Faculty of Engineering at benha

Model No.13
Programme Specifications
Communications and Computer Engineering
Academic Year2017 - 2018

University : Benha university
Faculty : Faculty of Engineering at benha

A- Basic information :

1. Programme title	Communications and Computer Engineering
2. Programme type	Single
3. Adoption program Date	12/12/2016
4- Department responsible for the program	Department 1 - الهندسة الكهربية / Faculty of Engineering at benha

B- Specialized information :

1- General objectives of the program

1- Introduce some of the fundamental principles driving future developments in electrical communications and computer engineering.
2- Develop advanced analytical and experimental skills that will allow the successful graduate to design new communication and computer systems and provide them with the skills to analyze existing designs.
3- Develop in the students a strong understanding of the capabilities and limitations of modeling and simulation tools.
4- Develop enhanced transferable skills and professional behavioral traits that will allow the graduate to hold responsible technical and managerial roles involving electrical communications and computer engineering.
5- Develop in the student's capability in computing in terms of software engineering and the use of the latest computing technologies.
6- Train students in laboratory techniques for the safe and effective construction and testing of electrical communications and computer systems.
7- Develop in the students excellence in communication of technical and non-technical information in written, oral or graphical form and the duties associated with the status of a chartered engineer.
8- Provide the students with opportunities for internships in industry to gain career-enhancing experience of the application of engineering principles.
9- Enhance the active learning by the students and provide them with a well-developed academic base that provides for further learning and professional development.
10- Give the students a chance to gain knowledge and develop skills in a range of specialized selective courses covering electrical communications or computer engineering.

2- Intended learning outcomes (ILOS)

a- Knowledge and Understanding

a1- Synthesize and critically analyze information and ideas, and apply creative and original thought in order to propose appropriate new solutions to complex industry related problems
a2- Characteristics of engineering materials related to electrical communications or

computer engineering
a3- Basics of electrical engineering, electronic circuits, and microprocessor based systems, logic circuits, communication theory, computer architecture and organization, and computer network systems
a4- Practical application of theory using computer software and programming skills as appropriate to electrical communications or computer engineering
a5- Principles and basics of signal detection and estimation, electrical communications, information theory and signal processing
a6- Principles of analog and digital modulation schemes and their different applications
a7- Principles and concepts of microwave circuits, electronic circuit, RF circuits, electromagnetic waves propagation and antenna theory, wireless communication and satellite systems
a8- Fundamentals, theorems and techniques of computer networking, computer architectures and organizations, and data security
a9- Concepts and principles of designing microprocessor based systems and its applications in communication system design and computer systems
a10- Fundamentals of computer programming and software design
a11- Fundamentals and concepts of data compression and encryption, digital signal and image processing
a12- New trends in the field of electrical communications and computer engineering, ranging from the well-established principles to new techniques
a13- Have an awareness of the limitations of current knowledge and the changing nature of technologies and society, in the fields of Communication and computer systems with performance evaluation

b- Intellectual Capacity

b1- Combine, exchange, and assess different ideas, views, and knowledge from a range of sources
b2- Assess and evaluate the characteristics and performance of components, systems and processes
b3- Investigate the failure of components, systems, and processes
b4- Solve engineering problems, often on the basis of limited and possibly contradicting information
b5- Select appropriate ICT tools to a variety of electrical communications and computer engineering problems
b6- Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact
b7- Incorporate economic, societal, environmental dimensions and risk management in design
b8- Analyze results of numerical models and assess their limitations
b9- Create systematic and methodic approaches when dealing with new and advancing technology
b10- Identify and formulate engineering problems to solve problems in the field of electrical communications and computer engineering
b11- Integrate electrical, electronic and RF components and equipment with signal processors in creatively computer controlled systems
b12- Analyze the performance of channel encoders, modulators, demodulators, channel decoders and synchronization circuits in communications systems
b13- Analyze the performance of computer systems, digital and analog communication systems, mobile communication, coding, and decoding systems
b14- Organize information innovatively in a form appropriate to decision-making

process

b15- Applying and integrating knowledge and understanding of other engineering disciplines to develop innovative solutions for the practical industrial problems

b16- Evaluate, conduct and write projects reports

c- Professional Skills

c1- Design and perform experiments, as well as analyze and interpret experimental results related to electrical communications and computer systems

c2- Use appropriate tools and relevant laboratory equipment to conduct experiments and examine performances of electrical communications and computers systems correctly

c3- Troubleshoot, repair and maintain the failure of computer and communication components and systems

c4- Apply modern techniques, skills and engineering tools to electrical communications and computer engineering systems in order to achieve desired engineering output

c5- Recognize professional and ethical issues in the use of technology and identify appropriate ethical, professional and legal practices

c6- Designing components in electric communication systems such as: data compression and encryption circuits, channel encoders and decoders, modulators and demodulators, signal conditioning circuits, power amplifiers, filtering circuits, feedback circuits, oscillator circuits, RF circuits, antennas and wave guides, synchronization circuits...etc

c7- Practice computer programming on professional levels achieving acceptable quality measures for the design and diagnostics of digital and analog communication, mobile communication, coding, and decoding systems

c8- Evaluate and integrate information and processes through individual and group project work

d- General Skills

d1- . Identify and work towards collective goals

d2- . Create, maintain and enhance productive working relationships, and resolve conflicts

d3- . Prepare action plans to meet personal and organizational objectives

d4- . Apply critical and creative thought to analyze and systematically solve complex problems

3- Academic standards

1- National Academic Reference Standards (NARS) for Engineering.

