Bachelor of Science in Electrical and Electronics Engineering

Program Description

The Bachelor of Science in Electrical and Electronics Engineering provides graduates with a sound understanding of fundamental engineering principles and applications in the field.

Graduates are prepared for post-graduate study or employment and are able to demonstrate their ability to apply the knowledge and methodologies of electrical and electronics engineering essential for a successful career. The American University of Ras Al Khaimah's (AURAK) Bachelor of Electrical and Electronics Engineering aims to produce effective, well educated, and globally competitive electrical and electronics engineers for the region and the wider world. The program aims to be amongst the top in the GCC region in the fields of electrical and electronics engineering with highly qualified and dedicated faculty and staff. It also aims to have a strong link with the local and regional government, public-sector organizations, and private sector enterprises. Moreover, the program aims to provide service to the community by sharing the program's technical expertise and human resources.

The Bachelor of Science in Electrical and Electronics Engineering is overseen by the School of Engineering and Computing and is designed to satisfy QF Emirates Level 7 requirements.

Program Mission

The mission of the Electrical and Electronics Engineering program is to provide graduates with a sound understanding of fundamental engineering principles and applications in the field. Graduates will have a comprehensive understanding of subjects like signals and systems, digital logic, circuits and electronics, and the theory and applications of digital communications, particularly networks and wireless communications, in addition to power systems, control systems, and electric machines. Graduates will be prepared for both graduate study and employment. They will be able to demonstrate their ability to apply the knowledge and methodologies in power systems, electronics, and communications engineering essential for a successful career.

Program Educational Objectives

The graduates of Electrical and Electronics Engineering Program, within a few years will be:

1. Become successful practitioners and innovators in the region and worldwide;
2. Continue their professional development throughout their careers; and
3. Work productively and ethically in teams, and function effectively in diverse cultural environments.

Program Learning Outcomes

AURAK Electrical and Electronics Engineering graduates should 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; and

7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Degree Requirements

The BS in Electrical and Electronics Engineering (EEE) requires the completion of 135 credits in the following areas:

Area	Credit
University General Education Requirements	32
School of Engineering and Computing Requirements	34
EEE Department Requirements	69 (63 CH compulsory and 6 CH technical electives)

University General Education Requirements — 32 Credit Hours

The program requires completion of the General Education Component. For information relating directly to the General Education requirements, please review the catalog section entitled, "General Education Component." You must speak with your advisor to ensure that the General Education Component requirements are satisfied. **The fifth writing intensive course for the BS in Electrical and Electronics Engineering is EEEN 434 Linear Electronics II Laboratory.**

Course Code	Title	Credits
ARAB 101 or ARAB 110	Arabic Language and Culture for Non-Native Learners I OR Arabic Language and Culture for Native Arabic Speakers I	3
ENGL 101	Composition **(Writing Intensive)**	3
CSCI 112	Introduction to Computer Programming	3
CSCI 113	Introduction to Computer Programming Lab	1
UNIV 100	University First-Year Transition	1
UNIV 200	Innovation, Entrepreneurship, and Sustainability **(Writing Intensive)**	3
PHIL 100 or ENGL 200	Critical Thinking and Reasoning **(Writing Intensive)** OR Advanced Composition **(Writing Intensive)**	3
MEST 100	Introduction to Islam in World Culture **(Writing Intensive)**	3
Gen Ed	Social and Behavioral Science Course – ECON 103 is recommended.	3
UAES 200	Survey of United Arab Emirates Studies	3
MATH 113	Calculus I	3
CHEM 211	General Chemistry I	3

School of Engineering and Computing Requirements — 34 Credit Hours

Course Code	Course Title	Credits
ENGR 107	Introduction to Engineering	2
PHYS 110	University Physics I	3
PHYS 111	University Physics I Lab	1
MATH 114	Calculus II	3
MATH 203	Linear Algebra	3
MATH 213	Calculus III	3
MATH 214	Elementary Differential Equations	3
PHYS 220	University Physics II	3
PHYS 221	University Physics II Lab	1
ENGR 200	Engineering Statistics	3
ENGR 210	Sustainability in Engineering	2
ENGR 390	Internship I	3
ENGR 391	Internship II	3
ENGR 450	Engineering Seminar	1

EEE Department Requirements — 69 Credit Hours

Core Courses — 63 Credit Hours

Course Code	Course Title	Credits
EEEN 220	Signals & Systems	3
EEEN 221	Signals & Systems Lab	1
EEEN 280	Electric Circuit Analysis I	3
EEEN 281	Electric Circuit Analysis Lab	1
EEEN 282	Electric Circuit Analysis II	3
EEEN 305	Electromagnetic Theory	3
EEEN 331	Digital System Design	3
EEEN 332	Digital System Design Lab	1
EEEN 333	Linear Electronics I	3
EEEN 334	Linear Electronics I Lab	1
EEEN 350	Electric Machines	3
EEEN 351	Electric Machines Lab	1
EEEN 412	Power Systems	3
EEEN 413	Microcontrollers and Embedded Systems	3
EEEN 414	Microcontrollers and Embedded Systems Lab	1
EEEN 431	Digital Circuit Design	3
EEEN 433	Linear Electronics II	3
EEEN 434	Linear Electronics II Lab	1
EEEN 437	Power Electronics	3
EEEN 451	Control Theory	3
EEEN 452	Control Lab	1
EEEN 460	Communication Systems	3
EEEN 461	Communication Engineering Lab	1
EEEN 464	Digital Communication Systems	3
EEEN 466	Digital Signal Processing	3

