



Electronics and Communication Engineering

Program Specification

2019 - 2020

Electronics and Communication Engineering

Program Specification

According to 2013 Regulation

Administrative Information

Program title	Electronics and Communication Engineering, ECE
Program type	Single
Award / degree	B.Sc. Degree
Dept. (s) responsible	Communication and Computer Engineering
Coordinator	Head of communication and computer engineering department Prof .Dr. Salah Alagooz.
Assistant Co-ordinator:	Dr. Mohamed Abdelhamed
External evaluator	Prof Dr: AbdelwahabKamel Electronics and communication engineering Dept.,BenhaUniversity
Date of most recent approval of program specification by the Department council	Department council's in 9/2019

1. General

1.1. Basic Information

- **Program Title:** Electronics and Communication Engineering Program
- **Program Type:** Single
- **Department:** Communication and Computer Engineering Department
- **Coordinator:** Prof. Salah Elagooz
- **Assistant Co-ordinator:** Dr. Mohamed Abdelhamed
- **Year of operation:** 2019-2020
- **Dates of program specifications approval:** 2013

1.2 Staff Members

The Electronics and Communications Engineering Program is taught by (25) highly qualified staff members, (9) of them are full time employed and, (5) is part time staff member, in addition to (11) full time employed staff members for teaching the basic science courses.

(Appendix 1)

1.3 External Evaluators:

The program was evaluated by external evaluator **Prof. Abdelwahab Kamel**. The evaluation showed that the program specification agrees with the National Academic Reference Standards. However, the reviewer gave objective comments, which were taken into consideration in the final version of the program specifications. The reviewers' reports and response to their comments are printed in separate volume. (Appendix 2)

2. Professional Information

2.1. Preamble

Engineers solve real-life problems. They find the best solutions through the application of their knowledge, experience and skills. Engineers help to define and refine the way of life by providing innovative, higher-performance, safer, cleaner or more comfortable day-use facilities for human beings. They seek improvement through the processes of invention, design, manufacturing and construction.

2.2. Program Mission and Aims

2.2.1. Program Mission

The mission of the Electronics, Communications Engineering Department is to provide education for those students who are able to compete internationally, able to produce creative solutions to the society's needs, conscious to the universal moral values, adherent to the professional ethical code, and to generate and disseminate knowledge and technologies essential to the local and global needs in the field of electronics and communication engineering.

2.2.2. Program Aims

The Electronics, Communications Engineering Program aims to provide future engineers with appropriate theoretical knowledge and technical skills to respond to professional market demands in the fields of Electronics and Communication Engineering.

The following are the aimed graduate attributes:

- a) Possess the basic skills and knowledge of the challenges in the areas of communications engineering, electronics, computers and contemporary control engineering.
- b) Apply modern methods in planning, design, implementation, management and construction in the communications engineering, electronics, computers and various modern control engineering systems.
- c) Acquire the communication skills to ensure that the spirit of cooperation and teamwork in multidisciplinary projects.
- d) Develop professional performance and creative thinking and action planning based on community values and ethics of the profession.
- e) Think logically and creatively and to gain the necessary skills in engineering analysis to determine the problem and modeling and then analyze and find the factors and parameters affecting the way to design.
- f) Maintain state of art of the latest developments in the fields of communications, electronics, computers and control engineering, through a re-evaluation study plans and curricula offered periodically.

- g) Create strong relationships with local and regional companies and international institutions to promote and support the process of educational activity in the department.

2.3 The Attributes of an Electronics and Communications engineer:

- a- Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.
- b- Design a system; component and process to meet the required needs within realistic constraints.
- c- Design and conduct experiments as well as analyze and interpret data.
- d- Identify, formulate and solve fundamental engineering problems.
- e- Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.
- f- Work effectively within multi-disciplinary teams.
- g- Communicate effectively.
- h- Consider the impacts of engineering solutions on society & environment.
- i- Demonstrate knowledge of contemporary engineering issues.
- j- Display professional and ethical responsibilities; and contextual understanding
- k- Engage in self- and life- long learning.
- l- Participate in and lead quality improvement projects.
- m- Manipulate with the electronic circuits, all the way from the discrete components level, circuits' analysis and design, to the troubleshooting with emphasis on electronic power devices.
- n- Apply control theory and measurement principals for industrial variables, signal conversion, conditioning and processing.
- o- Deal with the computers hardware, software, operating systems and interfacing.
- p- Design, operate and maintain digital and analog communication, mobile communication, coding, and decoding systems.

