

ELECTRICAL ENGINEERING (ELEN) - ECEN ELECTIVES

Requirements:

- Minimum 7 courses totaling 24 credits; each course must be at least three credits.
- Main area must have at least 3 courses.
- A minimum of 3 courses must be taken in at least 2 additional areas.

ANALOG AND MIXED SIGNAL

ECEN 326	Electronic Circuits	<i>ECEN 314; 325</i>	4	3-3	ECEN 457	Operational Amplifiers	<i>ECEN 325</i>	4	3-3
ECEN 453	Microwave Circuits & System	<i>ECEN 322</i>	3	3-0	ECEN 458	Active Filter Analysis and Design	<i>ECEN 325</i>	4	3-3
ECEN 454	Digital Integrated Circuit Design	<i>ECEN 214; 248</i>	3	2-2	ECEN 474	VLSI Circuit Design	<i>ECEN 326</i>	4	3-3

BIOMEDICAL IMAGING, SENSING AND GENOMIC SIGNAL PROCESSING

ECEN 333	Interface of ENGR & Life Sciences		3	3-0	ECEN 419	Genomic Signal Processing	<i>ECEN 314</i>	3	3-0
ECEN 410	Intro to Medical Imaging	<i>MATH 251; ECEN 314 or 444</i>	4	3-2	ECEN 447	Digital Image Processing	<i>ECEN 314</i>	4	3-3
ECEN 411	Intro to MRI and MRS	<i>MATH 251; PHYS 208</i>	3	2-3	ECEN 451	Antenna Engineering	<i>ECEN 322</i>	3	3-0
ECEN 412	Ultrasound Imaging	<i>ECEN 314</i>	3	3-0	ECEN 463	Magnetic Resonance Engineering	<i>ECEN 410 or 411 or BMEN 420</i>	3	2-3
ECEN 414	Biosensors		3	2-2					

COMPUTER ENGINEERING AND SYSTEMS

ECEN 423	Computer and Wireless Networks	<i>MATH 311</i>	3	3-0	ECEN 454	Digital Integrated Circuit Design	<i>ECEN 214; 248</i>	3	2-2
ECEN 424	Fundamentals of Networking	<i>ECEN 303 or STAT 211</i>	3	3-1	ECEN 468	Advanced Digital System Design	<i>ECEN 248</i>	4	3-3
ECEN 434	Optimization for ECEN	<i>MATH 251; MATH 311</i>	3	3-0	ECEN 469	Advanced Computer Architecture	<i>ECEN 350</i>	3	3-0
ECEN 449	Microprocessor System Design	<i>ECEN 248</i>	3	2-2	ECEN 474	VLSI Circuit Design	<i>ECEN 326</i>	4	3-3
					ECEN 475	Intro to VLSI Systems Design	<i>ECEN 248; 325</i>	4	3-3

DEVICE SCIENCE AND NANOTECHNOLOGY

ECEN 440	Intro to Thin Film Sci & Tech		3	3-1	ECEN 467	Harnessing Solar Energy	<i>ECEN 322; 370</i>	4	3-3
ECEN 462	Optical Communication Systems	<i>ECEN 322; 370</i>	3	3-0	ECEN 472	Microelectronic Circuit Fabrication	<i>ECEN 325; 370</i>	4	3-3
ECEN 464	Optical Engineering	<i>ECEN 322; 370</i>	3	3-0	ECEN 473	Microelectronic Device Design	<i>ECEN 325; 370</i>	3	3-0
ECEN 465	Experimental Optics		4	2-7	ECEN 477	Photonics: Fiber & Integrated Optics	<i>ECEN 322; 370</i>	4	3-3

ELECTRIC POWER SYSTEMS AND POWER ELECTRONICS

ECEN 415	Phys & Econ Oper of Sust Energy Sys	<i>ECEN 420 or 460</i>	3	3-0	ECEN 442	DSP Based Electromechanical Motion	<i>ECEN 314</i>	3	2-3
ECEN 438	Power Electronics		4	3-3	ECEN 459	Power Sys Fault Analysis & Protection	<i>ECEN 215 or 314</i>	4	3-2
ECEN 441	Electronic Motor Drives		4	3-3	ECEN 460	Power System Operation & Control	<i>ECEN 215 or 314</i>	4	3-2

ELECTROMAGNETICS AND MICROWAVES

ECEN 410	Intro to Medical Imaging	<i>MATH 251; ECEN 314 or 444</i>	4	3-2	ECEN 452	Ultra High Frequency Techniques	<i>ECEN 322</i>	3	2-3
ECEN 425	RF & Microwave Engineering	<i>ECEN 322</i>	3	3-0	ECEN 453	Microwave Circuits & System	<i>ECEN 322</i>	3	3-0
ECEN 445	Applied Electromagnetic Theory	<i>ECEN 322</i>	3	3-0	ECEN 463	Magnetic Resonance Engineering	<i>ECEN 410 or 411 or BMEN 420</i>	3	2-3
ECEN 451	Antenna Engineering	<i>ECEN 322</i>	3	3-0	ECEN 480	RF & Microwave Wireless	<i>ECEN 322</i>	3	3-0

INFORMATION SCIENCE AND SYSTEMS

ECEN 410	Intro to Medical Imaging	<i>MATH 251; ECEN 314 or 444</i>	4	3-2	ECEN 444	Digital Signal Processing	<i>ECEN 314</i>	4	3-3
ECEN 419	Genomic Signal Processing	<i>ECEN 314</i>	3	3-0	ECEN 447	Digital Image Processing	<i>ECEN 314</i>	4	3-3
ECEN 420	Linear Control Systems	<i>ECEN 314; MATH 308</i>	3	3-0	ECEN 448	Real Time Digital Signal Processing	<i>ECEN 444</i>	3	2-3
ECEN 422	Control Engineering & Design	<i>ECEN 420</i>	3	2-3	ECEN 455	Digital Communications	<i>ECEN 314; ECEN 303 or STAT 211</i>	4	3-3
ECEN 424	Fundamentals of Networking	<i>ECEN 303 or STAT 211</i>	3	3-1					

Additional Notes:

- A varying number of ECEN 489 (Special Topics) may be offered. Each course with a minimum of three credits may apply to one or more of the specialty areas, usually classified according to the professor's research area.
- Maximum total of three credits from ENGR 385 (Co-op), ECEN 484 (Internship), ECEN 485 (Directed Studies) and ECEN 491 (Research) may be counted towards the 24-credit ECEN electives, but they DO NOT replace any of the seven elective courses.
- Highlighted courses are offered in multiple research areas but may only be applied to one area for credit.