

Welcome to the

Computer Science Major

in the College of Computational, Mathematical, and Physical 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: 801-422-3000 (schedule appointment)
Office: WVB 2152A

Clubs

ACM – Kimball Germane, cs.byu.acm@gmail.com

Developers Club – Kimball Germane, dev-assoc@byu.edu, visit dev.byu.edu to join and learn more

BYU Competitive Programming Club—Ryan Farrell, farrell@cs.byu.edu, visit cpc.byu.edu to join and learn more

Dev-G (Game development) – Seth Holladay, dev-g-assoc@byu.edu

Linux Users Group – Casey Deccio, linux-assoc@byu.edu

Women in Computer Science – Angela Jones – angela@cs.byu.edu, wics@cs.byu.edu

Learning outcomes can be found here: <https://learningoutcomes.byu.edu/Courses/program-courses/693220/Computer+Science+BS+/1323>

Things to Know

Resources for Graduation Planning

- Flow Charts and Major Academic Plans (MAPs) can be found here: <https://science.byu.edu/advisement/explore-majors-and-minors>.
- 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 the 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/>.
- Many departments provide TA Tutorial Labs and research opportunities. Check your department for details:
 - Chemistry and Biochemistry: C-104 BNSN, 801-422-6261, <https://chem.byu.edu/department/faculty/>
 - 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 Careers & Experiential Learning in 1134 WSC and at <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 Networking Class). Class is held for 1 hour each week.

BS in Computer Science (693220) MAP Sheet

Physical and Mathematical Sciences, Computer Science

For students entering the degree program during the 2024-2025 curricular year

University Core and Graduation Requirements				Suggested Sequence of Courses			
University Core Requirements:				FRESHMAN YEAR		JUNIOR YEAR	
Requirements	# Classes	Hours	Classes	<u>1st Semester</u>		<u>5th Semester</u>	
Religion Cornerstones				CS 111	3.00	CS 312	3.00
Teachings and Doctrines of the Book of Mormon	1	2.00	REL A 275	CS 191	0.50	CS 340	3.00
Jesus Christ and the Everlasting Gospel	1	2.00	REL A 250	MATH 112	4.00	WR TG 316	3.00
Foundations of the Restoration	1	2.00	REL C 225	UNIV 101	2.00	GE Arts, Letters, Sciences	3.00
The Eternal Family	1	2.00	REL C 200	American Heritage or First Year Writing	3.00	GE Religion	2.00
BYU Foundations for Student Success				Religion Cornerstone Class	2.00	Total Hours:	14.00
Foundations for Student Success	1	2.00	UNIV 101	Total Hours:	14.50	<u>6th Semester</u>	
The Individual and Society				<u>2nd Semester</u>		CS 324	3.00
American Heritage	1 to 2	3.00-6.00	from approved list	CS 235	3.00	GE Religion	2.00
Global and Cultural Awareness	1	3.00	from approved list	CS 260	3.00	CS Elective Requirement 5.1	3.00
Skills				MATH 290, MATH 113, or STAT 220	3.00-4.00	GE Arts, Letters, Sciences	3.00
First Year Writing	1	3.00	from approved list	American Heritage or First Year Writing	4.00	CS 404	2.00
Advanced Written and Oral Communications	1	3.00	WR TG 316*	Religion Cornerstone Class	2.00	CS Elective Requirement 5.1	3.00
Quantitative Reasoning	1	4.00	MATH 112*	University Elective	1.00	Total Hours:	16.00
Languages of Learning (Math of Language)	1	4.00	MATH 112*	Total Hours:	16.00-17.00	SENIOR YEAR	
Arts, Letters and Sciences (Complete 6 of 7)				SOPHMORE YEAR		<u>7th Semester</u>	
Civilization 1	1	3.00	from approved list	<u>3rd Semester</u>		CS Elective Requirement 5.1	3.00
Civilization 2	1	3.00	from approved list	STAT 121, STAT 201 or MATH 431	3.00	CS Elective Requirement 5.1	3.00
Arts	1	3.00	from approved list	CS 236	3.00	PHSCS 121	3.00
Letters	1	3.00	from approved list	CS 224	3.00	Religion Elective	2.00
Biological Science	1	3.00-4.00	from approved list	CS 291	0.50	GE Arts, Letters, Sciences	3.00
Physical Science	2	3.00	CS 312*	Religion Cornerstone Class	2.00	University Elective	2.00
Social Science	1	3.00	from approved list	GE Arts, Letters, Sciences	3.00	Total Hours:	16.00
Core Enrichment: Electives				Total Hours:	14.50	<u>8th Semester</u>	
Religion Electives	3 to 4	6.00	from approved list	<u>4th Semester</u>		CS Elective Requirement 5.1	3.00
Open Electives	Variable	Variable	personal choice	CS 240	4.00	CS Elective	3.00
Graduation Requirements:				CS 252	3.00	CS Elective	3.00
Minimum residence hours required		30.00		MATH 213	2.00	Global and Cultural Awareness	3.00
Minimum hours needed to graduate		120.00		MATH 215	1.00	University Elective	3.00
				Religion Cornerstone Class	2.00	Total Hours:	15.00
				GE Arts, Letters, Sciences	3.00		
				Total Hours:	15.00		
*These classes fill both university core and program requirements							

