## MAJOR IN COMPUTER SCIENCE, COMPUTER SCIENCE CONCENTRATION

## Requirements Effective Fall 2023

A minimum grade of C (2.000) is required in CO 150 and in all CS, <u>DSCI</u>, MATH, STAT and departmental Technology Focus Elective courses which are required for graduation.

Freshman			
		AUCC	Credits
CO 150	College Composition (GT-CO2)	1A	3
MATH 156 or 160 <sup>1</sup>	Mathematics for Computational Science I (GT-MA1) Calculus for Physical Scientists I (GT-MA1)	1B	4
Select one group from th	e following: <sup>2</sup>		5-9
Group A			
CS 150A or 150B	Culture and Coding: Java (GT-AH3) Culture and Coding: Python (GT-AH3)	3B	
CS 162 or 164	CS1-Introduction to Java Programming CS1-Computational Thinking with Java		
Group B			
Arts and Humanities ( aucc/#arts-and-huma	http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ nities)	3B	
CS 152	Python for STEM		
CS 162 or 164	CS1-Introduction to Java Programming CS1-Computational Thinking with Java		
Group C			
Arts and Humanities ( aucc/#arts-and-huma	http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ nities)	3B	
CS 163	CS1No Prior Programming Experience		
CS 201/PHIL 201	Ethical Computing Systems (GT-AH3)	3B	3
Select at least two cours include the sequenced la	es totaling a minimum of 7 credits from the following (one course must be or boratory):		7
AA 100	Introduction to Astronomy (GT-SC2)	3A	
& AA 101			
ANTH 120	Human Origins and Variation (GT-SC2)	3A	
& ANTH 121			
BZ 110 & BZ 111	Principles of Animal Biology (GT-SC2)	3A	
& BZ 111 BZ 120	Principles of Plant Biology (GT-SC1)	3A	
CHEM 107	Fundamentals of Chemistry (GT-SC2)	3A	
& CHEM 108	i didamentais of offernistry (OF-302)	JA	
CHEM 111 & CHEM 112	General Chemistry I (GT-SC2)	ЗА	
GEOL 120 & GEOL 121	Exploring Earth - Physical Geology (GT-SC2)	ЗА	
GEOL 122 & GEOL 121	The Blue Planet - Geology of Our Environment (GT-SC2)	3A	
GEOL 124 & GEOL 121	Geology of Natural Resources (GT-SC2)	3A	

