GIZA HIGHER INSTITUTE OF ENGINEERING AND TECHNOLOGY

Communication and Electronics Engineering Department

(Terms' System)

Year of operation: 2021/2022

Program Specifications

2022/2023

(اعتماد المجلس الأكاديمي في ٦ / ٢٠٢٣)

A- Basic information

1. Program Title:	Communications & Electronics Engineering
2. Program Type:	Single
3. Department (s):	Communication & Electronics Engineering
4. Coordinator:	Dr. Nora Ahmed Ali
5. External Evaluator (s):	--------
6. Date of ministry approval of syllabus:	28/11/2020
7. Last date of program specifications approval:	Institute Academic Council 6/2023 (According to Internal evaluator report)

B- Professional Information

1. Program Mission and Aims

Program Mission

To prepare graduates with a high scientific background at the theoretical and practical levels that accommodate developments in science and technology and have the established scientific foundations to accommodate what is new in the future in the field of electronics and communications and participate in this future through development, innovation, and scientific research, which contribute to community service and satisfy its needs

Program Aims

The Communication and Electronics Engineering program prepares its graduates to become intellectual leaders in industry. Graduates are grounded in scientific, mathematical, and technical knowledge and relevant technologies that give them ability to analyze, synthesize, and design communication and electronics engineering systems. Upon completion of studying the program, the student should be capable to:

1- Apply the knowledge in mathematics, science, and engineering principles
2- Encompass the needed engineering design skills in electronics and communication engineering
3- Have the required skill to perform laboratory and field experiments and interpret their results.
4- Possess good oral and written communication skills.
5- Function effectively as an individual or as a member of a multi-disciplinary professional team
6- Possess a firm understanding of engineering ethical, legal, and professional responsibilities
7- Improve the student practical skills in handling and dealing with electronics and communication technology including the fabrication, characterization, and installation of components, devices, and systems
8- Work in multi-disciplinary environment and follow and contribute to the developments in electronics and communication engineering recognizing the significance of life-long learning.

The consistency of the program's mission with the mission of the institute is shown in the following matrix:

Program Mission / Institute Mission	prepare graduates with a high scientific background at the theoretical and practical levels	to accommodate what is new in the future in the field of electronics and communications	development, innovation, and scientific research	contribute to community service and satisfy its needs
Able to keep pace with the modern global technological development in various disciplines		√		
that meet the needs of the local and regional market			√	
through conducting scientific and applied research	√	√		
Establishing advisory centers and advanced research laboratories that contribute to serving the community and meeting its needs				√

The consistency of the program's mission with its aims is shown in the following matrix:

Program Mission / Program Aims	1	2	3	4	5	6	7	8
prepare graduates with a high scientific background at the theoretical and practical levels	√	√					√	
accommodate what is new in the future in the field of electronics and communications			√				√	
development, innovation, and scientific research				√				√
contribute to community service and satisfy its needs					√	√		√

2. CEE Graduate Attributes

The graduates of this program should be able to:

1. Master a wide spectrum of engineering knowledge and specialized skills and can apply acquired knowledge using theories and abstract thinking in real life situations.
2. Apply analytic critical and systemic thinking to identify, diagnose and solve telecommunication engineering problems with a wide range of complexity and variation.
3. Behave professionally and adhere to telecommunication engineering ethics and standards.
4. Work in and lead a heterogeneous team of professionals from different telecommunication engineering specialties and assume responsibility for own and team performance.
5. Recognize his/her role in promoting the telecommunication engineering field and contribute in the development of the profession and the community.
6. Value the importance of the environment, both physical and natural, and work to promote sustainability principles.
7. Use techniques, skills and modern engineering tools necessary for telecommunication engineering practice.
8. Assume full responsibility for own learning and self-development, engage in lifelong learning and demonstrate the capacity to engage in post- graduate and research studies.
9. Communicate effectively using different modes, tools and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner.

10. Demonstrate leadership qualities, business administration and entrepreneurial skills.
11. Analyze and conduct experiments for different telecommunications systems/sub-systems.
12. Trouble shoot, repair, analysis and design in communication networks and communication systems.
13. Apply principles of electrical, electronic circuits, measurements, digital and analog communication, new telecommunication techniques and technology to implement the telecommunications engineering systems.

The matrix below illustrates how the graduate attributes align with the program aims:

Graduate Attributes / Program Aims	1	2	3	4	5	6	7	8	9	10	11	12	13
1- Apply the knowledge in mathematics, science, and engineering principles		√										√	√
2- Encompass the needed engineering design skills in electronics and communication engineering	√	√					√				√	√	√
3- Have the required skill to perform laboratory and field experiments and interpret their results.					√		√					√	
4- Possess good oral and written communication skills.				√					√	√			
5- Function effectively as an individual or as a member of a multi-disciplinary professional team			√	√				√	√				
6- Possess a firm understanding of engineering ethical, legal, and professional responsibilities			√			√	√						
7- Improve the student practical skills in handling and dealing with electronics and communication technology including the fabrication, characterization, and installation of components, devices, and systems	√	√					√				√	√	
8- Work in multi-disciplinary environment and follow and contribute to the developments in electronics and communication engineering recognizing the significance of life-long learning.			√	√				√		√			

The matrix below illustrates how the graduate attributes align with the program mission:

Graduate Attributes / Program Mission	1	2	3	4	5	6	7	8	9	10	11	12	13
prepare graduates with a high scientific background at the theoretical and practical levels	√	√					√				√	√	√
to accommodate what is new in the future in the field of electronics and communications			√								√		√
development, innovation, and scientific research			√	√			√	√	√	√			
contribute to community service and satisfy its needs					√	√							

3. Program Academic Standards

The Council adopts the NARS 2018 for the Engineering Sector (level A), the National Reference Academic Standards (NARS 2018 Level B) for Electrical Engineering and ARS (Level C) Telecommunications and Electronics Engineering as a major reference for the learning outcomes (LOs) of the Telecommunications and Electronics Engineering Program.

3.1 Comparison of provision to NARS

		Program contact hours	EXISTING %	NARS %	Tolerance %
Institute Requirement	A- Humanities and Social Sciences	٣٣	12	11	9-12
General Basic Science	B- Mathematics and Basic Sciences	٥٣	20	21	20-26
Electronics and Communications Engineering	C- Basic Engineering Sciences	٦٦	٢٤	21	20-23
	D- Applied Engineering and Design	٣٧	١٤	21	20-22
	E- Computer Applications and ICT	٢٩	١١	10	9-11
	F- Projects and Practice	٣٢	١٢	9	8-10
	G- Discretionary subjects	٢٠	٧	7	6-8
	Total	272	100	100	

3.2 Comparison of provision to the requirements of the reference framework of the Engineering Sector Committee (2016):

	Existing % of Five Years	Requirement of the Engineering Sector Committee %
Humanities & Social Sciences	٨	8-12
Business Administration	٢	2-4
Math. & Basic Sciences	٢٠	18-22
Engineering Culture	٢	4-6
Basic Engineering Sciences	٢٦	25-30
Engineering Applications & Design	٣٠	25-30
Projects & Field training	١٢	4-6

From the above table, it is evident that there are little gaps between the current program and NARS except in the area of (Applied Engineering and Design). Moreover, fulfills the requirements of the reference framework of the Engineering Sector Committee (2020) except in the area of (Engineering Culture).

4. Program Competencies

According to the National Academic Reference Standard, the CCE program must satisfy the following Competencies:

1- General Engineering NARS Competencies in 2018		
Level A (NARS)	A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.
	A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.
	A3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.
	A4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.
	A5	Practice research techniques and methods of investigation as an inherent part of learning.
	A6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.
	A7	Function efficiently as an individual and as a member of multi-disciplinary and multi- cultural teams.
	A8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.
	A9	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.
	A10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.
2- Electrical NARS Competencies in 2018		
Level B (NARS)	B1	Select, model and analyze electrical power systems applicable to the specific discipline by applying the concepts of: generation, transmission and distribution of electrical power systems.
	B2	Design, model and analyze an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.
	B3	Design and implement: elements, modules, sub-systems or systems in electrical/electronic/digital engineering using technological and professional tools.
	B4	Estimate and measure the performance of an electrical/electronic/digital system and circuit under specific input excitation, and evaluate its suitability for a specific application.
	B5	Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain electrical/electronic/digital equipment, systems and services.
3- Communications and Electronics Engineering ARS		
Level C (ARS)	C1	implant the capacity to apply the concepts, principles, theories, and methods related to the design, modification, operation, analysis, test, fabrication, or verification in the design, development and implementation of application-oriented engineering systems (analog, radio frequency, communication, digital or control electronic circuits, subsystems and systems (e.g., hardware, software, hybrid)
	C2	Knowledge of the tools and techniques used to develop functional, physical prototype or production models and simulations for test and evaluation programs, the prediction of behavior and phenomena, and to communicate concepts.

	C3	Gain academic information and professional and practical experiences (complete and in-depth) in modern topics (Internet of Things -IOT, embedded systems - ES, Intelligent Software Systems - ISS, Industrial Process automation- IPA, system sensing and control and Biomedical systems) and their applications in the field of electronics and telecommunications
	C4	implant the capacity to apply the recent Microwave Integrated Circuits technologies (HMIC, MMIC, MEMS and MOEMS) in addition with the recent EM FDTD simulation coupled with Circuit Functionality and Device Physics in the design, analysis, simulation and implementation of Integrated Microwave Systems (radar systems, Satellite telecommunication systems, etc.
	C5	Isolate and solve complex problems in the domain of Electronics and Communication using latest hardware and software tools, along with analytical and managerial skills to arrive at cost effective and efficient and optimum solutions, either independently or as a team.
	C6	Acquaintance of social and environmental awareness with ethical responsibilities to have a successful career in real-world applications by keeping abreast of the technological changes in the domain of electronics and communication

The matrix below illustrates how the Program competencies align with the program aims:

Program Aims / Program Competencies	1	2	3	4	5	6	٧	٨
A1	X							
A2	X	X					X	
A3		X	X					
A4		X						
A5			X					
A6								X
A7					X			X
A8				X				
A9				X		X		
A10			X		X			X
B1			X					
B2			X					
B3			X				X	
B4		X					X	
B5							X	
C1	X	X						
C2							X	
C3							X	
C4							X	
C5			X					
C6						X		

The detailed comparisons between courses and Competencies are given in Appendix (1).

The matrix below illustrates how the graduate attributes align with the program Competencies:

Graduate Attributes / Program	1	2	3	4	5	6	7	8	9	10	11	12	13
A1	√				√								
A2	√				√						√		
A3					√	√							
A4			√		√	√			√	√			
A5		√	√					√					
A6	√		√	√						√			
A7				√						√			
A8									√				
A9	√	√						√					
A10		√		√				√					
B1	√												
B2	√						√				√	√	
B3	√						√				√	√	√
B4	√				√		√					√	
B5							√		√			√	
C1	√										√		√
C2	√						√	√	√			√	
C3	√		√	√									
C4	√										√		√
C5	√		√	√	√		√	√		√			
C6			√	√									

5. Curriculum Structure and Contents

5-1 Program duration:

Four specialized years in addition to one preparatory year. Each year consists of two terms.

