

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