

وزارة التعليم العالي والبحث العلمي
جهاز الإشراف والتقويم العلمي
دائرة ضمان الجودة والاعتماد الأكاديمي
قسم الاعتماد الدولي


استمارة وصف البرنامج الأكاديمي للكليات للعام الدراسي ٢٠١٩ - ٢٠٢٠

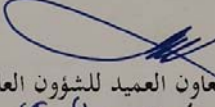
اسم الجامعة : النهدين

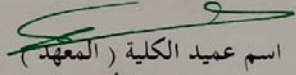
اسم الكلية: الهندسة

عدد الأقسام والفروع العلمية في الكلية : ٩

تاريخ ملء الملف :


اسم مدير شعبة ضمان الجودة والأداء الجامعي
د. Osama M. El-Sherpieny


اسم معاون العميد للشؤون العلمية
د. Mohamed El-Sherpieny


اسم عميد الكلية (المعهد)
د. Osama M. El-Sherpieny

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التوقيع

التاريخ ٢٠١٩/٥/٢٠

التوقيع


أ.م.د. أنس لطيف محمود
رئيس قسم الهندسة الإلكترونية
والاتصالات

دقق الملف من قبل

قسم ضمان الجودة والأداء الجامعي

اسم مدير قسم ضمان الجودة والأداء الجامعي:

التاريخ / /

التوقيع

EMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

The Electronic and Communications engineering program is designed to prepare qualified engineers who are capable to integrate theoretical knowledge and practical application. It is designed to develop essential knowledge, skills, and abilities needed for professional practice and graduate studies.

1. Teaching Institution	Al-Nahrain University – College of Engineering
2. Department/Centre	Department of Electronic and Communications
3. Program Title	B.Sc. Electronic and Communications Engineering
4. Title of Final Award	B.Sc. Electronic and Communications Engineering
5. Modes of Attendance	Full Attendance
6. Accreditation	Trying to fulfill ABET requirements.
7. Other external influences	MOHERS Quality Assurance Program
8. Date of this specification	12/5/2014
9. Aims of the Program:	
Preparing highly qualified engineers, scientifically and professionally, in electronics and communications engineering, in accordance with the standards of the ministry of high education and scientific research. The engineer should acquire:	
The ability to work in the industrial sector in the field of electronics and communication service.	
1. The ability to deal with the engineering problems in a scientific way and find the appropriate solutions.	
2. The ability of improving his knowledge in accordance with the fast scientific advancement in the field of electronics and communications engineering.	
3. The ability of improving his skills in the field of scientific research.	
4. The ability of improving his skills in designing electronic system and communication network.	

10. Learning Outcomes and Teaching, Learning and Assessment Methods:

A. Knowledge and Understanding:

- A1. Mathematical principles which has relation with the field of electronics and communications engineering.**
- A2. Scientific and methodological principles.**
- A3. Advanced concepts in analog and digital circuits and communication system.**
- A4. Industrial and Management principle.**

Teaching and Learning Methods:

Lectures, Experimental work, Applications, Assignments, Homework, and Discussion.

Assessment Methods:

Examinations, Assignments, Homework, Discussion, Lab reports, and Graduation project.

B. Subject-specific skills:

- B1. Analyzing and solving the engineering problems in a mathematical way.**
- B2. Full knowledge about the supportive specializations.**
- B3. Use of engineering principles and the capability to analyze the engineering problems in the field of electronics and communications engineering.**
- B4. Classify and evaluate the performance of networks using the engineering analysis method.**
- B5. Identify the problems and the health, environmental, and economic determinants of the electronic networks and the communication services.**

Teaching and Learning Methods:

Lectures, Experimental work, Applications, Assignments, Homework, and Discussion.

Assessment Methods:

Examinations, Assignments, Homework, Discussion, Lab reports, and Graduation project.

C. Thinking Skills:

- C1. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.**
- C2. An understanding of professional and ethical responsibility.**

Teaching and Learning Methods:

Lectures, Experimental work, Applications, Assignments, Homework, and Discussion.

Assessment Methods:

Examinations, Assignments, Homework, Discussion, Lab reports, and Graduation project.
D. General and Transferable Skills:
D1. An ability to function on multidisciplinary teams. D2. An ability to communicate effectively.
Teaching and Learning Methods:
Experimental work, Applications, Assignments, Homework, and Discussion.
Assessment Methods:
Assignments, Homework, Discussion, Lab reports, and Graduation project.

11. Program Structure:				
Level	Course Code	Course or Module Title	Credit Rating	
			Theoretical	Practical
Year 1 – Semester 1	UREQ110	Human Rights	1	
	MATH 110	Calculus	4	
	PHYS110	Physics	2	2
	UREQ112	Computer Programming I	2	2
	CREQ110	Engineering Drawing I	1	3
	CREQ 113	Chemistry	2	
	ECER110	Dc circuits Analysis	4	3
Year 1 – Semester 2	UREQ121	English Language I	2	
	UREQ122	Computer Programming II	2	2
	UREQ120	Arabic Language I	1	
	MATH120	Algebra (linear and Nonlinear)	4	
	CREQ120	Engineering Graphics	1	3
	ECER 120	Electronics Physics	3	
	ECER 121	AC Circuits Analysis	4	3
ECER 122	Digital Logic	3		
Year 2 – Semester 1	UREQ210	Management Principles	1	-
	UREQ211	Arabic Language II	1	-
	UREQ212	English Language II	2	-
	MATH210	Mathematics III	4	-
	ECER210	Electronics I	4	3
	ECER211	Network Analysis I	2	-
	ECER212	Digital Electronics I	3	3
ECER213	Electromagnetic Fields I	4	-	

