



PROGRAM SPECIFICATION

Bachelor in Electronics and Communication Engineering (2020 – 2021)

Awarding Institution	A'Sharqiyah University
College / Centre	Engineering
Program Title	Bachelor in Electronics and Communication Engineering
Program Title	Electronics and Communication Engineering
Credit hours	137
Mode of Study	Full time and Part time
Language of Study	English
Benchmarks	The program was initially developed by a team of faculty from Texas Tech University and benchmarked with similar programs at University of New Mexico, North Carolina State University, Purdue University, and Virginia Polytechnic Institute and State University.
Entry requirements	<ol style="list-style-type: none"> A student should have successfully passed the courses of all subjects of the general education diploma or its equivalence. A student should achieve the standards set for the subjects of the General Foundation Program. A student should have passed the following subjects to qualify for enrollment in the College of Engineering: Pure Mathematics, Physics and Chemistry. A student must be medically fit.
Minimum period of registration	Full time: 5 years Part time: 9 years
Maximum period of registration	Full time: 7 years Part time: 11 years
Date specification produced	March 2013
Date specification last reviewed	June 2018



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1. THE COLLEGE OF ENGINEERING

The College of Engineering at A'Sharqiyah University (ASU) opened in 2011 and has grown quickly to a current enrollment of over 300 students. The College will continue to grow at this rapid pace in order to accommodate over 1000 students in new classrooms and laboratories located in the new College of Engineering building that was completed in September 2017. With a first-rate building and state-of-the-art laboratories, the ASU Engineering College will continue to draw community members and prospective students to the growing campus. The College of Engineering at present offers undergraduate academic programs at Diploma/Degree levels in Civil Engineering, Environmental Engineering, Electronics and Communications Engineering and Construction Project Management.

The mission of the College is to educate creative professional engineers, technologists and technicians and to equip them to serve society in a globalized knowledge economy. Working in partnership with its stakeholders; the College is committed to the creation and transfer of new knowledge and technologies through the efforts of faculty, staff and students. The College vision is to achieve national and international stature as a College of Engineering through excellence in engineering education, research and innovation, outreach and external community engagement whilst contributing to the competitiveness, social and economic development and prosperity of the Sultanate of Oman.

2. PROGRAM OUTLINE

The Electronics and Communication Engineering program is planned to provide the students with a strong background of mathematics, physics which are fundamentals for students to peruse their engineering study more effectively. Thus, in addition to the courses in mathematics and physics provided in the foundation program, the students are offered five mathematics courses and two physics courses. Furthermore, there are different courses designed to provide the student with the required communication skills, improve the logical thinking of the students and to develop the student ability to model different real life phenomenon. With strong basic knowledge in place, the program introduces the students with well-designed courses in electronics and communication. These courses equip the students with the up to date knowledge that allow them to cross steadily to the future and be highly competitive in the job market. Electronics and Communication Engineers from this program will be able to undertake projects that include the deployment and maintenance of telecommunication networks, giving technical support and participating in establishing and building of new oil and gas plants, power plants, airports, hospitals and health care centers, all of which are of central importance to Oman.

3. PROGRAM AIMS

Electronics and Communication Engineering is a discipline that has grown over the last decade. The program aims at the production of qualified engineers who are competent in areas of electronics and communications and who are able to work in a globally competitive market by ever seeking lifelong learning in the technical, management, and other facets of concern.



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4. LEARNING OUTCOMES

Upon completion of the program, students will be able to:

[A – D are mandatory, however sub-categories in D should be completed as applicable]

<p>A. KNOWLEDGE AND UNDERSTANDING</p>	<ul style="list-style-type: none"> • Apply knowledge of mathematics, science, and engineering. • Acquire knowledge of contemporary engineering issues. • Acquire broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context. • Understand professional and ethical responsibilities. • Recognize the need for engagement in life-long learning.
<p>B. SUBJECT-SPECIFIC INTELLECTUAL SKILLS</p>	<ul style="list-style-type: none"> • Design and conduct experiments, analyze and interpret data, and draw conclusions. • Design systems, components, or processes to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability conditions and/or requirements. • Identify, formulate, and solve engineering problems.
<p>C. PROFESSIONAL / PRACTICAL SKILLS</p>	<ul style="list-style-type: none"> • Use adequate techniques, skills, and modern engineering tools necessary for engineering practice.
<p>D. GENERAL COMPETENCE</p>	<p>Communication</p> <ul style="list-style-type: none"> • Communicate effectively. <p>Teamwork and interpersonal skills</p> <ul style="list-style-type: none"> • Exhibit team-work management and interpersonal skills. <p>Leadership and entrepreneurship</p> <ul style="list-style-type: none"> • Lead group of employees. • Establish companies in fields of interest.