Fig.   Physical Geology for Scientists and Engineers   3A				
LIFE 102	GEOL 150	Physical Geology for Scientists and Engineers	3A	
LIFE 103	HONR 292A	Honors Seminar. Knowing in the Sciences	3A	
LIFE 201A   Introductory Genetics: Applied/Population/Conservation/Ecological (GF SC2) SC2)   LIFE 201B   Introductory Genetics: Molecular /Immunological/Developmental (GFSC2)   3A   LIFE 201B   Introductory Genetics: Molecular /Immunological/Developmental (GFSC2)   3A   LIFE 201/LAND 220   Fundamentals of Ecology (GFSC2)   3A   LIFE 201/LAND 220   General Physics I (GFSC1)   3A   LIFE 201/LAND 220   General Physics I (GFSC1)   3A   LIFE 201/LAND 220   General Physics I (GFSC1)   3A   LIFE 201/LAND 220   Physics for Scientists and Engineers I (GFSC1)   3A   LIFE 201/LAND 220   Physics for Scientists and Engineers I (GFSC1)   3A   LIFE 201/LAND 220   Physics for Scientists and Engineers II (GFSC1)   3A   LIFE 201/LAND 220   Physics for Scientists and Engineers II (GFSC1)   3A   LIFE 201/LAND 220   Physics for Scientists and Engineers II (GFSC1)   3A   LIFE 201/LAND 220   Physics for Scientists and Engineers II (GFSC1)   3A   LIFE 201/LAND 220   Physics for Scientists and Engineers II (GFSC1)   3A   LIFE 201/LAND 220   LIFE 201/LA	LIFE 102	Attributes of Living Systems (GT-SC1)	3A	
SC2    Introductory Genetics: Molecular/Inmunological/Developmental (GTSC2)   3A   Introductory GTSC2)   I	LIFE 103	Biology of Organisms-Animals and Plants (GT-SC1)	3A	
LIFE 220/LAND 220	LIFE 201A		3A	
NR 150	LIFE 201B	Introductory Genetics: Molecular/Immunological/Developmental (GT-SC2	) 3A	
PH 121	LIFE 220/LAND 220	Fundamentals of Ecology (GT-SC2)	3A	
PH 122         General Physics II (GTSCI)         3A           PH 141         Physics for Scientists and Engineers II (GTSCI)         3A           Diversity, Equity, and Inclusion (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/auce/diversity-quity-inclusion)         1C         3           Electives         7total Credits         26-34           Sophomore         25         25           CS 165         CS2-Data Structures         4           CS 220         Discrete Structures and their Applications         4           Select one group from the following:         4           Group A         4           CS 214         Software Development           CT 301         C++ Fundamentals           Group B         4           CS 259         Software Development with C++           Select one course from the following:         4           CS 250         Computer Systems Foundations         4           Sc1 270         Computer Organization         3           Select one course from the following:         4           Select one course from the following:         1           Select one course from the following:         1           Select one course from the following:         1           Select one course fro	NR 150	Oceanography (GT-SC2)	3A	
PH 141         Physics for Scientists and Engineers I (GFSC1)         3A           PH 142         Physics for Scientists and Engineers II (GFSC1)         3A           Diversity, Equity, and Inclusion (Intriby/catalog colostate-du/general-catalog/all-university-core-curriculum/aucc/#diversity-equity-inclusion)         1C         3           Electives 3         Total Credits         C8-34           Sophomore           CS 165         CS 2D-lat Structures and their Applications         4           CS 20         Discrete Structures and their Applications         4           Group A           CS 214         Software Development           CT 301         C+ Fundamentals           Group B           CS 253         Software Development with C++           Select one course from the following:         4           CS 250         Computer Systems Foundations           CS 250         Computer Systems Foundations           CS 250         Computer Organization           Select one course from the following:         1          4         2	PH 121	General Physics I (GT-SC1)	3A	
PH 142	PH 122	General Physics II (GT-SC1)	3A	
Diversity Equity, and Inclusion (http://catalog.colostate.edu/general-catalog/all-university-core- curriculum/aucc/#diversity-equity-inclusion)   Total Credits	PH 141		3A	
Electives	PH 142	Physics for Scientists and Engineers II (GT-SC1)	3A	
Total Credits   26-34	curriculum/aucc/#diversi		1C	
Sophomore	Electives			
CS 165         CS2-Data Structures         4           Select one group from the following:         4           Group A         CS 214         Software Development         4           CT 301         C++ Fundamentals         5           Group B         CS 253         Software Development with C++         4           Select one course from the following:         4           CS 250         Computer Systems Foundations         4           CS 270         Computer Systems Foundations         4           CS 270         Computer Organization         3-4           Select one course from the following:         3-4           DSCI 369         Linear Algebra 1         5           Select one course from the following:         1-3           S1AT 301         Introduction to Applied Statistical Methods         5           STAT 302A         Statistics Supplement: General Applications         5           STAT 301         Introduction to Biostatistics         1-3           STAT 307         Introduction to Biostatistics         1-3           STAT 315         Intro to Theory and Practice of Statistics         1-3           Stocial and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)         3     <		Total Credits		26-34
CS 220       Discrete Structures and their Applications       4         Select one group from the following:       45         Group A       CS 214       Software Development         CT 301       C++ Fundamentals	Sophomore			
CS 220       Discrete Structures and their Applications       4         Select one group from the following:       45         Group A       CS 214       Software Development         CT 301       C++ Fundamentals	00.145			
Select one group from the following:				
Group A CS 214 Software Development CT 301 C++ Fundamentals Group B CS 253 Software Development with C++ Select one course from the following: CS 250 Computer Systems Foundations CS 270 Computer Organization Select one course from the following: SIAT 309 Linear Algebra I Select one course from the following: STAT 301 Introduction to Applied Statistical Methods STAT 302A Statistics Supplement: General Applications STAT 307 Introduction to Biostatistics STAT 307 Introduction to Biostatistics STAT 315 Intro to Theory and Practice of Statistics Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ 3D 3 aucc/#historical-perspectives) Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ acc/#social-behavioral-sciences) Electives  CS 314 Software Engineering 4A,AB 3 CS 330 Algorithms-Theory and Practice 3 CS 370 Operating Systems 3 Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/ 5 SAB Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/ 5				•
CS 214 Software Development CT 301 C++ Fundamentals Group B CS 253 Software Development with C++  Select one course from the following: 4  CS 250 Computer Systems Foundations CS 270 Computer Organization  Select one course from the following: 3-4  DSCI 369 Linear Algebra for Data Science MATH 369 Linear Algebra I  Select one course from the following: 1-3  STAT 301 Introduction to Applied Statistical Methods STAT 302A Statistics Supplement: General Applications STAT 307 Introduction to Biostatistics STAT 315 Intro to Theory and Practice of Statistics STAT 315 Intro to Theory and Practice of Statistics  STAT 315 Intro to Theory and Practice of Statistics STAT 315 Intro to Theory and Practice of Statistics STAT 302 Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ 3D 3  aucc/#historical-perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ acc/#social-behavioral-sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ acc/#social-behavioral-sciences (http://catalog.colostate.edu/general-catalog/all-university-core 3C 3  STAT 314 Software Engineering 4A,4B 3  CS 320 AlgorithmsTheory and Practice 3  CS 370 Operating Systems 480-499  Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/# 2 8		e following:		4-5
CT 301 C++ Fundamentals Group B CS 253 Software Development with C++  Select one course from the following: CS 250 Computer Systems Foundations CS 270 Computer Organization  Select one course from the following: CS 270 Linear Algebra for Data Science MATH 369 Linear Algebra I  Select one course from the following: Select one course from the following: Select one course from the following: STAT 301 Introduction to Applied Statistical Methods STAT 302 Statistics Supplement: General Applications STAT 302 Introduction to Biostatistics STAT 305 Intro to Theory and Practice of Statistics STAT 315 Intro to Theory and Practice of Statistics Sicial and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ aucc/#social-behavioral-sciences)  Electives  Total Credits  Software Engineering AAAB  30  Agorithms-Theory and Practice S320 Algorithms-Theory and Practice S370 Operating Systems Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/ as a devanced Writing (http://catalog.colostate.edu/general-catalog/al		O. ferror Development		