Year 2 – Semester 2	UREQ220	Democracy	1	-
	MATH220	Mathematics IV	4	-
	ECER221	Network Analysis II	3	-
	ECER220	Electronics II	4	3
	ECER221	Transmission Lines	3	-
	ECER222	Digital Electronics II	3	3
	ECER223	Electromagnetic Fields II	4	-
Year 3 – Semester 1	ECER310	Engineering Statistics and Probability	4	-
	ECER311	Energy Conversion I	3	-
	ECER312	Communication Systems I	4	3
	ECER313	Electronics III	3	3
	ECER314	Wave Propagation	2	-
	ECER315	Microprocessor	2	3
Year 3 – Semester 2	ECER320	Numerical Analysis	3	3
	ECER321	Communications Systems II	4	3
	ECER322	Computer Architecture	3	-
	ECER323	Electronic instrumentation	2	-
	ECER324	Antennas	3	-
	ECER325	Industrial Management	1	-
	ECER326	Energy Conversion II	2	3
Year 4 – Semester 1	UREQ321	English Language III	2	-
	CREQ410	Project	4	
	ECER410	Information Theory and Coding	3	
	ECER411	Microwave Engineering	3	
	ECER412	Digital Signal Processing I	3	
	ECER413	Digital System Design	3	3
	ECER414	Control Systems I	3	
Year 4 – Semester 2	ECER415	Networks and Communication Protocols	3	
	CREQ420	Project	4	
	ECER420	VLSI Technology	3	
	ECER421	Satellite Communications	3	
	ECER422	Digital Signal Processing II	3	3
	ECER423	Wireless and Mobil Communications	3	
	ECER424	Control Systems II	3	3
ECER425	Optical Communications	2		
Awards and Credits				
Bachelor Degree Requires (154) Credits				

12. Personal Development Planning

Out of class activities.

13. Admission Criteria

Central admission by MOHERS.

14. Key sources of information about the programme

Students admission guide issued by MOHERS.

Curriculum Skills Map

Please tick in the relevant boxes where individual Programme Learning Outcomes are being assessed

Curriculum				Programme Learning Outcomes												
Level	Course Code	Course Title	Core/ Optional	Knowledge and understanding				Subject-specific skills					Thinking Skills		General & Transferable Skills (or) Other skills relevant to employability & personal development	
				A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	D1	D2
Year 1 Sem. 1	UREQ110	University Requirements I	O				X								X	X
	UREQ112	Computer Programming I	C					X	X	X			X	X		
	MATH110	Calculus	C	X	X					X			X	X		
	PHYS110	Physics	C					X	X	X			X	X		
	CREQ110	Engineering Drawing I	C										X	X	X	X
	ECER113	Chemistry	C	X	X			X	X	X			X	X		
	ECER110	DC Circuits Analysis	C	X	X			X	X	X	X		X	X		
Year 1 Sem.	UREQ120	Arabic Language I	O												X	X
	UREQ121	English Language II	O												X	X
	UREQ122	Computer Programming II	C					X	X	X			X	X		

2	MATH120	Algebra (linear and Nonlinear)	C	X	X					X			X	X		
	CREQ120	Engineering Graphics	C										X	X	X	X
	ECER 122	Digital Logic	C	X	X			X	X	X	X		X	X		
	ECER 120	Electronics Physics	C	X	X			X	X	X						
	ECER 121	AC Circuits Analysis	C	X	X			X	X	X	X		X	X		
Year 2 Sem. 1	UREQ210	University Requirements II	O				X								X	X
	UREQ211	Arabic Language II	O												X	X
	MATH210	Mathematics III	C	X	X					X			X	X		
	UREQ212	English Language II	O												X	X
	ECER210	Electronics I	C	X	X			X	X	X	X		X	X		
	ECER211	Network Analysis I	C	X	X	X		X	X	X	X		X	X		
	ECER212	Digital Electronics I	C	X	X			X	X	X	X		X	X		
	ECER213	Electromagnetic Fields I	C	X	X			X	X	X			X	X		
Year 2 Sem. 2	UREQ220	University Requirements III	O				X								X	X
	MATH220	Mathematics IV	C	X	X					X			X	X		
	CREQ221	Network Analysis II	C	X	X	X		X	X	X	X		X	X		
	ECER220	Electronics II	C	X	X			X	X	X	X		X	X		
	ECER221	Transmission Lines	C	X	X	X		X	X	X			X	X		
	ECER222	Digital Electronics II	C	X	X			X	X	X	X		X	X		
	ECER223	Electromagnetic Fields II	C	X	X			X	X	X			X	X		
	UREQ110	University Requirements I	C				X								X	X
Year 3 Sem. 1	ECER310	Engineering Analysis	C	X	X	X				X	X		X	X		
	ECER311	Transmission Lines	C	X	X	X		X	X	X			X	X		
	ECER312	Analogue Communication Systems	C	X	X			X	X	X	X		X	X		
	ECER313	Electronics III	C	X	X	X		X	X	X	X		X	X		

	ECER314	Wave Propagation	C	X	X	X		X	X	X			X	X		
	ECER315	Microprocessor	C	X	X	X		X	X				X	X		
	ECER 316	Industrial Management	C				X			X			X	X	X	X
	ECER320	Numerical Analysis	C	X	X			X	X	X	X		X	X	X	X
Year 3 Sem. 2	ECER321	Digital Communications	C	X	X	X		X	X	X	X		X	X		
	ECER322	Computer Architecture	C	X	X	X		X	X		X		X	X		
	ECER323	Electronic instrumentation	C	X	X	X		X	X			X	X	X		
	ECER324	Antennas	C	X	X	X		X	X	X	X		X	X		
	ECER325	Electronic Communication	C	X	X	X		X	X	X	X		X	X		
	ECER326	Integrated Electronics	C	X	X	X		X	X	X			X	X		
	CREQ410	Project	C	X	X	X		X	X	X	X		X	X	X	X
Year 4 Sem. 1	ECER410	Elective I	C	X	X	X		X	X				X	X		
	ECER411	Microwave Engineering	C	X	X	X		X	X			X	X	X		
	ECER412	Digital Signal Processing I	C	X	X	X		X	X	X	X		X	X		
	ECER413	Digital System Design	C	X	X	X		X	X	X	X		X	X		
	ECER414	Control Systems I	C	X	X	X		X	X	X	X		X	X		
	ECER415	Networks and Communication Protocols	C	X	X	X		X	X	X	X		X	X		
	CREQ420	Project	C	X	X	X		X	X	X	X		X	X	X	X
Year 4 Sem. 2	ECER420	Elective II	C	X	X	X		X	X				X	X		
	ECER421	Elective III	C	X	X	X		X	X				X	X		
	ECER422	Digital Signal Processing II	C	X	X	X		X	X	X	X		X	X		
	ECER423	Wireless and Mobil Communications	C	X	X	X		X	X			X	X	X		
	ECER424	Control Systems II	C	X	X	X		X	X	X	X		X	X		
	ECER425	Optical Communications	C	X	X	X		X	X	X			X	X		