Course Code	Course Title	Credits
EEEN 492	Senior Design Project I	2
EEEN 493	Senior Design Project II	4

Technical Electives **6 Credit Hours**

Course Code	Course Title	Credits
CENG 315	Microprocessor	3
EEEN 455	Digital Image Processing	3
EEEN 462	Data and Computer Communication	3
EEEN 467	Mobile and Wireless Communications	3
EEEN 472	Antenna Theory and Design	3
EEEN 474	Advanced Information Theory and Coding	3
EEEN 487	Robotics Engineering	3
EEEN 481	Concepts of Multimedia Processing & Transmission	3
EEEN 499	Special Topics in EEEN	3
EEEN 422	High Voltage Engineering	3
EEEN 423	Electrical Energy Systems and Fault Analysis	3
EEEN 425	Smart Power Grid Systems Theory and Implementation	3
EEEN 426	Renewable Energy Systems	3
ENGR 399	Undergraduate Research Project	3

Electrical and Electronics Engineering Program EEE 4-Year Study Plan

First Year, First Semester			First Year, Second Semester		
Course Code	**Course Title**	**Credits**	**Course Code**	**Course Title**	**Credits**
PHYS 110	Physics I	3	ARAB 101 or ARAB 110	Arabic Language and Culture for Non-Native Learners I OR Arabic Language and Culture for Native Arabic Speakers I	3
PHYS 111	Physics I Lab	1			
ENGL 101	Composition	3	CSCI 112	Intro. to Computer Programming	3
ENGR 107	Introduction to Engineering	2	CSCI 113	Intro. to Computer Programming Lab	1
MATH 113	Calculus I	3	MATH 114	Calculus II	3
UNIV 100	University First-Year Transition	1	PHYS 220	Physics II	3
CHEM 211	General Chemistry I	3	PHYS 221	Physics II Lab	1
			MEST 100	Introduction to Islam in World Culture	3
Subtotal =		**16**	**Subtotal =**		**17**
Second Year, First Semester			**Second Year, Second Semester**		
Course Code	**Course Title**	**Credits**	**Course Code**	**Course Title**	**Credits**
EEEN 280	Electric Circuit Analysis I	3	EEEN 220	Signals & Systems	3
EEEN 281	Electric Circuit Analysis I Lab	1	EEEN 221	Signals & Systems Lab	1
UAES 200	Survey of United Arab Emirates Studies	3	EEEN 282	Electric Circuit Analysis II	3
MATH 203	Linear Algebra	3	ENGR 200	Engineering Statistics	3
MATH 213	Calculus III	3	MATH 214	Elementary Differential Equations	3
EEEN 331	Digital System Design	3	ENGR 210	Sustainability in Engineering	2
EEEN 332	Digital System Design Lab	1			
Subtotal =		**17**	**Subtotal =**		**15**
Second Year, Summer Session					
Course Code	**Course Title**	**Credits**			
ENGR 390	Internship I	3			
Third Year, First Semester			**Third Year, Second Semester**		
Course Code	**Course Title**	**Credits**	**Course Code**	**Course Title**	**Credit**
EEEN 305	Electromagnetic Theory	3	EEEN 412	Power Systems	3
UNIV 200	Innovation, Entrepreneurship, and Sustainability	3	EEEN 433	Linear Electronics II	3
EEEN 350	Electric Machines	3	EEEN 434	Linear Electronics II Lab	1
EEEN 351	Electric Machines Lab	1	EEEN 431	Digital Circuit Design	3
EEEN 333	Linear Electronics I	3	EEEN 451	Control Theory	3
EEEN 334	Linear Electronics I Lab	1	EEEN 452	Control Lab	1
EEEN 413	Microcontrollers and Embedded Systems	3	EEEN 460	Communication Systems	3
EEEN 414	Microcontrollers and Embedded Systems Lab	1			
Subtotal =		**18**	**Subtotal =**		**17**
Third Year, Summer Semester					
Course Code	**Course Title**	**Credits**	**Course Code**	**Course Title**	**Credits**
ENGR 391	Internship II	3			
Fourth Year, First Semester			**Fourth Year, Second Semester**		
Course Code	**Course Title**	**Credits**	**Course Code**	**Course Title**	**Credits**
PHIL 100 or ENGL 200	Critical Thinking and Reasoning OR Advanced Composition	3	EEEN 464	Digital Communication Systems	3
EEEN 437	Power Electronics	3	ENGR 450	Engineering Seminar	1
EEEN 492	Senior Design Project I	2	EEEN 493	Senior Design Project II	4
EEEN 466	Digital Signal Processing	3	EEEN 461	Communication Engineering Lab	1
	Technical Elective I	3		Technical Elective II	3
			ECON 103	Principles of Microeconomics	3
Subtotal =		**14**	**Subtotal =**		**15**
Total 135 Credits					