

ELECTRICAL ENGINEERING, BS

for the degree of Bachelor of Science in Electrical Engineering

Electrical Engineering is a multifaceted discipline that has produced an astounding progression of technological innovations related to energy and information that continues to shape virtually every aspect of modern life. Electrical engineers need a broad and solid foundation in mathematics and physics to support their education in the engineering principles of analysis, synthesis, design, implementation, and testing of the devices and systems that provide the bedrock of modern energy, communication, sensing, computing, medical, security, and defense infrastructures. Within each subdiscipline one can find application domains that strongly rely on hands-on experimental work or that are based on theoretical, mathematical, and computational approaches. The multidisciplinary nature of the electrical engineering education addresses the growing demand for the innovation and design of sensing, communication, computing, and decision-making systems of increasing complexity in consumer, defense, and medical applications.

The curriculum starts with a core of fundamental courses on circuits, electromagnetics, solid-state electronics, and computer systems, leading to a comprehensive array of specialized courses and laboratories in all the important areas of modern electrical engineering.

Current Program Educational Objectives

for the degree of Bachelor of Science in Electrical Engineering

Graduation Requirements

Minimum Technical GPA (<https://go.grainger.illinois.edu/TechnicalGPA/>): 2.0

TGPA is required for ECE courses (except ECE 316). See **Technical GPA** (<https://go.grainger.illinois.edu/TechnicalGPA/>) to clarify requirements.

Minimum Overall GPA: 2.0

Minimum hours required for graduation: 128 hours

General education: Students must complete the Campus General Education requirements including the campus general education language requirement. ECE 445 or combination of ECE 496 & ECE 499 satisfies a technical core requirement and the Campus General Education Advanced Composition requirement.

Orientation and Professional Development

Code	Title	Hours
ENG 100	Grainger Engineering Orientation Seminar (External transfer students take ENG 300 instead.)	1
Total Hours		1

Foundational Mathematics and Science

Code	Title	Hours
CHEM 102	General Chemistry I	3
CHEM 103	General Chemistry Lab I	1
MATH 221	Calculus I (MATH 220 may be substituted. MATH 220 is appropriate for students with no background in calculus. 4 of 5 credit hours count towards degree.)	4
MATH 231	Calculus II	3
MATH 241	Calculus III	4
MATH 257	Linear Algebra with Computational Applications	3
or MATH 416	Abstract Linear Algebra	
MATH 285	Intro Differential Equations	3
PHYS 211	University Physics: Mechanics	4
PHYS 212	University Physics: Elec & Mag	4
PHYS 213	Univ Physics: Thermal Physics	2
PHYS 214	Univ Physics: Quantum Physics	2
Total Hours		33

Electrical Engineering Technical Core

Code	Title	Hours
ECE 110	Introduction to Electronics	3
ECE 120	Introduction to Computing	4
ECE 220	Computer Systems & Programming	4
ECE 210	Analog Signal Processing	4
ECE 313	Probability with Engrg Applic (STAT 410 may be substituted.)	3
ECE 329	Fields and Waves I	3
ECE 340	Semiconductor Electronics	3
ECE 385	Digital Systems Laboratory	3
ECE 445	Senior Design Project Lab (Combination of ECE 496 and ECE 499 may be substituted.)	4
Total Hours		31

Technical Electives

Code	Title	Hours
From Departmentally Approved List of Technical Electives (below), to include: at least 6 hours of non-ECE electives, at least 21 hours of ECE electives, at least 3 Advanced Core Electives, at least 3 ECE Labs, where at least one must be a Hardware Lab.		31
Non-ECE courses from list below:		6
AE 202	Aerospace Flight Mechanics	3
AE 302	Aerospace Flight Mechanics II	3
AE 311	Incompressible Flow	3
AE 312	Compressible Flow	3
AE 321	Mechs of Aerospace Structures	3
AE 352	Aerospace Dynamical Systems	3
AE 353	Aerospace Control Systems	3
AE 402	Orbital Mechanics	3 or 4
AE 403	Spacecraft Attitude Control	3 or 4
AE 410	Computational Aerodynamics	3 or 4
AE 412	Viscous Flow & Heat Transfer	4
AE 416	Applied Aerodynamics	3 or 4

