MAJOR IN COMPUTER ENGINEERING, EMBEDDED AND IOT SYSTEMS CONCENTRATION

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.

Requirements
Effective Fall 2023

In order to maintain professional standards required of practicing engineers, the Department of Electrical and Computer Engineering

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 at least one course totaling a minimum of 3 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
CS 356	Systems Security		3
ECE 311	Linear System Analysis I		3
ECE 450	Digital System Design Laboratory		1
ECE 451	Digital System Design		3
ECE 452	Computer Organization and Architecture		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	
Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)		3D	3
	Total Credits		**32**

Senior

CS 320	Algorithms--Theory and Practice		3

ECE 401	Senior Design Project I	4A,4B	3
ECE 402	Senior Design Project II	4C	3
Select one course from the following:			4
ECE 456	Computer Networks		
ECE 528/CS 528	Embedded Systems and Machine Learning		
Computer Engineering Electives and Technical Electives (see list below)			16
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	3
	Total Credits		**32**
	Program Total Credits:		**126**

Computer Engineering Electives 0-3 credits

Code	Title	Credits
ECE 101	Foundations in ECE	1
Select any course from the following: [2]		Var
ECE 395A	Independent Study	
ECE 395B	Independent Study: Open Option Project	
ECE 395C	Independent Study : Vertically Integrated Project	

Technical Electives 13-16 credits

Code	Title	Credits
CS 314	Software Engineering	3
CS 345	Machine Learning Foundations and Practice	3
CS 370	Operating Systems	3
CS 4XX Any CS at course at the 400-level, excluding CS457 and CS470		4
CS 545	Machine Learning	4
CS 553	Algorithmic Language Compilers	4
CS 559	Quantitative Security	4
CS 575	Parallel Processing	4
ECE 340	Electromagnetics for Computer Engineering	3
ECE 445	Digital Logic Synthesis	3
ECE 455	Introduction to Robot Programming/ Simulation	3
ECE 456	Computer Networks [3]	4
Select any course from the following: [2]		Var.
ECE 495A	Independent Study	
ECE 495B	Independent Study: Open Option Project	
ECE 495C	Independent Study: Vertically Integrated Projects	
ECE 519	Network Centric Systems	3
ECE 528/CS 528	Embedded Systems and Machine Learning [4]	4
ECE 544	Silicon Photonics for Computing Systems	3
ECE 554	Computer Architecture	3
ECE 558	Manycore System Design Using Machine Learning	3
ECE 561/CS 561	Hardware/Software Design of Embedded Systems	4
ECE 571	VLSI System Design	4
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
STAT 421	Introduction to Stochastic Processes	3

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

[2] 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.

[3] Course may count as a Technical Elective ONLY when not taken as part of the major requirements. The course cannot count as credit toward both major and technical elective requirements.