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5. PROGRAM STRUCTURE

Students must achieve the required credit hours for the program by completing University and University Electives listed in sections 5.1 to 5.5 below:

University Requirements

12 Credits

Course Code	Course Title	Pre-Requisites	Credits
ISLM101	Islamic Civilization		3
ENGL101	English Communication Skills I		3
ENGL102	English Communication Skills II	ENGL101	3
MNGT313	Entrepreneurship		3
Total			12



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College Requirements

41 Credits

Course Code	Course Title	Pre-Requisites	Credits
MATH101	Calculus I		3
MATH102	Calculus II	MATH101	3
ENGR111	Computer Applications		3
MATH204	Probability and Statistics	MATH102	3
PHYS101	Physics I	MATH101 (C)	3
PHYS102	Physics II	PHYS101	3
CHEM101	Chemistry	MATH 101 (C)	3
ENGR201	Engineering Drawing	MATH101	3
ENGR202	Technical Writing and Presentation	ENGL102	3
MATH406	Calculus III	MATH102	3
ENGR404	Engineering Economics	MATH204	3
MATH305	Numerical Methods	MATH102	3
MATH215	Linear Algebra	MATH102	3
MATH203	Differential Equations	MATH102	3
ENGR322	Summer Internship		0
Total			42

Major Requirements

83 credits

Course Code	Course Title	Pre-Requisites	Credits
ECEN211	Digital Systems	MATH101	3
ECEN312	Microcontrollers	ENGR111, ECEN211	3
ECEN221	Circuits Theory I	MATH102	3
ECEN281	Digital Systems Lab	ECEN211	1
ECEN322	Circuits Theory II	ECEN221	3
ECEN381	Circuits Lab I	ECEN221	1
ECEN341	Signals and Systems	MATH102	3
ECEN331	Electronics I	ECEN221	3
ECEN332	Electronics II	ECEN331	3
ECEN382	Electronics Lab I	ECEN331	1
ECEN533	Power Electronics	ECEN452	3
ECEN481	Electronics Lab II	ECEN382	1



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ECEN351	Electromagnetic Theory I	MATH102	3
ECEN452	Electromagnetic Theory II	ECEN351	3
ECEN342	Analog Communication Systems	ECEN341	3
ECEN343	Communication Lab	ECEN342	1
ECEN431	Communication Electronics	ECEN332, ECEN342	3
ECEN441	Digital Communication Systems	ECEN342	3
ECEN541	Digital Signal Processing	ECEN341	3
ECEN591	Capstone Design Project I	Pass in 90 credits	3
ECEN592	Capstone Design Project II	ECEN591	3
ECEN543	Wireless Communications	ECEN441	3
ECEN316	Integrating Group Project	Pass in 50 credits	3
ECEN311	Optical Communications	ECEN342	3
ECEN532	Digital Electronics	ECEN332	3
ECEN222	Instrumentation and Measurement Techniques	ECEN221	3
ECEN344	Renewable Energy	ECEN221	3
ECEN323	Communication Lab II	ECEN223	1
ECEN534	Digital Electronics Lab	ECEN481	1
ECEN432	Communication Electronics Lab	ECEN431	1
Select three Electronics & Communication Engineering Elective courses			9
Total			83

Electronics and Communication Engineering Electives

(Choose 9 Credit Hours)

Course Code	Course Title	Pre-Requisites	Credits
ECEN461	Control Systems	ECEN341	3
ECEN515	Communication Networks	ECEN441	3
ECEN535	CMOS Circuits Design	ECEN332	3
ECEN552	Antenna Theory and Design	ECEN452	3
ECEN555	Selected Topics in Communication Engineering	ECEN441	3
ECEN556	Selected Topics in Electronics Engineering	ECEN332	3
EETE427	Neural Networks and Fuzzy Logic	ENGR111 & MATH406	3
EETE515	Optimization Techniques in Engineering	ENGR111 & MATH305	3
EETE419	Automated Control Systems	ECEN461	3
ECEN553	Satellite Communications	ECEN441	3
ECEN554	Advanced Digital System Design	ECEN532	3
ECEN551	Microwave Engineering	ECEN452	3



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6. PROGRAM REFERENCE POINTS

This Program has been designed with reference to ABET.