Al-Nahrain University
College of Engineering



Electronic and
Communications Department

(Study Plan)
2019/2020

Department of Electronic and Communications Engineering

The Electronic and Communications Engineering Department was inaugurated in 1988. Electronic and communications engineering is a specialization of engineering that having the most impact on the accelerating pace of the scientific and technical evolution worldwide. It deals with the techniques, devices and apparatus for extracting and amplifying electrical signals containing information for all types such as telephone conservations, music, TV broadcasts and digital data. The B.Sc. degree in this department aims at providing the student with the basic scientific and engineering concepts of these fields such as analogue and digital electronics, industrial electronics, analogue and digital communications and antenna and wave propagation. The department prepares Iraqi engineers with outstanding scientific and technical competence to enable them to follow the progress in the ever-advancing field of electronics.

The department was established in 1989 admitted students for the M.Sc. degree. Afterwards in 1994 the department admitted Ph.D. students. The graduate M.Sc. and Ph.D. studies programs in the department comprise three specializations, namely Electronic Circuits and Systems, Modern Communications Engineering and Satellite Engineering. The graduate studies programs aim at deepen further the highly trained engineers in the relevant fields for which there is great demand in the present time. The research activities in the department cover the design of electronic circuits and modern systems in communications.

B.Sc. in Electronic and Communications Engineering

The students applying for this branch should be primary school degree holders, in the science classes. A Bachelor degree in the electronics and communication engineering is given to the graduates, after successfully fulfilling (151) credits in the four years of studying; each year is divided into two courses. The courses include obligatory and specialized material, in addition to optional materials. The graduates are qualified to work in the productive, industrial, and research institutions, and in the quality and standards organizations specialized in the electronics and communication engineering. Providing them with career advancement opportunities in the areas of design, build, and research and projects development. Assisting them to assert competitiveness in the global marketplace. Teaching them the skills and mechanisms necessary to deal with changes associated with new and breakthrough technologies.

M.Sc. in Electronic and Communications Engineering

Applicants for this study should have a B.Sc. degree in Electronic and Communications Engineering, and the M.Sc. degree is conferred after successfully completing 36 credit units including 26 units for courses taken in two semesters in addition to an M.Sc. dissertation (10 units) in Electronic Communications Engineering. The courses include compulsory and elective subjects. The M.Sc. graduate possess a capability for the analysis and design of electronic and communication systems. The graduate has also the capability to contact scientific research and to continue graduate study.

ACADEMIC STAFF – Department of ELECTRONIC AND COMMUNICATIONS ENGINEERING

No.	Name	General Specialty	Scientific Rank
1	Anas Lateef Mohmood	Electronic and Communications Engineering/Electronic Circuits and Systems	Ph.D. Assist. Prof. (Head of Department)
2	Anas Ali Hussein	Electronic and Communications Engineering/ Information Engineering	Ph.D. Prof.
3	Manal Jamil Al-Kindi	Electrical Engineering/Digital Signal Processing/Communications Engineering	Ph.D. Assist. Prof.
4	Malath Natik Alwan	Arabic Language Etiquette/Old Criticism	Ph.D. Assist. Prof.
5	Dhirgham Kamal Naji	Electrical Engineering/Communications Engineering	Ph.D. Assist. Prof.
6	Muhammed Sabri Salim	Mechatronics Engineering/Artificial Intelligent	Ph.D. Assist. Prof.
7	Mohammed Hussein Ali	Electronic and Communications Engineering/Digital Image Processing	Ph.D. Lecturer
8	Qussay Luttfi Hamdi	Electrical Engineering/Electric Power	Ph.D. Lecturer
9	Lubab Ali Salman	Electronic and Communications Engineering/Satellite Engineering	Ph.D. Lecturer
10	Amina Mahmoud Shakir	Electrical Engineering/Power Engineering	Ph.D. Lecturer
11	Ali AbdulRahman	Communications Engineering	Ph.D. Lecturer
12	Siba Monther Yousif	Electronic and Communications Engineering/Electronic Engineering	Ph.D. Lecturer
13	Hatem Hatif Abbas	Electronic and Communications Engineering/Wireless Communications	Ph.D. Lecturer
14	Ahmed Jumaa Lafta	Electronic and Communications Engineering/Data Telecommunications and Networks	Ph.D. Lecturer
15	Zena Kamal Ibrahim	English Language	M.Sc. Lecturer
16	Kareem Madhloom Gatea	Electrical Engineering/ Electronic and Communications Engineering	M.Sc. Assist. Lecturer
17	Bashar Mudhafar Ahmed	Electronic & Communications Engineering	M.Sc. Assist. Lecturer
18	_Bahaa Abdulkhaliq Numan	Electronic Engineering	M.Sc. Assist. Lecturer
19	Ali Muwafaq Ali	Control and System Engineering	M.Sc. Assist. Lecturer
20	Ali Mahdi Mohammed Redha	Communication Engineering/Information Technology and Communications systems	M.Sc. Assist. Lecturer

FORMER HEADS - Department of Electronic and Communications Engineering

No.	Name	Tenure
1	Prof. Dr. Khalid Abdulhameed Al-Khateeb	1988 - 1991
2	Prof. Dr. Faik Jawad A. Al-Azzawie	1991 - 1992
3	Prof. Dr. Fawzi Mohammed M. Al-Naima	1992 - 2000
4	Prof. Dr. Faik Jawad A. Al-Azzawie	2000 - 2003
5	Assist. Prof. Dr. Mohammed Tawfeek Lazim	2003
6	Assist. Prof. Dr. Abbas Ahmed Abbas	2003 - 2007
7	Prof. Dr. Jabir Salman Aziz	2007 – 2012
8	Assist. Prof. Dr. Manal J. AL-Kindi	2012 - 2016
9	Dr. Mohammed Hussein Ali	2016 - 2019
10	Assist. Prof. Dr. Anas Lateef Mohmood	2019 – Till Now.

