Welcome to the Computer Science Major
Software Engineering 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

Clubs
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
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: 167 TMCB, 801-422-1735, office@mathed.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).
  - 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

### University Core Requirements:

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

<table>
<thead>
<tr>
<th>1st Semester</th>
<th>2nd Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>C S 111</td>
<td>C S 202</td>
</tr>
<tr>
<td>First-year Writing or American Heritage</td>
<td>C S 203</td>
</tr>
<tr>
<td>MATH 112</td>
<td>C S 234</td>
</tr>
<tr>
<td>Religion Cornerstone course</td>
<td>C S 234</td>
</tr>
<tr>
<td>General-education, university requirements, and/or general electives</td>
<td>Religion Elective</td>
</tr>
<tr>
<td><strong>Total Hours</strong></td>
<td><strong>Total Hours</strong></td>
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<tr>
<td>15.0</td>
<td>15.0</td>
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</tbody>
</table>

### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>3rd Semester</th>
<th>4th Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>C S 203</td>
<td>C S 240</td>
</tr>
<tr>
<td>C S 234</td>
<td>C S 240</td>
</tr>
<tr>
<td>C S 236</td>
<td>C S 260 or other C S elective</td>
</tr>
<tr>
<td>Biological Science</td>
<td>MATH 213</td>
</tr>
<tr>
<td>Civilization 1</td>
<td>MATH 215</td>
</tr>
<tr>
<td>Religion Cornerstone course</td>
<td>Civilization 2</td>
</tr>
<tr>
<td><strong>Total Hours</strong></td>
<td><strong>Total Hours</strong></td>
</tr>
<tr>
<td>15.0</td>
<td>15.0</td>
</tr>
</tbody>
</table>

### JUNIOR YEAR

<table>
<thead>
<tr>
<th>5th Semester</th>
<th>6th Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>C S 204</td>
<td>C S 329</td>
</tr>
<tr>
<td>C S 324</td>
<td>C S 340</td>
</tr>
<tr>
<td>PHSCS 121</td>
<td>C S 452</td>
</tr>
<tr>
<td>First-year Writing or American Heritage</td>
<td>Letters</td>
</tr>
<tr>
<td>MATH 113</td>
<td>Religion Elective</td>
</tr>
<tr>
<td>Religion Cornerstone course</td>
<td><strong>Total Hours</strong></td>
</tr>
<tr>
<td><strong>Total Hours</strong></td>
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</table>

### SENIOR YEAR

<table>
<thead>
<tr>
<th>7th Semester</th>
<th>8th Semester</th>
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</thead>
<tbody>
<tr>
<td>C S 240</td>
<td>C S 481</td>
</tr>
<tr>
<td>C S 260 or other C S elective</td>
<td>C S Elective</td>
</tr>
<tr>
<td>MATH 213</td>
<td>WRTG 316</td>
</tr>
<tr>
<td>Civilization 2</td>
<td>Arts</td>
</tr>
<tr>
<td>Religion Cornerstone course</td>
<td>Religion Elective</td>
</tr>
<tr>
<td><strong>Total Hours</strong></td>
<td><strong>Total Hours</strong></td>
</tr>
<tr>
<td>16.0</td>
<td>16.0</td>
</tr>
</tbody>
</table>

### Global and Cultural Awareness

- C S 241: 3.0
- C S 260 or other C S elective: 3.0
- MATH 213: 2.0
- Civilization 2: 3.0
- Religion Cornerstone course: 2.0

**Total Hours:** 15.0
BS in Computer Science: Software Engineering (693225)

2022-2023 Program Requirements (74 - 76 Credit Hours)

Grades below C- are not allowed in major courses.

REQUIREMENT 1 Complete 16 courses

CORE COURSES:
- C S 453
- C S 356
- C S 345
- C S 330
- C S 260
- STAT 201
- STAT 121
- WRTG 316
- PHSCS 121
- MATH 113
- MATH 112
- C S 481
- C S 480
- C S 452
- C S 404
- C S 236
- C S 235
- C S 203
- C S 202
- C S 111

OPTION 3.2
- MATH 215
- MATH 213

- Fundamentals of Information Retrieval
- Operating Systems Design
- Concepts of Programming Languages
- Web Programming
- Software Engineering Capstone 1
- Ethics and Computers in Society
- Software Design
- Testing, Analysis, and Verification
- Systems Programming
- Algorithm Design and Analysis
- Discrete Structures
- Data Structures and Algorithms
- Introduction to Computer Systems
- Software Engineering Lab 3
- Software Engineering Lab 1

OPTION 3.1
- MATH 312 - Calculus 1
- MATH 313 - Calculus 2
- PHYSICS 121 - Introduction to Physics
- WRTG 316 - Technical Communication