AE 419	Aircraft Flight Mechanics	3 or 4	CHBE 321	Thermodynamics	4
AE 420	Finite Element Analysis	3 or 4	CHBE 421	Momentum and Heat Transfer	4
AE 428	Mechanics of Composites	3	CHBE 422	Mass Transfer Operations	4
AE 433	Aerospace Propulsion	3 or 4	CHBE 424	Chemical Reaction Engineering	3
AE 434	Rocket Propulsion	3 or 4	CHBE 430	Unit Operations Laboratory	4
AE 435	Electric Space Propulsion	3 or 4	CHBE 431	Process Design	4
AE 451	Aeroelasticity	3 or 4	CHBE 440	Process Control and Dynamics	3
AE 460	Aerodynamics & Propulsion Lab	2	CHBE 451	Transport Phenomena	3
Ag and Bio Eng. - All 300 and 400 level courses except ABE 440. Except seminars and special topics courses, which may be reviewed in the Advising Office			CHBE 452		
ASTR 210	Introduction to Astrophysics	3	CHBE 453	Electrochemical Engineering	2 or 3
ASTR 310	Computing in Astronomy	3	CHBE 456		
ASTR 330	Extraterrestrial Life	3	CHBE 471	Biochemical Engineering	3 or 4
ASTR 350	The Big Bang, Black Holes, and the End of the Universe	3	CHBE 472	Techniques in Biomolecular Eng	3 or 4
ASTR 404	Stellar Astrophysics	3	CHBE 473	Biomolecular Engineering	3 or 4
ASTR 405	Planetary Systems	3	CHBE 474	Metabolic Engineering	3 or 4
ASTR 406	Galaxies and the Universe	3	CHEM 104	General Chemistry II	3
ASTR 414	Astronomical Techniques	4	CHEM 105	General Chemistry Lab II	1
ATMS 201	General Physical Meteorology	3	Chemistry (CHEM): All 200, 300 and 400 level except 397, 497, and 499. Exceptions also include seminars and special topics, which may be reviewed in the Advising Office.		
ATMS 301	Atmospheric Thermodynamics	3	CEE 310	Transportation Engineering	3
ATMS 302	Atmospheric Dynamics I	3	CEE 330	Environmental Engineering	3
ATMS 303	Synoptic-Dynamic Wea Analysis	4	CEE 408	Railroad Transportation Engrg	3 or 4
ATMS 304	Radiative Transfer-Remote Sens	3	CEE 410	Railway Signaling & Control	3 or 4
ATMS 305	Computing and Data Analysis	3	CEE 416	Traffic Capacity Analysis	3 or 4