2- NARS Characterization of Computer Engineering.

3- NARS Characterization of Electronic Engineering.

4- External references for standards (Benchmarks)

1- Department of Communications and Computer Engineering. Graduate School of Science and Engineering. Tokyo Institute of Technology. Location: Ookayama campus South Building3. Address: 2-12-1 Ookayama, Meguro-ku, Tokyo 152-8550, JAPAN.

5- Curriculum structure and contents

a - Programme duration 5

b - Prgramme Structure

1 - No of hours /No of Units :	Theoretical	0	Practical	0	Total	0
	Compulsory	314	Elective	24	Optional	
2 - Basic sciences Courses :	43			26.22%		
3 - Social sciences and humanities courses :	18			10.98%		
4 - Specialized courses :	83			50.61%		
5 - Other Courses :	18			10.98%		
6 - Practical/field training:	2					

6- Programme courses

(الائحة الداخلية لكلية الهندسة ببنها) الفرقة الثالثة / هندسه الإتصالات و الحاسبات / الهندسه الكهربيه-

a- Compulsory :

code	Course Title	No.of Units	No. of hours/week			Semester
			Lect.	Excer.	Lab.	
ك ١٣٢٥	Computer Networks	3	3	1	2	First Semster
ك ١٣٢٧	Computer Organization	3	3	1	2	First Semster
ك ١٣٠٣	Design of Electronic Circuits	3	3	1	2	First Semster
ك ١٣٣٩	Electrical Power and Machines	3	3	2	1	First Semster
ك ١٣٠٥	Technical Report	0	0	0	2	First Semster
م ١٣٣٣	Environment and Pollution					
ك ١٣٢١	Microprocessor Based Systems A	3	3	1	2	First Semster
ك ١٣٢٠	Presentation and Communication	2	2			Second Semster
ك ١٣١٤	Communication Systems 1	3	3	1	2	Second Semster
ك ١٣١٢	Transmission Lines	3	3	1	2	Second Semster
ك ١٣٠٢	Safety in Electrical Environment	1	1	1	1	Second Semster
ك ١٣٢٢	Microprocessor Based Systems B	3	3	1	2	Second Semster
ك ١٣٢٤	Data Structures and Algorithms	3	3	1	2	Second Semster
ك ١٣٢٦	Information systems	6	3	2	1	Second Semster

b- Optional :

هندسه الإتصالات و الحاسبات أ / هندسه الإتصالات و الحاسبات / الهندسه الكهربيه / Fourth Year-
(الائحة الداخلية لكلية الهندسة ببنها)

a- Compulsory :

code	Course Title	No.of Units	No. of hours/week			Semester
			Lect.	Excer.	Lab.	
ك ١٤٢٩	Embedded and Real Time Systems	3	3	1	2	First Semster
ك ١٤٢٧	Cryptography and Cryptanalysis	3	3	2	1	First Semster
ك ١٤١٥	Communication System 2	3	3	2	1	First Semster
ك ١٤٢٣	Digital Signal Processing 1	3	3	1	2	First Semster
ك ١٤٠١	Field Training	1	0	0	2	First Semster
ك ١٥٠٠	Project	2	2	0	6	First Semster
ك ١٤١١	Waves and Antennas 1	3	3	2	1	First Semster
ك ١٥٠٠	Project	2	2	0	6	Second Semster
ج ١٤٠٠	Legislation And Contracts	2	2	0	0	Second Semster
ك ١٤٠٨	Engineering Economy	1	2	0	0	Second Semster

b- Optional :

code	Course Title	No.of Units	No. of hours/week			Semester
			Lect.	Excer.	Lab.	
ك ١٥١٨	Waves and Antennas 2	3	3	2	1	Second Semster
ك ١٥١٤	Digital Signal Processing 2	3	3	2	1	Second Semster
ك ١٥١٠	Selected Topics in Communications	3	3	2	1	Second Semster
ك ١٥١٦	Detection and Estimation Theory	3	3	2	1	Second Semster
ك ١٥١٢	Microwave Circuits and Devices	3	3	1	2	Second Semster