AL-Nahrain University
College of Engineering
Electronic and Communications Engineering Department
Study Plan for the B.Sc. Degree Course (2019-2020)

First Year											
The First Semester						The Second Semester					
Code	Subject	Hours per Week			Units	Code	Subject	Hours per Week			Units
		Th	App	Tut				Th	App	Tut	
UREQ 110	Human Rights	1	-	-	1	UREQ 120	Arabic Language I	1	-	-	1
UREQ 111	Computer Fundamentals and Programming I	1	2	-	2	UREQ 121	English Language I	2	-	-	2
MATH 110	Mathematics I	3	-	1	3	MATH 120	Mathematics II	3	-	1	3
CREQ 110	Engineering Drawings I	1	2	-	2	CREQ 120	Engineering Drawing II	1	2	-	2
PHYS 110	Physics	2	2	-	3	CREQ 121	Electronic Physics	2	-	1	2
ECER 110	Engineering Mechanics	2	-	1	2	CREQ 111	Workshop Technology	-	3	-	1*
ECER 111	Electrical Circuits I	3	3	1	4	ECER 120	Digital Logic	2	-	1	2
						ECER 121	Electrical Circuits II	3	3	1	4
Total		13	9	3	17	Total		14	8	4	16
		25							26		
The total number of hours for the first semester is 375 hours						The total number of hours for the first semester is 390 hours					
The total number of hours for the first year is 765 hours											
The total number of units for the first year is 33 units											
* Students are only required to pass by this subject, so its units don't count to the total.											

AL-Nahrain University
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Electronic and Communications Engineering Department
Study Plan for the B.Sc. Degree Course (2019-2020)

Second Year											
The First Semester						The Second Semester					
Code	Subject	Hours per Week			Units	Code	Subject	Hours per Week			Units
		Th	App	Tut				Th	App	Tut	
UREQ 210	English Language II	2	-	-	2	UREQ 220	Democracy	1	-	-	1
UREQ 211	Principles of Management	1	-	-	1	MATH 220	Mathematics IV	3	-	1	3
UREQ 212	Arabic Language II	1	-	-	1	ECER 221	Network Analysis II	2	-	1	2
UREQ 213	Computer Fundamentals and Programming II	1	2	-	2	ECER 220	Electronics II	3	3	1	4
MATH 210	Mathematics III	3	-	1	3	ECER 221	Transmission Lines	2	-	1	2
ECER2 10	Electronics I	3	3	1	4	ECER 222	Digital Electronics	3	3	-	4
ECER2 11	Network Analysis I	2	-	-	2	ECER 223	Electromagnetic Fields II	3	-	1	3
ECER2 12	Electromagnetic Fields I	3	-	1	3						
Total		16	5	3	18	Total		17	6	5	19
		24						28			
The total number of hours for the first semester is 360 hours						The total number of hours for the first semester is 420 hours					
The total number of hours for the second year is 780 hours											
The total number of units for the second year is 37 units											

AL-Nahrain University
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Third Year											
The First Semester						The Second Semester					
Code	Subject	Hours per Week			Units	Code	Subject	Hours per Week			Units
		Th	App	Tut				Th	App	Tut	
ECER 310	Engineering Statistics and Probability	3	-	1	3	ECER 320	Numerical Analysis	3	3	-	4
ECER 311	Energy Conversion I	3	-	-	3	ECER 321	Communications Systems II	3	3	1	4
ECER 312	Communication Systems I	3	3	1	4	ECER 322	Computer Architecture	3	-	-	3
ECER 313	Electronics III	3	3	1	4	ECER 323	Electronic instrumentation	2	-	-	2
ECER 314	Wave Propagation	2	-	-	2	ECER 324	Antennas	2	-	1	2
ECER 315	Microprocessor	2	3	-	3	ECER 325	Industrial Management	1	-	-	1
						ECER 326	Energy Conversion II	2	3	-	3
						UREQ 320	English Language III	2	-	-	2
Total		16	9	3	19	Total		18	9	2	21
		28						29			
The total number of hours for the first semester is 420 hours						The total number of hours for the first semester is 435 hours					
The total number of hours for the third year is 855 hours											
The total number of units for the third year is 40 units											

AL-Nahrain University
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Study Plan for the B.Sc. Degree Course (2019-2020)

Fourth Year											
The First Semester						The Second Semester					
Code	Subject	Hours per Week			Units	Code	Subject	Hours per Week			Units
		Th	App	Tut				Th	App	Tut	
CREQ 410	Project	-	4	-	2	CREQ 420	Project	-	4	-	2
ETHC 420	Professional Ethics	1	-	-	1	ECER 420	VLSI Technology**	2	-	1	2
ECER 410	Information Theory and Coding**	2	-	1	2	ECER 421	Satellite Communications**	2	-	1	2
ECER 411	Microwave Engineering	3	-	-	3	ECER 422	Digital Signal Processing II	3	3	-	4
ECER 412	Digital Signal Processing I	3	-	-	3	ECER 423	Wireless and Mobile Communications	3	-	-	3
ECER 413	Digital System Design	3	3	-	4	ECER 424	Control Systems II	3	3	-	4
ECER 414	Control Systems I	3	-	-	3	ECER 425	Optical Communications	2	-	-	2
ECER 415	Networks and Communication Protocols	2	-	1	2						
UREQ 410	English Language IV	2	-	-	2						
Total		19	7	2	22	Total		15	18	2	19
		28						27			
The total number of hours for the first semester is 420 hours						The total number of hours for the first semester is 405 hours					
The total number of hours for the third year is 825 hours											
The total number of units for the third year is 41 units											
The total number of hours for the four years is 3225 hours											
The total number of units for the four years is 151 units											

** Elective subject.

Approved Elective Subjects:

1	Information Theory and Coding.	5	Data Compression.
2	VLSI Technology.	6	Image Processing.
3	Satellite Communications.	7	Laser Electronics.
4	Industrial Electronics.	8	Other Selected Topic(s).