Program Requirements

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 13 Courses

Core courses:

- C S 111 - Intro to Computer Science 3.0
- C S 191 - Exploring CS 0.5
- C S 224 - Computer Systems 3.0
- C S 235 - Data Structures 3.0
- C S 236 - Discrete Structure 3.0
- C S 240 - Adv Software Construction 4.0
- C S 252 - Intro to Computational Theory 3.0
- C S 260 - Web Programming 3.0
- C S 291 - Careers in CS 0.5
- C S 312 - Algorithm Design & Analysis 3.0
- C S 324 - Systems Programming 3.0
- C S 340 - Software Design 3.0
- C S 404 - Ethics & Computers in Society 2.0

Requirement 2 — Complete 5 Courses

- MATH 112 - Calculus 1 4.0
- MATH 213 - Elementary Linear Algebra 2.0
- MATH 215 - Computational Linear Algebra 1.0
- PHSCS 121 - Intro to Newtonian Mechanics 3.0
- WRTG 316 - Technical Communication 3.0

Requirement 3 — Complete 1 of 3 Courses

- MATH 431 - Probability Theory 3.0
- STAT 121 - Intro to Stat Data Analysis 3.0
- STAT 201 - Stat for Engineers & Scientist 3.0

Requirement 4 — Complete 1 of 3 Courses

- MATH 113 - Calculus 2 4.0
- MATH 290 - Fundamentals of Mathematics 3.0
- STAT 220 - Stat Modeling for Data Science 3.0

Requirement 5 — Complete 21 hours

Complete 21.0 hours from the following option(s)

Option 5.1 — Complete up to 21 hours

Complete 12.0 to 21.0 hours from the following course(s)

- C S 329 - Test, Analysis, & Verification 3.0
- C S 330 - Concepts of Programng Lang 3.0
- C S 345 - Operating Systems Design 3.0
- C S 355 - Graphics and Image Processing 3.0
- C S 356 - Advanced Techniques in HCI 3.0
- C S 393 - Adv Algorithms & Probl Solving 3.0

C S 401R - Topics in Computer Science - *You may take up to 3.0 credit hours* 1.0v