5-2 Program structure:

5.2.1	Total No. of contact hours	Lectures (140), Lab/Exercise (130), Total (270)
5.2.2	No. of contact hours / week	26 – 31
5.2.3	No. of courses	Compulsory (64), Elective (6)
5.2.4	No. of contact hours of university requirements' courses	28(10%)
5.2.5	No. of contact hours of institute requirements' courses	68 (25%)
5.2.6	No. of contact hours of general specification' courses	174(65%)
5.2.7	No. of contact hours of minor specification' courses	--(----)
5.2.8	Program terms	The program consists of 5 years, 2 terms/year = 5 x 2 = 10 terms.

5-3 Program Contents:

The following are the subjects taught during this program.

Prep. Year / 1st Term

Code	Course Title	Teaching Hours				Marking				
		Lecture	Exercise / Class W.	Practical	Sum	Class Grades	Practical / Oral exam	Written	SUM	Exam. Period
EMP 011	Mathematics (1)	2	2	0	4	75	0	50	125	3
EMP 012	Physics (1)	2	0	2	4	45	45	60	150	3
EMP 013	Mechanics (1)	2	2	0	4	75	0	50	125	3
EMP 014	Eng. Drawing &Projection (1)	1	3	0	4	60	0	40	100	4
EMP 015	Chemistry	2	0	2	4	30	30	40	100	3
HUM 016	English Language	2	0	2	4	20	25	30	75	2
EMP 017	Introduction to Computer and programming	2	0	2	4	20	25	30	75	2
		13	7	8	28	325	125	300	750	

Prep. Year / 2nd Term

Code	Course Title	Teaching Hours				Marking				
		Lecture	Exercise / Class W.	Practical	Sum	Class Grades	Practical / Oral exam	Written	SUM	Exam. Period
EMP 021	Mathematics (2)	2	2	0	4	75	0	50	125	3
EMP 022	Physics (2)	2	0	2	4	45	45	60	150	3
EMP 023	Mechanics (2)	2	2	0	4	75	0	50	125	3
EMP 024	Eng. Drawing &Projection (2)	2	3	0	5	75	0	50	125	4
ECL 025	Production Technology	3	0	2	5	40	35	50	125	2
HUM 026	Health and Accommodations	2	0	0	2	20	0	30	50	2
ECL 027	History of Engineering & Technology	2	0	0	2	20	0	30	50	2
		15	7	4	26	35	80	32	750	

TRN 028	**Summer Internship (1)**	**0**	**0**	**0**	**0**	**25**	**25**	**0**	**50**	

1st Year / 1stTerm

Code	Course Title	Teaching Hours				Marking				
		Lecture	Exercise / Class W.	practical	Total Hours	Class works	Practical / Oral exam	Written exam	Total	Wr. exam duration
CEE ١١١	Electronic Engineering	2	1	1	4	40	35	50	125	3
EMP 112	Structural Programming	2	0	2	4	40	20	40	100	3
CEE 113	Electric circuits (1)	2	1	2	5	40	35	50	125	3
EMP 114	Mathematics (3)	2	2	0	4	75	0	50	125	3
HUM 115	Social Impact of Technology	2	0	0	2	45	0	30	75	2
HUM 116	Advanced English Language for Communication And electronics engineering	2	2	0	4	45	0	30	75	2
TRN 117	Technical Report Writing	2	0	0	2	45	0	30	75	2
	TOTAL	14	6	5	25				700	

1st Year/ 2ndTerm

Code	Course Title		Teaching Hours			Marking				
		Lecture	Exercise / Class W.	practical	Total Hours	Class works	Practical / Oral exam	Written exam	Total	Wr. exam duration
CEE ١٢١	Electronic circuits (1)	2	1	2	5	40	35	50	125	3
CEE ١٢٢	Electric circuits (2)	2	1	2	5	40	35	50	125	3
CEE ١٢٣	Digital Logic Design	2	1	2	5	40	35	50	125	3
EMP 124	Mathematics (4)	2	2	0	4	75	0	50	125	3
CEE ١٢5	Signal and systems	2	1	1	4	40	35	50	125	3
EMP 126	Fundamentals of material Science	2	0	0	2	45	0	30	75	3
ECL 127	Scientific and creative thinking	2	1	0	3	30	0	20	50	2
	TOTAL	14	7	7	28				750	

2nd Year/ 1stTerm

Code	Course Title	Teaching Hours				Marking				
		Lecture	Exercise / Class W.	practical	Total Hours	Class works	Practical / Oral exam	Written exam	Total	Wr. exam duration
CEE ٢١١	Electronic circuits (2)	2	1	2	5	40	35	50	125	3
CEE ٢١٢	Electronic measurements (1)	2	1	1	4	30	30	40	100	3
CEE 213	Computer organization and assembly language	2	1	1	4	40	35	50	125	3
EMP 214	Mathematics (5)	2	2	0	4	75	0	50	125	3
CEE 115	Introduction to Communications	2	1	1	4	30	30	40	100	3
BUS 216	Engineering economics	2	0	0	2	45	0	30	75	3
CEE 217	Field theory	2	2	0	4	30	30	40	100	3
	TOTAL	14	8	5	27				750	

2nd Year / 2ndTerm

Code	Course Title	Teaching Hours				Marking				
		Lecture	Exercise / Class W.	practical	Total Hours	Class works	Practical / Oral exam	Written exam	Total	Wr. exam duration
EMP٢٢١	Programming Application	2	0	2	4	30	30	40	100	3
CEE ٢٢٢	Electronic measurements (2)	2	1	1	4	30	30	40	100	3
BUS٢٢٣	Management & marketing	2	1	0	3	45	0	30	75	2
EMP٢٢٤	Mathematics (6)	2	2	0	4	75	0	50	125	3
CEE ٢٢٥	Communication systems	2	1	2	5	50	40	60	150	3
CEE ٢٢٦	Electromagnetic Waves	2	2	0	4	50	40	60	150	3
BUS 227	Feasibility Studies and projects management	2	0	0	2	30	0	20	50	2
	TOTAL	14	7	5	26				750	
TRN 228	Field Internship (2)	0	0	0	0	25	25	0	50	

3rd Year/ / 1stTerm

Code	Course Title	Teaching Hours				Marking				
		Lecture	Exercise / Class W.	practical	Total Hours	Class works	Practical / Oral exam	Written exam	Total	Wr. exam duration
CEE ٣١١	Microprocessor and microcontroller	٢	1	2	5	40	20	40	100	3
CEE ٣١٢	Linear systems and control (1)	٢	2	0	4	60	0	40	100	3
CEE ٣١٣	CA Design and simulation of electronic circuits	٢	0	2	4	40	20	40	100	3
CEE ٣١٤	Electric machines	2	2	0	4	60	0	40	100	3
CEE ٣١٥	Digital Signal Processing	2	1	1	4	40	35	50	125	3
CEE ٣١٦	Microwave Engineering	2	1	1	4	40	35	50	125	2
HUM 317	Engineering Legislation and professional Relations	2	1	0	3	30	0	20	50	3
	TOTAL	14	8	6	28				750	

3rd Year/ / 2stTerm

Code	Course Title	Teaching Hours				Marking				
		Lecture	Exercise / Class W.	practical	Total Hours	Class works	Practical / Oral exam	Written exam	Total	Wr. exam duration
HUM٣٢١	Environmental pollution	2	0	0	2	30	0	20	50	٣
CEE ٣٢٢	Data Communication and network	2	1	1	4	40	35	50	125	٣
CEE ٣٢٣	Solid State Electronics	2	1	1	4	40	35	50	125	٣
CEE ٣٢٤	Linear systems and control (2)	2	2	0	4	60	0	40	100	٣
CEE ٣٢٥	Power electronics	2	1	1	4	30	30	40	100	٣
CEE ٣AW**	Elective course (1)	2	2	0	4	75	0	50	125	٣
CEE ٣AW**	Elective course (2)	2	2	0	4	75	0	50	125	3
	TOTAL	14	9	3	26				750	
TRN 328	Field Internship (3)	0	0	0	0	25	25	0	50	

4th Year/ 1nd Term

Code	Course Title	Teaching Hours				Marking				
		Lecture	Exercise / Class W.	practical	Total Hours	Class works	Practical / Oral exam	Written exam	Total	Wr. exam duration
CEE ٤١١	Computer networks	2	1	1	4	30	30	40	100	3
CEE ٤١٢	Digital communication	2	1	1	4	30	30	40	100	3
CEE ٤١٣	Optical communication	2	1	1	4	30	30	40	100	3
TRN 414	Graduation project (1) **	2	0	2	4	60	0	40	100	Disc
CEE ٤١٥	Antennas	2	1	1	4	30	30	40	100	3
CEE 4AW*	Elective Course (3)	2	2	0	4	60	0	40	100	3
CEE 4AW*	Elective Course (4)	2	2	0	4	60	0	40	100	3
	TOTAL	14	8	6	28				700	

4th Year/ 2nd Term

Code	Course Title	Teaching Hours				Marking				
		Lecture	Exercise / Class W.	practical	Total Hours	Class works	Practical / Oral exam	Written exam	Total	Wr. exam duration
HUM٤٢١	Professional ethics	2	0	0	2	30	0	20	50	3
CEE ٤٢٢	Satellite communications	2	2	0	4	30	30	40	100	3
CEE ٤٢٣	Mobile communications	2	1	1	4	30	30	40	100	3
TRN٤٢٤	Graduation project (2) **	2	0	4	6	120	0	80	200	Disc
CEE 425	Optical Electronics	2	1	1	4	30	30	40	100	3
CEE 4BW*	Elective Course (5)	2	2	0	4	60	0	40	100	3
CEE 4BW*	Elective Course (6)	2	2	0	4	60	0	40	100	3
	TOTAL	14	8	6	28				750	

*** The student's grade in the final project in the graduation certificate are the average of the total project (1) and project (2)**

5-4 Indicative curricula contents by Communication and Electronics Engineering Program:

Code	Course Title	Teaching Hours				Subject Area						
		Lecture	Exercise / Class W.	Lab / Practical	TOTAL Hours	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Design	Comp. App. & ICT	Project & Practice	Discretionary
EMP 011	Mathematics (1)	2	2	0	4		4					
EMP 012	Physics (1)	2	0	2	4		2	2				
EMP 013	Mechanics (1)	2	2	0	4		**4**					
EMP 014	Engineering Drawing & Projection (1)	1	3	0	4			**4**				
EMP 015	Chemistry	2	0	2	4			**2**			**2**	
HUM 016	English Language	2	0	2	4	**4**						
EMP 017	Introduction to Computer and programming	2	0	2	4			**2**		**2**		
EMP 021	Mathematics (2)	2	2	0	4		**4**					
EMP 022	Physics (2)	2	0	2	4		2	2				
EMP 023	Mechanics (2)	2	2	0	4		**4**					
EMP 024	Engineering Drawing & Projection (2)	1	3	0	4			**5**				
ECL 025	Production Technology	2	0	2	4			**3**		2		
HUM 026	Health and Accommodations	2	0	2	4	2						
ECL 027	History of Engineering and Technology	2	0	2	4	2						
TRN 028	Summer Internship (1)			√							√	
CEE 111	Electronic Engineering	2	1	1	4			3			1	
EMP 112	Structural Programming	2	0	2	4					2	2	
CEE 113	Electric Circuits (1)	2	1	2	5			4	1			
EMP 114	Mathematics (3)	2	2	0	4		4					
HUM 115	Social Impact of Technology	2	0	0	2	2						

Code	Course Title	Teaching Hours				Subject Area						
		Lecture	Exercise / Class W.	Lab / Practical	TOTAL Hours	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Design	Comp. App. & ICT	Project & Practice	Discretionary
HUM 116	Advanced English Language for Communication and Electronic Engineering	2	2	0	4	2		**2**				
TRN 117	Technical Report Writing	2	0	0	2	2						
CEE 121	Electronic Circuits (1)	2	1	2	5			4			1	
CEE 122	Electric Circuits (2)	2	1	2	5			2		2	1	
CEE 123	Digital Logic Design	2	1	2	5		2		2	1		
EMP 124	Mathematics (4)	2	2	0	4		4					
CEE 125	Signals and Systems	2	1	1	4		4					
EMP 126	Fundamentals of Material Science	2	0	0	2	1		1				
ECL 127	Scientific and Creative Thinking	2	1	0	3	3						
CEE 211	Electronic Circuits (2)	2	1	2	5			2	2	1		
CEE 212	Electronic Measurements (1)	2	1	1	4			2	1	1		
CEE 213	Computer Organization and Assembly Language	2	1	1	4					4		
EMP 214	Mathematics (5)	2	2	0	4		4					
CEE 215	Introduction to Communications	2	1	1	4		3				1	
BUS 216	Engineering Economics	2	0	0	2	2						
CEE 217	Field Theory	2	2	0	4		1	1	1	1		
EMP 221	Programming Application	2	0	2	4			2	2	1		
CEE 222	Electronic Measurements (2)	2	1	1	4		1	1	2			
BUS 223	Management & Marketing	2	1	0	3	2		**1**				
EMP 224	Mathematics (6)	2	2	0	4		4					

Code	Course Title	Teaching Hours				Subject Area						
		Lecture	Exercise / Class W.	Lab / Practical	TOTAL Hours	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Design	Comp. App. & ICT	Project & Practice	Discretionary
CEE 225	Communication Systems	2	1	2	5		2		3			
CEE 226	Electromagnetic Waves	2	2	0	4			2	2			
BUS 227	Feasibility Studies and Projects Management	2	0	0	2	2						
TRN 228	Field Internship (2)			√							√	
CEE 311	Microprocessor and Microcontroller	2	1	2	5					5		
CEE 312	Linear Systems and Control (1)	2	2	0	4			2			2	
CEE 313	CA Design and Simulation of Electronic Circuits	2	0	2	4				4			
CEE 314	Electric Machines	2	2	0	4			2			2	
CEE 315	Digital Signal Processing	2	1	1	4		4					
CEE 316	Microwave Engineering	2	1	1	4			2	1		1	
HUM 317	Engineering Legislation and Professional Relations	2	1	0	3	3						
HUM 321	Environmental Pollution	2	1	0	3	3						
CEE 322	Data Communication and Networks	2	1	1	4			**4**				
CEE 323	Solid State Electronics	2	1	1	4				2	2		
CEE 324	Linear Systems and Control (2)	2	2	0	4			2			2	
CEE 325	Power Electronics	2	1	1	4			2			2	
CEE3A W**	Elective Course (1)	2	2	0	4							4
CEE3A W**	Elective Course (2)	2	2	0	4							4
TRN 328	Field Internship (3)			√							√	
CEE 411	Computer Networks	2	1	1	4						4	
CEE 412	Digital Communication	2	1	1	4			2	1	1		

Code	Course Title	Teaching Hours				Subject Area						
		Lecture	Exercise / Class W.	Lab / Practical	TOTAL Hours	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Design	Comp. App. & ICT	Project & Practice	Discretionary
CEE 413	Optical Communication	2	1	1	4			1	1	1	1	
CEE 414	Graduation Project (1)**	2	0	2	4					2	2	
CEE 415	Antennas	2	1	1	4			2	2			
CEE4A W*	Elective Course (3)	2	2	0	4							4
CEE4A W*	Elective Course (4)	2	2	0	4							**4**
HUM 421	Professional Ethics	2	0	0	2	2						
CEE 422	Satellite Communications	2	2	0	4	1			1		2	
CEE 423	Mobile Communication	2	1	1	4	1			1		2	
CEE 424	Graduation Project (2)**	2	0	4	6						4	
CEE 425	Optical Electronics	2	1	1	4				4			
CEE4B W*	Elective Course (5)	2	2	0	4				2			2
CEE4B W*	Elective Course (6)	2	2	0	4				2			2
	TOTAL CONTACT HOURS					**36**	**53**	**66**	**37**	**28**	**32**	**20**
	AVAILABLE % OF THE SUBJECT AREA					**13%**	**19%**	**24%**	**14%**	**11%**	**12%**	**7%**
	NARS %					**11**	**21**	**21**	**21**	**10**	**9**	**7**
	TOLERANCE					**9-12**	**20-26**	**20-23**	**20-22**	**9-11**	**8-10**	**6-8**

6. Program Admission Requirements (متطلبات الالتحاق بالبرنامج):

A General Secondary School Certificate (Scientific division) with certain grade percentage specified by the national admission office in the supreme council of universities are necessary for admission to the preparatory year.

The student is free to selects the program specialization after the preparatory year without any preconditions.

7. Regulations for progression and program completion:

a) The student gets a B.Sc. degree if he passed all courses of the 10terms.
b) The student is promoted to the next higher level if he fails in not more than (2 main courses + 2 humanities and social sciences courses) of his year or from lower years.
c) 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,
d) The grades of the successful student in a course and in the general grade are evaluated as follows:
   - Excellent: from 85% and upwards of the total mark.
   - Very good: from 75% to less than 85% of the total mark.
   - Good: from65%to lessthan75%ofthe total mark
   - Pass: from 50% to less than 65% of the total mark
   - Fail: in one of' the followings:
     – Weak: from 30% to less than 50% of the total mark.
     – Very weak: less than 30% of the total mark.
e) 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.
f) 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 year of study other than the preparatory year. Moreover, he should have not failed in any examination in any year other than the preparatory year.

8. Teaching / Learning methods and strategies

The program uses several methods and strategies of teaching and learning as follows:

1. Lecture
2. Class work (tutorial)
3. Practical and Lab. Experiment
4. Discussion
5. Brain Storming
6. Research and Report
7. Project
8. Practical training
9. Distant learning (interactive online lectures/tutorials, recorded lectures/tutorials, and videos).

Appendix (2) contains a matrix of the contribution of courses to the teaching / learning methods and strategies.

The matrix below illustrates how the teaching/ learning methods and strategies align with the program Competencies

Program Competencies	Teaching methods and Strategies								
	Lecture	Tutorial	Practtial	Discussion	Brainstorming	Research and Reports	Project	Practical Training	Distant learning
A1	√	√		√	√	√	√		√
A2			√	√	√		√	√	
A3	√	√	√			√	√		√
A4						√		√	√
A5	√			√	√	√			
A6							√	√	
A7			√			√	√	√	
A8	√	√	√					√	
A9	√			√	√	√		√	
A10	√	√				√	√		
B1	√	√	√	√			√		√
B2	√		√	√	√		√	√	√
B3			√	√	√		√	√	
B4	√	√	√				√	√	
B5			√	√					√
C1	√	√		√		√			√
C2	√		√		√	√	√	√	√
C3	√	√	√			√	√	√	√
C4			√	√	√	√	√		
C5	√		√		√		√	√	
C6						√		√	

9. Student Assessment Methods

Assessment Methods	Program Competencies																			
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6
Final Written Exam	√	√	√	√							√	√	√	√	√	√	√	√	√	√	√
Midterm Exam	√	√	√	√	√			√	√		√	√	√	√	√	√	√	√	√	√	√
Quizzes	√	√	√	√	√	√		√	√	√	√	√	√	√	√	√	√	√	√	√	√
Oral		√			√	√	√	√	√		√	√	√	√	√	√	√	√	√	√	√
Practical exam		√			√	√					√	√	√	√	√	√	√	√	√	√	√
Class works (discussion, quizzes, observation)	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Assignment (report, solving problem)	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Project		√	√			√	√			√			√	√	√	√	√	√	√	√	√
Electronic Exam	√										√	√	√			√	√				
Online exam	√										√	√	√			√	√				

10. Course contents

Preparatory Year - First Term

EMP 011 Mathematics (1)
Introduction to functions – inverse function – elementary functions – trigonometric and inverse trigonometric functions – exponential function – logarithmic functions – hyperbolic and inverse hyperbolic functions – limits – continuity – derivative – applications on derivative – curve sketching – convexity and concavity – extreme of functions – indefinite integrals – methods of integration – definite integrals. the fundamental theorem of calculus – l' Ho pital rule – applications on integration – areas – volumes of solids of revolution

EMP 012 Physics (1)
Properties of matter, physical quantities, units, properties of mech. and electric materials – gravitational field and its applications – fluid statics – fluid dynamics – viscosity – elasticity – sound waves – waves in elastic media – heat and heat dynamics – heat transfer – molecular motion of gasses – first law of heat dynamics – second law of heat dynamics – applications.

EMP 013 Mechanics (1)

Vectors Algebra and Applications - Resultant and Moments of a Force System – Equivalent Force Systems – Equilibrium of Particles and bodies – Friction – Hinges and Pulleys – Center of Gravity – Moment of inertia – Product of inertia Moment – Inertia Moment Transfer Theories – Mohr's Cricle.

EMP 014 Engineering Drawing & Projection (1)
Projection theory – Orthogonal projection – Projection of a point, line, plane simple bodies – Assistant Projections. Intersection of planes, surfaces and bodies – Unfolding body surfaces – Drawing technology and skills – Geometrical Constructions – Writing dimensions – Perspective.

EMP 015 Chemistry
States of matter – Solutions – Phase rule – Chemical Equilibrium – corrosions – Electrochemistry – Water treatment – Building materials – Pollution – Other chemical industries – Mineral fertilizers. Dyes, colour and Chemical Constitution – Polymers – Sugar and Starch Industries – Petro Chemicals – Semiconductors – Oils, fats, soaps and detergents.