هندسه الإتصالات و الحاسبات ب / هندسه الإتصالات و الحاسبات / الهندسه الكهربيه / Fourth Year-
(الائحة الداخلية لكلية الهندسة ببنها)

a- Compulsory :

code	Course Title	No.of Units	No. of hours/week			Semester
			Lect.	Excer.	Lab.	
ك ١٤١١	Waves and Antennas 1	3	3	2	1	First Semster
ك ١٤١٥	Communication System 2	3	3	2	1	First Semster
ك ١٤٢٧	Cryptography and Cryptanalysis	3	3	2	1	First Semster
ك ١٤٢٣	Digital Signal Processing 1	3	3	1	2	First Semster
ك ١٥٠٠	Project	2	2	0	6	First Semster
ك ١٤٢٩	Embedded and Real Time Systems	3	3	1	2	First Semster
ك ١٤٠١	Field Training	1	0	0	2	First Semster
ك ١٤٠٨	Engineering Economy	1	2	0	0	Second Semster
ك ١٥٠٠	Project	2	2	0	6	Second Semster
ج ١٤٠٠	Legislation And Contracts	2	2	0	0	Second Semster

b- Optional :

code	Course Title	No.of Units	No. of hours/week			Semester
			Lect.	Excer.	Lab.	
ك ١٥٢٤	Advanced Computer Networks	3	3	2	1	Second Semster
ك ١٥٢٨	Image Processing And Pattern Recognition	3	3	1	2	Second Semster
ك ١٥٢٢	Data Security	3	3	1	2	Second Semster
ك ١٥٢٠	Advanced Computer Architecture	3	3	2	1	Second Semster
ك ١٥٢٦	Computer Operating Systems	3	3	1	2	Second Semster

-Preparatory Year (الائحة الداخلية لكلية الهندسة ببنها)

a- Compulsory :

code	Course Title	No.of Units	No. of hours/week			Semester
			Lect.	Excer.	Lab.	
م ١٠٦١	Engineering Drawing A	1			3	First Semster
س ١٠١١	Mathematics 1 A	4	4	2	0	First Semster
س ١٠٣١	Physics A	4	4	-	2	First Semster
س ١٠٤١	Chemistry A	4	4	2	2	First Semster
ك ١٠٢١	Computer Fundamentals and Programming A- Computer Fundamentals and Programming A	1	0	0	2	First Semster
ج ١٠١١	Technical English Language A	1			2	First Semster
م ١٠٧١	Production Engineering and Workshops A	2	2	0	3	First Semster
س ١٠٢١	Mechanics A	4	4	2		First Semster
م ١٠٠٢	Technology and Society	2	2			Second Semster
س ١٠٢٢	Mathematics 1 B	4	4	2		Second Semster
س ١٠٤٢	Chemistry B	4	4	2	2	Second Semster
س ١٠١٢	Mathematics 1 B	4	4	2	0	Second Semster
ك ١٠٢٢	Computer Fundamentals and Programming B	1	0	0	2	Second Semster
ج ١٠١٢	Technical English Language B	1			2	Second Semster

م ١072	Production Engineering and Workshops B	2	2	0	3	Second Semster
س ١٠٣٢	Physics B	4	4	0	2	Second Semster
م ١٠٦٢	Engineering Drawing B	3			3	Second Semster

b- Optional :

(الائحة الداخلية لكلية الهندسة ببنها) الهندسه الكهربيه / First Year-

a- Compulsory :

code	Course Title	No.of Units	No. of hours/week			Semester
			Lect.	Excer.	Lab.	
ك ١١٠٣	Electrical Engineering Applications A	1	1	0	3	First Semster
ك ١١٢٣	Computer Programming A	1	1		3	First Semster
ك ١١٠١	Electrical Engineering and Circuit Analysis A	2	2	2		First Semster
ك ١١٢١	Logic Circuits A	2	2	1	2	First Semster
س ١١١١	Mathematics 2 A	3	3	2	0	First Semster
م ١١٠١	Mechanical Engineering Technology	3	3	1		First Semster
س ١١٣٣	Modern Physics	3	3	1	2	First Semster
ج ١١١١	Language	1			2	First Semster
ك ١١٢٤	Computer Programming B	1	1		3	Second Semster
ك ١١٠٢	Electrical Engineering and Circuit Analysis B	3	3	1	2	Second Semster
ج ١١٢٢	Human Rights	2	2	-	-	Second Semster
ك ١١٠٤	Electrical Engineering Applications B	1	1		3	Second Semster
س ١١١٢	Mathematics 2 B	3	3	2	0	Second Semster
ك ١١٠٦	Electrical Measurements 1	2	2	1	1	Second Semster
ك ١١٢٢	Logic Circuits B	2	2	1	2	Second Semster
د ١١٠٨	Civil Engineering Technology	3	3		1	Second Semster

b- Optional :

(الائحة الداخلية لكلية الهندسة ببنها) الهندسه الكهربيه / Second Year-

a- Compulsory :

code	Course Title	No.of Units	No. of hours/week			Semester
			Lect.	Excer.	Lab.	
ك ١٢٠٣	Electronic Circuits A	2	2	1	2	First Semster
ك ١٢٠٥	Maintenance workshop of Electrical Machines	1	1		3	First Semster