AL-Nahrain University
College of Engineering
Electronic and Communications Engineering Department
Study Plan for the B.Sc. Degree Course
(2019-2020)

1) First Year

First Year / First Semester						
No	Code	Subject	Hours per week			units
			Theory	Applied	Tutorial	
1	UREQ110	Human Rights	1	-	-	1
<p>طبيعة حقوق الإنسان ، ماهية حقوق الإنسان وأسسها ، جذور حقوق الإنسان في التاريخ البشرية ، حقوق الشعوب والجماعات ، حقوق الفئات ذات الأوضاع الاجتماعية الخاصة .</p>						
2	UREQ111	Computer Fundamentals and Programming I	1	2	-	2
<p>Computers Fundamentals and Components, Computer Safety, Operating Systems, basic of Number systems, The Languages of Computer, Algorithm, Processing a High-Level language program, Basic Elements of C++ programming language, Data Types, Arithmetic operations, Constants and Variables, Input/ Output statements, Standard I/O Devices, Control Structures: Selection, Repetition statements.</p>						
3	MATH110	Mathematics I	3	-	1	3
<p>Functions, Limits and Continuity, Indeterminate Forms and L'Hopital Rule, Derivative, Differentiation Rules, Velocity, Speed and Other Rates of Changes, Implicit Differentiation, Related Rates, Applications of Derivatives, Trigonometric Functions and their Derivatives, Inverse Functions and their Derivatives.</p>						
4	CREQ110	Engineering Drawings I	1	2	-	2
<p>Types of lines and their recognizing, Engineering Drawing processes, Projections, Estimation and drawing of third projection, Dimensions.</p>						
5	PHYS110	Physics	2	2	-	3
<p>This course concerns with the nature and description atom, electrons, proton and neutron. Several were theories developed to estimate the behavior of electrons and its orbits have been discussed. The difference between atom elements are also clarified and tabulated in periodic table.</p>						
6	ECER110	Engineering Mechanics	2	-	1	2
<p>Thermodynamics, Some Concepts and Definitions, Properties of a pure substance, Work and Heat, The first law of Thermodynamics, Static Engineering Mechanics, Strength of Materials, Heat Transfer.</p>						
7	ECER111	Electrical Circuits I	3	3	1	4
<p>Basic concepts of electrical circuits, Electrical circuits elements I, ohm's law , Kirchoff's law, series and parallel circuits, series-parallel networks, Δ-Y circuits, methods of analysis D.C networks, networks theorems.</p>						

First Year / Second Semester						
No	Code	Subject	Hours per week			units
			Theory	Applied	Tutorial	
1	UREQ120	Arabic Language I	1	-	-	1
اقسام الكلام، البناء والأعراب في العربية، الجملة في اللغة العربية وتفصيلاتها، النواسخ (كان واخواتها) ، الأسماء المنصوبة ، الجموع ، المثنى ، الأسماء الخمسة، قصائد من الأدب العربي ، المتنبي ، محمود حسن أسماعيل ، محمود درويش ، سعاد الصباح .						
2	UREQ121	English Language I	2	-	-	2
In this course The New Headway, Beginners is studied. It focuses on simple skills work, which incorporates manageable communicative activities appropriate for the low level. In the Everyday English section, we deal with social and functional language, and survival skills. Each unit has these components: • Starter • Presentation of new language • Practice • Vocabulary. Grammar. Also, skills work - speaking, combined with reading and/or listening and/or writing • Everyday English						
3	MATH120	Mathematics II	3	-	1	3
Complex Numbers, Integration, Applications of Definite Integrals (area between curves and surface area), Calculus of Transcendental Functions, Techniques of Integration (Integration by Parts, Trigonometric Substitutions, Partial Fractions, Tabular Integrations and Further Substitutions), Derivatives and Integrals of Inverse Trigonometric Functions. Derivatives and Integrals of Hyperbolic Functions.						
4	CREQ120	Engineering Drawing II	1	2	-	2
Projection of points, Intersections of pipes with the H.V. planes, Inclinations with the H.V. planes, Isometric drawing, Sectional drawing.						
5	CREQ121	Electronic Physics	2	-	1	2
This course defines the interior structure of a metallic crystal and classifies the material to conductor, semiconductor and insulators. The difference between them from electronic point of view and how can make use from this structure to build semiconductor devices.						
6	CREQ111	Workshop Technology	-	3	-	1*
Hand tools, Measuring tools, Marking-out, Chisel cutting, Sawing and file work, Manual drilling and thread cutting, Casting and welding processes and techniques, Wood working.						
7	ECER120	Digital Logic	2	-	1	2
Introductory Concepts: Digital and Analog Quantities and Digital Waveforms, Number Systems, Logic Gates, Boolean Algebra and Logic Simplification: DeMorgan's Theorems; The Karnaugh Map, Combinational Logic Analysis: Basic Combinational Logic Circuits; Implementing Combinational Logic, Functions of Combinational Logic: Half and Full Adders; Comparators; Decoders; Encoders; Multiplexers; Demultiplexers.						
8	ECER121	Electrical Circuits II	3	3	1	4
Basic Concept of an Alternating Current, Representation of an Alternating Quantity, Single Phase A.C Circuits, Complex numbers in A.C circuits, A.C Series and Parallel Circuits, Power and Sources in A.C Circuits, Series-Parallel A.C Networks, Delta-Star connection in A.C circuits, A.C Circuits Analysis Methods, Analysis of A.C Circuits using Networks Theorems, Resonance in A.C Circuits.						

