

Welcome to the

Computer Science Major Bioinformatics Emphasis

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/693222/Computer+Science+BS+Bioinformatics/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: Bioinformatics (693222) 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	MMBIO 240	3.00
Jesus Christ and the Everlasting Gospel	1	2.00	REL A 250	MATH 112	4.00	WRWG 316	3.00
Foundations of the Restoration	1	2.00	REL C 225	UNIV 101	2.00	BIO 264	3.00
The Eternal Family	1	2.00	REL C 200	American Heritage or First Year Writing	3.00	Religion Elective	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 473 or 474	3.00
American Heritage	1 to 2	3.00-6.00	from approved list	CS 235	3.00	CS Elective	3.00
Global and Cultural Awareness	1	3.00	from approved list	BIO 130	3.00	PWS 340	3.00
Skills				Religion Cornerstone Class	2.00	GE Arts, Letters, Sciences	3.00
First Year Writing	1	3.00	from approved list	American Heritage or First Year Writing	3.00	CS 404	2.00
Advanced Written and Oral Communications	1	3.00	WRWG 316*	MATH 213	2.00	Total Hours:	14.00
Quantitative Reasoning	1	4.00	MATH 112*	MATH 215	1.00	SENIOR YEAR	
Languages of Learning (Math of Language)	1	4.00	MATH 112*	Total Hours:	14.00	<u>7th Semester</u>	
Arts, Letters and Sciences (Complete 6 of 7)				SOPHMORE YEAR		CS Elective	3.00
Civilization 1	1	3.00	from approved list	<u>3rd Semester</u>		BIO 364	3.00
Civilization 2	1	3.00	from approved list	CHEM 105	4.00	Global and Cultural Awareness	3.00
Arts	1	3.00	from approved list	CS 236	3.00	Religion Elective	2.00
Letters	1	3.00	from approved list	CS 224	3.00	GE Arts, Letters, Sciences	3.00
Biological Science	1	3.00	BIO 130*	CS 291	0.50	BIO 250 or BIO 420	2.00
Physical Science	2	7.00	CHEM 105* & PHSCS 121*	Religion Cornerstone Class	2.00	Total Hours:	16.00
Social Science	1	3.00	from approved list	GE Arts, Letters, Sciences	3.00	<u>8th Semester</u>	
Core Enrichment: Electives				Total Hours:	15.50	BIO 465	3.00
Religion Electives	3 to 4	6.00	from approved list	<u>4th Semester</u>		CS Elective	3.00
Open Electives	Variable	Variable	personal choice	CS 240	4.00	CS Elective	3.00
Graduation Requirements:				BIO 165	3.00	Religion Elective	2.00
Minimum residence hours required		30.00		CS 270	3.00	GE Arts, Letters, Sciences	3.00
Minimum hours needed to graduate		120.00		Religion Cornerstone Class	3.00	Total Hours:	14.00
				PHSCS 121	3.00		
				Total Hours:	16.00		
*These classes fill both university core and program requirements							

Program Requirements

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.

Requirement 1 — Complete 10 Courses

Computer Science core:

CS 111 - Intro to Computer Science 3.0

CS 191 - Exploring CS 0.5

CS 224 - Computer Systems 3.0

CS 235 - Data Structures 3.0

CS 236 - Discrete Structure 3.0

CS 240 - Adv Software Construction 4.0

CS 270 - Intro to Machine Learning 3.0

CS 291 - Careers in CS 0.5

CS 312 - Algorithm Design & Analysis 3.0

CS 404 - Ethics & Computers in Society 2.0

Requirement 2 — Complete 7 Courses

Biology core:

BIO 130 - Biology 4.0

BIO 165 - Introduction to Bioinformatics 3.0

BIO 264 - Stat Analysis for Biologists 4.0

BIO 364 - Bioinformatics Algorithms 3.0

BIO 465 - Capstone in Bioinformatics 3.0

MMBIO 240 - Molecular Biology 3.0

PWS 340 - Genetics 3.0

Requirement 3 — Complete 5 Courses

Supporting courses:

CHEM 105 - Gen College Chem 1+Lab Integr 4.0

MATH 112 - Calculus 1 4.0

MATH 213 - Elementary Linear Algebra 2.0

MATH 215 - Computational Linear Algebra 1.0

WRWG 316 - Technical Communication 3.0

Requirement 4 — Complete 1 of 2 Courses

BIO 250 - Evolutionary Medicine 2.0

BIO 420 - Evolutionary Biology 4.0

Requirement 5 — Complete 1 of 2 Courses

CS 473 - Advanced Machine Learning 3.0

CS 474 - Deep Learning 3.0

Requirement 6 — Complete 12 hours

Courses will not double count between Requirement 5 and Requirement 6.