م ١٢٨٣	Industrial Safety	2	2	0	0	First Semster
ك ١٢٠٧	Electrical Measurements 2	2	2	1	2	First Semster
ك ١٢٠١	Electromagnetic Field Theory	3	3	2	0	First Semster
ك ١٢١١	Random and Stochastic Processes	2	2	2	0	First Semster
ك ١٢٢٣	Computer Engineering Applications A	1	1		3	First Semster
س ١٢١٥	Mathematics 4 A	3	3	2		First Semster
ك ١٢٢٤	Computer Engineering Applications B	1	1		3	Second Semster
ك ١٢١٤	Signals and Systems	2	2	2		Second Semster
ك ١٢٠٤	Electronic Circuits B	2	2	1	2	Second Semster
س ١٢١٦	Mathematics 4 B	3	3	2		Second Semster
ك ١٢٢٢	Computer Architecture					
ك ١٢٣٦	Control Engineering 1	3	3	1	1	Second Semster
ك ١٢٠٦	Maintenance workshop of Electronic Devices	1	1		3	Second Semster
م ١٢٨٤	Psychology in Industry	2	2	0	0	Second Semster
b- Optional :						

7- Programme admission requirements

1- The students from the Egyptian secondary education or equivalent certificate with major in mathematics.

8 - Regulations for progression and programme completion

Benha university|Faculty of Engineering at benha| الهندسه الكهربيه/هندسه الإتصالات و الحاسبات/الفرقة الثالثة

1- The student is considered successful if he passes the examinations in all courses of his class.,The student is promoted to the next higher level if he fails in not more than two subjects of his class or from lower classes.,In addition to the two subjects mentioned in the previous item, the student who fails in two subjects in humanities and social sciences, whether from his class or from lower classes, is admitted to the transfer to the consecutive higher level. Passing successfully in all courses before obtaining the B.Sc. degree is a prerequisite.,The referred student has to sit the examination in the courses in which he has failed together with the students studying the same courses. The student gets a pass grade when he passes the examination successfully. In case the student was considered absent with acceptable excuse in a course, he gets the actual grade.,The grades of the successful student in a course and in the general grade are evaluated as follows: Distinction: from 85% of the total mark and upwards. Very good: from 75% to less than 85% of the total mark. Good: from 65% to less than 75% of the total mark. Pass: from 50% to less than 65% of the total mark,The grades of a failing student in a course are estimated in one of the following grades: Weak: from 30% to less than 50% of the total mark. Very weak: less than 30% of the total mark.,The B.Sc. general grade for students is based on the cumulative marks obtained during all the years of study. The students are then arranged serially according to their cumulative sum.,The student is awarded an honor degree if his cumulative sum is distinction or very good provided that he gets a grade not less than very good in any class of study other than the preparatory year. Moreover, he should not have

failed in any examination he has sat in any class other than the preparatory year.

Benha university|Faculty of Engineering at benha| الهندسه الكهربيه/هندسه الإتصالات و الحاسبات/هندسه الإتصالات و الحاسبات أ|Fourth Year

2- The student is considered successful if he passes the examinations at all courses of his class.,The student is promoted to the next higher level if he fails in not more than two subjects of his class or from lower classes.,In addition to the two subjects mentioned in the previous item, the student who fails in two subjects in humanities and social sciences, whether from his class or from lower classes, is admitted to the transfer to the consecutive higher level. Passing successfully in all courses before obtaining the B.Sc. degree is a prerequisite.,The referred student has to sit the examination in the courses in which he has failed together with the students studying the same courses. The student gets a pass grade when he passes the examination successfully. In case the student was considered absent with acceptable excuse in a course, he gets the actual grade.,The grades of the successful student in a course and in the general grade are evaluated as follows: Distinction: from 85% of the total mark and upwards. Very good: from 75% to less than 85% of the total mark. Good: from 65% to less than 75% of the total mark. Pass: from 50% to less than 65% of the total mark,The grades of a failing student in a course are estimated in one of the following grades: Weak: from 30% to less than 50% of the total mark. Very weak: less than 30% of the total mark.,The B.Sc. general grade for students is based on the cumulative marks obtained during all the years of study. The students are then arranged serially according to their cumulative sum.,The student is awarded an honor degree if his cumulative sum is distinction or very good provided that he gets a grade not less than very good in any class of study other than the preparatory year. Moreover, he should not have failed in any examination he has sat in any class other than the preparatory year.

Benha university|Faculty of Engineering at benha| الهندسه الكهربيه/هندسه الإتصالات و الحاسبات/هندسه الإتصالات و الحاسبات ب|Fourth Year

3- The student is considered successful if he passes the examinations in all courses of his class.,The student is promoted to the next higher level if he fails in not more than two subjects of his class or from lower classes.,In addition to the two subjects mentioned in the previous item, the student who fails in two subjects in humanities and social sciences, whether from his class or from lower classes, is admitted to the transfer to the consecutive higher level. Passing successfully in all courses before obtaining the B.Sc. degree is a prerequisite.,The referred student has to sit the examination in the courses in which he has failed together with the students studying the same courses. The student gets a pass grade when he passes the examination successfully. In case the student was considered absent with acceptable excuse in a course, he gets the actual grade.,The grades of the successful student in a course and in the general grade are evaluated as follows: Distinction: from 85% of the total mark and upwards. Very good: from 75% to less than 85% of the total mark. Good: from 65% to less than 75% of the total mark. Pass: from 50% to less than 65% of the total mark,The grades of a failing student in a course are estimated in one of the following grades: Weak: from 30% to less than 50% of the total mark. Very weak: less than 30% of the total mark.,The B.Sc. general grade for students is based on the cumulative marks obtained during all the years of study. The students are then arranged serially according to their cumulative sum.,The student is awarded an honor degree if his cumulative sum is distinction or very good provided that he gets a grade not less than very good in any class of study other than the preparatory year. Moreover, he should not have failed in any examination he has sat in any class other than the preparatory year.