ATMS 404	Risk Analysis in Earth Science	3 or 4	CEE 430		
ATMS 405	Boundary Layer Processes	4	CEE 447	Atmospheric Chemistry	4
ATMS 406	Tropical Meteorology	4	CEE 491	Decision and Risk Analysis	3 or 4
ATMS 410	Radar Remote Sensing	4	CPSC 265	Genetic Engineering Lab	3
ATMS 411	Satellite Remote Sensing	4	CS 101	Intro Computing: Engrg & Sci (By Approval)	3
ATMS 420	Atmospheric Chemistry	4	CS 173	Discrete Structures	3
ATMS 421	Earth Systems Modeling	4	CS 225	Data Structures	4
ATMS 447	Climate Change Assessment	3	CS 242	Programming Studio	3
ATMS 449	Biogeochemical Cycles	4	CS 357	Numerical Methods I	3
BIOC 406	Gene Expression & Regulation	3	CS 410	Text Information Systems	3 or 4
BIOC 446	Physical Biochemistry	3	CS 411	Database Systems	3 or 4
BIOC 455	Technqs Biochem & Biotech	4	CS 412	Introduction to Data Mining	3 or 4
BIOE 201	Conservation Principles Bioeng	3	CS 413	Intro to Combinatorics	3 or 4
BIOE 202	Cell & Tissue Engineering Lab	2	CS 414	Multimedia Systems	3 or 4
BIOE 302	Modeling Human Physiology	3	CS 416	Data Visualization	3 or 4
BIOE 414	Biomedical Instrumentation	3	CS 418	Interactive Computer Graphics	3 or 4
BIOE 415	Biomedical Instrumentation Lab	2	CS 419	Production Computer Graphics	3 or 4
BIOE 461	Cellular Biomechanics	4	CS 420	Parallel Progrmg: Sci & Engrg	3 or 4
BIOE 467	Biophotonics	3	CS 421	Programming Languages & Compilers	3 or 4
BIOE 476	Tissue Engineering	3	CS 422	Programming Language Design	3 or 4
BIOE 480	Magnetic Resonance Imaging	3 or 4	CS 423	Operating Systems Design	3 or 4
BIOE 485	Computational Mathematics for Machine Learning and Imaging	4	CS 424	Real-Time Systems	3 or 4
Biophysics (BIOP): All 400 level courses except seminars and special topics courses, which may be reviewed in the Advising Office.			CS 425	Distributed Systems	3 or 4
CHBE 221	Principles of CHE	3	CS 426	Compiler Construction	3 or 4
			CS 427	Software Engineering I	3 or 4
			CS 428	Software Engineering II	3 or 4
			CS 429	Software Engineering II, ACP	3