7. TEACHING AND LEARNING METHODS (indicative)

Lectures, tutorials, and lab works.

8. ASSESSMENT METHODS (Indicative)

Assignments, quizzes, Exams, presentation and Lab work.

9. CAREER and STUDY OPPORTUNITIES

The program facilitates entries to job and work opportunities in a number of market and industrial settings such as:

1. Telecommunication networks of public and private service.
2. Supervision posts in public/governmental and/or private enterprises of interest.
3. Industrial manufacturing settings of interest.
4. Electronic assembly plants.
5. Enable graduates to pursue post-graduate studies in various areas of electrical engineering.

10. STUDENT SUPPORT

Students attend an orientation week at the start of the program and are supported by a Course Coordinator. The Head of Department is also available to advise on program-related queries.

Students have access to the University's library with a range of reading materials, online resources and study support.

The University's Student Affairs Office supports and advises students on issues such as finance, regulations, legal matters, accommodation, transportation, disabilities and career guidance.

The Student Council is also an important source of support and guidance

The University has a Student Fund which considers applications on a case by case basis.

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11. PROGRAM STRUCTURE DIAGRAM

Bachelor of Engineering in Electronics and Communication Engineering

Year 1		Year 2		Year 3		Year 4		Year 5
FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL
ENGR111 Computer Applications	CHEM101 Chemistry	ECEN221 Circuits Theory I Pre-R: MATH102	ECEN344 Renewable Energy Pre-R: ECEN221	ECEN311 Optical Communications Pre-R: ECEN342	MATH305 Numerical Methods Pre-R: MATH102	ECEN312 Microcontrollers Pre-R: ECEN112/ECEN211	ECEN591 Capstone Design Project I	ECEN592 Capstone Design Project II Pre-R: ECEN591
ISLM101 Islamic Civilization	ENGL102 English Communication Skills II Pre-R: ENGL101	ECEN341 Signals and Systems Pre-R: MATH102	ECEN223 Communication Lab I Co-R: ECEN342	ECEN322 Circuit Theory II Pre-R: ECEN221	ECEN351 Electromagnetic Theory I Pre-R: MATH102	MATH406 Calculus III Pre-R: MATH102	ECEN541 Digital Signal Processing Pre-R: ECEN341	ECEN543 Wireless Communications Pre-R: ECEN441
ENGL101 English Communication Skills I	MATH102 Calculus 2 Pre-R: MATH101	ENGR201 Engineering Drawing Pre-R: MATH101	ECEN331 Electronics I Pre-R: ECEN221	ECEN332 Electronics II Pre-R: ECEN331	MATH204 Probability and Statistics Pre-R: MATH102	ECEN533 Power Electronics Pre-R: ECEN322	ECEN431 Communication Electronics	ECEN532 Digital Electronics Pre-RL ECEN332
MATH101 Calculus 1	PHYS102 Physics 2 Pre-R: PHYS101	ENGR202 Technical Writing and Presentation Pre-R: ENGL102	ECEN222 Instrumentation and Measurement Techniques Pre-R: ECEN221	ECEN481 Electronics Lab II Co-R: ECEN332	ECEN441 Digital Communication Systems Pre-R: ECEN342	ENGR404 Engineering Economics	Electronics and Communication Engineering Elective	Electronics and Communication Engineering Elective
PHYS101 Physics I	ECEN211 Digital Systems Pre-R: MATH101	MATH215 Linear Algebra Pre-R: MATH102	ECEN342 Analog Communication Systems Pre-R: ECEN341	ECEN381 Circuits Lab Co-R: ECEN322	MATH203 Differential Equations Pre-R: MATH102	ECEN452 Electromagnetic Theory II Pre-R: ECEN351	ECEN432 Communication Electronics Lab Co-R: ECEN431	Electronics and Communication Engineering Elective
	ECEN281 Digital Systems Lab Pre-R: ECEN211		ECEN382 Electronics Lab I Pre-R: ECEN331	ECEN316 Integrating Group Project	ECEN323 Communication Lab II Pre-R: ECEN223 Co-R: ECEN441		ENGR322 Summer Internship	ECEN534 Digital Electronics Lab Pre-R: ECEN481 Co-R: ECEN532
				MNGT 313 Entrepreneurship				