Benha university|Faculty of Engineering at benha|Preparatory Year

4- The student is considered successful if he passes the examinations in all courses of his

class.,The student is promoted to the next higher level if he fails in not more than two subjects of his class or from lower classes,In addition to the two subjects mentioned in the previous item, the student who fails in two subjects in humanities and social sciences, whether from his class or from lower classes, is admitted to the transfer to the consecutive higher level. Passing successfully in all courses before obtaining the B.Sc. degree is a prerequisite.,The referred student has to sit the examination in the courses in which he has failed together with the students studying the same courses. The student gets a pass grade when he passes the examination successfully. In case the student was considered absent with acceptable excuse in a course, he gets the actual grade.,The grades of the successful student in a course and in the general grade are evaluated as follows: Distinction: from 85% of the total mark and upwards. Very good: from 75% to less than 85% of the total mark. Good: from 65% to less than 75% of the total mark. Pass: from 50% to less than 65% of the total mark,The grades of a failing student in a course are estimated in one of the following grades: Weak: from 30% to less than 50% of the total mark. Very weak: less than 30% of the total mark.,The B.Sc. general grade for students is based on the cumulative marks obtained during all the years of study. The students are then arranged serially according to their cumulative sum.,The student is awarded an honor degree if his cumulative sum is distinction or very good provided that he gets a grade not less than very good in any class of study other than the preparatory year. Moreover, he should not have failed in any examination he has sat in any class other than the preparatory year.

Benha university|Faculty of Engineering at benha|الهندسه الكهربيه|First Year

5- The student is considered successful if he passes the examinations in all courses of his class.,The student is promoted to the next higher level if he fails in not more than two subjects of his class or from lower classes.,In addition to the two subjects mentioned in the previous item, the student who fails in two subjects in humanities and social sciences, whether from his class or from lower classes, is admitted to the transfer to the consecutive higher level. Passing successfully in all courses before obtaining the B.Sc. degree is a prerequisite.,The referred student has to sit the examination in the courses in which he has failed together with the students studying the same courses. The student gets a pass grade when he passes the examination successfully. In case the student was considered absent with acceptable excuse in a course, he gets the actual grade.,The grades of the successful student in a course and in the general grade are evaluated as follows: Distinction: from 85% of the total mark and upwards. Very good: from 75% to less than 85% of the total mark. Good: from 65% to less than 75% of the total mark. Pass: from 50% to less than 65% of the total mark,The grades of a failing student in a course are estimated in one of the following grades: Weak: from 30% to less than 50% of the total mark. Very weak: less than 30% of the total mark.,The B.Sc. general grade for students is based on the cumulative marks obtained during all the years of study. The students are then arranged serially according to their cumulative sum.,The student is awarded an honor degree if his cumulative sum is distinction or very good provided that he gets a grade not less than very good in any class of study other than the preparatory year. Moreover, he should not have failed in any examination he has sat in any class other than the preparatory year.

Benha university|Faculty of Engineering at benha|الهندسه الكهربيه|Second Year

6- The student is considered successful if he passes the examinations in all courses of his class.,The student is promoted to the next higher level if he fails in not more than two subjects of his class or from lower classes.,In addition to the two subjects mentioned in the previous item, the student who fails in two subjects in humanities and social sciences, whether from his class or from lower classes, is admitted to the transfer to the consecutive higher level. Passing successfully in all courses before obtaining the B.Sc. degree is a

prerequisite.,The referred student has to sit the examination in the courses in which he has failed together with the students studying the same courses. The student gets a pass grade when he passes the examination successfully. In case the student was considered absent with acceptable excuse in a course, he gets the actual grade.,The grades of the successful student in a course and in the general grade are evaluated as follows: Distinction: from 85% of the total mark and upwards. Very good: from 75% to less than 85% of the total mark. Good: from 65% to less than 75% of the total mark. Pass: from 50% to less than 65% of the total mark,The grades of a failing student in a course are estimated in one of the following grades: Weak: from 30% to less than 50% of the total mark. Very weak: less than 30% of the total mark.,The B.Sc. general grade for students is based on the cumulative marks obtained during all the years of study. The students are then arranged serially according to their cumulative sum.,The student is awarded an honor degree if his cumulative sum is distinction or very good provided that he gets a grade not less than very good in any class of study other than the preparatory year. Moreover, he should not have failed in any examination he has sat in any class other than the preparatory year.