CS 431	Embedded Systems	3 or 4	ECE 408	Applied Parallel Programming	4
CS 433	Computer System Organization	3 or 4	ECE 411	Computer Organization & Design	4
CS 434	Real World Algorithms for IoT and Data Science	3 or 4	ECE 412		3
CS 435	Cloud Networking	3 or 4	ECE 414	Biomedical Instrumentation	3
CS 436	Computer Networking Laboratory	3 or 4	ECE 415	Biomedical Instrumentation Lab	2
CS 437	Topics in Internet of Things	3 or 4	ECE 416	Biosensors	3
CS 438	Communication Networks	3 or 4	ECE 417	Multimedia Signal Processing	4
CS 439	Wireless Networks	3 or 4	ECE 418	Image & Video Processing	4
CS 440	Artificial Intelligence	3 or 4	ECE 419	Security Laboratory	0 to 4
CS 441	Applied Machine Learning	3 or 4	ECE 420	Embedded DSP Laboratory	2
CS 444	Deep Learning for Computer Vision	3 or 4	ECE 422	Computer Security I	4
CS 445	Computational Photography	3 or 4	ECE 424	Computer Security II	3 or 4
CS 446	Machine Learning	3 or 4	ECE 425	Intro to VLSI System Design	3
CS 447	Natural Language Processing	3 or 4	ECE 428	Distributed Systems	3 or 4
CS 450	Numerical Analysis	3 or 4	ECE 431	Electric Machinery	4
CS 460	Security Laboratory	3 or 4	ECE 432		3
CS 461	Computer Security I	4	ECE 435	Computer Networking Laboratory	3 or 4
CS 463	Computer Security II	3 or 4	ECE 437	Sensors and Instrumentation	3
CS 465	User Interface Design	4	ECE 438	Communication Networks	3 or 4
CS 466	Introduction to Bioinformatics	3 or 4	ECE 439	Wireless Networks	3 or 4
CS 467	Social Visualization	3 or 4	ECE 441	Physcs & Modeling Semicond Dev	3
CS 473	Algorithms	4	ECE 442	Silicon Photonics	3 or 4
CS 475	Formal Models of Computation	3 or 4	ECE 443	LEDs and Solar Cells	4
CS 476	Program Verification	3 or 4	ECE 444	IC Device Theory & Fabrication	4
CS 477	Formal Software Development Methods	3 or 4	ECE 446	Principles of Experimental Research in Electrical Engineering	4
CS 481	Advanced Topics in Stochastic Processes & Applications	3 or 4	ECE 447	Active Microwave Ckt Design	3
CS 484	Parallel Programming	3 or 4	ECE 448	Artificial Intelligence	3 or 4
CS 398	Special Topics (As Approved)	1 to 4	ECE 451	Adv Microwave Measurements	3
CS 498	Special Topics (As Approved)	1 to 4	ECE 452	Electromagnetic Fields	3
ECE 297	Individual Study	1	ECE 453	Wireless Communication Systems	4
ECE 304	Photonic Devices	3	ECE 454	Antennas	3
ECE 307	Techniques for Engrg Decisions	3	ECE 455	Optical Electronics	3 or 4
ECE 310	Digital Signal Processing	3	ECE 456	Global Nav Satellite Systems	4
ECE 311	Digital Signal Processing Lab	1	ECE 457	Microwave Devices & Circuits	3
ECE 314	Probability in Engineering Lab	1	ECE 458	Applic of Radio Wave Propag	3
ECE 330	Power Ckts & Electromechanics	3	ECE 459	Communications Systems	3
ECE 333	Green Electric Energy	3	ECE 460	Optical Imaging	4
ECE 342	Electronic Circuits	3	ECE 461	Digital Communications	3
ECE 343	Electronic Circuits Laboratory	1	ECE 462	Logic Synthesis	3
ECE 350	Fields and Waves II	3	ECE 463	Digital Communications Lab	2
ECE 365	Data Science and Engineering	3	ECE 464	Power Electronics	3
ECE 374	Introduction to Algorithms & Models of Computation	4	ECE 465		3
ECE 380	Biomedical Imaging	3	ECE 466		1
ECE 391	Computer Systems Engineering	4	ECE 467	Biophotonics	3
ECE 395	Advanced Digital Projects Lab	2 or 3	ECE 468	Optical Remote Sensing	3
ECE 396	Honors Project	1 to 4	ECE 469	Power Electronics Laboratory	2
ECE 397	Individual Study in ECE	0 to 4	ECE 470	Introduction to Robotics	4
ECE 402	Electronic Music Synthesis	3	ECE 472	Biomedical Ultrasound Imaging	3
ECE 403	Audio Engineering	3	ECE 473	Fund of Engrg Acoustics	3 or 4
ECE 407	Cryptography	3 or 4	ECE 476	Power System Analysis	3
			ECE 478	Formal Software Development Methods	3 or 4