Option 6.1 — Complete at least 6 hours up to 12 hours

Complete up to 12 hours from the following courses

BIO 463 - Genetics of Human Disease 3.0

CS 256 - Introduction to HCI 3.0

CS 260 - Web Programming 3.0

CS 329 - Test, Analysis, & Verification 3.0

CS 330 - Concepts of Programng Lang 3.0

CS 345 - Operating Systems Design 3.0

CS 355 - Graphics and Image Processing 3.0

CS 356 - Advanced Techniques in HCI 3.0

CS 393 - Adv Algorithms & Probl Solving 3.0

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

CS 405 - Software Business 3.0

CS 412 - Linear Prog/Conv Optimization 3.0

CS 428 - Software Engineering 3.0

CS 431 - Algorithmic Lang & Compilers 3.0

CS 450 - Computer Vision 3.0

CS 452 - Database Modeling Concepts 3.0

CS 453 - Fund of Information Retrieval 3.0

CS 455 - Computer Graphics 3.0

CS 456 - Mobile and Ubiquitous HCI 3.0

CS 460 - Comp Comms & Networking 3.0

CS 462 - Distributed System Design 3.0

CS 465 - Computer Security 3.0

CS 466 - Blockchain Technologies 3.0

CS 470 - Intro Artificial Intelligence 3.0

CS 471 - Voice Interfaces 3.0

CS 473 - Advanced Machine Learning 3.0

CS 474 - Deep Learning 3.0

CS 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

CS 479 - Intro to Machine Translation 3.0

CS 480 - Soft Eng Capstone 1 3.0

CS 481 - Soft Eng Capstone 2 3.0

CS 482 - Data Science Capstone 1 3.0

CS 483 - Data Science Capstone 2 3.0

CS 486 - Verification and Validation 3.0

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

CS 513 - Robust Control 3.0

CS 556 - Inter Soft Systems 3.0 - *This course is not currently available.*

CS 574 - Transformers for NLP 3.0

CS 575 - Intro to Network Science

CS 580 - Theory of Predictive Modeling 3.0

Option 6.2 — Complete up to 6 hours

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

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

Requirement 7 — 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

Bioinformatics Emphasis

(81 Credit Hours)
Fall 2024 Requirements

1. Grades below C- are not allowed in major courses.

Core Course Requirements (85 Hours)

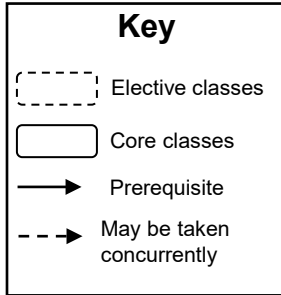
- Complete the following 10 courses: CS 111, 191, 224, 235, 236, 240, 270, 291, 312, 404,
- Complete the following 7 courses: BIO 130, BIO 165, BIO 264, BIO 364, BIO 465, MMBIO 240, PWS 340
- Complete the following 5 courses: CHEM 105, Math 112, Math 213, Math 215, WRTG 316
- Courses cannot double count between Complete 1 courses: BIO 250 or BIO 420
- Complete 1 course: CS 473 or CS 474**
- Complete 12 total hours from the following:

A. Complete 9 to 12 credit hours from the following: BIO 463, CS 256, 260, 329, 330, 345, 355, 356, 393, 401R, 405, 412, 428, 431, 450, 452, 453, 455, 456, 460, 462, 465, 466, 470, 471, 473, 474, 479, 480, 481, 482, 483, 486, 493R, 513, 556, 574, 575, or 580

