

# MAJOR IN COMPUTER ENGINEERING, VLSI AND INTEGRATED CIRCUITS 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 2022

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
CS 163 or 164	CS1—No Prior Programming Experience CS1—Computational Thinking with Java		4
CS 165	CS2—Data Structures		4
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 ( <a href="http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#diversity-equity-inclusion">http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#diversity-equity-inclusion</a> )		1C	3
Career Development Seminar <sup>1</sup>			
<b>Total Credits</b>			<b>30</b>

### Sophomore

CS 220	Discrete Structures and their Applications		4
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
PH 142	Physics for Scientists and Engineers II (GT-SC1)	3A	5
Career Development Seminar <sup>1</sup>			
<b>Total Credits</b>			<b>33</b>

### Junior

CS 253	Software Development with C++		4
ECE 311	Linear System Analysis I		3
ECE 331	Electronics Principles I		4
ECE 332	Electronics Principles II		4
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		3
Select one course from the following:			
CO 301B	Writing in the Disciplines: Sciences (GT-CO3)	2	
JTC 300	Strategic Writing and Communication (GT-CO3)	2	
Career Development Seminar <sup>1</sup>			

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**Total Credits** **31**

**Senior**

ECE 340	Electromagnetics for Computer Engineering		3
ECE 401	Senior Design Project I	4A,4B	3
ECE 402	Senior Design Project II	4C	3
ECE 456	Computer Networks		4
Select a minimum of three credits from the following:			

CS 356	Systems Security		
ECE 528/CS 528	Embedded Systems and Machine Learning		

Computer Engineering Electives and Technical Electives			7
Arts and Humanities ( <a href="http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities">http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities</a> )	3B		6
Historical Perspectives ( <a href="http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives">http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives</a> )	3D		3
Career Development Seminar <sup>1</sup>			

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**Total Credits** **32**

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**Program Total Credits:** **126**

## Computer Engineering Electives 0-3 credits

Code	Title	Credits
ECE 101	Foundations in ECE	1
ECE 312	Linear System Analysis II	3
ECE 395A	Independent Study <sup>2</sup>	1-3
ECE 395B	Independent Study: Open Option Project <sup>2</sup>	1
ECE 395C	Independent Study : Vertically Integrated Project <sup>2</sup>	1

ECE 541	Applied Electromagnetics	3
ECE 544	Silicon Photonics for Computing Systems	3
ECE 545	FPGA Signal Processing/Software-Defined Radio	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	3
ECE 575	Experiments in VLSI System Design I	1
MATH 450	Introduction to Numerical Analysis I	3
MATH 451	Introduction to Numerical Analysis II	3
STAT 421	Introduction to Stochastic Processes	3

## Technical Electives 2-7 credits

Code	Title	Credits
CS 356	Systems Security <sup>3</sup>	3
ECE 4XX	Any ECE course at the 400-level	3-4
Select any course from the following: <sup>2</sup>		
ECE 495A	Independent Study	
ECE 495B	Independent Study: Open Option Project	
ECE 495C	Independent Study: Vertically Integrated Projects	
ECE 520	Optimization Methods-Control & Communication	3
ECE 528/CS 528	Embedded Systems and Machine Learning <sup>3</sup>	4
ECE 534	Analog Integrated Circuit Design	3
ECE 535	Analog Integrated Circuit Laboratory	1
ECE 536	RF Integrated Circuit Design	3
ECE 538	Design/Analysis of Analog Digital Interface	4

<sup>1</sup> Students are required to complete three Career Development Seminars: 1) Resume Writing; 2) Behavior Based Interviewing; and 3) Using LinkedIn™. Completion of the required workshops may be spread over the student's four-year program.

<sup>2</sup> A total 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.

<sup>3</sup> 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.