ECE 479	IoT and Cognitive Computing	4	IB 348	Fish and Wildlife Ecology	3
ECE 480	Magnetic Resonance Imaging	3 or 4	IB 368	Vertebrate Natural History	4
ECE 481	Nanotechnology	4	IB 401	Introduction to Entomology	3 or 4
ECE 482	Digital IC Design	3	IB 405	Evolution of Traits and Genomes	3
ECE 483	Analog IC Design	3	IB 420	Plant Physiology	3
ECE 484	Principles of Safe Autonomy	4	IB 421	Photosynthesis	3
ECE 485		3	IB 426	Env and Evol Physl of Animals	3
ECE 486	Control Systems	4	IB 427		
ECE 487	Intro Quantum Electr for EEs	3	IB 431	Behavioral Ecology	3
ECE 488	Compound Semicond & Devices	3	IB 432	Genes and Behavior	3
ECE 489	Robot Dynamics and Control	4	IB 440	Plants and Global Change	3
ECE 490	Introduction to Optimization	3 or 4	IB 444	Insect Ecology	3 or 4
ECE 491	Numerical Analysis	3 or 4	IB 451	Conservation Biology	4
ECE 492	Parallel Progrmg: Sci & Engrg	3 or 4	IB 452	Ecosystem Ecology	3
ECE 493	Advanced Engineering Math	3 or 4	IB 453	Community Ecology	3
ECE 495	Photonic Device Laboratory	3	IB 461	Ornithology	4
ECE 298	Special Topics (As approved)	1 to 4	IB 462	Mammalogy	4
ECE 398	Special Topics in ECE (As approved)	0 to 4	IB 463	Ichthyology	4
ECE 498	Special Topics in ECE (As approved)	0 to 4	IB 464	Herpetology	4
ENG 491	Interdisciplinary Design Proj (CubeSat, Solar Decathlon, Formula SAE, Baja SAE, or by Approval.)	1 to 4	IB 467	Principles of Systematics	4
GEOL 107	Physical Geology	4	IB 468	Insect Classification and Evol	4
GEOL 208	History of the Earth System	4	IB 471	Fungal Diversity and Ecology	4
GEOL 333	Earth Materials and the Env	4	IB 472		
GEOL 380	Environmental Geology	4	IB 473		
GEOL 411	Structural Geol and Tectonics	4	IB 481	Vector-borne Diseases	4
GEOL 417	Geol Field Methods, Western US	6	IB 482	Insect Pest Management	3
GEOL 432	Mineralogy and Mineral Optics	4	LING 300	Anat & Physiol Spch Mechanism	4
GEOL 436	Petrology and Petrography	4	LING 406	Introduction to Computational Linguistics	3 or 4
GEOL 440	Sedimentology and Stratigraphy	4	LING 407	Logic and Linguistic Analysis	3 or 4
GEOL 450	Investigating the Earth's Interior	3	LING 427	Language and the Brain	3 or 4
GEOL 452	Introduction to Geophysics	4	MSE 280	Engineering Materials	3
GEOL 460	Geochemistry	3	Material Science and Eng. (MSE): All 300 and 400 level courses except 304, 460, and 461. Exceptions of seminar and special topics courses can be reviewed in the Advising Office.		
IE 310	Deterministic Models in Optimization	3	MATH 213	Basic Discrete Mathematics	3
IE 330	Industrial Quality Control	3	MATH 347	Fundamental Mathematics	3
IE 360	Facilities Planning and Design	3	MATH 357	Numerical Methods I	3
IE 361	Production Planning & Control	3	MATH 402	Non Euclidean Geometry	3 or 4
IE 400	Design & Anlys of Experiments	3 or 4	MATH 403	Euclidean Geometry	3 or 4
IE 410	Advanced Topics in Stochastic Processes & Applications	3 or 4	MATH 412	Graph Theory	3 or 4
IE 411	Optimization of Large Systems	3 or 4	MATH 413	Intro to Combinatorics	3 or 4
IE 412	OR Models for Mfg Systems	3 or 4	MATH 414	Mathematical Logic	3 or 4
IE 413	Simulation	3 or 4	MATH 417	Intro to Abstract Algebra	3 or 4
IE 420	Financial Engineering	3 or 4	MATH 418	Intro to Abstract Algebra II	3 or 4
IE 430	Economic Found of Quality Syst	3 or 4	MATH 423	Differential Geometry	3 or 4
IE 431	Design for Six Sigma	3	MATH 424	Honors Real Analysis	3
IB 150	Organismal & Evolutionary Biol	4	MATH 425	Honors Advanced Analysis	3
IB 202	Physiology	3 or 4	MATH 427	Honors Abstract Algebra	3
IB 203	Ecology	4	MATH 428	Honors Topics in Mathematics	3
IB 204	Genetics	4	MATH 432	Set Theory and Topology	3 or 4
IB 302	Evolution	4	MATH 442	Intro Partial Diff Equations	3 or 4
IB 335			MATH 444	Elementary Real Analysis	3 or 4