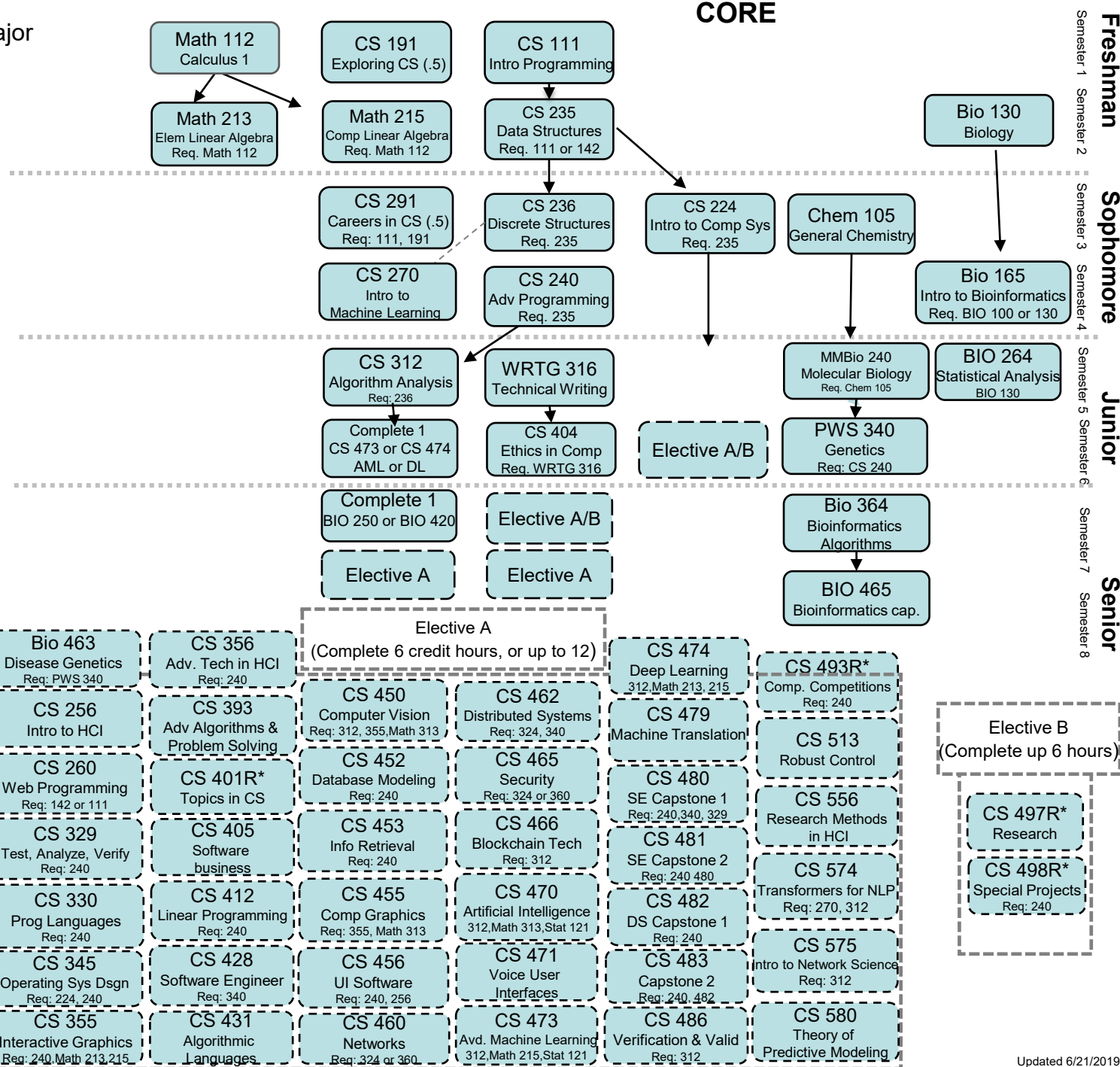
B. Complete up to 6 hours CS 497R*, 498R*

* Must be taken for 3 hours to fill the requirement

** Courses may not double count between requirements 5 and 6



Guide only – Consult MyMap for your major/minor requirements



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/>*