Electrical and Computer Engineering
Group Advising

April 20th 2021

Some course requirement changes since 19-20 for the ELEN program

- Programming sequence:

  COEN10-COEN 11-COEN 12

- ELEN 33 has been replaced by ELEN120 taught Fall quarter

- Physics 34 or Math 51

- Do not require CENG 41 – Do 5 electives instead of 4 electives

ELEN 4-year plan – Year 1 and 2

	Fall	Winter	Spring
FIRST YEAR	MATH 11 Calculus I	MATH 12 Calculus II	MATH 13 Calculus III
	CHEM 11 Chemistry I	PHYS 31 Physics for Engineers I	PHYS 32 Physics for Engineers II
	ENGR 1 Intro to Eng. (2 units)	ELEN 20 Emerging Areas in Electrical Engineering	ELEN 21 Introduction to Logic Design
	Critical Thinking and Writing I	Culture and Ideas II	Critical Thinking and Writing II
	Culture and Ideas I		
	Fall	**Winter**	**Spring**
SOPHOMORE	ELEN 50 Circuits I	ELEN 100 Circuits II	ELEN 115 Electronics
	COEN 10 Intro to Programming	COEN 11 Advanced Programming	COEN 12 Data Structures
	MATH 14 Calculus IV	AMTH 106 Differential Equations	ELEN 110 Linear Systems
	PHYS 33 Physics for Engineers III	PHYS 34 Physics for Engineers IV/ Math 51 Discrete Math	University Core

ECEN 4-year plan – Year 1 and 2

	Fall	Winter	Spring
FIRST YEAR	MATH 11 Calculus I	MATH 12 Calculus II	MATH 13 Calculus III
	CHEM 11 OR Univ. Core	PHYS 31 Physics for Engineers I	PHYS 32 Physics for Engineers II
	COEN 10 Introduction to Programming	COEN 11 Advanced Programming	COEN 12 Data Structures
	ENGR 1 Intro to Eng. (2 unit)	ELEN 20 Emerging Areas	ELEN 21 Introduction to Logic Design
	Critical Thinking and Writing I	Critical Thinking and Writing II	
	Fall	**Winter**	**Spring**
SOPHOMORE	ELEN 50 Circuits I	ELEN 100 Circuits II	ELEN 115 Electronics
	ELEN 120 Microprocessor System Design	ELEN 122 Computer Architecture	ELEN 121 Real-time Embedded Systems
	MATH 14 Calculus IV	AMTH 106 Differential Equations	Math 51 Discrete Math
	Cultures and Ideas I	Cultures and Ideas II	University Core

ELEN 4-year plan – Year 3 and 4

	Fall	Winter	Spring
JUNIOR	ELEN 104 Electromagnetics	MECH 121 Thermodynamics	ELEN 192 Intro to Sr. Design (2 units)
	ELEN 120 Microprocessor System Design	Math Science Elective (Note 1)	AMTH 108 Probability and Statistics
	ELEN Elective 1 (Note 2)	ELEN Elective 2 (Note 2)	ELEN Elective 3 (Note 2)
	University Core	ENGL 181 Eng. Comm. (4 units)	Professional Development (Note 3)

	Fall	Winter	Spring
SENIOR	ELEN 194 Design Project I (2 units)	ELEN 195 Design Project II (2 units)	ELEN 196 Design Project III (1 unit)
	ELEN Elective 4 (Note 2)	ELEN Elective 5 (Note 2)	Optional Elective or BS/MS option (Note 4)
	Optional Elective or BS/MS option (Note 4)	Optional Elective or BS/MS option (Note 4)	Optional Elective or BS/MS option (Note 4)
	University Core	University Core	University Core

ECEN 4-year plan – Year 3 and 4

	Fall	Winter	Spring
JUNIOR	AMTH 108 Probability and Statistics	ELEN 142 Networks and Communications	ELEN 133 Digital Signal Processing
	PHYS 33 Physics for Engineers III	COEN 177 Operating Systems	ELEN 192 Intro to Sr. Design (2 units)
	CSCI 163A Algorithms CSCI 163	Math 53 Linear Algebra	ENGL 181 Eng. Comm. (4 units)
	ELEN Elective 1 (Note 2)	ELEN Elective 2	ELEN Elective 3
	Fall	**Winter**	**Spring**
SENIOR	ELEN 194 Design Project I (2 units)	ELEN 195 Design Project II (2 units)	ELEN 196 Design Project III (1 unit)
	Math Science Elective (Note 1)	Professional Development (Note 3)	Optional Elective or BS/MS option
	Optional Elective or BS/MS option (Note 4)	Optional Elective or BS/MS option	University Core
	University Core	University Core	University Core

ENGR1

Required for all students.

