: S-389 ESC, 801-422-3918, geology@byu.edu
  - Mathematics: 275 TMCB, 801-422-2061, office@mathematics.byu.edu
  - Mathematics Education: 167 TMCB, 801-422-1735, office@mathed.byu.edu
  - Physics and Astronomy: N-283 ESC, 801-422-4361, physics_office@byu.edu
  - Statistics: 2152 WVB, 801-422-4505, statsec@stat.byu.edu

Prepare Early for a Career

- Check out University Career Services in 2590 WSC and at [https://ucs.byu.edu/](https://ucs.byu.edu/).
- Consider doing an internship.
  - Attend the STEM and Career Fairs held in fall and winter semesters.
  - Talk to your department about internship opportunities.
  - Use LinkedIn and Handshake (see flyer in this packet) to connect with alumni and apply for jobs/internships. BYU Connect is another great resource for networking ([connect.byu.edu](http://connect.byu.edu)).
  - Talk with the college Career Director who can help you search for internships as well as assist you with many other career related strategies (see first page of this packet).
- Consider taking StDev 317 (Career Strategies) your junior year.
- Consider taking either Chem 502, CS 502, Geol 502, Math 502, PHSCS 502, or STAT 502 (1-credit Job Search Class). Class is held for 1 hour per week for eight non-consecutive weeks throughout the semester.
**University Core and Graduation Requirements**

<table>
<thead>
<tr>
<th>University Core Requirements:</th>
<th>Suggested Sequence of Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>University Core Requirements:</strong></td>
<td><strong>FRESHMAN YEAR</strong></td>
</tr>
<tr>
<td><strong>Requirements</strong></td>
<td><strong>1st Semester</strong></td>
</tr>
<tr>
<td><strong>#Classes</strong></td>
<td><strong>Hours</strong></td>
</tr>
<tr>
<td>Religion Cornerstones</td>
<td></td>
</tr>
<tr>
<td>Teachings and Doctrine of The Book of Mormon</td>
<td>1</td>
</tr>
<tr>
<td>Jesus Christ and the Everlasting Gospel</td>
<td>1</td>
</tr>
<tr>
<td>Foundations of the Restoration</td>
<td>1</td>
</tr>
<tr>
<td>The Eternal Family</td>
<td>1</td>
</tr>
<tr>
<td><strong>The Individual and Society</strong></td>
<td></td>
</tr>
<tr>
<td>American Heritage</td>
<td>1-2</td>
</tr>
<tr>
<td>Global and Cultural Awareness</td>
<td>1</td>
</tr>
<tr>
<td><strong>Skills</strong></td>
<td></td>
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<tr>
<td>First Year Writing</td>
<td>1</td>
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<tr>
<td>Advanced Written and Oral Communications</td>
<td>1</td>
</tr>
<tr>
<td>Quantitative Reasoning</td>
<td>1</td>
</tr>
<tr>
<td>Languages of Learning (Math or Language)</td>
<td>1</td>
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<tr>
<td><strong>Arts, Letters, and Sciences</strong></td>
<td></td>
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<tr>
<td>Civilization 1</td>
<td>1</td>
</tr>
<tr>
<td>Civilization 2</td>
<td>1</td>
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<tr>
<td>Arts</td>
<td>1</td>
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<tr>
<td>Letters</td>
<td>1</td>
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<tr>
<td>Biological Science</td>
<td>1</td>
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<tr>
<td>Physical Science</td>
<td>1</td>
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<tr>
<td>Social Science</td>
<td>1</td>
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<tr>
<td><strong>Core Enrichment: Electives</strong></td>
<td></td>
</tr>
<tr>
<td>Religion Electives</td>
<td>3-4</td>
</tr>
<tr>
<td>Open Electives</td>
<td>Variable</td>
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<tr>
<td><strong>Total Hours</strong></td>
<td>15.0</td>
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<tr>
<td><strong>Core Enrichment: Electives</strong></td>
<td></td>
</tr>
<tr>
<td>Religion Electives</td>
<td>2.0</td>
</tr>
<tr>
<td>Open Electives</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Total Hours</strong></td>
<td>15.0</td>
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</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

**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.

**FOR UNIVERSITY CORE OR PROGRAM QUESTIONS, CONTACT THE ADVISEMENT CENTER.**

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

<table>
<thead>
<tr>
<th>REQUIREMENT 1 Complete 3 courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>C S 111 - Introduction to Computer Science 3.0</td>
</tr>
<tr>
<td>C S 235 - Data Structures and Algorithms 3.0</td>
</tr>
<tr>
<td>CSANM 150 - Introduction to Three-Dimensional Computer Graphics 1.5</td>
</tr>
</tbody>
</table>

Be admitted to the program.