MATH 446	Applied Complex Variables	3 or 4	ME 403	Internal Combustion Engines	3 or 4
MATH 447	Real Variables	3 or 4	ME 404	Intermediate Thermodynamics	4
MATH 448	Complex Variables	3 or 4	ME 410	Intermediate Gas Dynamics	3 or 4
MATH 450	Numerical Analysis	3 or 4	ME 411	Viscous Flow & Heat Transfer	4
MATH 453	Number Theory	3 or 4	ME 412	Numerical Thermo-Fluid Mechs	2 to 4
MATH 473	Algorithms	4	ME 420	Intermediate Heat Transfer	4
MATH 475	Formal Models of Computation	3 or 4	ME 430	Failure of Engrg Materials	3 or 4
MATH 481	Vector and Tensor Analysis	3 or 4	ME 431	Mechanical Component Failure	3 or 4
MATH 482	Linear Programming	3 or 4	ME 440	Kinem & Dynamics of Mech Syst	3 or 4
MATH 484	Nonlinear Programming	3 or 4	ME 445	Introduction to Robotics	4
MATH 487	Advanced Engineering Math	3 or 4	ME 451	Computer-Aided Mfg Systems	3 or 4
MATH 489	Dynamics & Differential Eqns	3 or 4	ME 452	Num Control of Mfg Processes	3 or 4
MCB 150	Molecular & Cellular Basis of Life	4	ME 460	Industrial Control Systems	4
MCB 250	Molecular Genetics	3	ME 461	Computer Cntrl of Mech Systems	3 or 4
MCB 251	Exp Techniqs in Molecular Biol	2	ME 471	Finite Element Analysis	3 or 4
MCB 252	Cells, Tissues & Development	3	ME 472	Introduction to Tribology	3 or 4
MCB 253	Exp Techniqs in Cellular Biol	2	ME 485		
MCB 300	Microbiology	3	ME 487	MEMS-NEMS Theory & Fabrication	4
MCB 301	Experimental Microbiology	3	MUS 407	Elect Music Techniques I	3
MCB 314	Introduction to Neurobiology	3	MUS 409	Elec Music Techniques II	2
MCB 316	Genetics and Disease	4	NEUR 453	Cog Neuroscience of Vision	3 or 4
MCB 354	Biochem & Phys Basis of Life	3	NPRE 201	Energy Systems	2 or 3
MCB 400	Cancer Cell Biology	3	NPRE 247	Modeling Nuclear Energy System	3
MCB 401	Cellular Physiology	3	NPRE 330	Materials in Nuclear Engineering	3
MCB 402	Sys & Integrative Physiology	3	NPRE 402	Nuclear Power Engineering	3 or 4
MCB 403			NPRE 412	Nuclear Power Econ & Fuel Mgmt	3 or 4
MCB 404			NPRE 421	Plasma and Fusion Science	3
MCB 406	Gene Expression & Regulation	3	NPRE 423	Plasma Laboratory	2
MCB 408	Immunology	3	NPRE 429	Plasma Engineering	3
MCB 410	Developmental Biology, Stem Cells and Regenerative Medicine	3	NPRE 435	Radiological Imaging	3
MCB 413	Endocrinology	3	NPRE 432	Nuclear Engrg Materials Lab	2
MCB 419	Brain, Behavior & Info Process	3	NPRE 441	Radiation Protection	4
MCB 421	Microbial Genetics	3	NPRE 442	Radioactive Waste Management	3
MCB 424	Microbial Biochemistry	3	NPRE 448	Nuclear Syst Engrg & Design	4
MCB 426	Bacterial Pathogenesis	3	NPRE 451	NPRE Laboratory	3
MCB 430	Molecular Microbiology	3	NPRE 455	Neutron Diffusion & Transport	4
MCB 431	Microbial Physiology	3	NPRE 457	Safety Anlys Nucl Reactor Syst	3 or 4
MCB 433	Virology & Viral Pathogenesis	3	NPRE 458	Design in NPRE	4
MCB 435	Evolution of Infectious Disease	3	NPRE 470		
MCB 446	Physical Biochemistry	3	NPRE 475		
MCB 480	Eukaryotic Cell Signaling	3	PHYS 225	Relativity & Math Applications	2
ME 200	Thermodynamics	3	PHYS 325	Classical Mechanics I	3
ME 310	Fundamentals of Fluid Dynamics	4	PHYS 326	Classical Mechanics II	3
ME 320	Heat Transfer	4	PHYS 401	Classical Physics Lab	3
ME 330	Engineering Materials	4	PHYS 402	Light	3 or 4
ME 340	Dynamics of Mechanical Systems	3.5	PHYS 403	Modern Experimental Physics	4 or 5
ME 370	Mechanical Design I	3	PHYS 406		
ME 371	Mechanical Design II	3	PHYS 419	Space, Time, and Matter-ACP	3 or 4
ME 400	Energy Conversion Systems	3 or 4	PHYS 420	Space, Time, and Matter	2
ME 401	Refrigeration and Cryogenics	3 or 4	PHYS 427	Thermal & Statistical Physics	4
ME 402	Design of Thermal Systems	3 or 4	PHYS 460	Condensed Matter Physics	4
			PHYS 466	Atomic Scale Simulations	3 or 4