HUM 016 English Language
Introduction – characteristics of technical English language – revision of English Grammer – some styles of writing – characteristics of effective sentences – common faults in writing of sentences in English language – construction of paragraphs: main idea – methods of presentation of main idea – types of paragraphs – analysis of some technical writings in different engineering specializations – translation.

EMP 017 Introduction to Computer and Programming
Computer system – brief history - computer devices and element – input and output devices – central processor unit - additional units – software programs – operation system programs – programming language application – programs flowcharts – problem solving and programs – software algorithms – Boolean Algebra – principles of spreadsheet and database – application program development.

EMP 021 Mathematics (2)
Theory of equations – matrices – matrices and linear system – determinants and linear systems – eigenvalues and eigenvectors – applications on matrices and determinants – sequences and series –vectors – polar, cylindrical and spherical coordinates – equations of the second degree – parabola – ellipse – hyperbole – translation and rotation of axes – equations of pairs of strict lines.

EMP 022 Physics (2)
Electricity and magnetism - charge, matter and electric field – Gauss law - elec. Potential – capacitors and insulating materials – current, resistance, and elec. Field – magnetic field – Amper law – Savart and Biot laws – Faraday's law coefficient …. – magnetic properties of materials – integral form – heat effect of current – optics – properties of optics – electromagnetic waves – optical phenomena deviation of optics – mirrors – lenses – optical fibers.

EMP 023 Mechanics (2)
Kinematics of particles – coordinate systems – linear and curvilinear motions – relative motion – kinetics of particles – Newton's laws of motion – constant and variable Acceleration - applications – work and energy of particles – work and kinetic energy – different types of energies – power.

EMP 024 Engineering Drawing &Projection (2)
Obtaining missing views – principles of sectioning – applications on machines parts drawing – steel connections – structural steel.

EMP 025 Production Technology
Introduction to engineering material (ferrous & non-ferrous) – polymers – ceramic – composite materials – forming processes – casting – forging – rolling – drawing – joining operations – riveting – welding – adhesive bonding – hand operations – machining operations – turning – shaping – drilling – milling – grinding – measurement tools – vernier caliper – micrometer.

HUM 026 Health and Accommodations
Definition of demography – demographic properties – demographic data sources – population growth and environmental impact – concept of community health and psychological health – factors affecting health – environmental problems.

ECL 027 History of Engineering and Technology
Engineering concepts and definitions (Engineering - Engineer – Technology) , Requirements of technological advancement, Types of technology (Capital saving technology - Labor saving technology - Neutral technology), Successful Engineer, Pioneers in Engineering Science and Technology, Early engineering work, Major sections of Engineering (Aerospace Engineering - Chemical Engineering - Civil Engineering, Communication and Electronics Engineering - Mechanical Engineering - Architecture), New Fields (Computer Engineering - Software Engineering - Micro Engineering - Molecular Engineering - Mechatronics - Medical Engineering - .....), Engineering from a social perspective, relations with different sciences (engineering and science - engineering and literature), areas of work in different engineering disciplines

Communications and Electronics Engineering Department - First Year - First Term

CEE111 Electronic Engineering
Review on semiconductors: Bohr's model, N-type and p-type semiconductors, Methods of current flow, Pn-junction: I-V ccs. Reverse saturation current depletion layer capacitance, Diffusion capacitance. Diode applications half- and full-wave rectifier, Battery charger, Peak rectifier, Voltage doublers. Other two-terminal devices: Zener diodes, Light emitting diodes (LED). Bipolar junction transistor (BJT): Ebermoll model, Static and dynamics characteristics, Field effect transistors. (Linear and nonlinear and pinch off regions), JFETs symbol and model and biasing. Insulated gate FETs: Types, Regions of operation, MOSFETs symbol and model and biasing. FETs applications: MOSFET as a resistance, JFET as a constant current source, selected applications examples. Integrated circuit technology.

CEE 112 Structural programming
An introduction to C-language Programming is provided in this course, Variable/Constant definitions, Basic Programs, Sequential Programming, Conditional Programming, Looping and repetitions, Functions, Arrays as well as searching and sorting techniques.

CEE113 Electric circuits (1)
Different methods for circuit analysis, Kirchhoff Laws, Mesh analysis and nodal analysis, superposition theory, Thevenin theory, Norton theory, Natural and step responses for the first and second order circuits, Impedance and admittance, phase and phase analysis, Average, active, and root mean square values, Power and power factor, Magnetic circuits.

EMP 114 Mathematics (3)
Series, Criteria for series convergence, Power series, Taylor series, Fourier series, Functions of two variables, Continuity of partial derivatives, Differentiability, Function of three or more variables, Lagrange multiplier, Double integral, Triple integral, evaluation of triple integral.

HUM 115 Social Impact of Technology
In this course you will learn how to use theories and methods to make predictions of the potential impact of new technology – historical context of technology and its impact to shape our society, analyze how to innovate to create new markets in existing needs and how technology is a key resource, adverse effects of technology and potential unintended consequences to both society and planet.

HUM 116 Advanced English for Communications and Electronics Engineering
Presentation skills for varied topics, Terminologies and report writing on relevant subjects for Communications and Electronics Engineering branches, Creative writing and research work.

TRN 117 Technical Report Writing
Introduction ,Writing of numbers ,Symbols ,Abbreviations and equations ,Rules of statement writing, language, structure, accuracy, consolidation, variety, confirmation ,Variation of sentences ,Easiness to read ,Basic writing of active paragraph ,How to start writing ,Summary and conclusion ,Writing and organizing the subject ,Review and editing ,Different forms of writing : letters, notes, proposals, reports, examples, reference, tables and tables ,Final edition of technical writing ,Contacts writing.

CEE121 Electronic Circuit (1)
Review: Biasing techniques of BJT and FETs. Transistor biasing stability: Current feedback, Voltage feedback, Current and voltage feedback, Stability factor ،Analysis of AF amplifiers: RC- and transformer-coupled AF power amplifiers: Power transistor considerations, Class-A amplifiers (direct, transformer coupled), Push-pull operation (class-A, class-B). Operational amplifiers (OP-AMPs): Difference amplifier, OP-AMP specifications, Frequency characteristics. OP-AMP applications: Adder, Subtracter, Integrator, Differentiator, Electronic analogue computation, I to V and V to I converter, Comparators, Schmitt trigger, OP-AMP oscillators (rectangular, sinusoidal, Wien bridge and phase shift).

CEE122 Electric circuits (2)
The Complex frequency, the damped sinusoidal forcing function, S-plane, frequency response, parallel and series resonance, magnetically coupled circuits, Mutual inductance, the ideal transformer, three phase systems. Two port networks: admittance, impedance, hybrid and transmission parameters.

CEE123 Digital Logic Design
Numbering systems, Logic gates, Boolean algebra, Combinational systems, encoders, decoders, multiplexers, demultiplexers, arithmetic circuits. Flip flops, properties and different types, Counters, Shift registers, Sequential circuits, Memories, Programmable logic devices, PLDS.

EMP 124 Mathematics (4)
First order differential equation (different methods), second order differential equation, Higher order differential equation (different methods). Laplace transform, Inverse Laplace transform, Initial value theorem.

CEE125 Signal analysis
Signals and systems: Continuous time and discrete-time signals, Exponential and sinusoidal signals, the unit Impulse and unit step functions, Basic system properties. Linear time-invariant systems: Discrete-time LTI systems: The convolution sum. Continuous-time LTI systems, Properties of LTI systems, Causal LTI systems described by differential and difference equations. Fourier series representation of periodic signals: Fourier representation of continuous, Time periodic signals, Fourier series representation of discrete, Time periodic signals, Filters described by differential equations and filters described by difference equations. The continuous-time Fourier transform: Representation of aperiodic signals, The Fourier transform for periodic signals, The properties of continuous-time Fourier transform, The discrete-time Fourier transform: Representation of aperiodic signals, The discrete Fourier transform for periodic signals, Properties of the discrete-time Fourier transform. The Z-transform: Region of convergence, The Inverse Z-transform, Properties of the Z-transform, Analysis and characterization of LTI systems using Z-transform, System function algebra, The unilateral Z-transform

EMP 126 Electric Properties of materials
Atomic and Crystal structure of materials, Engineeringmaterials, Electric properties of materials, Temperature properties of materials, Insulators, Conductors, Semiconductors, Examples of such materials, Material behavior under repetitive load, and pulsed load, Dynamics of friction, Theory of breakdown.

ECL 127 Scientific and creative thinking
The definition of scientific thinking, its characteristics and objectives, the development of scientific thinking, observation and experimentation and extraction of scientific hypotheses, analysis and synthesis, data analysis, the discovery of relationships through data analysis. Creativity as a concept, literary creativity and its difference from scientific creativity, how to stimulate creativity since early childhood, stimulate artistic, technical and applied creativity in life fields, acquire skills for how to extract basic and creative ideas and test the best.

CEE21١ Electronic Circuits (2)
Feedback (FB) amplifiers: FB concept, General characteristics of negative FB amplifiers, Input and output impedances with FB, Oscillators (sinusoidal, phase shift, resonant circuits and crystal). Multivibrators (MVs): Bistable MVs (fixed and self-bias), Triggering, Schmitt trigger (emitter

coupled), Monostable and a stable MVs (collector and emitter-coupled). Radio frequency (RF) voltage amplifiers. RF power amplifiers. Voltage regulators: Basic requirements, Regulator types (shunt, series and FB-regulators), Complete FB regulator.

CEE21٢ Electronic Measurements (1)
Electric units, error in measurements, measurements of DC voltage and current, DC bridges and application, AC bridges and application, Oscilloscope, applications of oscilloscope, Transducers, Measuring no electrical parameters (temperature, sound, etc.…), electronic instruments for DC and AC currents.

CEE 21٣ Computer organization and assembly language
Computer interconnection structures , computer components , computer function interconnection structures , bus interconnection. , Internal and external memory , computer memory system overview , semiconductors main memory , cache memory , magnetic tape , optical memory , Input / Output , I/O modules , programmed I/O , interrupt-driven I/O , direct memory Access , Operating system , Operating systems overview ,scheduling , memory management , The central processing unit , Computer Arithmetic , characteristics and functions of instruction sets , addressing modes , processor organization , the instruction cycle , instruction pipelining , Control unit Micro-operation , hardware implementation , Control Functions. Introduction to assembly language

EMP 21٤ Mathematics (5)
Complex functions, Harmonic functions, Cauchy theorem, Cauchy integral formula, Laurant series, Residues, Real integral, Transform, Inverse Z transform, Difference equations. Using Z transform to solve difference equations, probability theory.

CEE21٥ Introduction to Communications
Signal communication, Communication noise, Band width, Modulation, definition, amplitude modulation and its types, single side band, Frequency and phase modulation, Demodulation, AM transmitters and receivers, FM transmitters and receivers, Radio and television systems.