<table>
<thead>
<tr>
<th>REQUIREMENT 2 Complete 20 courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>C S 224 - Introduction to Computer Systems 3.0</td>
</tr>
<tr>
<td>C S 236 - Discrete Structures 3.0</td>
</tr>
<tr>
<td>C S 240 - Advanced Programming Concepts 4.0</td>
</tr>
<tr>
<td>C S 252 - Introduction to Computational Theory 3.0</td>
</tr>
<tr>
<td>C S 312 - Algorithm Design and Analysis 3.0</td>
</tr>
<tr>
<td>C S 324 - Systems Programming 3.0</td>
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<tr>
<td>C S 340 - Software Design 3.0</td>
</tr>
<tr>
<td>C S 355 - Interactive Graphics and Image Processing 3.0</td>
</tr>
<tr>
<td>C S 404 - Ethics and Computers in Society 2.0</td>
</tr>
<tr>
<td>C S 455 - Computer Graphics 3.0</td>
</tr>
</tbody>
</table>

COMPLETE THE FOLLOWING AFTER BEING ADMITTED TO THE PROGRAM:

**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 116 - Technical Communication 3.0

**PREREQUISITE COURSES:**
- STAT 201 - Statistics for Engineers and Scientists
- STAT 121 - Principles of Statistics
- CSANM 459R - Video Game Production 1
- CSANM 450R - Advanced Senior Film Production 1
- CSANM 458 - Three-Dimensional Visual Effects
- CSANM 454 - Advanced Shading
- CSANM 458 - Three-Dimensional Visual Effects
- CSANM 460R - Video Game Production 2
- DESAN 350 - Digital Sculpting
- EC EN 425 - Real-Time Operating Systems 4.0

<table>
<thead>
<tr>
<th>REQUIREMENT 3 Complete 5 courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPLETE 3 courses</td>
</tr>
<tr>
<td>CSANM 354 - Shader Programming 3.0</td>
</tr>
<tr>
<td>MATH 112 - Calculus 1 4.0</td>
</tr>
<tr>
<td>MATH 113 - Calculus 2 4.0</td>
</tr>
<tr>
<td>PHSCS 121 - Introduction to Newtonian Mechanics 3.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REQUIREMENT 4 Complete 1 option</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPTION 4.1 Complete 1 course</td>
</tr>
<tr>
<td>MATH 113 - (Not currently offered)</td>
</tr>
</tbody>
</table>

**OPTION 4.2 Complete 2 courses**
- MATH 113 - Elementary Linear Algebra 2.0
- CSANM 150 - Introduction to Three-Dimensional Computer Graphics 1.0

**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**
- C S 401R - Topics in Computer Science 3.0
- C S 402 - Software Engineering 3.0
- C S 410 - 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 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 486 - Verification and Validation 3.0
- C S 498R - Undergraduate Special Projects 3.0
- EC EN 425 - Real-Time Operating Systems 4.0

**REQUIREMENT 7 Complete 1 course**
- C S 412 - Linear Programming and Convex Optimization 3.0
- C S 418 - (Not currently offered) 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 456 - Introduction to User Interface Software 3.0
- C S 460 - Computer Communications and Networking 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 486 - Verification and Validation 3.0
- C S 498R - Undergraduate Special Projects 3.0

**REQUIREMENT 8 Complete 3 courses**
- C S 401R - Topics in Computer Science 3.0
- C S 402 - Software Engineering 3.0
- C S 410 - Algorithmic Languages and Compilers 3.0
- C S 418 - (Not currently offered) 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 456 - Introduction to User Interface Software 3.0
- C S 460 - Computer Communications and Networking 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 486 - Verification and Validation 3.0
- C S 498R - Undergraduate Special Projects 3.0