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12. ASSESSMENT of LEARNING OUTCOMES

KEY: F = Formative assessment S = Summative assessment FS = Formative AND Summative assessment

Upon completion of the program, students will be able to:	REQUIRED COURSES:	ENGR202	ENGR111	ECEN211	ECEN312	ECEN221	ECEN322	ECEN331	ECEN332
KNOWLEDGE AND UNDERSTANDING									
• An ability to apply knowledge of mathematics, science, and engineering.		FS	FS	S	FS	S	S	S	S
• A knowledge of contemporary issues									
• The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.						FS			
• An understanding of professional and ethical responsibility		FS							
• A recognition of the need for and an ability to engage in life-long learning		FS							
SUBJECT-SPECIFIC INTELLECTUAL SKILLS									
• An ability to design and conduct experiments, as well as to analyze and interpret data.					FS	FS	FS	FS	FS
• An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability			S	FS				S	S

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• An ability to identify, to formulate, and to solve engineering problems	S	FS	FS	S	FS	S	S	S	S
PROFESSIONAL / PRACTICAL SKILLS									
• An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.		FS	FS	FS	FS	S	S	S	S
TRANSFERABLE SKILLS (INCLUDING FOR EMPLOYABILITY)									
Communication Skills									
• An ability to communicate effectively.		FS							
Teamwork and interpersonal skills									
• An ability to function on multidisciplinary teams					FS	FS			
Leadership and entrepreneurship									
• Ability to lead group of peers or employees.						FS	FS		
• Ability to establish companies in the field of interest						FS	FS		

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Upon completion of the program, students will be able to:	REQUIRED COURSES:	ECEN341	ECEN342	ECEN351	ECEN431	ECEN452	ECEN461	ECEN441	ECEN541	ECEN543	ECEN571
KNOWLEDGE AND UNDERSTANDING											
• An ability to apply knowledge of mathematics, science, and engineering.		S	S	S	S	S	S	S	S	S	S
• A knowledge of contemporary issues					FS	FS	FS				
• The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.						FS	FS				
• An understanding of professional and ethical responsibility						F	F	F	F		
• A recognition of the need for and an ability to engage in life-long learning								FS	FS	FS	
SUBJECT-SPECIFIC INTELLECTUAL SKILLS											
• An ability to design and conduct experiments, as well as to analyze and interpret data.					FS	FS	FS	FS	FS		
• An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability					S		S				
• An ability to identify, to formulate, and to solve engineering problems		S	S	S	S	S	S	S	S	S	S
PROFESSIONAL / PRACTICAL SKILLS											

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• An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	S	S		S	S	S	S	S	S	S
TRANSFERABLE SKILLS (INCLUDING FOR EMPLOYABILITY)										
Communication Skills										
• An ability to communicate effectively.									FS	FS
Teamwork and interpersonal skills										
• An ability to function on multidisciplinary teams									FS	FS
Leadership and entrepreneurship										
• Ability to lead group of peers or employees.									FS	FS
• Ability to establish companies in the field of interest					FS	FS	FS			

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Upon completion of the program, students will be able to:	REQUIRED COURSES:	ECEN551	ECEN552	ECEN532	ECEN535	ECEN515	ECEN543	ECEN591	ECEN592
KNOWLEDGE AND UNDERSTANDING									
• An ability to apply knowledge of mathematics, science, and engineering.		S	S	S	S	S	S	FS	FS
• A knowledge of contemporary issues						S		FS	FS
• The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.								FS	FS
• An understanding of professional and ethical responsibility								FS	FS
• A recognition of the need for and an ability to engage in life-long learning								FS	FS
SUBJECT-SPECIFIC INTELLECTUAL SKILLS									
• An ability to design and conduct experiments, as well as to analyze and interpret data.								FS	FS
• An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability		S	S	S	S			FS	FS
• An ability to identify, to formulate, and to solve engineering problems		S	S	S	S	S	S	FS	FS
PROFESSIONAL / PRACTICAL SKILLS									

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• An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	S	S	S	S	S	S	FS	FS
TRANSFERABLE SKILLS (INCLUDING FOR EMPLOYABILITY)								
Communication Skills								
• An ability to communicate effectively.							FS	FS
Teamwork and interpersonal skills								
• An ability to function on multidisciplinary teams							FS	FS
Leadership and entrepreneurship								
• Ability to lead group of peers or employees.							FS	FS
• Ability to establish companies in the field of interest				FS	FS			

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