C S 412 - Linear Prog/Conv Optimization 3.0

C S 428 - Software Engineering 3.0

C S 431 - Algorithmic Lang & Compilers 3.0

C S 450 - Computer Vision 3.0

C S 452 - Database Modeling Concepts 3.0

C S 453 - Fund of Information Retrieval 3.0

C S 455 - Computer Graphics 3.0

C S 456 - Mobile and Ubiquitous HCI 3.0

C S 460 - Comp Comms & Networking 3.0

C S 462 - Distributed System Design 3.0

C S 465 - Computer Security 3.0

C S 466 - Blockchain Technologies 3.0

C S 470 - Intro Artificial Intelligence 3.0

C S 471 - Voice Interfaces 3.0

C S 473 - Advanced Machine Learning 3.0

C S 474 - Deep Learning 3.0

C S 479 - Intro to Machine Translation 3.0

C S 486 - Verification and Validation 3.0

C S 501R - Adv Topics in Computer Sci - *You may take up to 3.0 credit hours* 1.0v

C S 513 - Robust Control 3.0

C S 556 - Inter Soft Systems 3.0 - *This course is no longer offered.*

C S 574 - Transformers for NLP 3.0

C S 575 - Intro to Network Science 3.0

C S 575 - Intro to Network Science 3.0

C S 580 - Theory of Predictive Modeling 3.0

Note: If C S 401R or C S 501R is chosen, it must be taken for three hours.

Option 5.2 — Complete up to 6 hours

Courses can not double count between requirement 4 and option 5.2

C S 180 - Intro to Data Science 3.0

C S 202 - Software Engineering Lab 1 1.0

C S 203 - Software Engineering Lab 2 1.0

C S 204 - Software Engineering Lab 3 1.0

C S 256 - Introduction to HCI 3.0

C S 270 - Intro to Machine Learning 3.0

C S 405 - Software Business 3.0

C S 478 - Tools for Machine Learning - *This course is no longer available for registration and will count only if you completed it while it was offered. Please see your college advisement center for possible substitutions.* 3.0

EC EN 220 - Fund of Digital Systems 3.0

MATH 113 - Calculus 2 4.0

MATH 290 - Fundamentals of Mathematics 3.0

STAT 220 - Stat Modeling for Data Science 3.0

Option 5.3 — Complete up to 8 hours

Complete up to 8.0 hours from the following course(s)

EC EN 330 - Intro Embedded Programming 4.0

EC EN 427 - Embedded Systems 4.0

IS 567 - Cybersecurity & Pen Testing 3.0

MATH 485 - Mathematical Cryptography 3.0

Option 5.4 — Complete up to 9 hours

C S 480 - Soft Eng Capstone 1 3.0

C S 481 - Soft Eng Capstone 2 3.0

C S 482 - Data Science Capstone 1 3.0

C S 483 - Data Science Capstone 2 3.0

C S 493R - Computing Competitions - *You may take up to 3.0 credit hours* 3.0

C S 494 - Capstone 1 3.0

C S 495 - Capstone 2 3.0

C S 497R - Undergraduate Research - *You may take up to 6.0 credit hours* 3.0

C S 498R - Undergraduate Special Projects - *You may take up to 3.0 credit hours* 1.0v

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 6 — Obtain confirmation from your advisement center that you have completed the following:

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

Computational, Mathematical and Physical Sciences College

Advisement Center

Brigham Young University
N-181 ESC
Provo, UT 84602
Telephone: (801) 422-2674

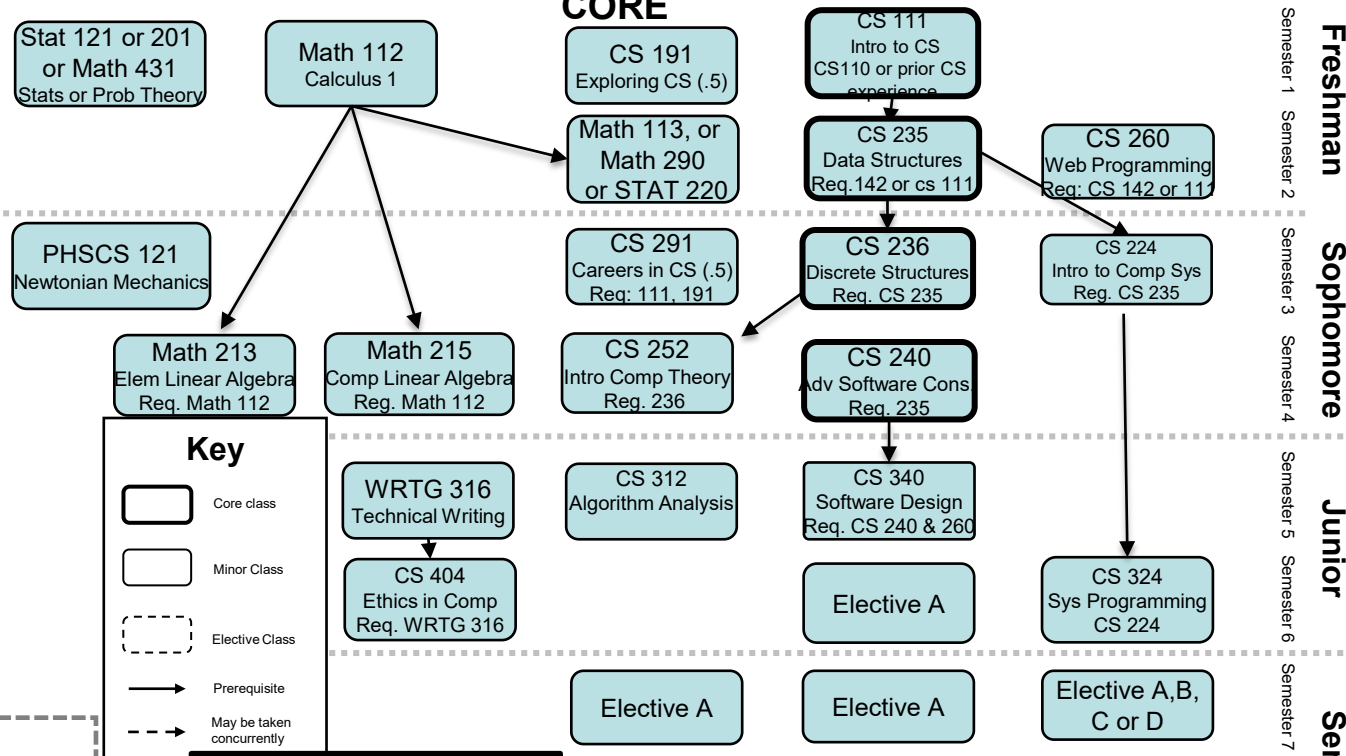
BYU Computer Science Major

Fall 2024 Requirements

Major (74-75 Hours)

Grades below C- are not allowed in major courses.

- Complete the following courses: CS 111, 191, 224, 235, 236, 240, 252, 260, 291, 312, 324, 340, 404
 - Complete the following supporting courses: WRTG 316, Math 112, 213, 215, and Phscs 121, 3
 - Complete one of the following: Math 431, Stat 121 or Stat 201
 - Complete one of the following: Math 113, Math 290 or STAT 220
 - Complete 21 hours from the following options
 - 12 hours **must** be from the following courses, but may take up to 21 hours: CS 329, 330, 345, 355, 356, 393, 401R**, 412, 428, 431, 450, 452, 453, 455, 456, 460, 462, 465, 466, 470, 471, 473, 474, 479, 486, 501R**, 513, 556, 574, 575, 580
 - Up to 6 hours from the following: CS 180, 202, 203, 204, 256, 270, 405, EC EN 220, MATH 113, Math 290, STAT 220
 - Up to 8 hours from the following courses: EC EN 330, EC EN 427, IS 567, or Math 485
 - Up to 9 hours from the following courses: CS 480, 481, 482, 483, 493R**, 494, 495, 497R**, 498R** (If CS, 493R, 497R, 498R, or 501R is chosen, it must be taken for three credit hours)
- Guide only—please consult MyMap for full requirements.