2) Second Year

Second Year / First Semester						
No	Code	Subject	Hours per week			units
			Theory	Applied	Tutorial	
1	UREQ210	English Language II	2	-	-	2
<p>In this course the New Headway, Pre- Intermediate is studied. In it, proven traditional approaches are used alongside those which have been developed and researched in the first year. The grammatical syllabus is improves slightly to suit the requirements of lower level students. There is a great variety of practice activities. Vocabulary is not only integrated throughout but also developed in its own section. Skills work is integrated and balanced. It all comes from authentic sources but has been simplified and adapted to suit the level. There is an Everyday English section, Presentation of new language • Practice • Vocabulary. Grammar. Also, skills work - speaking, combined with reading, listening and writing.</p>						
2	UREQ211	Principles of Management	1	-	-	1
<p>تعريف بالعمل الإداري، ادارة مشاريع هندسية وصناعية، اهمية الادارة استثمار المال والجهد والوقت، المخططات الهيكلية والادارية.</p>						
3	UREQ212	Arabic Language II	1	-	-	1
<p>الإملاء وأهدافه، علامات الترقيم، كتابة الضاد والطاء، الهمزة، التاء القصيرة والطويلة، نص قرآني، الخطبة، الرسائل، قصائد من الشعر العربي، كعب بن زهير، عبد الله بن رواحة، السؤال، الأخطاء الشائعة.</p>						
4	UREQ213	Computer Fundamentals and Programming II	1	2	-	2
<p>Standard functions in C++ programming language, User defined functions, Void function. Array and strings: One-dimensional arrays, Processing one-Dimensional Arrays, C-string (character arrays), Two- Dimensional Array, Processing Two-Dimensional Arrays, Record (Structs), Introduction to Matlab programming Language.</p>						
5	MATH210	Mathematics III	3	-	1	3
<p>Sequences and Series, Ordinary Differential Equations, Laplace Transform, Linear Algebra and Matrices, Vector Differential Calculus, Vector Integral Calculus.</p>						
6	ECER210	Electronics I	3	3	1	4
<p>Semiconductor Diodes, Diode Characteristics, Diode Applications, Bipolar Junction Transistor (BJT), Biasing the BJT.</p>						
7	ECER211	Network Analysis I	2	-	-	2
<p>Energy Storage Elements: Inductance, Capacitance, and Mutual Inductance, Series-Parallel Combinations. Natural and Step Response of First order RL and RC circuits Forms, Time Constant, and their general solution, Sequential Switching, Natural and Step response of Second order series and Parallel RLC Circuits and general solution (Underdamped, Critically damped, Overdamped response).</p>						
8	ECER212	Electromagnetic Fields I	3	-	1	3
<p>Vector Analysis, Electric Field Intensity, Electric Flux and Flux Density, Energy and Potential.</p>						

Second Year / Second Semester						
No	Code	Subject	Hours per week			units
			Theory	Applied	Tutorial	
1	UREQ220	Democracy	1	-	-	1
مفهوم الديمقراطية ، التطور التاريخي والفكري للديمقراطية ، خصائص الديمقراطية ، أهمية الديمقراطية ، أنواع الديمقراطية ، أركان الديمقراطية ، الانتخابات ، أركان الانتخابات ، الديمقراطية والواقع العربي .						
2	MATH220	Mathematics IV	3	-	1	3
Fourier series, Fourier Transform, Complex Functions, Power Series Solution of Differential Equations, Partial Differential Equations.						
3	ECER221	Network Analysis II	2	-	1	2
Introduction to the Laplace Transform, Definition of Step and Impulse Functions, Functional and Operational Laplace Transforms. Applying the Laplace Transform and Laplace inverse, Poles & Zeros of $F(s)$. The use of Laplace Transforms in Circuit Analysis and Applications. Transfer Functions, Partial Function Expansions, Convolution Integral, Steady-State Sinusoidal Response, The Impulse Function in Circuit Analysis. Introduction to Frequency Selective Circuits.						
4	ECER220	Electronics II	3	3	1	4
Small Signal Analysis of BJT, Amplifier Frequency Response Analysis, Feedback amplifier, Power Amplifiers.						
5	ECER221	Transmission Lines	2	-	1	2
Distributed Constants and Traveling Waves, The A.C. Steady State, Lines with reflections, Special Consideration for Radio Frequency Lines, Transmission Line Chart (Smith Chart), Telephone and Telegraph Lines, Coaxial Transmission Lines.						
6	ECER222	Digital Electronics	3	3	-	4
Logic Circuits, Latches, Operation of Digital System, Flip-Flops, Counters, Shift Registers, Analog to Digital Converter, and Digital to Analog Converter.						
7	ECER223	Electromagnetic Fields II	3	-	1	3
Current and Current density, The Magnetic Field Intensity, Magnetic Materials and Forces, Introduction to Time-Varying Fields.						

3) Third Year

Third Year / First Semester						
No	Code	Subject	Hours per week			units
			Theory	Applied	Tutorial	
1	ECER310	Engineering Statistics and Probability	3	-	1	3
Sample Spaces and Events, Addition Rules, Conditional Probability, Multiplication and Total Probability Rules, Independence, Bayes' Theorem, Random Variables, Discrete (Continues) Random Variables, Probability Distributions and (Density) Functions, Cumulative Distribution Functions, Mean and Variance of a Discrete (Continues) Random Variable, Types of Discrete (Continues) Distribution: Uniform, Binomial, Poisson, (Uniform, Normal, Normal Approximation to Binomial and Poisson, exponential), Joint Probability and Correlation, Moment-Generating Functions, Descriptive Statistics, Frequency Distribution and Histograms.						
2	ECER311	Energy Conversion I	3	-	-	3
Magnetic circuits, Inductance principles and design parameters, Transformers: principles and electronic applications, DC machines: principles: types and applications, Special purpose machines (stepper motors, servo motors) principles and applications.						
3	ECER312	Communication Systems I	3	3	1	4
Signal Representation and Analysis, Amplitude Carrier Modulation, Angle Modulation, Frequency division multiplexing, Analogue Pulse Modulation, Behavior of Analogue Systems in the presence of Noise.						
4	ECER313	Electronics III	3	3	1	4
Field - Effect Transistors, FET Biasing, FET Amplifiers and its Frequency Response, Operational Amplifiers, Linear & Non Linear Op-Amp Application, Oscillator Circuits, Multivibrator Circuits.						
5	ECER314	Wave Propagation	2	-	-	2
Wave Propagation Characteristics, Reflection and Refraction of EMWs, Radio Wave Propagation, Ionospheric Propagation, Tropospheric Waves, Ground Wave Propagation, Link Power- Budget Calculations, Radar Range Equation.						
6	ECER315	Microprocessor	2	3	-	3
Introduction to Microprocessors and Microcomputers, Software Architecture of the 8088/8086 Microprocessors (Microarchitecture), Assemble language programming: The instruction set, Addressing Mode. Machine Language Coding. 8088/8086 programming: Integer Instructions and Computations, Control Flow Instructions and Program Structures. 8088/8086 Microprocessors and their Memory and Input/Output Interfaces, Minimum and Maximum Mode systems, Hardware Organization of the Memory Address Space.						