If transferred in after first year take ENGR 110 instead.
Offered every quarter.

ELEN 20

Required for first and second year

Juniors and Seniors

Take a course on emerging topics in the graduate program:

Look at Graduate bulletin: Recommended- ELEN 280, ENGR 262

Emerging Topics in Engineering

- AMTH 308 Theory of Wavelets
- AMTH 351 Quantum Computing
- AMTH 367 Mathematical Finance
- AMTH 387 Cryptology
- BIOE 256/ENGR 256 Introduction to Nanobioengineering
- CENG 213 Sustainable Materials
- CENG 215 Sustainable Structural Engineering
- CENG 219 Designing for Sustainable Construction
- CENG 282 Introduction to Building Information Modeling
- ELEN 280/MECH 287 Introduction to Alternative Energy Systems
- ELEN 285 Introduction to the Smart Grid
- ENGR 260 Nanoscale Science and Technology
- ENGR 262 Nanomaterials
- ENGR 273 Sustainable Energy and Ethics
- ENGR 337 Sustainability and Green Information Technology
- ENGR 371/MECH 371 Space Systems Design and Engineering I
- ENGR 372 Space Systems Design and Engineering II
- MECH 234 Combustion Technology
- MECH 268 Computational Fluid Dynamics I
- MECH 295 Fire Dynamics (Special Topic)

Math Science Elective - ELEN majors

May be one of the following:

CHEM 12: General Chemistry II

BIOL 1A: Energy and Matter

PHYS 113: Advanced Electromagnetism and Optics

PHYS 121: Quantum Mechanics I

MATH 53: Linear Algebra

MATH 105: Theory of Functions of a Complex Variable

MATH 123: Probability and Statistics II

Math Science Elective - ECEN majors

May be one of the following:

CHEM 11: General Chemistry I

CHEM 12: General Chemistry II

BIOL 1A: Energy and Matter

PHYS 34: Physics for Scientists and Engineers IV

PHYS 113: Advanced Electromagnetism and Optics

PHYS 121: Quantum Mechanics I

MATH 105: Theory of Functions of a Complex Variable

MATH 123: Probability and Statistics II

Math/CSCI Course Offerings

Math 51: Fall/Spring

Math 53: Winter/Spring

CS 163A: All three quarters.

COEN Course Offerings

COEN 10: Fall-2 sections, Winter -1 sections Spring-0 sections

COEN 11: Fall-1 section, Winter -2 sections Spring-1 section

COEN 12: Fall-1 section, Winter -2 sections Spring-2 sections

COEN 177: Fall-2 section, Winter-2 sections, Spring-1 section

Electives – ELEN Majors

- Five 100-level electives
- One elective must be selected from at least four of the five areas.

Electives – ECEN Majors

- Three undergraduate ELEN 100-level elective courses:
- At least one elective must be selected from group D – "Digital and Embedded Systems".
- With advisor approval at most one may be selected from COEN courses.

Electives – Power and IC Design – same for both ELEN & ECEN

Power Systems (P)	
164	Introduction to Power Electronics
183	Power Systems Analysis
184	Power System Stability and Control

IC Design (I)	
116	Analog Integrated Circuit Design
151	Semiconductor Devices
152	Integrated Circuit Fabrication Technology
153	Digital Integrated Circuit Design
156	Introduction to Nanotechnology

Electives - ELEN

RF and Communications (C)	
105	Electromagnetics II
141	Communication Systems
142	Communications and Networking
144	Microwave Circuit Analysis and Design

Electives - ECEN

RF and Communications (C)	
104	Electromagnetics I
105	Electromagnetics II
141	Communication Systems
144	Microwave Circuit Analysis and Design

Electives - ECEN

Systems (S)	
118	Fundamentals of Computer Aided Circuit Simulation
130	Control Systems
133	Digital Signal Processing
134	Applications of Signal Processing
160	Chaos Theory, Metamathematics and the Limits of Knowledge
161	Information Theory and Quantum Computing
167	Medical Imaging Systems

Electives - ECEN

Systems (S)	
110	Linear Systems
118	Fundamentals of Computer Aided Circuit Simulation
130	Control Systems
134	Applications of Signal Processing
160	Chaos Theory, Metamathematics and the Limits of Knowledge
161	Information Theory and Quantum Computing
167	Medical Imaging Systems

Electives - ELEN

Digital and Embedded Systems (D)	
121	Real-time Embedded Systems
122	Computer Architecture
123	Mechatronics
~~124~~	~~Introduction to Hardware Security and Trust~~
127	Advanced Logic Design

