MAJOR IN COMPUTER ENGINEERING, AEROSPACE SYSTEMS CONCENTRATION

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 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 312	Linear System Analysis II		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	
	Total Credits		**32**

Senior

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 (see list below) 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
Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)		3D	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
ATS 550	Atmospheric Radiation and Remote Sensing	3
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 404	Experiments in Optical Electronics	2
ECE 411	Control Systems	3
ECE 412	Digital Control and Digital Filters	3
ECE 415	Semiconductor Physics and Junctions	2
ECE 421	Telecommunications I	3
ECE 441	Optical Electronics	3
ECE 444	Antennas and Radiation	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 512	Digital Signal Processing	3
ECE 514	Applications of Random Processes	3
ECE 516	Information Theory	3
ECE 520	Optimization Methods--Control and Comm.	3
ECE 521	Satellite Communication	3
ECE 528/CS 528	Embedded Systems and Machine Learning [3]	4
ECE 540	Computational Electromagnetics	3
ECE 541	Applied Electromagnetics	3
ECE 544	Silicon Photonics for Computing Systems	3
ECE 545	FPGA Signal Processing/Software-Defined Radio	3
ECE 549	Radar Systems and Design	3
ECE 554	Computer Architecture	3
ECE 556	AI for Radar and Remote Sensing	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
ECE 578	Satellite Data Analysis	3
ECE 579	Global Navigation Satellite Systems	3
ENGR 570	Coupled Electromechanical Systems	3
MATH 450	Introduction to Numerical Analysis I	3
MATH 451	Introduction to Numerical Analysis II	3
MECH 518	Orbital Mechanics	3
MECH 519	Aerospace Vehicles Trajectory and Performance	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.