MAJOR IN COMPUTER ENGINEERING

Requirements
Effective Fall 2023

In order to maintain professional standards required of practicing engineers, the Department of Electrical and Computer Engineering requires a cumulative grade point average of at least 2.000 in Electrical Engineering courses as a graduation requirement. It is the responsibility of any student who fails to maintain a 2.000 average to work with their advisor to correct grade point deficiencies. ECE courses required for the major at the 100, 200, and 300 level must be passed with a minimum grade of C (2.000); grades below a C will require the student to retake the course. ECE courses designated as an elective are exempt from the C or higher minimum grade requirement.

Freshman

		AUCC	Credits
CO 150	College Composition (GT-CO2)	1A	3
Select one group from the following:[1]			7
Group A			
CS 150B	Culture and Coding: Python (GT-AH3)	3B	
CS 164	CS1--Computational Thinking with Java		
Group B			
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	
CS 152	Python for STEM		
CS 162	CS1--Introduction to Java Programming		
Group C			
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	
CS 163	CS1---No Prior Programming Experience		
ECE 102	Digital Circuit Logic		4
ECE 251	Introduction to Microcontrollers and IoT		4
MATH 160	Calculus for Physical Scientists I (GT-MA1)	1B	4
MATH 161	Calculus for Physical Scientists II (GT-MA1)	1B	4
Diversity, Equity, and Inclusion (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#diversity-equity-inclusion)		1C	3
Total Credits			**29**

Sophomore

CS 165	CS2--Data Structures		4
CT 301	C++ Fundamentals		2
ECE 103	DC Circuit Analysis		3
ECE 202	Circuit Theory Applications		4
ECE 232	Introduction to Project Practices		1
ECE 303/STAT 303	Introduction to Communications Principles		3
MATH 261	Calculus for Physical Scientists III		4
MATH 340	Intro to Ordinary Differential Equations		4
PH 141	Physics for Scientists and Engineers I (GT-SC1)	3A	5
Select a minimum of three credits from the following:			3
AA 100	Introduction to Astronomy (GT-SC2)	3A	
AA 101	Astronomy Laboratory (GT-SC1)	3A	
ANTH 120	Human Origins and Variation (GT-SC2)	3A	
ANTH 121	Human Origins and Variation Laboratory (GT-SC1)	3A	
BZ 110	Principles of Animal Biology (GT-SC2)	3A	
BZ 111	Animal Biology Laboratory (GT-SC1)	3A	
BZ 120	Principles of Plant Biology (GT-SC1)	3A	

CHEM 103	Chemistry in Context (GT-SC2)	3A	
CHEM 104	Chemistry in Context Laboratory (GT-SC1)	3A	
CHEM 107	Fundamentals of Chemistry (GT-SC2)	3A	
CHEM 108	Fundamentals of Chemistry Laboratory (GT-SC1)	3A	
CHEM 111	General Chemistry I (GT-SC2)	3A	
CHEM 112	General Chemistry Lab I (GT-SC1)	3A	
CHEM 120	Foundations of Modern Chemistry (GT-SC2)	3A	
CHEM 121	Foundations of Modern Chemistry Laboratory (GT-SC1)	3A	
GEOL 120	Exploring Earth - Physical Geology (GT-SC2)	3A	
GEOL 121	Introductory Geology Laboratory (GT-SC1)	3A	
GEOL 122	The Blue Planet - Geology of Our Environment (GT-SC2)	3A	
GEOL 124	Geology of Natural Resources (GT-SC2)	3A	
GEOL 150	Physical Geology for Scientists and Engineers	3A	
HONR 292A	Honors Seminar: Knowing in the Sciences	3A	
LIFE 102	Attributes of Living Systems (GT-SC1)	3A	
LIFE 103	Biology of Organisms-Animals and Plants (GT-SC1)	3A	
LIFE 201A	Introductory Genetics: Applied/Population/Conservation/Ecological (GT-SC2)	3A	
LIFE 201B	Introductory Genetics: Molecular/Immunological/Developmental (GT-SC2)	3A	
LIFE 220/LAND 220	Fundamentals of Ecology (GT-SC2)	3A	
MIP 101	Introduction to Human Disease (GT-SC2)	3A	
NR 150	Oceanography (GT-SC2)	3A	
PH 110	Physics of Everyday Phenomena (GT-SC2)	3A	
PH 111	Physics of Everyday Phenomena Laboratory (GT-SC1)	3A	
PH 122	General Physics II (GT-SC1)	3A	
PH 142	Physics for Scientists and Engineers II (GT-SC1)	3A	
	Total Credits		**33**