Third Year / Second Semester						
No	Code	Subject	Hours per week			units
			Theory	Applied	Tutorial	
1	ECER320	Numerical Analysis	3	3	-	4
Numerical solution of nonlinear equations, Numerical solution of system of linear simultaneous equations, Interpolation and curve fitting, Numerical integration, Numerical solution of differential equations, Optimization (Linear & nonlinear Programming).						
2	ECER321	Communications Systems II	3	3	1	4
Digital Pulse Modulation, Introduction to Information Theory and Coding, Digital Modulation, Emerging Digital Communication Technologies.						
3	ECER322	Computer Architecture	3	-	-	3
Organization and Architecture, Computer Function and Interconnection, Bus Interconnection, PCI bus, Internal Memory, Cache Memory, External Memory, Computer Arithmetic, The Arithmetic and Logic Unit, Integer and Floating-Point Representation and Arithmetic, CPU Structure and Function, Instruction Pipelining, Control Unit Operation, Control Unit Hardwire Implementation, Microprogrammed Control. Parallel Organization.						
4	ECER323	Electronic instrumentation	2	-	-	2
Introduction to measurement, Instrument types and performance characteristics, Errors during the measurement process, Calibration of measuring sensors and instruments, Measurement noise and signal processing, Electrical indicating instruments and test instruments, Variable conversion elements, Signal transmission, Intelligent devices.						
5	ECER324	Antennas	2	-	1	2
Introduction: Definition, The Radio Spectrum, Historical Perspective, Hertz Radio System, Basic Antenna Types. The Radiation Principle: The Magnetic Vector Potential, Uniform Spherical Waves, Hertzian Dipole. Antenna Fundamentals: Radiation Pattern, Beam Solid Angle, Directivity, Gain, Input Impedance, Polarization, Bandwidth, Reciprocity, Effective Aperture, Vector Effective Length, Antenna Temperature. Wire Antennas: Short Dipole, Radiation Resistance, Directivity, Half-wave Dipole Antenna, Monopole Antenna, Small Loop Antenna. Aperture Antennas: Current Sheets, Apertures, Slot Antennas, Open WG, Horn Antennas, Reflector Antennas, Lens Antenna. Array Antennas: Linear Arrays, Pattern Multiplication, Two-element Array, Uniform Array Antennas. Special Antennas: Monopole and Dipole Antennas, Long Wire Antenna, V Antenna, Rhombic Antenna, Yagi-Uda Array, Turnstile Antenna, Batwing Antenna, Super-Turnstile Antenna, Helical Antenna, Biconical Antenna, Log-Periodic Dipole Array, Spiral Antenna, Microstrip Patch Antenna.						
6	ECER325	Industrial Management	1	-	-	1
Elements of Management. Planning Technique. Depreciation. Break-even analysis & Decision making. Work study (Time & motion study). Linear Programming .						
7	ECER326	Energy Conversion II	2	3	-	3
Types of electronic switches and operation principles: Gate turn off Thyristors, Power MOSFET, Diode rectifier, single phase rectifier, DC-DC Converters and applications, Inverters and applications, Gate Derive circuits, Examples for Gate derive circuits Renewable energy sources, Photovoltaic renewable energy, Renewable energy operation and circuits.						
8	UREQ320	English Language III	2	-	-	2

In this course the New Headway -Intermediate is studied. In it both accuracy and fluency-based activities is practiced. Traditional and developed communicative approaches are studied. In addition to treatment of grammar and systematic lexical syllabus. The course comprises lectures on: Language input: Grammar, vocabulary, everyday English, reading passages, speaking, listening, and different techniques of writing. It also concentrates on developing skills (Reading, Writing, Speaking and Listening).

4) Fourth Year

Fourth Year / First Semester						
No	Code	Subject	Hours per week			units
			Theory	Applied	Tutorial	
1	ETHC420	Professional Ethics	1	-	-	1
<p>مقدمة: مقدمة عن اخلاقيات المهنة بشكل عام واخلاقيات المهنة الهندسية بشكل خاص. مفهوم اخلاقيات المهنة: المفهوم العام ل اخلاقيات المهنة، المفهوم اللغوي ل اخلاقيات المهنة، المفهوم الاصطلاحي ل اخلاقيات المهنة، اهمية اخلاقيات المهنة في الحياة، اهمية العمل في حياة الانسان. المقومات العامة ل اخلاقيات المهنة: الضمير، المصلحة، اللوائح والانظمة، تنظيم العمل، عقد العمل، مراقبة العمل. الاخلاق التي لها صلة مباشرة باخلاقيات المهنة: الامانة في العمل، الصدق في العمل، الحلم في العمل، الصبر في العمل. اخلاقيات مهنة الهندسة: مقدمة، اخلاقيات ممارسة المهنة الهندسية، تأريخ المدونات الهندسية، المدونات والمهن، تعدد مدونات قواعد السلوك. امثلة من مدونات اخلاقيات مهنة الهندسة: مدونة البناء في بابل (قانون حمورابي)، مدونة ابي لقواعد سلوك المهندسين، مدونة الجمعية القومية للمهندسين المهنيين، مدونة معهد المهندسين الكهربائيين والالكترونيين. كتابة التقارير الهندسية: تقرير مشروع التخرج، التقارير البحثية وتقارير كتابة مشروع العمل، الامانة العلمية في كتابة التقرير والاستلال الالكتروني، الحلقات النقاشية (Seminar).</p>						
2	ECER410	Information Theory and Coding	2	-	1	2
<p>The course starts by the modeling of discrete information sources followed by the definition of entropy as a metric of information content of the source. Concepts, such as joint and conditional entropies, mutual information, and differential entropy, are introduced then to set the stage for subsequent treatment of continuous information sources and channel modeling. The student then gets introduced to the theory of channel coding and the underlying coding techniques. These include: linear block coding, cyclic coding, and convolutional coding.</p>						
3	ECER411	Microwave Engineering	3	-	-	3
<p>Introduction, Guided Waves, Waveguide, Matching and Terminations, Cavity Resonators, Scattering Matrix, Strip Lines, Micro-strip lines, Slot lines, Coplanar lines, Ferrite Materials, Passive Microwave Components, Active Microwave Components.</p>						
4	ECER412	Digital Signal Processing I	3	-	-	3
<p>Signals, Systems and Signal Processing. Basic Elements of DSP System, Advantages of Digital over Analogue Signal Processing. Types of Signals. The Concept of Frequency in Continuous and Discrete-Time Signals. Sampling of Analogue Signals. Discrete-Time signals and Systems: Classifications & Manipulation. Input-Output Discretion, Resolution of Discrete-Time Signals into impulses, Response of LTI Systems to Arbitrary Inputs: Convolution Sum and properties, Casual LTI Systems. Stability. Finite-Duration & Infinite-Duration Impulse Response (FIR & IIR). Recursive and Nonrecursive systems, Impulse Response of LTI Recursive Cascaded Systems Difference Equations and their Solution, Realization Structures of LTI Systems. Autocorrelation and Crosscorrelation Sequence and properties for Discrete-Time Signals.</p>						