PHYS 470	Subatomic Physics	4	ECE 439	Wireless Networks	3 or 4
PHYS 485	Atomic Phys & Quantum Theory	3	ECE 443	LEDs and Solar Cells	4
PHYS 486	Quantum Physics I	4	ECE 444	IC Device Theory & Fabrication	4
PHYS 487	Quantum Physics II	4	ECE 446	Principles of Experimental Research in Electrical Engineering	4
PSYC 204	Intro to Brain and Cognition	3	ECE 447	Active Microwave Ckt Design	3
SHS 200	General Phonetics	3	ECE 451	Adv Microwave Measurements	3
SHS 240	Intro Sound & Hearing Science	3	ECE 453	Wireless Communication Systems	4
SHS 300	Anat & Physiol Spch Mechanism	4	ECE 456	Global Nav Satellite Systems	4
SHS 301	General Speech Science	4	ECE 460	Optical Imaging	4
SHS 320	Development of Spoken Language	3	ECE 463	Digital Communications Lab	2
SHS 450	Intro Audiol & Hear Disorders	4	ECE 466		1
SHS 470	Neural Bases Spch Lang	3	ECE 468	Optical Remote Sensing	3
STAT 420	Methods of Applied Statistics	3 or 4	ECE 469	Power Electronics Laboratory	2
STAT 424	Design of Experiments	3 or 4	ECE 470	Introduction to Robotics	4
STAT 425	Statistical Modeling I	3 or 4	ECE 481	Nanotechnology	4
STAT 428	Statistical Computing	3 or 4	ECE 486	Control Systems	4
STAT 429	Time Series Analysis	3 or 4	ECE 489	Robot Dynamics and Control	4
STAT 440	Statistical Data Management	3 or 4	ECE 495	Photonic Device Laboratory	3
SE 411	Reliability Engineering	3 or 4	Software Labs:		
SE 420	Digital Control Systems	4	ECE 311	Digital Signal Processing Lab	1
SE 423	Mechatronics	3	ECE 314	Probability in Engineering Lab	1
SE 424	State Space Design for Control	3	ECE 365	Data Science and Engineering	3
TAM 211	Statics	3	ECE 411	Computer Organization & Design	4
TAM 212	Introductory Dynamics	3	ECE 484	Principles of Safe Autonomy	4
TAM 251	Introductory Solid Mechanics	3	Free Electives		
TAM 324	Behavior of Materials	4	Code	Title	Hours
TAM 335	Introductory Fluid Mechanics	4	Additional course work, subject to the Grainger College of Engineering restrictions to Free Electives, so that there are at least 128 credit hours earned toward the degree. (https://go.grainger.illinois.edu/FreeElectives/)		
TAM 412	Intermediate Dynamics	4	Total Hours of Curriculum to Graduate 128		
TAM 435	Intermediate Fluid Mechanics	4	<i>For the degree of Bachelor of Science in Electrical Engineering</i>		
TAM 445	Continuum Mechanics	4	<hr/>		
TAM 451	Intermediate Solid Mechanics	4	Sample Sequence		
Select three courses from the following list of Advanced Core ECE electives.			<i>This sample sequence is intended to be used only as a guide for degree completion. All students should work individually with their academic advisors to decide the actual course selection and sequence that works best for them based on their academic preparation and goals. Enrichment programming such as study abroad, minors, internships, and so on may impact the structure of this four-year plan. Course availability is not guaranteed during the semester indicated in the sample sequence. The curriculum sequence can also be viewed via dynamic and static curricular maps (https://grainger.illinois.edu/academics/undergraduate/majors-and-minors/ee-map/), which include prerequisite sequencing.</i>		
ECE 391	Computer Systems Engineering	4	<i>Students must fulfill their Language Other Than English requirement by successfully completing a third level of a language other than English. See the corresponding section on the Degree and General Education Requirements (http://catalog.illinois.edu/general-information/degree-general-education-requirements/). ECE 445 or combination of ECE 496 &</i>		
or CS 225	Data Structures				
ECE 310	Digital Signal Processing	3			
ECE 330	Power Ckts & Electromechanics	3			
ECE 342	Electronic Circuits	3			
ECE 350	Fields and Waves II	3			
Select three courses from the following list of ECE labs. At least one must be a Hardware Lab.					
Hardware Labs:					
ECE 343	Electronic Circuits Laboratory	1			
ECE 391	Computer Systems Engineering	4			
ECE 395	Advanced Digital Projects Lab	2 or 3			
ECE 402	Electronic Music Synthesis	3			
ECE 415	Biomedical Instrumentation Lab	2			
ECE 420	Embedded DSP Laboratory	2			
ECE 431	Electric Machinery	4			
CS 436	Computer Networking Laboratory	3 or 4			
ECE 437	Sensors and Instrumentation	3			
ECE 438	Communication Networks	3 or 4			