Group B CS 253 Software Development with C++  Select one course from the following: 4 CS 250 Computer Systems Foundations CS 270 Computer Organization  Select one course from the following: 3-4 DSCI 369 Linear Algebra for Data Science MATH 369 Linear Algebra I  Select one course from the following: 3-4 STAT 301 Introduction to Applied Statistical Methods STAT 301 Introduction to Applied Statistical Methods STAT 302A Statistics Supplement: General Applications STAT 315 Intro to Theory and Practice of Statistics Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ aucc/#social-behavioral-sciences)  Electives				
Select one course from the following: Select one course from the follo		C++ Fundamentals		
Select one course from the following: CS 250 Computer Systems Foundations CS 270 Computer Organization  Select one course from the following: 3-4 DSCI 369 Linear Algebra for Data Science MATH 369 Linear Algebra I  Select one course from the following: 1-3 STAT 301 Introduction to Applied Statistical Methods STAT 302A Statistics Supplement: General Applications STAT 307 Introduction to Biostatistics STAT 315 Intro to Theory and Practice of Statistics Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curricullum/ 3D 3 aucc/#historical-perspectives  Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curricullum/ 3C 3 curricullum/aucc/#social-behavioral-sciences)  Electives				
CS 250 Computer Systems Foundations CS 270 Computer Organization  Select one course from the following: 3-4 DSCI 369 Linear Algebra for Data Science MATH 369 Linear Algebra I  Select one course from the following: 1-3 STAT 301 Introduction to Applied Statistical Methods STAT 302A Statistics Supplement: General Applications STAT 307 Introduction to Biostatistics STAT 315 Intro to Theory and Practice of Statistics Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ 3D 3 aucc/#historical-perspectives Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ aucc/#social-behavioral-sciences)  Electives				
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Select one course from the following:  DSCI 369				
DSCI 369 Linear Algebra for Data Science MATH 369 Linear Algebra I  Select one course from the following: 1-3 STAT 301 Introduction to Applied Statistical Methods STAT 302A Statistics Supplement: General Applications STAT 307 Introduction to Biostatistics STAT 315 Intro to Theory and Practice of Statistics Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ 3D 3 aucc/#historical-perspectives) Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ aucc/#social-behavioral-sciences)  Electives 7 Total Credits 30 Junior  CS 314 Software Engineering 4A,4B 3 CS 320 Algorithms—Theory and Practice 3 CS 370 Operating Systems 48-499 Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/ 2 3 Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/ 2 3				
MATH 369 Linear Algebra I  Select one course from the following: 1-3  STAT 301 Introduction to Applied Statistical Methods  STAT 302A Statistics Supplement: General Applications  STAT 307 Introduction to Biostatistics  STAT 315 Intro to Theory and Practice of Statistics  Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curricullum/ 3D 3  aucc/#historical-perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curricullum/ aucc/#social-behavioral-sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curricullum/ aucc/#social-behavioral-sciences)  Electives		•		3-4
Select one course from the following:  STAT 301 Introduction to Applied Statistical Methods STAT 302A Statistics Supplement: General Applications STAT 307 Introduction to Biostatistics STAT 315 Intro to Theory and Practice of Statistics Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ 3D 3 aucc/#historical-perspectives) Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ aucc/#social-behavioral-sciences)  Electives  Total Credits  Software Engineering CS 314 Software Engineering AlAAB 3 CS 320 Algorithms—Theory and Practice CS 370 Operating Systems 3 Two CS courses numbered 300- or above, excluding 380-399 and 480-499 Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/ 2 3 3				
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STAT 302A Statistics Supplement: General Applications STAT 307 Introduction to Biostatistics STAT 315 Intro to Theory and Practice of Statistics Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ 3D 3 aucc/#historical-perspectives  Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ 3C 3C 3 curriculum/aucc/#social-behavioral-sciences)  Electives 0-4  Total Credits 30  Junior  CS 314 Software Engineering 4A,4B 3  CS 320 Algorithms-Theory and Practice 3  CS 370 Operating Systems 3  Two CS courses numbered 300- or above, excluding 380-399 and 480-499  Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/ 2 3		3		1-3
STAT 307 Introduction to Biostatistics  STAT 315 Intro to Theory and Practice of Statistics  Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ aucc/#historical-perspectives)  Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)  Electives  Total Credits  Software Engineering  Algorithms—Theory and Practice  CS 314 Software Engineering  Algorithms—Theory and Practice  CS 370 Operating Systems  Two CS courses numbered 300- or above, excluding 380-399 and 480-499  Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/  2 30  30  31  4A,4B  31  4A,4B  32  4A,4B  33  4A,4B  34  4A,4B  36  4A,4B  37  4A,4B  4A,4B		• •		
STAT 315 Intro to Theory and Practice of Statistics  Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ aucc/#historical-perspectives)  Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)  Electives  Total Credits  Software Engineering  CS 314  Software Engineering  Algorithms—Theory and Practice  CS 370  Operating Systems  Two CS courses numbered 300- or above, excluding 380-399 and 480-499  Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/  2  30  31  4A,4B  4A,4B  3  4A,4B  4A,4B  4A,4B  4A,4B  5  6-8  Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/  2				
Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/ aucc/#historical-perspectives)  Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)  Electives  Total Credits  Software Engineering  CS 314  Software Engineering  Algorithms-Theory and Practice  CS 370  Operating Systems  Two CS courses numbered 300- or above, excluding 380-399 and 480-499  Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/  2  3D  3D  3D  4A  4A  4A  5C  4A  4A  4B  3C  4A  4A  4B  3C  4B  4A  4B  3C  4B  4B  4B  4B  4B  4B  4B  4B  4B  4				
aucc/#historical-perspectives) Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)  Electives  Total Credits  Software Engineering CS 314 Software Engineering AlgorithmsTheory and Practice CS 370 Operating Systems Two CS courses numbered 300- or above, excluding 380-399 and 480-499 Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/ 2  3C 3C 3C 3C 4A,AB 3C 4A,AB 3 3C 3C 3C 3C 3C 3C 3C 3C 3C 4A,AB 3C 4A,AB 3C 3C 3C 3C 3C 3C 4A,AB 3C 3C 3C 3C 3C 3C 4A,AB 3C 3C 3C 3C 4A,AB 3C 3C 3C 3C 3C 4A,AB 3C 3C 3C 4A,AB 3C 3C 4A,AB 3C 3C 4A,AB 3C 4C			0.0	
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Total Credits Junior  CS 314 Software Engineering 4A,4B 3 CS 320 Algorithms—Theory and Practice 3 CS 370 Operating Systems 3 Two CS courses numbered 300- or above, excluding 380-399 and 480-499 6-8 Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/ 2 3			3C	3
CS 314 Software Engineering 4A,4B 3 CS 320 AlgorithmsTheory and Practice 3 CS 370 Operating Systems 5 Two CS courses numbered 300- or above, excluding 380-399 and 480-499 6-8 Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/ 2 3	Electives			0-4
CS 314 Software Engineering 4A,4B 3 CS 320 Algorithms—Theory and Practice 3 CS 370 Operating Systems 3 Two CS courses numbered 300- or above, excluding 380-399 and 480-499 6-8 Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/ 2 3		Total Credits		30
CS 320 Algorithms—Theory and Practice 3 CS 370 Operating Systems 3 Two CS courses numbered 300- or above, excluding 380-399 and 480-499 6-8 Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/ 2 3	Junior			
CS 320 Algorithms—Theory and Practice 3 CS 370 Operating Systems 3 Two CS courses numbered 300- or above, excluding 380-399 and 480-499 6-8 Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/ 2 3	CS 314	Software Engineering	4A,4B	3
CS 370 Operating Systems 3 Two CS courses numbered 300- or above, excluding 380-399 and 480-499 6-8 Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/ 2 3				
Two CS courses numbered 300- or above, excluding 380-399 and 480-499  Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/ 2 3				3
Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/ 2 3				
	Advanced Writing (http://		2	