9- Assessment rules enrolled in the program

No	**Method**	**As measured from the intended learning outcomes**
1-	Written excersice	Knowledge & Understanding skills - Intellectual skills.
2-	Practical excersice	Knowledge & Understanding skills - Professional skills - General & transferable skills.
3-	Quizz	Knowledge & Understanding skills - Intellectual skills.
4-	Oral exams	Knowledge & Understanding skills - Intellectual skills - General & transferable skills.
5-	Discussion	Knowledge & Understanding skills - Intellectual skills - Professional skills - General & transferable skills.
6-	Presentation	Knowledge & Understanding skills - Intellectual skills - Professional skills - General & transferable skills.

10- Methods of assessment program

No	**Evaluator**	**Tool**	**Sample**
1-	1- Senior Students	Evaluation sheet	
2-	2- Alumni	Evaluation sheet & Seminars	
3-	3- Stakeholders (Employers)	Evaluation sheet & Seminars	
4-	4- External Evaluator	Evaluation sheet & Seminars	
5-	5- Others	None	

11- Matrix of knowledge and skills

(الائحة الداخلية لكلية الهندسة ببنها) الفرقة الثالثة / هندسه الإتصالات و الحاسبات / الهندسه الكهربيه-

a- Compulsory :

No.	Course Title	Knowledge and Understanding	Intellectual capacity	Professional skills	General Skills
1-	Computer Networks	a4,a8	b5	c6	d4
2-	Computer Organization	a9	b4,b13	c3	
3-	Design of Electronic Circuits	P0a4,P0a5,a1,a3,a4	P0b3,P0b5,P0b9,b2,b3,b4,b5,b6,b7	P0c1,P0c3,P0c5,c1,c2,c3,c6	P0d1,d1,d2,P0d6,d4
4-	Electrical Power and Machines		P0b4		P0d2,P0d6
5-	Technical Report	Course do not need specification			
6-	Environment and Pollution	Course do not need specification			
7-	Microprocessor Based Systems	Course do not need specification			

	A				
8-	Presentation and Communication	P0a7,P0a9,P0a10	P0b3,P0b4	P0c9,P0c11,P0c12	P0d1,P0d3,P0d5,P0d6,P0d8
9-	Communication Systems 1	P0a1,P0a2,P0a12		P0c1,P0c2,P0c6	P0d1,P0d4,P0d9
10-	Transmission Lines	a2,a7	b1,b4,b8	c6	d1
11-	Safety in Electrical Environment	P0a2,P0a6,P0a11	P0b1,P0b9,P0b5,P0b6	P0c8,P0c10	P0d8,d3,P0d1,P0d2
12-	Microprocessor Based Systems B	Course do not need specification			
13-	Data Structures and Algorithms	a4,a10	b1,b4,b6,b10	c5,c7,c8	d1,d2,d4
14-	Information systems	a2,a3,a5	b4,b6,b8	c2,c3,c4,c6	d3

b- Optional :

-Fourth Year / هندسه الإتصالات و الحاسبات أ / هندسه الإتصالات و الحاسبات / الهندسه الكهربيه
(الائحة الداخلية لكلية الهندسة ببنها)

a- Compulsory :

No.	Course Title	Knowledge and Understanding	Intellectual capacity	Professional skills	General Skills
1-	Embedded and Real Time Systems	P0a1,P0a2,P0a3,P0a4,P0a5,P0a8	P0b1,P0b2,P0b3,P0b4,P0b5,P0b6,P0b7,P0b8,P0b9,P0b12	P0c1,P0c2,P0c3,P0c4,P0c5,P0c6,P0c8,P0c11,P0c12	P0d1,P0d2,P0d3,P0d4,P0d5,P0d6,P0d7,P0d8,P0d9
2-	Cryptography and Cryptanalysis	P0a1,P0a2,P0a12		P0c1,P0c2	P0d1,P0d4,P0d9
3-	Communication System 2	P0a1,P0a2,P0a3,P0a4,P0a5	P0b1,P0b2,P0b3,P0b7,P0b11,P0b12	P0c1,P0c2,P0c3,P0c5	P0d8,P0d1,P0d2,P0d3,P0d4,P0d9
4-	Digital Signal Processing 1	P0a1,P0a2,P0a4,P0a5	P0b2,P0b3,P0b11,P0b1	P0c1,P0c2,P0c3,P0c12	P0d8,P0d1,P0d2,P0d3,P0d4,P0d9
5-	Field Training	Course do not need specification			
6-	Project	Course do not need specification			
7-	Waves and Antennas 1	a2,a7	b1,b4,b8	c6	d1
8-	Project	P0a1,P0a2,P0a12		P0c1,P0c2,P0c5,P0c7	P0d1,P0d4,P0d9,P0d2,P0d3,P0d5,P0d6,P0d7,P0d8
9-	Legislation And Contracts	Course do not need specification			
1	Engineering Economy	Course do not need specification			

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b- Optional :