5	ECER413	Digital System Design	3	3	-	4
Input/Output data transfers in 8086/8088 microcomputer, Input/Output handshaking and parallel interfacing, basic concept in programmable devices, 8255 PPI, 82C54 timer PIT, programmable direct memory access DMA controller (82C37A), serial communication interfacing controller 8251A, keyboard and displays interfacing, 8086/8088 interrupts, programmable interrupt controller (82C59A).						
6	ECER414	Control Systems I	3	-	-	3
Introduction to Control System, The Laplace Transform, Mathematical Modeling of Dynamic Systems, Block Diagram reduction Rules, Mason's gain formula, Transient Analysis Linearity, time-invariance versus nonlinearity and time-variance time domain analysis of system response, Stability of Control Systems, Frequency domain analysis: Bode plot.						
7	ECER415	Networks and Communication Protocols	2	-	1	2
Network Models, Network Architectures, 802.xx Protocols, Internet Protocol (IP), Internetworking and Routing, Application Protocols, Network Security, IP Telephony and Internet Video H.323 and SIP, Network Quality of Services.						
8	UREQ410	English Language IV	2	-	-	2
In this course the New Headway, Upper- Intermediate is studied. In it, there is fluency-based activities, a blend of traditional and more recently developed communicative approaches, treatment of grammar and systematic lexical syllabus, and putting attention to all four language skills (listening, speaking, reading, and writing). The grammatical syllabus will be studied: • work on the tense system. perfect versus non-perfect verb forms, simple versus continuous aspects; narrative and future verb forms; expressing quantity relative pronouns, participles and adverbial clauses, conjunctions, and determiners. There is work on new areas: modal auxiliary verbs are dealt with over two units, the first on all meanings, and the second on modal verbs in the past verbs related to modals, such as able to, obliged to, manage to, supposed to are covered.						

Fourth Year / Second Semester						
No	Code	Subject	Hours per week			units
			Theory	Applied	Tutorial	
1	ECER420	VLSI Technology	2	-	1	2
A Brief History, MOS Transistors, CMOS Logic, CMOS Fabrication and Layout, Stick Diagrams, Long-Channel I-V Characteristics, C-V Characteristics, Nonideal I-V Effects, DC Transfer Characteristics, CMOS Technologies, Layout Design Rules, CMOS Process Enhancements, Technology-Related CAD Issues, Manufacturing Issues, Delay, Transient Response, RC Delay Model, Linear Delay Model, Logical Effort of Paths, Timing Analysis Delay Models.						
2	ECER421	Multimedia Communications	2	-	1	2
Multimedia Representation, Introduction to Multimedia, Audio / Image / Video Representation, Multimedia Compression, Encoding and Compression Techniques, Image Compression (JPEG), Video Compression (MPEG2), Multimedia Resource Management, Multimedia Quality of Service, Multimedia Server Design, Multimedia Operating system, Multimedia Communication						

Systems, Multimedia Networking, Multimedia Applications and Services, Multimedia Video Conferencing, Multimedia Entertainment Applications.						
3	ECER422	Digital Signal Processing II	3	3	-	4
The z-transform, inversion of z-transform methods, Analysis of LTI System by z-transform. Discrete-Time Fourier Series (DTFS), Discrete-Time Fourier Transform (DTFT): relations, properties and convergence. Frequency-Domain Analysis of LTI Systems: Response to complex and sinusoidal signals, The frequency response function and geometric interpretation of poles and zeros. The Discrete Fourier Transform (DFT): Its properties and applications, The DFT as a linear transformation, circular convolution theorem, and the use of the DFT in linear filtering.						
4	ECER423	Wireless and Mobile Communications	3	-	-	3
Introduction to Wireless and Cellular systems, Mobile Communications Evolution, Cellular Systems, Global system for mobile Communications (GSM), Radio Communication Basics, Wireless Networks, Antennas for cellular networks.						
5	ECER424	Control Systems II	3	3	-	4
Frequency-Response Analysis, State Space Analysis, Construction of Root Locus, Stability, and Dominant Poles, Nyquist Plots, Compensators in Control Systems. Lag ,Lead, Lag-Lead Compensator, Design of PID control system, Introduction to Digital Control Systems, Linear Difference Equations and the Z- Transform, Design of Conventional Digital Control System using Transform Techniques, design of Digital Control systems using State-Space Method.						
6	ECER425	Optical Communications	2	-	-	2
Introduction, Non coherent Optical Communication systems, Coherent Optical Communication systems, Optical multiplexed systems, Optical Amplifiers, Optical Networks, Soliton Transmission						