BUS 21٦Engineering Economics
Fundamentals of engineering economics and Economic Theories (macro & micro), Construction & Housing economics, Economic Resources & production Function, Economic construction studies, market balance, Transportation economics, financial statements, accounting methods, Depreciation and Maintenance, financial statements, construction project costs, Introduction to Feasibility Studies Risk analysis, SWOT analysis, Fundamentals of civil engineering projects' evaluation.

CEE21٧ Field Theory
Vector analysis, Electric field intensity and the potential for different charge distributions, Electric flux density, Gausslaw, divergence, Capacitance, Poisson and Laplace's equations, Magnetic field intensity and magnetic flux density, Biot-Savart law, Ampere's law, Curl operator, Stocks theorem, Inductance and mutual inductance, Time varying field, Faraday's law, Maxwell's equations.

CEE221 Programming Application
An advanced C-language Programming is provided in this course: two dimensional arrays, strings, pointers, recursion, structures, bitwise-operators, input-output interfacing as well as text and binary files are covered in details. Fundamentals of object-oriented program (C++): classes methods, object, Projects are required from students to increase their skills in C programming.

CEE222 Electronic Measurements (2)
Digital instruments: A/D and D/A converters, digital counters, signal analyzers, wave analyzer, spectrum analyzers, signal generators, microprocessor, based instruments, fault testing, testing of digital systems.

BUS 223 Management & marketing
Marketing Management is designed to serve as an introduction to the theory and practice of marketing. Students will improve their ability to develop effective marketing strategies and assess market opportunities, as well as design strategy implementation programs. In addition, students will have the opportunity to communicate and defend their recommendations and build upon the recommendations of their peers. We will explore the theory and applications of marketing concepts through a mix of cases, discussions, lectures, guest speakers, individual assignments, and group projects. We will draw materials from a variety of sources and settings including services, consumer and business-to-business products.

EMP224 Mathematics (6)
Roots of algebraic and transcendental equations; function approximation; numerical differentiation; numerical integration; solution of simultaneous algebraic equations, Finite difference techniques, Finite element techniques.

CEE225 Communication Systems

Introduction to communication systems, Analysis of amplitude modulation, Frequency modulation, Phase modulation, Pulse modulation systems, Transmitters and receivers, Detectors, Mixers, Automatic gain control, Automatic frequency control, Phase-locked-loop, Applications of RF power amplifiers, Limiters, Harmonic generators and AM modulators, Stereo coder and decoder, FM stereo broadcast transmitters and receivers, Black and white television system: Scanning methods, Synchronization, Black and white camera and picture tubes, Black and white transmitters and receivers and their associated circuits, Color TV systems (PAL/ SECAM/NTSC), PAL coders and decoders, SECAM coders and decoders, NTSC coders and decoders, Color TV transmitters and receivers, Alignment of color TV receivers.

CEE226 Electromagnetic Waves

Power flow on TL, Smith chart and impedance matching, Theory of small reflections, Power and energy relations, Guided waves: Waves between two conducting parallel plates, TE and TM waves and their characteristics, Velocities of propagation, Attenuation and quality factor, Wave impedance, Basic closed wave, Guides TE and TM waves and their characteristics in rectangular wave guides, Waves solution in cylindrical coordinates, TE and TM waves in circular wave- guides, Attenuation and quality factor of the wave- guide, Dielectric planar wave- guide, Surface waves, Modes of TE and TM waves in planar dielectric guide, Optical fibers.

BUS 227 Feasibility Studies for Engineering Projects

Feasibility Studies (importance, definition, concepts & history), Engineering project: concepts, forms and types such as Types of Feasibility Studies (Pre-feasibility studies, technical, economic, marketing, financial, environmental, legal, Comprehensive, etc.), Financial studies, financial statement i.e. types, analyses, Cost and Revenue, Project evaluation and assessment and decision taking.

TRN 228 Field Internship (2)

Field Internship is considered one of the most important methods of practical application at the undergraduate level. It also aims to market the outputs of the departments as it may have the opportunity to get a promise of employment by the training body

Summer Internship is an essential part of the graduation requirements that the student must successfully pass, and a two-week period performed by the student in one of the outstanding companies or institutions in the field of specialization to allow the student to develop knowledge and applied skills, and the link between theoretical study and practical reality, which helps the student to accept the nature of work and adapt to it, and develop communication skills with others. At the end of the Internship, the student shall submit a separate report on the training. The evaluation shall be done through a committee formed by the department council. One of its members shall be the supervisor of the training from the training department and the training supervisor from the scientific department in addition to a third member nominated by the department head.

CEE 311 Microprocessors and Microcontrollers

Introduction about microprocessors, differences between microprocessors and microcontrollers, Properties of embedded systems, Busses, Van Newman and Harvard bussing systems, Microprocessor architecture, Detailed study of one of the 8 bits microprocessor (8085), Memory Interfacing, Input output interfacing, Programmable peripheral interface, PPI.

CEE312 Linear Systems and Control (1)

Mathematical background, linear system components and system modelling, linear differential equations, transient response, Laplace transform, frequency response, Nyquiste and Nichols diagrams, stability and other performance specifications of feedback systems, root locus method, control design by Bode and root locus diagrams.

CEE313 CA Design and simulation of electronic circuits

Schematics of an electronic circuits, Analysis of static and dynamic circuits using computers, Errors and sensitivity, Monto-carlo analysis, Design using one of electronic circuit simulation packages to simulate circuits and making layout like PSpice, Workbench, ORcad, and others available in the market.

CEE 314 Electric machines

Transformers, theory and operations, Energy conversion, DC machines, theory and operation, field excitation, starting, and speed control, AC machines, induction machines, theory of operation, simulation and speed control, Special purpose machines.

CEE315 Digital Signal Processing

Introduction to Digital Signal Processing - Introduction to Discrete-Time Signals and discrete time system - Frequency Analysis of signals and Systems - Analysis and design of discrete time system in frequency Domain - Discrete-Fourier transform and fast-Fourier transform - The Z-Transform and its application to the analysis of LTI system - introduction to Digital Filters (Recursive Filter Design Technique) - Introduction to Digital Filters (Finite Impulse Response –Convolution filters)

CEE316 Microwave Engineering

Microwave network analysis, scattering and transfer parameters, directional coupler, microwave tubes, reflex klystron, magnetrons, traveling wave tubes, microwave measurements.

HUM 317 Engineering Legislation and Professional Relations
Concept of engineering and professional practices - Responsibilities and ethics of the profession of engineering - Regulation of practicing the profession - Rules of the engineering and scientific system - Engineering reading of legal texts and executive regulations - Laws governing work in the field of specialization and its executive regulations - Laws of indecency (Law of Engineers Syndicate, Labor Law) - Analytical reading of selected texts - Laws related to professional work in specializations - Applications and presentation of models of issues and problems and their solutions.

HUM 321 Environmental Pollution
Environment, Definition of environmental pollution, Environmental system, Classification of pollutants in atmosphere, Air pollution and how to control, Water pollution, wastewater treatment, Noise pollution, Soil pollution, Radiation effects.

CEE 322 Data Communication and networks
concept of computer communication. Analogue & digital transmission, networking principles, the evolution of networks and identify the key concepts and functions that form the basis for layered architecture. We introduce examples of protocols and services that are familiar to the students, and we explain how these services are supported by networks. Further, we explain fundamental concepts in digital communication, and focus on error control techniques that include parity check, polynomial code, and Internet checksum. Students will be required to have some previous programming experience in C-programming (C++/Java), some fundamental knowledge of computer organization and IT architecture and a background in

CEE 323 Solid State Electronics
Elementary materials science concepts: atomic structure, Bonding and types of solids, the crystalline state, lattice vibrations, the Hall Effect and Hall devices. Quantum mechanics: photons, particles and waves, the electron as a wave, infinite potential well, Heisenberg's uncertainty principle, Tunneling phenomenon (potential barrier). The band theory of solids: E-K diagram, energy bands diagram, Electrons and holes, effective mass Semiconductors: Intrinsic semiconductors, Extrinsic semiconductors (n-type doping, p-type doping, compensation doping), Electron and holes Concentrations, Fermi energy level position, Conductivity of a semiconductor, Diffusion and conduction currents equations. Definitions for dielectric and magnetic materials and superconductivity.

CEE 324 Linear systems and control (2)
Time, domain performance of continuous data control systems: the steady, state error; time, domain performance of control systems: transient response; transient response of a prototype second, order system. Design with the phase, lead controller; design with the phase, lag controller; design with lead, lag, lag, lead controllers. Digital control system design through discrete approximation of analog controller.

CEE 325 Power electronics
Properties of power semiconductor devices, Power diodes, Power transistors, Thermistors, Trials, Power electronic circuits, Application of microprocessors in power electronics.

TRN 328 Field Internship (3)
Field Internship is considered one of the most important methods of practical application at the undergraduate level. It also aims to market the outputs of the departments as it may have the opportunity to get a promise of employment by the training body
Summer Internship is an essential part of the graduation requirements that the student must successfully pass, and a two-week period performed by the student in one of the outstanding companies or institutions in the field of specialization to allow the student to develop knowledge and applied skills, and the link between theoretical study and practical reality, which helps the student to accept the nature of work and adapt to it, and develop communication skills with others. At the end of the Internship, the student shall submit a separate report on the training. The evaluation shall be done through a committee formed by the department council. One of its members shall be the supervisor of the training from the training department and the training supervisor from the scientific department in addition to a third member nominated by the department head.

CEE 41١ Computer Networks
network architectures, communication protocols, data link control, medium access control; introduction to local area networks metropolitan area networks and wide area networks; introduction to Internet and TCP/IP.OSI model: layered protocol architectures., Bridging and switching, Routing protocols and algorithms Introduction to Internet IP, ICMP, routing UDP and TCP Application layer protocols: DNS, SMTP and HTTP, Sniffing over LANs.

CEE 412 Digital Communications
Acoustical signals, properties, spectrum, and bandwidth, Digital representation of signals, Sampling, Pulse width modulation, delta modulation, Source coding, Line coding, Digital transmission: baseband transmission of digital signals, Interference, Digital modulation: ASK, FSK, PSK, QAM, MSKK, cabling systems, Channel multiplexing.

CEE 413 Optical Communications

Physics of optical communication components and applications to communication systems. Topics include fiber attenuation and dispersion, laser modulation, photo detection and noise, receiver design, bit error rate calculations, and coherent communications.

CEE414 Graduation project (1)
The students choose a topic, define objectives and write a project proposal that should be approved by the supervisor. Upon approval, the student proceeds by defining the requirements, setting specifications, preparatory studies of the literature and data collection.
The course covers directed readings in the literature of communication and electronics engineering, introduction to research methods, seminar discussions dealing with special engineering topics of current interest. Planning, design, analysis and implementation of an engineering project. Writing a technical report. By the end of the semester, the students present a complete report and defend his project in front of a committee.