Electives - ECEN

Digital and Embedded Systems (D)	
123	Mechatronics
~~124~~	~~Introduction to Hardware Security and Trust~~
127	Advanced Logic Design

Elective Offerings 2021-22

RF and Communications (C)					
Technical Electives	**Course Number**	**Fall**	**Winter**	**Spring**	**Summer**
Electromagnetics I	ELEN 104**	X			
Electromagnetics II	ELEN 105		X		
Communications and Networking	ELEN 142*			X	
Microwave Circuit Analysis and Design	ELEN 144 (706)			X	
Senior Level					
Communication Systems	ELEN 141/241E$^+$	X			
Graduate courses open to seniors					
Computational E&M (prereq ELEN 201)	ELEN 202		X		
Information Theory (prereq AMTH 211)	ELEN 244E		X		
+ Every two years					
* Required for ECEN					
** Required for ELEN					

Elective Offerings 2021-22

Power Systems (P)					
Technical Electives	**Course Number**	**Fall**	**Winter**	**Spring**	**Summer**
Power Electronics	ELEN 164	X			
Power Systems	ELEN 183/281E		X		
Senior Level					
Power Systems and Control	ELEN 184/231			X	
Graduate courses open to seniors					
Introduction to Wind Energy	ELEN 286	X			
Smart Grid	ELEN 285		X		
Introduction to storage systems	ELEN 287			X	
Introduction to Sustainable Energy	ELEN 280	X	X	X	
+ Every two years					
* Required for ECEN					
** Required for ELEN					

Elective Offerings 2021-22

IC Design (I)					
Technical Electives	**Course Number**	**Fall**	**Winter**	**Spring**	**Summer**
Analog IC Design	~~ELEN 116+~~	will be offered in 2022/2023			
Semiconductor Devices	ELEN 151 (267)		X		
Integrated Circuit Fabrication Technology	ELEN 152 (276)			X	
Digital IC Design	ELEN 153	X	X	X	
Introduction to Nanotechnology	~~ELEN 156~~	will be offered in 2022/2023			
Graduate courses open to seniors					
Fundamentals of Semiconductor Physics	ELEN 261	X			
Analog Integrated Circuits II	ELEN 253			X	
Advanced Analog Integrated Circuits	ELEN 254	X			
DC to DC Power Conversion	ELEN 353		X		
+ Every two years					
* Required for ECEN					
** Required for ELEN					

Elective Offerings 2021-22

Digital and Embedded Systems (D)					
Technical Electives	**Course Number**	**Fall**	**Winter**	**Spring**	**Summer**
Real-time Embedded Systems	ELEN 121*			X	
Computer Architecture	ELEN 122*		X		
Mechatronics	ELEN 123	X	X		
Advanced Logic Design	ELEN 127	X			
Graduate courses open to seniors					
Embedded Systems	ELEN 501	X			
Real-Time Systems	ELEN 502		X		
Advanced Computer Architecture	ELEN 511	X			
Advanced Computer Architecture II	ELEN 512		X		
Hardware Security and Trust	ELEN 530		X		
+ Every two years					
* Required for ECEN					
** Required for ELEN					

Elective Offerings 2021-22

Systems (S)					
Technical Electives	**Course Number**	**Fall**	**Winter**	**Spring**	**Summer**
Linear Systems	ELEN 110**			X	
Fundamentals of Computer Aided Circuit Simulation	~~ELEN 118~~				
Digital Signal Processing	ELEN 133*			X	
Applications of Signal Processing	~~ELEN 134~~				
Chaos Theory, Metamathematics and the Limits of Knowledge	ELEN 160	X			
Information Theory and Quantum Computing	ELEN 161		X		
Medical Imaging Systems	~~ELEN 167~~				
Senior Level					
Control Systems	ELEN 130	X			
Graduate courses open to seniors					
Introduction to Machine Learning	ELEN 520, 520L	X	X	X	
Deep Learning (prereq ELEN 520)	ELEN 521		X		
+ Every two years					
* Required for ECEN					

Professional Development

- Four or more units in **study abroad** program that does not duplicate other coursework.
- Two units in **ENGR 110**.
- Preparation for graduate study in electrical engineering with completion of two or more additional units of upper-division or graduate-level courses.
- Completion of an **approved minor or second major** in any field of engineering or science.
- Two units of Peer education experience – ELEN 193
- Two units of undergraduate research, ELEN 199
- Cooperative education experience- ELEN 188 & ELEN 189.
- Completion of 10 or more units in the combined bachelor of science and master of science program