2.4 Intended Learning Outcomes (ILO's)

2.4.1. Knowledge and Understanding:

On successful completion of the programmes graduates must be able to demonstrate knowledge and understanding

General	K1	Discuss the Concepts and theories of mathematics and sciences, appropriate to the discipline in electronics, communication and computer engineering.
	K2	Link information and communications technology (ICT) specialization electronics, communication and computer Engineering
	K3	Classify different materials according to the characteristics of each material.
	K4.	Recognize the basics of design, where different elements of design and construction systems.
	K5	Follow the methodologies and techniques for solving engineering problems.
	K6	Discuss the foundations of quality system requirements and occupational safety and health and the nature of the risk and to reduce them.
	K7	Recall electronics, communication and computer industrial projects, as an introduction to systems management, marketing, legal and economic dimensions associated with them.
	K8	Mention electronics, communication and computer engineering techniques.
	K9	Discuss topics of humane and professional ethics.
	K10	Recognize the writing of technical reports.
	K11	Confirm the foundations of practice and ethics of the profession and the constraints and the role of electronics, communication and computer engineering in the development of human society economically, socially and environmentally.
	K12	Discuss contemporary engineering topics.

Specified	K13	Explain Basics of design and analyzing electronic circuits, components and engineering systems, while considering the constraints of applying inappropriate technology and the needs of commercial risk evaluation
	K14	Explain principles of Analyzing and design of control systems with performance evaluation
	K15	Explain Broad lines of industrial and informatics process engineering
	K16	Explain and design communication systems and Coding and decoding techniques
	K17	Demonstrate Microwave applications, Antenna and wave propagation
	K18	List methods of fabrication of Integrated circuits
	K19	Describe and acquiring analysis of signal processing
	K20	Define Engineering principles in the fields of logic design, machine and programming languages, computer organization and architectures, memory hierarchy, advanced computer architectures, embedded systems Operating systems, real-time systems and reliability analysis.
	K21	Describe measurement techniques and measuring instrumentation.

2.4.2. Intellectual Skills:

On successful completion of this programme graduate must be able to:

General	11	Determine the appropriate mathematical methods and using computer modeling and analysis of engineering problems.
	12	Use analytical thinking in the selection of the most appropriate solutions to engineering problems.
	13	Creative thinking of design and solving engineering problem...
	14	Recognize the different ideas through the exchange of information and views.
	15	Evaluate the properties and performance of systems and processes.
	16	Examine the reasons for the failure of systems and processes.
	17	Analyze engineering problems using available information...
	18	Choose the most appropriate ICT tools for engineering problems.
	19	Evaluate decisions in terms of cost, feasibility, safety, quality, efficiency and its

		impact on the environment.
	I10	Choose appropriate design criteria for economic, environmental and feasibility study.
	I11	Puts the system to deal with the systematic development in technology.
	I12	Analyze the results of mathematical modeling and evaluation of its borders.
Specified	I13	Approach the suitable tools for solving problems to tackle any practical Problems in the electronics and communications field.
	I14	Prepare an oral presentation.
	I15	Develop computer simulations and programs
	I16	Select and apply appropriate mathematical tools, computing methods, design techniques and tools in computer engineering disciplines, for modeling and analyzing systems
	I17	Plan, conduct and write a report on a project or assignment.
	I18	Synthesis and integrate systems for certain specific function using the right equipment

2.4.3. Professional and Practical Skills:

On successful completion of the programmes, students must be able to:

General	P1	Find problems solutions using engineering design, mathematical methods and previous experiences.
	P2	Get better by understanding the design and engineering information.
	P3	Determine an appropriate structural system.
	P4	Think in design while maintaining the aesthetic appeal.
	P5	Conducted tests, data collection, analysis and use of advanced devices and equipment.
	P6	Occur various analysis programs.
	P7	Resort to analytical methods to solve engineering problems.
	P8	Apply the safety standards to avoid the risk.
	P9	Apply the basics of project management skill.
	P10	Use quality assurance standards and follow the codes and specifications.
	P11	Exchange useful information and skills.
	P12	Prepare and present technical reports

Specified	P13	Use relevant laboratory and field equipment competently, safely and analyze the results correctly.
	P14	Troubleshoot, maintain and repair almost all types of systems using the standard tools.
	P15	Practice computer programming for the design and diagnostics of communication system and coding and decoding techniques.
	P16	Identify appropriate specifications for required devices.
	P17	Use appropriate tools to measure system performance.
	P18	Use appropriate mathematical methods or IT tools.