CEE 415 Antennas
Fundamentals and definitions for transmitting and receiving antennas and antenna arrays. Dipoles array synthesis and antenna arrays, Line sources. Resonant antennas wires and patches: Folded dipole antennas, Yagi Uda antennas, Microstrip antennas. Broadband antennas: Travelling wave wire antennas, helical antennas, Biconical antennas, Sleeve antennas. Aperture antennas: Rectangular and circular apertures, Reflector antennas. Feeding networks for wire antennas, Arrays and reflectors. Antennas in communication systems: Friis transmission formula, Antenna noise temperature. Microwave propagation: Atmospheric effects, Ground effects and plasma effects.

HUM 421 Presential ethics
This course is an introduction to the philosophical study of morality, including the theory of right and wrong behavior, the theory of value (goodness and badness), and the theory of virtue and vice. Besides providing familiarity with the primary questions addressed within moral philosophy and the most influential answers given by well-known philosophers, this course is designed to help students develop their abilities to read, explicate, analyze, and evaluate philosophical literature, write and express themselves well about their own ethical positions, and think critically and analytically about ethical issues.

CEE422 Satellite communications
Overview and basic concepts of Satellite communication, satellite system applications, orbital aspects, antenna look angle, system elements, space and earth segments link power budget calculation, satellite receivers, multiple access techniques, CDMA, TDMA, FDMA.

CEE 423 Mobile Communications
Difference between conventional mobile and cellular mobile, Overview on different cellular generations, Cellular radio design principles, Concept of frequency reuse/cellular block diagram, Co channel interference/adjacent channel interference, Multipath propagation, Speech coding in GSM, Channel coding and interleaving in GSM, GSM mobile station block diagram, Multiple access techniques, Control channels in GSM, Location updating\ security management.

CEE424 Graduation project (2)
Each student must do a complete project under the supervision of one of the staff members. By the end of the year the students present a complete report and defend his project in front of a committee.

CEE 425 Optical Electronics
Photodiodes and optical detection, photometry and radiometry, geometric optics, lens theory, imaging system, EM wave propagation, optical waveguides and fibers, heterojunction structures, laser theory, semiconductor lasers, and optical transmission system.

TRN X28 Summer Internship
The Training aims to offer students the opportunity to apply their knowledge in real-life environments through an industry placement for eight-weeks. It is expected that the skills students will gain from working with an organization will help them perform better on their jobs after graduation. In addition, the Training greatly increases the chances for students to obtain full time employment after graduation

Tables of Elective Courses

List of electives courses (1 & 2)

COMMUNICATION TRACK		ELECTRONICS TRACK	
CEE 331	Acoustics	CEE 341	Integrated Circuit Fabrication
CEE 332	Image processing	CEE 342	Telephone circuits and switches
CEE 333	Remote Sensing Systems	CEE 343	Electronic devices
CEE 334	Information Theory & Coding	CEE 344	RF Circuit design
CEE 335	advanced digital signal processing	CEE 345	Modern Electronic Circuits
CEE 336	Computer vision	CEE 346	Micro-Electro-Mechanical Systems [MEMS]

List of electives courses (3 & 4)

COMMUNICATION TRACK		ELECTRONICS TRACK	
CEE 431	Radar systems	CEE 441	Artificial intelligence
CEE 432	Advanced antenna systems	CEE 442	Computer Aided Design
CEE 433	Neural Networks	CEE 443	Selected Topics in Electronics
CEE 434	Network security	CEE 444	Digital VLSI Design
CEE 435	Multimedia systems	CEE 445	Automated Industrial Systems
CEE 436	Cryptography and Information Security		

List of electives courses (5 & 6)

COMMUNICATION TRACK		ELECTRONICS TRACK	
CEE 451	Communication System Design	CEE 461	Embedded system
CEE 452	Modern Wireless Communications	CEE 462	VLSI Fabrication & Testing of IC
CEE 453	Selected Topics in Communications	CEE 463	Biomedical Electronics
CEE 454	Telecommunications System Engineering	CEE 464	Nano Electronics Technology
CEE 455	Media & Entertainment Engineering	CEE 465	advanced power electronics
CEE 456	Networked control system design and application		

Elective Courses Description

CEE 331 Acoustics

Acoustic wave and velocity of sound , The one-dimensional wave equation , Impedance of mediums , Three-dimensional wave equation and spherical wave , Sound intensity and power , Energy density and levels , Multiple sources and loudness , Environmental acoustics , Equivalent sound pressure level and assessment of noise , Analogy between acoustical and electrical circuits , Transducers and sensitivity of MICs and loudspeakers , Hi-fi system and introduction of underwater acoustics , Velocity profiles and SONAR

CEE 332 Image Processing

Image representation, spatial frequency domain, Descriptions of line and shape, Perspective transformations, Projective invariant, Descriptive methods in scene analysis. Feature analysis: Pre-processing, Feature extraction. Classification: the bays classifier, Discrimination function and decision surfaces, Clustering application in image field.

CEE 333 Remote Sensing Systems

The basics of remote sensing, characteristics of remote sensors, aerial photography and photogrammetry, visual image interpretation, characteristics of various sensing systems (i.e. multispectral, thermal, hyperspectral, microwave and lidar) and remote sensing applications in academic disciplines and professional industries

CEE 334 Information Theory & Coding

Review of probability theory, Concept of information theory and coding, Average information & Entropy, Mutual information, Channel capacity, Bandwidth and S/N of a channel, Source Coding, Channel Coding Theorem, Linear block codes, Convolutional codes, Viterbi decoding, Turbo Codes, Iterative decoding, Performance of different coded modulation in AWGN channels.

CEE 335 advanced digital signal processing

The student studies all methods used in the design of digital filters of various types in addition to studying the characteristics of each method

CEE 336 Computer vision

This course provides a comprehensive introduction to computer vision. Major topics include image processing, detection and recognition, geometry-based and physics-based vision and video analysis. Students will learn basic concepts of computer vision as well as hands on experience to solve real-life vision problems.

CEE 341 Integrated Circuit Fabrication

Introduction, Basic Processes in Integrated Circuit fabrication, Electrical characteristics of Silicon, Solid state diffusion, Photolithography, Ion Implantation, Local Oxidation, Polysilicon Deposition, High Voltage Bipolar integrated circuit fabrication, Passive Components in Bipolar integrated circuits, MOS Integrated, Circuit Fabrication, Passive Components in MOS technology, BiCMOS Technology, Economics of Integrated Circuit fabrication, Packaging Considerations for integrated circuits.

CEE 342 Telephone circuits and switches

Introduction to telephone networks, Methods of connection to switches, Control system of switches, Control using ready-made programs, Control signals, One channel control system, Numbering system, Methods of switching, Planning of telephone networks.

CEE 343 Electronic Devices

Reviewing charge transport in semiconductors, Generation recombination mechanism, High field effects, High injection in pn junctions, large and small signal models for BJTs, Metal semiconductor contact, MOS capacitors, large and small signal models for MOSFET, short and narrow channel effects, power devices, Devices simulators, other semiconductor devices, Applications.

CEE 344 RF Circuit Design

Design and analysis of RF transmitters and receivers, design of amplifiers, mixers, oscillators, noise calculations, harmonic distortion

CEE 345 Modern Electronic Circuits

A course that integrates electronic courses with communication courses to give students the overall picture of different communications systems. This includes the design, analysis, testing and troubleshooting methods to be carried in these systems.

CEE 346 Micro-Electro-Mechanical Systems [MEMS]

MEMS technology, revolution and advantages of MEMS technology. Description of the MEMS applications, and its fabrication techniques. Studying the nature of piezoelectricity and piezo resistivity. Description of the microsensors, micro actuators, different system issues and the scaling effect. Finally describing the Micro assembly and an overview on Micro robotics.

CEE 431 Radar systems

Radar systems, radar equations, range prediction, radar signal noise, pulse radar, Target cross-section, signal analysis, continuous wave radar, using radar in control traffic, radar application in navigation, Remote sensing, and guidance system.

CEE 432 Advanced antenna systems

Rectangular Microstrip antenna (definition, analysis, design, radiation pattern, directivity). Circular Microstrip antenna (definition, analysis, design, radiation pattern, directivity). Wideband Antenna (analysis of Spiral Antenna, Conical Antenna, Cylindrical Antenna). Helical Antenna (analysis, design, radiation pattern, directivity). Inverted F Antenna (analysis, design, radiation pattern, directivity). Log Periodic Antenna (analysis, design, radiation pattern, directivity). Analysis of Lens Antenna. Introduction to Smart Antenna.

CEE 433 Neural Networks

Introduction to basic concepts of neural networks. The basic neuron. The multilayer perceptron. Artificial neural networks: applications, learning, and architecture. Competitive neural networks. Kohonen self-organizing networks. Adaptive reasoning theory (ART). Hopfield neural networks. Neural networks implementation. Neural networks applications. Introduction to MATLAB environment. Single perceptron, Multilayer perceptron, Competitive networks, Kohonen networks, ART networks, And Hopfield networks using MATLAB.

CEE 434 Network security

Problems and types of information security, Viruses, Decoding methods, Decoding theorems, Digital signature systems, DES, RSA, Problems with keys, Authentication, Security in computers and information networks, Control of access, Fire walls, definition and applications, Fire walls and internet, Security protocols.

CEE 435 Multimedia systems

Include introduction to multimedia systems, digital video compression techniques, operating system support for digital audio and video, as well as network and transport protocols for multimedia.

CEE 436 Cryptography and Information Security

an introduction to internet purchases, ATM transactions, and secure electronic communication are examples of everyday activities that rely on cryptography, surveys the historical development and impact of secret codes, the mathematics underlying the making and breaking of several significant classical codes, and the security of modern computer-based ciphers are presented, the balance between the right to individual privacy and the need for law enforcement and national security are also considered.

CEE 441 Artificial intelligence

study the most fundamental knowledge for understanding AI. some basic search algorithms for problem solving; knowledge representation and reasoning; pattern recognition; fuzzy logic; Structures of expert systems and neural networks.

CEE 442 Computer Aided Design

To introduce fundamental algorithms and techniques for computer aided integrated circuit design. It covers aspects of design flow, physical design, logic optimization, timing analysis and verification, synthesis for testability.

CEE 443 Selected Topics in Electronics

The course includes a description of a number of topics in the field of modern electronics systems with the identification of applications of these systems. A group of students presents a project to design components of a modern electronics system

CEE 444 Digital VLSI Design
Design of VLSI digital circuits, Stick diagrams, design rules, CAD system, speed and power considerations, floor planning, layout techniques

CEE 445 Automated Industrial Systems
Automated hierarchical levels and components. Detecting sensors and actuating elements, relay logic and their applications. Introduction to PLC.S. Types of PLCs and construction. Hardware configuration and descriptions. Programming and testing basic functions. Programming and testing advanced functions. Industrial Applications using PLCs

CEE 451 Communication System Design
This course presents a top-down approach to communications system design. The course will cover communication theory, algorithms and implementation architectures for essential blocks in modern physical-layer communication systems (coders and decoders, filters, multi-tone modulation, synchronization sub-systems). The course is hands-on, with a project component serving as a vehicle for study of different communication techniques, architectures and implementations.