Junior

CS 214	Software Development		3
CS 220	Discrete Structures and their Applications		4
ECE 311	Linear System Analysis I		3
ECON 202	Principles of Microeconomics (GT-SS1)	3C	3
Select a minimum of three credits from the following:			3
DSCI 369	Linear Algebra for Data Science		
MATH 369	Linear Algebra I		
Select one course from the following:			3
CO 301B	Writing in the Disciplines: Sciences (GT-CO3)	2	
JTC 300	Strategic Writing and Communication (GT-CO3)	2	
Computer Engineering Electives - Group 1 (see list below)			14
	Total Credits		**33**

Senior

ECE 401	Senior Design Project I	4A,4B	3
ECE 402	Senior Design Project II	4C	3
Computer Engineering Electives - Group 2 and Group 3 and/or Technical Electives (see lists below)[2]			19
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	3
Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)		3D	3
	Total Credits		**31**
	Program Total Credits:		**126**

Computer Engineering Electives - Group 1

Code	Title	Credits
Choose 14 credits from the courses below:		14
CS 356	Systems Security	3
ECE 450	Digital System Design Laboratory	1
ECE 451	Digital System Design	3
ECE 452	Computer Organization and Architecture	3
ECE 456	Computer Networks	4
ECE 528/CS 528	Embedded Systems and Machine Learning	4

Computer Engineering Electives - Group 2 and Group 3

Code	Title	Credits
Group 2 - Choose 0-11 credits from the list below: [2]		0-11
DSCI 320	Optimization Methods in Data Science	
ECE 312	Linear System Analysis II	
ECE 331	Electronics Principles I	
ECE 332	Electronics Principles II	
Group 3 - Choose 0-3 credits from the list below: [2]		0-3
ECE 101	Foundations in ECE	
Select any course from the following: [3]		
ECE 395A	Independent Study	
ECE 395B	Independent Study: Open Option Project	
ECE 395C	Independent Study : Vertically Integrated Project	

Technical Electives 4-20 credits

Code	Title	Credits
CS 310H/IDEA 310H	Design Thinking Toolbox: Mixed Reality Design	3
CS 314	Software Engineering	3
CS 320	Algorithms--Theory and Practice	3
CS 345	Machine Learning Foundations and Practice	3
CS 356	Systems Security	3
CS 370	Operating Systems	3
CS 4XX Any CS course at the 400-level, excluding CS 457 and CS 470		
CS 5XX Any CS course at the 500-level		
DSCI 475	Topological Data Analysis	2
ECE 340	Electromagnetics for Computer Engineering	3
Select any course from the following: [3]		Var.
ECE 495A	Independent Study	
ECE 495B	Independent Study: Open Option Project	
ECE 495C	Independent Study: Vertically Integrated Projects	
ECE 4XX Any ECE course at the 400-level		

Code	Title	Credits
ECE 5XX Any ECE course at the 500-level, excluding ECE 532/SYSE 532		
MATH 360	Mathematics of Information Security	3
MATH 450	Introduction to Numerical Analysis I	3
MATH 451	Introduction to Numerical Analysis II	3
MATH 460	Information and Coding Theory	3
MATH 463	Post-Quantum Cryptography	3
MECH 564	Fundamentals of Robot Mechanics and Controls	3
STAT 421	Introduction to Stochastic Processes	3

[1] Recommended sequence for most incoming students is Group A: CS 150B to CS 164.

[2] Students will use 0-14 credits of Group 2 and Group 3 Engineering Electives and 4-20 credits of Technical Electives to reach the required total of 126 program credits.

[3] A total of 6 credits of Independent Study may apply toward total degree requirements. This includes credit awarded for ECE 395A, ECE 395B, ECE 395C and ECE 495A, ECE 495B, ECE 495C combined.