2.4.4. General and Transferable Skills:

On successful completion of the programmes, students must acquire the following:

General	T1	Cooperate with team members
	T2	Works under pressure.
	T3	Communicate with others in a good way.
	T4	Show skills own IT.
	T5	Lead and encourages individuals.
	T6	Run various projects through good management of activities, time and resources.
	T7	Look for information and expertise.
	T8	Acquire the ability to view and clarification of thought and method.
	T9	Attend lectures related to the project.

2.5 Curriculum Structure and Contents

2.5.1 Program Content:

The following are the subjects taught during this program

Prep. Year / 1st Semester

Code	Course Name	Teaching Hours						Marking				Subject Area						
		Lectures	Exercises	Practical	Total hours	Credit Hours	Written Exam Duration	Year work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
PHM 011	Mathematics (1)	2	2	-	4	3	2	60	-	90	150		√					
PHM 031	Mechanics (1)	2	2	-	4	3	2	60	-	90	150		√					
PHM 021	Physics (1)	2	1	1	4	2	2	30	30	40	100		√					
ARC 011	Engineering drawing & Projection (1)	1	3	-	4	2	2	50	-	50	100			√				
HUM 021	Production Technology	1	1	2	4	2	2	30	30	40	100			√				
Hum 021	History of engineering and technology	2	-	-	2	2	2	30	-	70	100	√						
CHE 001	Chemistry (1)	2	1	1	4	2	2	30	30	40	100		√					
HUM 011	Technical English language (1)	-	2	2	4	1	1	15	15	20	50	√						
Total		12	12	6	30	17	15	305	105	440	850	3	10	4	-	-	-	-

Prep. Year/ 2nd Semester

Code	Course Name	Teaching Hours						Marking				Subject Area						
		Lectures	Exercises	Practical	Total hours	Credit Hours	Written Exam Duration	Year work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
PHM 012	Mathematics (2)	2	2	-	4	3	2	60	-	90	150		√					
PHM 032	Mechanics (2)	2	2	-	4	3	2	60	-	90	150		√					
PHM 022	Physics (2)	2	1	1	4	2	2	30	30	40	100		√					
ARC 012	Engineering drawing & Projection (2)	1	3	4	8	3	2	45	45	60	150			√(2)	√(1)			
HUM 012	Technical English language (2)	-	2	2	4	1	1	15	15	20	50	√						
ECE 001	International Computer Driving License (ICDL)	-	-	4	4	1	2	15	15	20	50				√			
SCX 0P1	Selective Course (1)	2	1	1	4	2	2	30	30	40	100			√				
SCX 0P2	Selective Course (2)	2	1	-	3	2	2	40	-	60	100			√				
Total		11	12	12	35	17	15	295	135	420	850	1	8	6	-	2	-	-

First Year / 1st Semester

Code	Course Name	Teaching Hours					Written Exam Duration	Marking				Subject Area						
		Lectures	Exercises	Practical	Total hours	Credit Hours		Year work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
ECE 141	Circuits (2)	2	2	-	4	3	2	30	40	80	150			√				
ECE 111	Electronics (2)	2	1	1	4	2	2	30	30	40	100			√				
ECE 121	Measurements and Laboratory (1)	2	-	2	4	2	2	20	40	40	100			√				
PHM 110	Mathematics (3)	2	2	-	4	3	2	60	-	90	150		√					
PHM 121	Physics (3)	2	1	1	4	2	2	20	20	60	100		√					
ECE 143	Mechanical Engineering (1)	2	-	2	4	2	2	30	30	40	100			√				
ECE 191	Information Technology	2	-	2	4	2	2	30	30	40	100					√		
Total		17	6	8	28	16	14	220	190	390	800	-	5	9	-	2	-	-