CEE 452 Modern Wireless Communications
Radio Wave Propagation, Digital Modulation Techniques, spread spectrum techniques (DS & FH), spreading codes, OFDM, OFDMA, SC-OFDM and their applications, Cellular systems, speech coding, Equalization & Diversity, MRC, RAKE Receiver, Channel coding: block codes, convolutional codes, and turbo codes.

CEE 453 Selected Topics in Communications
The course includes a description of a number of topics in the field of modern digital and analogue communications systems with the definition of applications of these systems. A group of students presents a project to design components of a modern communication system

CEE 454 Telecommunications System Engineering
Principles, Technologies, system architectures, standards of GSM, GPRS, UMTS, WLAN, 802.16 and WiMAX, QoS in telecommunication systems, Internet Telephony, Resource allocation and management, Sensor networks

CEE 455 Media & Entertainment Engineering
Stereophonic broadcasting systems, TV scanning and broadcasting, Detailed block diagram of a TV transmitter and receiver, Color TV fundamentals, NTSC, PAL, and SECAM systems, Digital TV, HDTV and Satellite TV, Audio recording analog and digital, Compact disc and CD player, Reflection and ray tracing theory, Acoustical treatment and studio design

CEE 456 Networked control system design and application
The concepts and applications of the control system in which the sensors and/or actuators are connected through a computer network. examine the problems that arise with the configuration of this control system, how to model and to conduct a system behavior analysis will be discussed. With the results of the analysis, the controller synthesis will be performed to get the system with the desired performance

CEE 461 Embedded system
An overview of embedded systems, hardware and utilities for the design of paid systems, digital hardware modeling of solid components, structural modeling, data flow modeling and behavioral modeling. Build and accomplish microprocessors, instructions, design and implementation of processor software, real-time operating systems and test them.

CEE 462 VLSI Fabrication & Testing of IC
Choice of technology, different fabrication processes of VLSI integrated circuits: crystal growth, thermal oxidation, chemical etching, diffusion and ion implantation, epitaxy and chemical-vapor deposition, metallization, and process integration. Testing techniques. Design for testability.

CEE 463 Biomedical electronics
Biomedical instrumentation, basics of biomedical engineering, biological phenomena, bio potential amplifiers, electronic pacemaker circuits. Bio potential signals, ECG, EMG, EEG, Isolation amplifiers, Safety of medical devices.

CEE 464 Nano Electronics Technology

An introduction to the principles of quantum mechanics, including quantization, the wave-particle duality, wavefunctions and Schrödinger's equation, the electronic properties of molecules, carbon nanotubes and crystals, including energy band formation and the origin of metals, insulators and semiconductors, Electron conduction with ballistic transport and concluding with a derivation of Ohm's law, compare ballistic to bulk MOSFETs.

CEE 465 advanced power electronics

Modeling, analysis, and control techniques; design of power circuits including inverters, rectifiers, and DC-DC converters; analysis and design of magnetic components and filters; and characteristics of power semiconductor devices. Numerous application examples will be presented such as motion control systems, power supplies, and radio-frequency power amplifiers.

11. Evaluation of program intended learning outcomes

Evaluator	Tool	Sample
1- Senior students	Questionnaire	Questionnaires for the student opinion the courses, lecturers and the supporting body with a total sample size of 154 questionnaires.
2- Alumni	Questionnaire	Questionnaires were conducted for the graduates' opinions in the program with a total sample size of 17 questionnaires
3- Stakeholders (Employers)	Questionnaire	Surveys and meeting were conducted with a group of businessmen, stakeholders and beneficiaries in the engineering field
4-External Evaluator(s) (External Examiner(s))	Report	Report of external evaluator 5/2023
5- Other societal parties	Questionnaire	N. A

We certify that all of the information required to deliver this program is contained in the above specification and will be implemented. All course specification for this program is in place.

Program coordinator:

Name:	Dr. Nora Ahmed Ali	Signature:	Date:

Dean:

Name:	Prof. Dr. Ahmed Abdullah	Signature:	Date:

Head of Quality Assurance Unit:

Name:	Prof. Dr. Mohamed Sadek	Signature:	Date:

Appendix (1)

Contribution of Courses to Program Competencies

Contribution of Courses to Program Competencies

Code	Title	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6
EMP 011	Mathematics (1)	√																				
EMP 012	Physics (1)	√	√			√																
EMP 013	Mechanics (1)	√			√	√																
EMP 014	Engineering Drawing &Projection (1)								√													
EMP 015	Chemistry	√	√		√																	
HUM 016	English Language								√		√											
EMP 017	Introduction to Computer and Programming		√		√					√												
EMP 021	Mathematics (2)	√																				
EMP 022	Physics (2)	√	√			√																
EMP 023	Mechanics (2)	√				√																
EMP 024	Engineering Drawing & Projection (2)								√													
ECL 025	Production Technology		√					√														
HUM 026	Health and Accommodations					√					√											
ECL 027	History of Engineering and technology					√					√											
TRN 028	Summer Internship (1)							√	√	√												
CEE 111	Electronic Engineering	√	√											√			√	√				
EMP 112	Structural Programming	√	√											√				√			√	√
CEE 113	Electric Circuits (1)	√	√											√	√							
EMP 114	Mathematics (3)	√																				
HUM 115	Social Impact of Technology	√				√																
HUM 116	Advanced English Language for Communication and Electronic Engineering					√		√	√		√											
TRN 117	Technical Report Writing							√	√													
CEE 121	Electronic Circuits (1)	√	√											√			√	√				
CEE 122	Electric Circuits (2)	√	√											√	√							
CEE 123	Digital Logic Design	√											√	√								
EMP 124	Mathematics (4)	√								√												

Contribution of Courses to Program Competencies

Code	Title	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6
CEE 125	Signals and Systems	√											√		√							
EMP 126	Fundamentals of Material Science				√	√																
ECL 127	Scientific and Creative Thinking									√	√											
CEE 211	Electronic Circuits (2)	√												√			√	√	√			
CEE 212	Electronic Measurements (1)	√	√	√								√	√				√					
CEE 213	Computer Organization and Assembly Language			√				√					√	√			√	√				
EMP 214	Mathematics (5)	√				√				√	√											
CEE 215	Introduction to Communications	√	√										√		√						√	
BUS 216	Engineering Economics	√	√																			
CEE 217	Field Theory	√				√									√		√					
EMP 221	Programming Application						√	√						√	√				√			
CEE 222	Electronic Measurements (2)	√	√	√								√	√				√					
BUS 223	Management & Marketing						√		√	√	√											
EMP 224	Mathematics (6)	√								√												
CEE 225	Communication Systems			√									√	√							√	
CEE 226	Electromagnetic Waves	√				√						√	√	√			√					
Bus 227	Feasibility Studies and Projects Management	√								√												
TRN 228	Field Internship (2)		√	√		√	√					√	√	√		√	√	√	√			
CEE 311	Microprocessor and Microcontroller					√	√						√	√			√		√			
CEE 312	Linear Systems and Control (1)	√	√			√								√	√		√					
CEE 313	CA Design and Simulation of Electronic Circuits												√	√								
CEE 314	Electric Machines	√	√			√								√	√		√		√			
CEE 315	Digital Signal Processing	√	√												√		√					
CEE 316	Microwave Engineering	√				√							√		√		√			√		
HUM 317	Engineering Legislation and Professional Relations							√	√	√	√											

Contribution of Courses to Program Competencies

Code	Title	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6
HUM 321	Environmental Pollution	√							√		√											
CEE 322	Data Communication and Networks			√									√								√	
CEE 323	Solid State Electronics		√									√					√					
CEE 324	Linear Systems and Control (2)	√	√			√								√	√		√					
CEE 325	Power Electronics	√	√			√								√	√		√					
CEE3AW**	Elective Course (1)		√									√	√				√		√			
CEE3AW**	Elective Course (2)		√									√	√				√		√			
TRN 328	Field Internship (3)		√			√	√	√		√	√		√			√						√
CEE 411	Computer Networks			√				√					√	√			√	√				
CEE 412	Digital Communication	√	√												√		√					
CEE 413	Optical Communication		√										√	√			√					
CEE 414	Graduation Project (1)**		√	√		√				√		√	√	√			√	√		√		
CEE 415	Antennas	√	√											√	√		√					
CEE4AW*	Elective Course (3)		√									√	√				√		√			√
CEE4AW*	Elective Course (4)		√									√	√				√		√			√
HUM 421	Professional Ethics								√	√	√											
CEE 422	Satellite Communications	√				√							√		√		√					
CEE 423	Mobile Communication	√				√							√		√			√				
CEE 424	Graduation Project (2)**		√	√		√				√		√	√	√			√	√		√		
CEE 425	Optical Electronics		√									√	√					√				
CEE4BW*	Elective Course (5)		√									√	√				√		√			
CEE4BW*	Elective Course (6)		√									√	√				√		√			
	No. of courses covering the competency	٣٨	34	9	4	24	5	9	10	13	١١	١٤	٢٧	٢٣	١٦	2	30	11	11	3	4	4

Appendix (2)

Contribution of Teaching/learning Methods and Strategies to the Courses

Communication and Electronics engineering - Teaching/learning Methods and Strategies Vs. Courses Matrix

Course	Teaching/learning Methods	Lecture	Class work (tutorial)	Practical and Lab. Experiment	Discussion	Brain Storming	Research and Report	Case study	Project	Practical training	Self-Study
EMP 011	Mathematics (1)	X	X			X					
EMP 012	Physics (1)	X	X		X		X				
EMP 013	Mechanics (1)	X	X	X	X	X					
EMP 014	Engineering Drawing &Projection (1)	X	X		X	X					
EMP 015	Chemistry	X	X	X	X		X				
HUM 016	English Language	X	X		X		X				
EMP 017	Introduction to Computer and Programming	X	X		X	X					
EMP 021	Mathematics (2)	X	X	X	X		X				
EMP 022	Physics (2)	X	X	X	X	X					
EMP 023	Mechanics (2)	X	X		X	X					
EMP 024	Engineering Drawing & Projection (2)	X	X	X	X						
ECL 025	Production Technology	X	X	X	X	X					
HUM 026	Health and Accommodations	X						X			X
ECL 027	History of Engineering and technology	X						X			X
TRN 028	Field Internship (3)									X	
CEE 121	Electronic Circuits (1)	X	X	X	X		X		X		
CEE 122	Electric Circuits (2)	X	X	X	X		X				
CEE 123	Digital Logic Design	X	X		X						
EMP 124	Mathematics (4)	X	X		X	X					X
CEE 125	Signals and Systems	X	X	X	X						
EMP 126	Fundamentals of Material Science	X	X		X						
ECL 127	Scientific and Creative Thinking	X		X	X		X		X		
CEE 211	Electronic Circuits (2)	X	X	X	X		X		X		X
CEE 212	Electronic Measurements (1)	X	X	X					X		
CEE 213	Computer Organization and Assembly Language	X	X		X						X
EMP 214	Mathematics (5)	X	X		X	X					
CEE 215	Introduction to Communications	X	X				X				X
BUS 216	Engineering Economics	X	X	X	X					X	
CEE 217	Field Theory	X	X	X	X		X				
EMP 221	Programming Application	X	X	X		X					X
CEE 222	Electronic Measurements (2)	X	X	X	X		X			X	
BUS 223	Management & Marketing	X				X	X	X			