No.	Course Title	Knowledge and Understanding	Intellectual capacity	Professional skills	General Skills
11-	Waves and Antennas 2	a2,a7	b1,b4,b8	c6	d1
12-	Digital Signal Processing 2				P0d8,P0d9
13-	Selected Topics in Communications	P0a1,P0a2,P0a3,P0a4,P0a5	P0b1,P0b2,P0b3,P0b7,P0b11,P0b12	P0c1,P0c2,P0c3,P0c5	P0d8,P0d9,P0d1,P0d2,P0d3,P0d4
14-	Detection and Estimation Theory	P0a5,a1,a5,a13	P0b1,P0b4,P0b5,b2,b4,b6,b10,b14	P0c1,P0c3,P0c5,c4,c6,c7	P0d1,P0d2,P0d6,d1,d3,d2
15-	Microwave Circuits and Devices	P0a1,P0a2,P0a3,P0a4,P0a5	P0b1,P0b2,P0b3,P0b4,P0b6	P0c1,P0c2,P0c3,P0c5	P0d3,P0d4,P0d6,P0d9

-Fourth Year / هندسه الإتصالات و الحاسبات ب / هندسه الإتصالات و الحاسبات / الهندسه الكهربيه
(الائحة الداخلية لكلية الهندسة ببنها)

a- Compulsory :

No.	Course Title	Knowledge and Understanding	Intellectual capacity	Professional skills	General Skills
1-	Waves and Antennas 1	a7,a2	b1,b4,b8	c6	d1
2-	Communication System 2	Course do not need specification			
3-	Cryptography and Cryptanalysis	Course do not need specification			
4-	Digital Signal Processing 1	Course do not need specification			
5-	Project	Course do not need specification			
6-	Embedded and Real Time Systems	Course do not need specification			
7-	Field Training	Course do not need specification			
8-	Engineering Economy	Course do not need specification			
9-	Project	Course do not need specification			
10-	Legislation And Contracts	Course do not need specification			

b- Optional :

No.	Course Title	Knowledge and Understanding	Intellectual capacity	Professional skills	General Skills
11-	Advanced Computer Networks	P0a2	P0b8		P0d1,P0d2,P0d3
12-	Image Processing And Pattern Recognition	a5			
13-	Data Security	a1,a4,a8,a11	b1,b8,b13	c5,c6,c7,c8	d1,d2,d3,d4

14-	Advanced Computer Architecture	Course do not need specification			
15-	Computer Operating Systems	a1,a2,a3,a8,a9,a10	b1,b2,b3,b4,b5,b6,b9,b10,b13,b15,b16	c1,c2,c3,c7,c8	d1,d4

-Preparatory Year (الائحة الداخلية لكلية الهندسة ببنها)

a- Compulsory :

No.	Course Title	Knowledge and Understanding	Intellectual capacity	Professional skills	General Skills
1-	Engineering Drawing A	P0a2,P0a4,P0a8,P0a10	P0b4,P0b12	P0c2,P0c3,P0c4,P0c11	P0d1,P0d2,P0d3,P0d7
2-	Mathematics 1 A	P0a1,P0a5	P0b1,P0b2,P0b7	P0c1	P0d7
3-	Physics A	P0a1,P0a3	P0b2	P0c1,P0c5	P0d1,P0d9
4-	Chemistry A	P0a1,P0a3	P0b1,P0b5	P0c1	P0d1,P0d9
5-	Computer Fundamentals and Programming A	P0a1,P0a2,P0a5,P0a8	P0b1,P0b2,P0b3,P0b4,P0b6,P0b7,P0b8,P0b12	P0c1,P0c3,P0c5,P0c11	P0d4,P0d5,P0d6,P0d7,P0d9
6-	Technical English Language A	Course do not need specification			
7-	Production Engineering and Workshops A	P0a3,P0a6,P0a4,P0a5	P0b2,P0b5	P0c2,P0c8,P0c10	P0d1,P0d3,P0d5
8-	Mechanics A	P0a5,P0a1	P0b2,P0b3,P0b1	P0c1	P0d1
9-	Technology and Society	P0a6,P0a7,P0a9	P0b9,P0b10	P0c10	P0d2
10-	Mathematics 1 B	P0a5,P0a1	P0b2,P0b3,P0b1	P0c1	P0d1
11-	Chemistry B	P0a1,P0a3	P0b1,P0b2,P0b4	P0c1,P0c5,P0c8	P0d1
12-	Mathematics 1 B	P0a1,P0a5	P0b1,P0b2,P0b7	P0c1	P0d7
13-	Computer Fundamentals and Programming B	P0a1,P0a2,P0a5,P0a8,P0a10	P0b1,P0b2,P0b5,P0b7,P0b8,P0b12	P0c1,P0c3,P0c5,P0c10	P0d1,P0d4,P0d7,P0d9
14-	Technical English Language B	Course do not need specification			
15-	Production Engineering and Workshops B	Course do not need specification			
16-	Physics B	P0a1,P0a3	P0b2	P0c1,P0c5	P0d1,P0d9
17-	Engineering Drawing B	P0a2,P0a4,P0a8,P0a10	P0b4,P0b12	P0c2,P0c3,P0c4,P0c11	P0d1,P0d2,P0d3,P0d6

b- Optional :

-First Year / الهندسه الكهربيه (الائحة الداخلية لكلية الهندسة ببنها)

a- Compulsory :