FirstYear / 2nd Semester

Code	Course Name	Teaching Hours					Written Exam Duration	Marking				Subject Area						
		Lectures	Exercises	Practical	Total hours	Credit Hours		Year work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
ECE 122	Measurements and Laboratory (2)	2	-	2	4	2	2	20	40	40	100			√				
PHM 111	Mathematics (4)	2	2	-	4	3	2	60	-	90	150		√					
PHM 122	Physics (4)	2	2	1	5	3	2	30	30	90	150		√					
ECE 144	Mechanical Engineering (2)	2	-	2	4	2	2	30	30	40	100			√				
ECE 181	Training Project (1)	-	2	-	2	1	-	-	50	-	50						√	
ECPI 03	Logic design	2	2	2	6	3	2	40	40	70	150					√		
HUM 1xx	Selective Course (Humanities (1))	2	1	-	3	2	2	30	-	70	100	√						
Total		12	9	7	28	16	12	210	190	400	800	2	6	4	-	3	1	-

FirstYear / 3rd Semester (summer)

Code	Course Name	Teaching Hours					Written Exam Duration	Marking				Subject Area							
		Lectures	Exercises	Practical	Total hours	Credit Hours		Year work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary	
ECE 13X	Practical field training (1)	-	-	3	3	1	-	25	25	-	50							√	
ECE 182	Training Project (2)	-	2	-	2	1	-	-	50	-	50							√	
Total		-	2	3	5	2	-	25	75	-	100	-	-	-	-	-	-	2	-

SecondYear/ 1st Semester

Code	Course Name	Teaching Hours					Written Exam Duration	Marking				Subject Area						
		Lectures	Exercises	Practical	Total hours	Credit Hours		Year work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
ECE 261	Electrical and Magnetic Fields (1)	2	1	-	3	2	2	40	-	60	100				√			
ECE 223	Measurements and Laboratory (3)	1	-	2	3	1	2	15	15	20	50			√				
ECE 213	Electronics (3)	2	1	1	4	2	2	30	30	40	100			√				
PHM 211	Mathematics (5)	2	2	-	4	3	2	60	-	90	150		√					
ECE 283	Training Project (3)	-	2	-	2	1	-	-	50	-	50						√	
ECE 291	Microprocessors	2	2	2	6	3	2	40	60	50	150					√		
ECE 242	Circuits (3)	2	2	2	6	3	2	40	40	70	150			√				
HUM 203	Technical written reports	2	1	-	3	2	2	30	-	70	100	√						
Total		13	11	7	31	17	14	255	195	400	850	2	3	6	2	3	1	-

Second Year/ 2nd Semester

Code	Course Name	Teaching Hours						Marking				Subject Area						
		Lectures	Exercises	Practical	Total hours	Credit Hours	Written Exam Duration	Year work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
ECE 262	Electrical and Magnetic Fields (2)	2	1	-	3	2	2	40	-	60	100				√			
ECE 224	Measurements and Laboratory (4)	1	-	2	3	1	2	15	15	20	50			√				
ECE 214	Electronics (4)	2	1	1	4	2	2	30	20	50	100			√				
PHM 212	Mathematics (6)	2	1	-	3	2	2	40	-	60	100		√					
ECE 251	Electrical Signal Analysis	2	-	2	4	2	2	40	-	60	100				√			
ECE 231	Dynamics system and control	2	2	-	4	3	2	60	-	90	150			√				
ECE 292	Computer Engineering (1)	2	-	4	6	3	2	45	45	60	150					√		
Total		13	5	9	27	15	14	270	80	400	750	-	2	6	4	3	-	-

Second Year/ 3rd Semester (Summer Course)

Code	Course Name	Teaching Hours						Marking				Subject Area						
		Lectures	Exercises	Practical	Total hours	Credit Hours	Written Exam Duration	Year work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
ECE 23X	Practical Field training (2)	-	-	3	3	1	-	25	25	-	50						√	
ECE 284	Training Project (4)	-	2	-	2	1	-	-	50	-	50						√	
Total		-	2	3	5	2	-	25	75	-	100	-	-	-	-	-	2	-