Course		Teaching/learning Methods: Lecture	Class work (tutorial)	Practical and Lab. Experiment	Discussion	Brain Storming	Research and Report	Case study	Project	Practical training	Self-Study
EMP 224	Mathematics (6)	X	X		X	X					
CEE 225	Communication Systems	X	X	X	X	X			X		
CEE 226	Electromagnetic Waves	X	X	X	X			X		X	X
Bus 227	Feasibility Studies and Projects Management	X			X	X	X		X		
TRN 228	Field Internship (2)									X	
CEE 311	Microprocessor and Microcontroller	X	X	X					X		
CEE 312	Linear Systems and Control (1)	X	X		X		X				X
CEE 313	CA Design and Simulation of Electronic Circuits	X	X		X		X	X			
CEE 314	Electric Machines	X	X	X	X						
CEE 315	Digital Signal Processing	X	X	X	X		X		X		
CEE 316	Microwave Engineering	X	X	X	X		X				
HUM 317	Engineering Legislation and Professional Relations	X			X			X			X
HUM 321	Environmental Pollution	X			X		X	X			X
CEE 322	Data Communication and Networks	X	X		X	X	X				
CEE 323	Solid State Electronics	X	X	X	X		X				
CEE 324	Linear Systems and Control (2)	X	X		X						X
CEE 325	Power Electronics	X	X	X			X		X		
CEE3AW**	Elective Course (1)	X	X			X	X	X			
CEE3AW**	Elective Course (2)	X	X	X	X		X				X
TRN 328	Field Internship (3)									X	
CEE 411	Computer Networks	X	X		X	X	X				
CEE 412	Digital Communication	X	X	X	X		X		X		
CEE 413	Optical Communication	X	X		X				X		X
CEE 414	Graduation Project (1)**				X	X	X				X
CEE 415	Antennas	X	X		X		X	X			
CEE4AW*	Elective Course (3)	X	X		X						X
CEE4AW*	Elective Course (4)	X	X		X		X				X
HUM 421	Professional Ethics	X			X	X	X				X
CEE 422	Satellite Communications	X	X		X		X	X			
CEE 423	Mobile Communication	X	X		X		X	X			X
CEE 424	Graduation Project (2)**				X	X	X				X
CEE 425	Optical Electronics	X	X	X	X		X		X		
CEE4BW*	Elective Course (5)	X	X		X		X		X		
CEE4BW*	Elective Course (6)	X	X		X		X		X		

MINISTRY OF HIGHER EDUCATION

QUALITY ASSURANCE UNIT

GIZA HIGHER INSTITUTE OF ENGINEERING

Appendix (3)

Report of Internal Reviewer

تقرير مراجعة داخلية
لتوصيف برنامج بكالوريوس هندسة الالكترونيات والاتصالات
ومقررات الفرق حتى السنة الثانية
لائحة 2022/2021

تم الاستفادة من المراجعة الخارجية لبرنامج اللائحة القديمة (2017/2016) والتي ورد تقريرها في 2023/5، حيث قام القسم بعمل التعديلات اللازمة طبقاً لتقرير المراجع الخارجي. وأسقطت تلك التعديلات والملاحظات على توصيف البرنامج والمقررات للائحة الجديدة.

يعبر التقرير التالي عن الرأي العلمي الموضوعي

للسيد الدكتور: هشام حامد

الوظيفة : أستاذ منتدب بقسم الإلكترونيات والاتصالات – معهد الجيزة

تمت مراجعة وتقييم توصيف البرنامج المرفق بناء على طلب: وحدة ضمان الجودة

اسم البرنامج: هندسة الإلكترونيات والاتصالات

اسم الكلية / المعهد: معهد الجيزة العالي للهندسة والتكنولوجيا

بداية العمل باللائحة(2022-2021) :

تاريخ المراجعة: 6/ 2023

التقييم الشامل لتوصيف البرنامج المعنى يشمل المكونات التالية:

أ) البيانات الأساسية للبرنامج

العناصر	مستوف	مستوف جزئيا	غير مستوفاة	مبررات التقييم
البيانات الأساسية	√			بالاطلاع على توصيف البرنامج تبين أن البيانات الأساسية للبرنامج مستوفاة
اسم المنسق: د. نورا أحمد على				

ب) التقييم الأكاديمي

أهداف البرنامج			مبررات التقييم
صياغة الأهداف	√ واضحة	غير واضحة	أهداف البرنامج واضحة ومنطقية وقابلة للتحقيق، ويمكن قياسها كماً ونوعاً، ومتسقة مع المعايير المتبناة
قابلة للقياس	√ كما	√ نوعا	

ج) المعايير الأكاديمية

العنصر	التقييم		مبررات التقييم
تحديد المعايير الأكاديمية	محددة √	غير محددة	تم تبني معايير أكاديمية محددة

تبنى البرنامج معايير الهيئة القومية لضمان جودة التعليم والاعتماد	نعم √	لا	تبنى البرنامج المعايير الأكاديمية القومية (NARS 2018) المعدة بمعرفة الهيئة القومية لضمان جودة التعليم والاعتماد في 2020/2
المعايير تتوافق مع رسالة المؤسسة	نعم √	لا	تم الاطلاع على رسالة المعهد
تم اعتماد المعايير الأكاديمية من مجلس الكلية	نعم √	لا	تم الاطلاع على محضر المجلس الاكاديمي في 2021/2/1 والذي اعتمد المعايير المتبناة
تم إحاطة مجلس الجامعة بالمعايير الأكاديمية	نعم √	لا	لا ينطبق
تم مراجعة المعايير الأكاديمية من مراجع خارجي	نعم √	لا	تم الاطلاع على تقرير المراجع الخارجي لتوصيف البرنامج (أ.م.د. شيماء مصطفى جابر) الذي أعد في مايو 2023
تم اتخاذ الإجراءات التصحيحية بناء على مراجعة المعايير	نعم √	لا	تم الاطلاع على الاجراءات التصحيحية بناء على مراجعة البرنامج
ملائمة المعايير الأكاديمية لمواصفات الخريج	ملائمة √	غير ملائمة	توجد مصفوفة توضح مدى ملائمة المعايير الاكاديمية لمواصفات الخريج
تحقيق المعايير الأكاديمية المتبناة من خلال توصيف البرنامج	تحقق √	لا تتحقق	طرق التدريس والتعلم واساليب تقويم الطلاب المتضمنة في توصيف البرنامج والمقررات تمكن من تحقيق المعايير الاكاديمية

د) مخرجات التعلم للبرنامج

مخرجات التعلم	واضحة √	غير واضحة ☐
المبررات: تم الاطلاع على مخرجات التعلم وتبين وضوحها، كما استخدمت أفعال مناسبة، وقابلة للقياس. كما أنها تحقق الجدارات المستهدفة للخريج.		
ارتباط مخرجات التعلم بأهداف البرنامج	مرتبطة √	غير مرتبطة ☐
المبررات: توجد مصفوفة صحيحة ومنطقية توضح الارتباط		
تحقيق المقررات الدراسية لمخرجات التعلم	**تتحقق √**	**لا تتحقق ☐**
المبررات: من خلال مصفوفة العلاقة بين المقررات والمخرجات والجدارات، تبين أن كل جدارة تتحقق بأكثر من مقرر. **وقد تم تصحيح مخرجات التعلم وعلاقتها بالجدارات المتبناة طبقاً لتوصيات تقرير المراجع الخارجي.**		
مواكبة مخرجات التعلم للبرنامج لاحتياجات سوق العمل	تواكب بنسبة كبيرة √	لا تواكب
المبررات: تغطي احتياجات السوق من أفرع هندسة الالكترونيات والاتصالات.		

هـ) هيكل البرنامج ومحتوياته

توازن هيكل البرنامج مع مواصفات الخريج من حيث :		
مقررات العلوم الأساسية	متوازنة √	غير متوازنة
مقررات العلوم الإنسانية والاجتماعية	متوازنة	غير متوازنة √
مقررات متخصصة	متوازنة	غير متوازنة √
تدريب عملي وميداني	متوازنة √	غير متوازنة
أخرى	متوازنة √	غير متوازنة
مبررات التقييم: تم عمل جدول مقارنة بين نسب مكونات البرنامج ونظيراتها بمعايير الـ NARS حيث وجد نقص بسيط في نسبة Applied Engineering and Design . وأيضاً بالمقارنة مع نسب لجنة القطاع الهندسي، وجد نقص بسيط في نسبة Engineering Culture.		

و) تقويم أعمال الطلاب

طرق التقويم المستخدمة: امتحانات اعمال سنة تحريرية، امتحانات صغيرة، تمارين، تقييم ابحاث، مناقشة بالمحاضرة، امتحانات تحريرية نهائية، امتحن منتصف ترم، امتحانات شفوية، امتحانات عملية. كما تم إضافة طرق التقويم الالكتروني بناء على توصية المراجع الخارجي.		
ملائمة طرق تقويم الطلاب لطبيعة مخرجات التعلم	ملائمة √	غير ملائمة
المبررات:. تم الاطلاع على مصفوفة الارتباط بين وسائل التقويم ومخرجات التعلم، حيث تبين ملائمة طرق التقويم للمخرجات		
قدرة طرق التقويم على قياس مخرجات التعلم المستهدفة	قادرة √	غير قادرة
المبررات: . تتسم بتنوع طرق التقويم		

ى) مقررات البرنامج

- نموذج توصيف المقرر المستخدم مستوفي جميع العناصر اللازمة للتوصيف
- استخدام التعليم الهجين بكفاءة لعدة مقررات، وبنسبة مناسبة جداً للهدف منه.
- استخدام وسائل تقويم مناسبة طبقاً لتوصيات المراجع الخارجي.

الرأي النهائي:

يوجد توصيف جيد للبرنامج ومقررات الفرق الجاري تدريسها حتى سنة 2023-2024، ويمكن اعتماد التوصيف من المجالس المعنية.

الإسم : أ.د. هشام حامد **التوقيع:**