**REQUIREMENT 9 Complete 1 course**
- C S 501R - Advanced Topics in Computer Science 3.0

**REQUIREMENT 10 Complete Senior Exit interview with the CS department during your last semester or term.**

**NOTE:** If C S 401R is chosen, it must be taken for three hours.

C S 361 - Web Programming 3.0
C S 392 - 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 3.0
- You may take up to 3 credit hours.
- C S 412 - Linear Programming and Convex Optimization 3.0
- C S 418 - (Not currently offered) 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 456 - Introduction to User Interface Software 3.0
- C S 460 - Computer Communications and Networking 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 486 - Verification and Validation 3.0
- C S 498R - Undergraduate Special Projects 3.0
- You may take up to 3 credit hours.
- C S 513 - Robust Control 3.0
- 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 352R - 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 11 Complete 1 course**
- ARTHC 111 - Introduction to Art History 3.0
- ARTHC 202 - World Civilization Since 1500 3.0
- TAM 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

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
BYU's own job board. Employers who want to hire BYU graduates or offer internships to current students post job openings to this website and students apply. Just like LinkedIn, employers can view student profiles and students can network as they apply for jobs and internships.

Login to handshake.byu.edu >>> BYU Net ID
*you do not need to create an account, just sign in with your BYU information

HOW TO MAKE THE MOST OUT OF HANDSHAKE:

1. COMPLETE YOUR PROFILE
   - Upload your resume and it will auto-fill in your profile
   - Completed profiles tailor your Handshake experience
   - Information from your transcript is already uploaded
   - Fill in the Summary/Bio section
   - Fill in your past jobs and experiences, including all the bullet points you use on your resume
   - Add a professional headshot and background photo
   Remember: every word in your profile will be searchable by students and employers

2. APPLY FOR JOBS
   - Search for job titles, employers, or skills
   - Apply for interesting jobs that meet your skill set

3. RESEARCH COMPANIES
   - Under the “Jobs” Tab there is an “Employers” Tab
   - Search for keywords or locations to find companies that are the right fit for you
   - Plan to attend their info sessions on BYU Campus, connect with them at Career Fairs, or set up informational interviews to learn more
   Remember: when looking at companies or jobs, Handshake will tell you what other BYU students have worked there. Use this resource to network and discover more information!

4. EXPLORE FELLOW STUDENTS
   - “Students” tab
   - Search for fellow BYU students to view their profiles and job positions (Facebook stalking... “networking”)

5. ATTEND EVENTS
   - The “Events” tab will be your key to attending info sessions, interviews, and Career Fairs
   - The “Calendar” tab under “Events” will show you what events are coming soon
   - Make sure to save events you are interested in or RSVP so you do not forget to attend
   - Spread the word to your friends on social media

6. DOWNLOAD HANDSHAKE APP
   - Search: “Handshake” not “Handshake Career Services”
   - Input your BYU e-mail address: netID@byu.edu (it will forward emails to the e-mail you have on file with BYU)
   - Handshake will send you a link via e-mail to enable your account in the app
   - Navigate the app to perform all the functions of the website that have been previously mentioned

7. VISIT THE CAREER STUDIO
   - Freshen up your resume, cover letter, or LinkedIn
   - Receive networking help
   - Practice interviewing with a mock interview
   - Meet with a full-time Career Counselor in your field

8. GET A JOB, RING THE BELL
   - Once you’re hired, stop by the Career Studio to ring our Victory Bell and get a picture for the Victory Board

employers are
5X MORE LIKELY
to view a profile that has
at least one job/skill/organization

BYU CAREER SERVICES
careers.byu.edu
1134 WSC
(801) 422-3000
Possible Careers
with a Computer Science major
(Not a comprehensive list)

Animation Tool Developer
Applications developer
Artificial intelligence engineer
Bioinformatics developer
Business intelligence analyst
Cloud-related jobs – devops engineer, cloud engineer, virtualization engineer, web serviced engineer
Computational and information scientist
Computer programmer
Computer systems analyst
Cyber Security Analyst
Data scientist
Database manager
Embedded Systems Programmer
Multimedia programmer
Network Engineer
Network Architect
Professor*
Research Scientist
Robotics software engineer
Security Engineer
Security Architect
Software Test Engineer
Software Development Manager
Software Engineer
Systems Engineer
UI/UX Engineer
UI/UX Researcher
Video game developer and designer
Web designer
Web programmer

*Usually requires a graduate degree

More information is available at the Counseling and Career Center and from CareerOneStop: http://www.careeronestop.org/