Elective Information:
At least 12 hours **must** come from elective group A. The remaining 9 hours can be taken from any of the elective groups A (up to 9), B (up to 6), C (up to 8), or D (up to 9).

Elective A
(Complete 12 (required) up to 21 hours)

CS 329 Test, Analysis, Verify Req: 240	CS 330 Prog Languages Req: 240	CS 345 Operating Sys Dsgn Req: 224 & 240	CS 355 Interactive Graphic Req: 240, Math 213, 215	CS 356 Adv. Tech in HCI Req: 256 & 260	CS 393 Algorithms & Problem Solving Req: 312	CS 401R** Topics in CS	CS 412 Convex Optimization Req: 240, Math 213 or 312	CS 428 Software Engineer Req: 340
CS 431 A. Lang & Compilers Req: 240	CS 450 Computer Vision Req: 312, 355, Math 313	CS 452 Database Modeling Req: 240	CS 453 Info Retrieval Req: 240	CS 455 Comp Graphics Req: 355, Math 213, 215	CS 456 UI Software Req: 240, 356	CS 460 Networks Req: 324	CS 462 Distributed Systems Req: 260, 324	CS 479 Machine Translation CS 240
CS 465 Security Req: 324	CS 466 Blockchain Tech CS 312	CS 470 Artificial Intelligence 312, Math 215, Stat 121	CS 471 Voice User Interfaces	CS 473 Avd. Machine Learning 312, Math 215, Stat 121	CS 474 Deep Learning 312, Math 213, 215	CS 477 Intro to Network Science Req: 312	CS 486 Verification & Valid. Req: 312	CS 501R** Adv CS Topics
CS 488 Robust Control Req: Math 213, 215	CS 513 Robust Control Req: Math 213, 215	CS 516 Research Methods in HCI	CS 524 Transformers for NLP Req: 270, 312	CS 525 Intro to Network Science Req: 312	CS 526 Theory of Predictive Modeling	CS 530 Theory of Predictive Modeling	CS 531 Theory of Predictive Modeling	CS 532 Theory of Predictive Modeling

Elective B
(Choose up to 6 hours)

CS 180 Intro to Data Science	CS 202 SE Lab 1 (1 credit) Req: CS 142 or 111	CS 203 SE Lab 2 (1 credit) Req: CS 202 & 235	CS 204 SE Lab 3 (1 credit) Req: CS 203 & 240	CS 256 Intro to HCI	CS 270 Intro Machine Learning	CS 405 Software Business Req: 240 & Engl 316	MATH 113 Calculus 2 Req: MATH 112	MATH 290 Fundamentals of Math Req: MATH 112	STAT 220 Stat Modeling for DS Req: MATH 334
ECEN 220 Fund of Digital sys CS 142 or 111	ECEN 330 Embedded Program Req: EC EN 323 & 330	EC EN 427 Embedded systems Req: MATH 213	IS 567 Cybersecurity & Pen Req: CS 465 or IT 366	MATH 485 Cryptography Req: MATH 213	CS 480 Software Eng Cap 1 Req: 240, 340, 329	CS 481 Software Eng Cap 2 Req: CS 480	CS 482 Data Science Cap 1 Req: 240	CS 483 Data Science Cap 2 Req: 282	CS 494 Capstone 1 Req: 240

Elective C
(Choose up to 8 hours)

Elective D
(Choose up to 9 hours)

CS 480 Software Eng Cap 1 Req: 240, 340, 329	CS 481 Software Eng Cap 2 Req: CS 480	CS 482 Data Science Cap 1 Req: 240	CS 483 Data Science Cap 2 Req: 282	CS 494 Capstone 1 Req: 240	CS 495 Capstone 2 Req: 240, 494	CS 493R** Comp. Competitions Req: 240	CS 497R** Research	CS 498R** Special Projects Req: 240
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**Must be taken for 3 hours to fill the requirement

handshake

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 you 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

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

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!

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/>*