MAJOR IN COMPUTER ENGINEERING, NETWORKS AND DATA CONCENTRATION

Requirements
Effective Fall 2025

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
CHEM 111	General Chemistry I (GT-SC2)	3A	4
CHEM 112	General Chemistry Lab I (GT-SC1)	3A	1
CO 150	College Composition (GT-CO2)	1A	3
ENGR 111	Fundamentals of Engineering		3
ENGR 114	Engineering for Grand Challenges		3
MATH 160	Calculus for Physical Scientists I (GT-MA1)	1B	4
MATH 161	Calculus for Physical Scientists II (GT-MA1)	1B	4
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 (https://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 (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	
CS 163	CS1---No Prior Programming Experience		
	Total Credits		**29**

Sophomore

CS 165	CS2--Data Structures		4
ECE 205	Analog Circuits I		2
ECE 206	Analog Circuits II		3
ECE 232	Introduction to Project Practices		1
ECE 252	Introduction to Digital Circuits		3
ECE 253	Microcontrollers and C for Internet-of-Things		3
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
	Total Credits		**32**

Junior

CS 214	Software Development		3
CS 220	Discrete Structures and the Applications		4
CT 301	C++ Fundamentals		2

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
JTC 300 or CO 301B	Strategic Writing and Communication (GT-CO3) Writing in the Disciplines: Sciences (GT-CO3)	2	3
Select a minimum of three credits from the following:			3
DSCI 369	Linear Algebra for Data Science		
MATH 369	Linear Algebra I		
	Total Credits		**31**

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
ECE 421	Telecommunications I		3
ECE 456	Computer Networks		4
Computer Engineering Electives (see list below) and Technical Electives (see list below)			9
1C (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc)		1C	3
Arts and Humanities (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	3
Historical Perspectives (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)		3D	3
	Total Credits		**34**
	Program Total Credits:		**126**

Computer Engineering Electives 0-3 credits

Code	Title	Credits
Select 0-3 credits from the following courses:		
DSCI 320/MATH 320	Optimization Methods in Data Science	3
ECE 395A	Independent Study [2]	1-3
ECE 395B	Independent Study: Open Option Project [2]	1
ECE 395C	Independent Study : Vertically Integrated Project [2]	1
IDEA 310L	Design Thinking Toolbox : Creating Things That Think	2

Technical Electives 6-9 credits

Code	Title	Credits
CS 314	Software Engineering	3
CS 345	Machine Learning Foundations and Practice	3
CS 356	Systems Security	3
CS 370	Operating Systems	3
CS 420	Introduction to Analysis of Algorithms	4
CS 425	Introduction to Bioinformatics Algorithms	4
CS 435	Introduction to Big Data	4
CS 440	Introduction to Artificial Intelligence	4
CS 445	Introduction to Machine Learning	4
CS 455	Introduction to Distributed Systems	4
CS 456	Modern CyberSecurity	4
CS 458	Blockchain Principles and Applications	4
CS 462	Engaging in Virtual Worlds	4
CS 464	Principles of Human-Computer Interaction	4
CS 545	Machine Learning	4
CS 559	Quantitative Security	4
ECE 340	Electromagnetics for Computer Engineering	3
ECE 445	Digital Logic Synthesis	3
ECE 495A	Independent Study [2]	1-3
ECE 495B	Independent Study: Open Option Project [2]	1
ECE 495C	Independent Study: Vertically Integrated Projects [2]	1
ECE 514	Applications of Random Processes	3
ECE 519	Network Centric Systems	3
ECE 528/CS 528	Embedded Systems and Machine Learning	4
ECE 529	Signal Processing & Artificial Intelligence	3
ECE 544	Silicon Photonics for Computing Systems	3
ECE 545	FPGA Signal Processing/Software-Defined Radio	3
ECE 553	Adaptive Systems and Machine Learning	3
ECE 554	Computer Architecture	3

ECE 561/CS 561	Hardware/Software Design of Embedded Systems	4
ECE 564	Semiconductor Memory	3
MATH 360	Mathematics of Information Security	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 3 credits of Independent Study may apply toward total degree requirements. This includes credit awarded for ECE 395A, ECE 395B, ECE 395C, ECE 495A, ECE 495B, and ECE 495C combined.