Electives			10-12
	Total Credits		30
Senior			
Capstone Course - se	elect one course from the following:		4
CS 410	Introduction to Computer Graphics	4C	
CS 414	Object-Oriented Design	4C	
CS 420	Introduction to Analysis of Algorithms	4C	
CS 425	Introduction to Bioinformatics Algorithms	4C	
CS 430	Database Systems	4C	
CS 435	Introduction to Big Data	4C	
CS 440	Introduction to Artificial Intelligence	4C	
CS 445	Introduction to Machine Learning	4C	
CS 453	Introduction to Compiler Construction	4C	
CS 454	Principles of Programming Languages	4C	
CS 455	Introduction to Distributed Systems	4C	
CS 456	Modern CyberSecurity	4C	
CS 457	Computer Networks and the Internet	4C	
CS 458	Blockchain Principles and Applications	4C	
CS 462	Engaging in Virtual Worlds	4C	
CS 464	Principles of Human-Computer Interaction	4C	
CS 470	Computer Architecture	4C	
CS 475	Parallel Programming	4C	
Two CS courses nun	nbered 400- or above, excluding 480-499		8
Select one group fro	m the following - Technology Focus or Minor/Second Major.		10
Group A - Technol	logy Focus		
Technology Focus	s Electives (6 credits) - see list below		
CS course numbe	red 400- or above, excluding 480-499, not taken elsewhere in the pro-	gram (4 credits)	
Group B - Minor o	r Second Major <sup>4</sup>		
Electives <sup>5</sup>			6-10
	Total Credits		28-32
	Program Total Credits:		120