ThirdYear/ 1st Semester

Code	Course Name	Teaching Hours					Written Exam Duration	Marking				Subject Area						
		Lectures	Exercises	Practical	Total hours	Credit Hours		Year work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
ECE 351	Communications (1)	2	2	2	6	3	2	45	45	60	150				√			
ECE 361	Electromagnetic Waves (1)	2	2	2	6	3	2	45	45	60	150				√			
PHM 311	Mathematics (7)	2	1	-	3	2	2	40	-	60	100		√					
ECE 371	Automatic Control	2	2	-	4	3	2	60	-	90	150				√			
EPM 305	Power and Electrical machines engineering (1)	2	-	2	4	2	2	30	30	40	100			√				
ECE 391	Computer Engineering (2)	2	-	2	4	2	2	30	30	40	100					√		
HUM 3XX	Selective Course (Humanities (2))	2	1	-	3	2	2	30	-	70	100	√						
Total		14	8	8	30	17	14	280	150	420	850	2	2	2	9	2	-	-

Third Year/2nd Semester

Code	Course Name	Teaching Hours						Marking				Subject Area						
		Lectures	Exercises	Practical	Total hours	Credit Hours	Written Exam Duration	Year work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
ECE 352	Communications (2)	2	2	2	6	3	2	45	45	60	150				√			
ECE 362	Electromagnetic Waves (2)	2	-	2	4	2	2	30	20	50	100				√			
ECE 372	Digital Control	2	-	2	4	2	2	40	-	60	100				√			
EPM 305	Power and Electrical machines engineering (2)	2	-	2	4	2	2	40	-	60	100			√				
ECE 311	Electronics (5)	2	-	2	4	2	2	30	30	40	100				√			
ECE 312	design of electronic circuits computer automated	-	-	6	6	2	2	30	30	40	100					√		
HUM 303	Legislation, Contracts and Specifications	2	1	-	3	2	2	30	-	70	100	√						
Total		12	3	16	31	15	14	245	125	380	750	2	-	2	9	2	-	-

Third Year/ 3rd Semester (Summer Course)

Code	Course Name	Teaching Hours						Marking				Subject Area						
		Lectures	Exercises	Practical	Total hours	Credit Hours	Written Exam Duration	Year work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
ECE 33X	Practical Field training (3)	-	-	3	3	1	-	25	25	-	50						√	
ECE 385	Training Project (5)	-	-	4	4	1	-	-	50	-	50						√	
Total		-	-	7	7	2	-	25	75	-	100	-	-	-	-	-	2	-

FourthYear/ 1st Semester

Code	Course Name	Teaching Hours					Written Exam Duration	Marking				Subject Area						
		Lectures	Exercises	Practical	Total hours	Credit Hours		Year work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
ECE 451	Communications (3)	2	2	2	6	3	2	45	45	60	150				√			
ECE 461	Electromagnetic Waves (3)	2	2	2	6	3	2	45	45	60	150				√			
ECE 491	Computer Networks (1)	2	1	1	4	2	2	30	30	40	100							√
ECE 4XX	Selective Course (1)	2	-	2	4	2	2	30	30	40	100							√
ECE 4XX	Selective Course (2)	2	-	2	4	2	2	30	30	40	100							√
HUM 404	Selective Course (Humanities(3))	2	1	-	3	2	2	30	-	70	100	√						
ECE 486	Project	2	-	3	5	3	-	50	-	-	50							√
Total		14	6	12	32	17	12	260	180	310	750	2	-	-	6	-	3	6

Fourth Year/ 2nd Semester

Code	Course Name	Teaching Hours						Marking				Subject Area						
		Lectures	Exercises	Practical	Total hours	Credit Hours	Written Exam Duration	Year work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
ECE 452	Communications (4)	2	2	2	6	3	2	45	45	60	150				√			
ECE 462	Electromagnetic Waves (4)	2	2	-	4	3	2	60	-	90	150				√			
ECE 492	Computer Networks (2)	2	1	1	4	2	2	30	30	40	100							√
ECE 4XX	Selective Course (3)	2	-	2	4	2	2	30	30	40	100							√
ECE 4XX	Selective Course (4)	2	-	2	4	2	2	30	30	40	100							√
HUM 442	Projects Management	2	1	-	3	2	2	30	-	70	100	√						
ECE 486	Project	2	-	3	5	3	-	70	180	-	250						√	
Total		14	6	10	30	17	12	295	315	340	950	2	-	-	6	-	3	6