REQUIREMENT 2 Complete 4 courses

SUPPORTING COURSES:
- MATH 312 - Calculus 1
- MATH 313 - Calculus 2
- PHYSICS 121 - Introduction to Physics
- *WRTG 316 - Technical Communication

REQUIREMENT 3 Complete 1 option

OPTION 3.1 Complete 1 course
- MATH 313 - (Not currently offered)

OPTION 3.2 Complete 2 courses
- MATH 213 - Elementary Linear Algebra
- MATH 215 - Computational Linear Algebra

REQUIREMENT 4 Complete 1 course
- STAT 121 - Principles of Statistics
- 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

REQUIREMENT 6 Complete 2 courses

COURSES WILL NOT DOUBLE COUNT BETWEEN REQUIREMENT 5 AND REQUIREMENT 6.

- C S 252 - Introduction to Computational Theory
- C S 260 - Web Programming
- C S 330 - Concepts of Programming Languages
- C S 345 - Operating Systems Design
- 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 - Creating and Managing a Software Business
- C S 412 - Linear Programming and Convex Optimization
- 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

Note: If C S 493R, C S 498R, or C S 501R is chosen, it must be taken for 3 credit hours.

REQUIREMENT 7

Complete Senior Exit interview with the C S department during last semester or term.

Note: Math 112, Math 113, Phscs 121, WRTG 356, and C S 312 can be used to fill both General Education and program requirements.

DEPARTMENT INFORMATION

Computer Science Department
Brigham Young University
3361 Talmageh 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 Computer Science Major

Software Engineering Emphasis

Fall 2022 Requirements

Major (74-76 Hours)

1. Grades below C- are not allowed in major courses.
2. Complete the following courses: CS 111, 202, 203, 204, 224, 235, 236, 240, 312, 324, 340, 404, 452, 480, 481
3. Complete the following supporting courses: WRTG 112, Math 112, 113, 213, 215, and Phscs 121
4. Complete one of the following: Stat 121 or Stat 201
5. Complete a total of 4 elective courses from the follow two groups:
   a. 2 courses must be from the following courses:
      CS 260, 330, 345, 356, 456, 460, 462, 465, 486
   b. 2 courses from the following courses:

(If CS 401R, 493R, 497R, 498R, or 501R is chosen, it must be taken for three credit hours)

Elective Information:
Students must complete a total of 4 elective courses. 2 from Elective A and 2 from Elective B. Courses may not double count for both Elective A and Elective B.

Core Requirements

Math 112 Calculus 1
Math 113 Calculus 2 Req. Math 112
Math 213 Elem Linear Algebra Req. Math 112
Math 215 Comp Linear Algebra Req. Math 112

Elective A
(Choose 2 courses)
- CS 260 Web Programming Req. 142 or 111
- CS 252 Intro Comp Theory Req. 235
- CS 356 User Experience Req. 240
- CS 456 UI Software Req. 240, 356
- CS 330 Prog Languages Req. 240
- CS 460 Networks Req. 240
- CS 345 Operating Sys Dsgn Req. 224 & 240
- CS 462 Distributed Systems Req. 260, 324
- CS 356 Security Req. 240
- CS 453 Comp Linear Algebra Req. 240
- CS 401** Topics in CS Req. 235, 236, Math 213, 215
- CS 452** Comp Graphics Req. 355, Math 213, 215
- CS 345 Interactive Graphic Design Req. 240, Math 213, 215, 240
- CS 385 Convex Optimization Req. 240
- CS 412 Machine Learning Req. 312, Math 215, Stat 121

Elective B
(Choose 2 courses)
- CS 202 SE Lab 1 Req. 142 or 111
- CS 203 SE Lab 2 Req. 235 & 202
- CS 260 or other CS Elective Req. 111 or 142
- CS 326 Discrete Structures Req. 235
- CS 204* SE Lab 3 Req. 203 & 240
- CS 452* Adv Programming Req. 235 & 236
- Stat 121 or 201 Statistics
- CS 329* Test, Analyze, Verify Req. 240
- CS 312* Algorithm Analysis Req. 240
- CS 340 Design and Testing Req. 240
- CS 480* Capstone 1 Req. 340, 329
- CS 450 System Analysis Req. 240
- CS 481 Capstone 2 Req. 480
- CS 472 Machine Learning Req. 312, Math 215, Stat 121
- WRTG 316 Technical Writing

-*Prerequisite: CS 240

Guide only—please consult MyMap for full requirements.

Courses will not double count between requirements A and B.
Handshake: BYU’s Online Job Board

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

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

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
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/