## **Technology Focus Electives**

If Group A - Technology Focus is selected Senior year, select at least 6 credits from the list below, not taken elsewhere in the program. At least 3 credits must be upper-division (300- to 400-level).

above, excluding 380 and CT 301	Title A, or MATH Courses numbered 300- or -399 and 480-499, and MATH 369, DSCI 369,	Credits
307, 315, 380-399 an	ımbered 300- or above, excluding 301, 302A, d 480-499	
BZ 350	Molecular and General Genetics	4
BZ 360	Bioinformatics and Genomics	4
CIS 320	Project Management for Information Systems	3
CIS 350	Operating Systems and Networks	3
CIS 360	Systems Analysis and Design	3
CIS 413	Advanced Networking and Security	3
CIS 455	Advanced Database Management	3
ECE 452	Computer Organization and Architecture	3
ENGR 422	Technology Entrepreneurship	3

JTC 372	Web Design and Development	3
JTC 472	Advanced Web Design and Development	3
MATH 161	Calculus for Physical Scientists II (GT-MA1)	4
MATH 256	Mathematics for Computational Science II	4
MGT 330	Creativity, Innovation, and Value Creation	3
MGT 340	Fundamentals of Entrepreneurship	3
MGT 420	New Venture Creation	3
PHIL 410	Gödel's Incompleteness Theorems	3
PHIL 411	Logic in Philosophy and Beyond	3
PHIL 415	Logic and Scientific Method	3
PSY 252	Mind, Brain, and Behavior	3
PSY 352	Learning and Memory	3
PSY 452	Cognitive Psychology	3
PSY 454	Biological Psychology	3
PSY 456	Sensation and Perception	3
PSY 458	Cognitive Neuroscience	3

MATH 156 recommended for computer science majors who do not already have MATH 160 credit.

- Major in Computer Science, Computer Science Concentration
- $^2\,$  Recommended sequence for most incoming students is Group A: CS 150B to CS 164.
- <sup>3</sup> CS 192 or other seminar course is a recommended elective for incoming first semester students.
- Of the 21 credits for the minor or second major, none may be from CS.
   Select enough elective credits to bring the program total to a minimum of 120 credits, of which at least 42 must be upper-division (300- to 400level).