

ELECTRICAL ENGINEERING, BACHELOR OF SCIENCE

The Electrical Engineering program at Hamad Bin Khalifa University (HBKU) offers a comprehensive approach that blends theoretical foundations with practical applications. This approach equips students to tackle contemporary challenges in areas such as information, communication, computing, power, and electrical systems.

With an emphasis on collaborative education, training, research, and capacity-building, the program aims to prepare adaptable engineers, capable of meeting society's evolving needs and embracing leadership, social consciousness, integrity, and ethics.

Requirements

Minimum hours required to complete program 129 CH

Code	Title	Hours
CHEM 127	General Chemistry I	4
ELEN 110	Introduction to Electrical Engineering	4
ELEN 209	Computer Programming and Algorithms	4
ELEN 214	Circuit Analysis	4
ELEN 248	Digital System Design	4
ELEN 250	Machine Learning for Electrical Engineering	3
ELEN 303	Random Signals and Applications	3
ELEN 314	Signals and Systems	3
ELEN 322	Electric and Magnetic Fields	3
ELEN 325	Electronics	4
ELEN 340	Electric Energy Conversion	4
ELEN 349	Microprocessor and Embedded Systems	4
ELEN 350	Computer Architecture and Design	4
ELEN 370	Physical Properties of Materials	3
ELEN 391	Internship	0
ELEN 403	Senior Design Project I	3
ELEN 404	Senior Design Project II	3
ENGL 114	Composition and Rhetoric	3
ENGL 220	Technical Writing	3
ENGR 110	Introduction to Programming	3
ENGR 482	Ethics and Engineering	3
MATH 161	Engineering Mathematics I	4
MATH 162	Engineering Mathematics II	4
MATH 261	Engineering Mathematics III	3
MATH 318	Differential Equations	3
MATH 321	Topics in Applied Mathematics I	3
PHYS 216	Newtonian Mechanics for Engineering and Science	3
PHYS 217	Electricity and Magnetism for Engineering and Science	3
PHYS 226	Experimental Physics and Engineering Laboratory I: Mechanics	2
PHYS 227	Experimental Physics and Engineering Laboratory II: Electricity and Magnetism	2
Subtotal		96
<i>Technical Area Electives</i>		15
ELEN 410	Automatic Control Systems	
ELEN 412	Power Electronics	

ELEN 414	Electric Power Systems	
ELEN 416	Electric Machines and Drives	
ELEN 418	Renewable Electric Power Systems	
ELEN 430	Digital Signal Processing	
ELEN 432	Wireless Communication	
ELEN 434	Radar and Remote Sensing	
ELEN 436	Image Processing	
ELEN 440	Principles of Artificial Intelligence	
ELEN 442	Deep Learning for Robotics	
ELEN 446	VLSI Design	
ELEN 448	CMOS Digital Circuit Design	
ELEN 489	Selected Topics in Electrical Engineering	
<i>UCC Electives</i>		18
ARAB 150	Arabic for Professional Communication	
ARAB 152	Arabic Linguistics	
BIOL 101	Biology	
COMM 110	Language, Identity, and Communication in Qatar	
ECON 110	Economic Principles	
ENGR 130	Sustainable Cities and Urban Mobility	
ENGR 125	AI Literacy and Critical Thinking	
ENGL 115	Creative and Digital Writing	
HELT 115	Health and Wellness in Modern Society	
HIST 107	World History	
HUMN 105	Global Cinema	
HUMN 110	Moral Reasoning and Decision-Making	
HUMN 111	Data Methods for Digital Humanities	
HUMN 113	Art and Visual Culture	
HUMN 114	Cinema and Musical Culture in the Arab World	
ISLM 105	Scriptural Ethics	
ISLM 106	Philosophy, Theology, and Ethics	
ISLM 117	Islamic Art and Architecture	
LAW 103	Law and Technology	
POLS 135	International Relations of the Gulf	
POLS 136	Perspectives in Gulf Studies	
POLS 137	Policy Analysis, Design and Implementation	
POLS 140	Global Grand Challenges	
PSYC 101	Introduction to Psychology	
SOCI 101	Introduction to Sociology	
SOCI 105	AI and Society	
SOCI 111	Community Service and Engagement	
SOCI 115	Comparative Theories and Methods	
SOCI 117	Technology, Innovation, and Society	
SOCI 137	Global Citizenship and Social Responsibility	

Total Hours **129**

Course	Title	Hours
Freshman		
First Semester		
CHEM 127	General Chemistry I	4
MATH 161	Engineering Mathematics I	4
ENGR 110	Introduction to Programming	3
ENGL 114	Composition and Rhetoric	3
UCC	Univ. Core Elective	3
Semester Hours		17
Second Semester		
PHYS 216	Newtonian Mechanics for Engineering and Science	3
PHYS 226	Experimental Physics and Engineering Laboratory I: Mechanics	2
MATH 162	Engineering Mathematics II	4

ELEN 110	Introduction to Electrical Engineering	4
UCC	Univ. Core Elective	3
Semester Hours		16
Sophomore		
First Semester		
PHYS 217	Electricity and Magnetism for Engineering and Science	3
PHYS 227	Experimental Physics and Engineering Laboratory II: Electricity and Magnetism	2
MATH 261	Engineering Mathematics III	3
ELEN 209	Computer Programming and Algorithms	4
ELEN 248	Digital System Design	4
Semester Hours		16
Second Semester		
MATH 318	Differential Equations	3
MATH 321	Topics in Applied Mathematics I	3
ELEN 214	Circuit Analysis	4
ELEN 250	Machine Learning for Electrical Engineering	3
UCC	Univ. Core Elective	3
Semester Hours		16
Junior		
First Semester		
ELEN 349	Microprocessor and Embedded Systems	4
ELEN 314	Signals and Systems	3
ELEN 370	Physical Properties of Materials	3
ELEN 325	Electronics	4
ENGL 220	Technical Writing	3
Semester Hours		17
Second Semester		
ELEN 303	Random Signals and Applications	3
ELEN 322	Electric and Magnetic Fields	3
ELEN 340	Electric Energy Conversion	4
ELEN 350	Computer Architecture and Design	4
UCC	Univ. Core Elective	3
Semester Hours		17
Third Semester		
ELEN 391	Internship	0
Semester Hours		0
Senior		
First Semester		
ENGR 482	Ethics and Engineering	3
ELEN 403	Senior Design Project I	3
Technical Area Electives		3
Technical Area Electives		3
UCC	Univ. Core Elective	3
Semester Hours		15
Second Semester		
ELEN 404	Senior Design Project II	3
Technical Area Electives		3
Technical Area Electives		3
Technical Area Electives		3
UCC	Univ. Core Elective	3
Semester Hours		15
Total Hours		129