ECE 499 satisfies a technical core requirement and the Campus General Education Advanced Composition requirement.

Free Electives: Additional course work, subject to the Grainger College of Engineering restrictions to Free Electives (<https://go.grainger.illinois.edu/FreeElectives/>), so that there are at least 128 credit hours earned toward the degree.

First Year	
First Semester	Hours
ECE 110	3
MATH 221 (MATH 220 may be substituted)	4
CHEM 102	3
CHEM 103	1
ENG 100	1
Composition I or General Education course (Choose a Humanities or Social/Behavioral Science course)	4
<hr/>	
16	

Total Hours 16

First Year	
Second Semester	Hours
ECE 120	4
MATH 231	3
PHYS 211	4
Free Elective course	3
General Education course (Choose a Humanities or Social/Behavioral Science course) or Composition I	3
<hr/>	
17	

Total Hours 17

Second Year	
First Semester	Hours
ECE 220	4
MATH 241	4
PHYS 212	4
MATH 257	3
General Education course (Choose a Humanities or Social/Behavioral Science course with a Cultural Studies designation)	3
<hr/>	
18	

Total Hours 18

Second Year	
Second Semester	Hours
ECE 210	4
MATH 285	3
PHYS 213	2
PHYS 214	2

Language Other Than English (3rd level)	4
<hr/>	
15	

Total Hours 15

Third Year	
First Semester	Hours
ECE 329	3
ECE 385	3
Technical Elective course	3
Technical Elective course	4
General Education course (Choose a Humanities or Social/Behavioral Science course with a Cultural Studies designation)	3
<hr/>	
16	

Total Hours 16

Third Year	
Second Semester	Hours
ECE 313	3
ECE 340	3
Technical Elective course	3
Technical Elective course	4
Free Elective course	3
<hr/>	
16	

Total Hours 16

Fourth Year	
First Semester	Hours
Technical Elective course	3
Technical Elective course	3
Technical Elective course	4
Free Elective course	3
General Education course (Choose a Humanities or Social/Behavioral Science course with a Cultural Studies designation)	3
<hr/>	
16	

Total Hours 16

Fourth Year	
Second Semester	Hours
ECE 445 or 496 <i>and</i> 499	4
Technical Elective course	3
Technical Elective course	4
Free Elective course	3
<hr/>	
14	

Total Hours 14**Total Hours: 128**

for the degree of Bachelor of Science Major in Electrical Engineering

Student learning outcomes are based on learning outcomes in line with the ABET accreditation process.

Electrical Engineering graduates will have:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

for the degree of Bachelor of Science in Electrical Engineering

Electrical & Computer Engineering Website (<https://ece.illinois.edu/about/directory/faculty/>)
Electrical & Computer Engineering Faculty

The Grainger College of Engineering Admissions (<https://grainger.illinois.edu/>)
The Grainger College of Engineering