No.	Course Title	Knowledge and Understanding	Intellectual capacity	Professional skills	General Skills
1-	Electrical Engineering Applications A	P0a3,P0a4,P0a8,P0a12	P0b1,P0b2,P0b3,P0b4	P0c1,P0c2,P0c3,P0c5	P0d1,P0d2,P0d3,P0d4
2-	Computer Programming A	P0a1,P0a2,P0a5	P0b1,P0b2,P0b3,P0b4	P0c1,P0c2	P0d2,P0d3,P0d4,P0d6
3-	Electrical Engineering and Circuit Analysis A	P0a1,P0a3,P0a4	P0b1,P0b2,P0b6	P0c1,P0c2,P0c5	P0d2,P0d3,P0d9
4-	Logic Circuits A	P0a1,P0a4,P0a5,P0a3	P0b1,P0b2,P0b3	P0c1,P0c3,P0c7,P0c4	P0d1,P0d3,P0d6,P0d9
5-	Mathematics 2 A	Course do not need specification			
6-	Mechanical Engineering Technology	Course do not need specification			
7-	Modern Physics	P0a1,P0a3,P0a8	P0b3	P0c5	P0d7
8-	Language	Course do not need specification			
9-	Computer Programming B	P0a1,P0a2,P0a5	P0b1,P0b2,P0b3,P0b4	P0c1,P0c2	P0d2,P0d3,P0d4,P0d6
10-	Electrical Engineering and Circuit Analysis B	P0a1,P0a3,P0a4	P0b1,P0b2,P0b6	P0c1,P0c2,P0c5	P0d2,P0d3,P0d9
11-	Human Rights	Course do not need specification			
12-	Electrical Engineering Applications B	P0a3,P0a4,P0a8,P0a12	P0b1,P0b2,P0b3,P0b4	P0c1,P0c2,P0c3,P0c5	P0d1,P0d2,P0d3,P0d4
13-	Mathematics 2 B	Course do not need specification			
14-	Electrical Measurements 1	P0a3,P0a4,P0a5,P0a8	P0b2,P0b3,P0b4,P0b6	P0c2,P0c3,P0c4,P0c5	P0d2,P0d6,P0d7
15-	Logic Circuits B	P0a3,P0a4,P0a5,P0a8	P0b1,P0b2,P0b3,P0b4,P0b12	P0c1,P0c5,P0c6,P0c3	P0d6,P0d9,P0d2,P0d3
16-	Civil Engineering Technology	P0a1	P0b4	P0c2	P0d9

b- Optional :

-Second Year / الهندسه الكهربيه (الائحة الداخلية لكلية الهندسة ببنها)

a- Compulsory :

No.	Course Title	Knowledge and Understanding	Intellectual capacity	Professional skills	General Skills
1-	Electronic Circuits A	P0a1,P0a3,P0a4,P0a5	P0b1,P0b2,P0b5	P0c1,P0c5	P0d7,P0d9
2-	Maintenance workshop of Electrical Machines	P0a1,P0a4	P0b2,P0b4,P0b6	P0c5	P0d1,P0d2
3-	Industrial Safety	Course do not need specification			
4-	Electrical Measurements 2	P0a1,P0a4,P0a8	P0b4		P0d7
5-	Electromagnetic Field Theory	P0a1,P0a4	P0b7,P0b1,P0b2	P0c1,P0c2	P0d1,P0d2,P0d6,P0d9
6-	Random and Stochastic	P0a1,P0a2,P0a3	P0b1,P0b2,P0	P0c1,P0c2,P	P0d1,P0d7,

	Processes	,P0a5	b3,P0b7	0c5	P0d9
7-	Computer Engineering Applications A	P0a1,P0a5	P0b1,P0b2	P0c1,P0c6	P0d7,P0d9
8-	Mathematics 4 A	P0a1,P0a5	P0b1,P0b2,P0b7	P0c1,P0c7	P0d7
9-	Computer Engineering Applications B	P0a1,P0a5,P0a8	P0b1,P0b2,P0b3	P0c1,P0c6,P0c2	P0d7,P0d9
10-	Signals and Systems	P0a1,P0a2,P0a5,P0a7	P0b1,P0b2,P0b5,P0b7	P0c1,P0c2,P0c5,P0c7	P0d1,P0d2,P0d7,P0d9
11-	Electronic Circuits B	P0a1,P0a3,P0a4,P0a5	P0b1,P0b2,P0b5	P0c1,P0c5	P0d7,P0d9
12-	Mathematics 4 B	P0a1,P0a5	P0b1,P0b2,P0b7	P0c1,P0c7	P0d7
13-	Computer Architecture	P0a3,P0a4,P0a8,P0a12	P0b1,P0b4,P0b6,P0b12	P0c3,P0c5,P0c6	P0d2,P0d3,P0d6,P0d9
14-	Control Engineering 1				d1
15-	Maintenance workshop of Electronic Devices	P0a1,P0a2,P0a4	P0b1,P0b4,P0b6	P0c5,P0c12	P0d1,P0d2
16-	Psychology in Industry	Course do not need specification			

b- Optional :

Program Coordinators :

Ayman Mustafa Hassan Mohamed

Open Description