



GIZA HIGHER INSTITUTE OF  
ENGINEERING AND TECHNOLOGY



QUALITY ASSURANCE UNIT



MINISTRY OF HIGHER EDUCATION

**GIZA HIGHER INSTITUTE OF  
ENGINEERING AND TECHNOLOGY**  
**Communication and Electronics  
Engineering Department**

**(Terms' System)**

**Year of operation: 2016/2017**

**Program Specifications**

**2022/2023**

**Based on NARS2018**

(معدل طبقاً لتقرير المراجع الخارجي بتاريخ ٢٤ ابريل ٢٠٢٣)  
(اعتماد المجلس الأكاديمي في ٦ / ٢٠٢٣)



## A- Basic information

1. Program Title:	Communications& Electronics Engineering
2. Program Type:	<b>Single</b>
3. Department (s):	Communication & Electronics Engineering
4. Coordinator:	Dr. Nora Ahmed Ali, Head of Department
5. External Evaluator (s):	Dr. Shaimaa Mostafa Gaber, Egyptian Russian University, May 2023.
6. Last date of program specifications approval:	Institute Academic Council 6/2023

## B- Professional Information

### 1. Program Mission, and Aims

Communication and Electronics engineering permeates most aspects of modern life, from electricity power generation and transmission industries, the computer revolution, global telecommunications, and the modern entertainment industries. The Communication and Electronics Engineering Program aims to qualify the graduates with technical and practical skills which enable them to solve engineering problems with electronic and communication relevance, the ability to appreciate communication and integrate contributions from multiple disciplines to address electronic and communication problems and to continue their studies in professional schools and graduate programs.

#### 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	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
<b>Institute Mission</b>				
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 Aims	1	2	3	4	5	6	7	8
<b>Program Mission</b>								
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	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Program Aims</b>													
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	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Program Mission</b>													
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

Institute Requirement		Program contact hours	EXISTING %	NARS %	Tolerance %
General Science	A- Humanities and Social Sciences	23	8	11	9-12
	B- Mathematics and Basic Sciences	63	22	21	20-26
Electronics and Communications Engineering	C- Basic Engineering Sciences	72	25	21	20-23
	D- Applied Engineering and Design	61	22	21	20-22
	E- Computer Applications and ICT	22	8	10	9-11
	F- Projects and Practice	33	11	9	8-10
	G- Discretionary subjects	10	4	7	6-8
Total		284	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	6.5	8-12
Business Administration	1.5	2-4
Math. & Basic Sciences	22	18-22
Engineering Culture	0	4-6
Basic Engineering Sciences	29	25-30
Engineering Applications & Design	30	25-30
Projects & Field training	11	4-6

From the above table, it is evident that there are some gaps between the current program and NARS. Moreover, fulfills the requirements of the reference framework of the Engineering Sector Committee except in some subject areas (Humanities & Social Sciences, Business Administration, Discretionary subjects and Engineering Culture).

The institute add practical summer trainings to the old curriculum (as a result of the program report of year 2018/2019 – enhancement plan)

- From prep. to first year the student must pass internal summer training for (2 weeks \* 5 days \* 6 hours = 60 hours) on different subjects related to institute specializations and the department market for alumni.
- From first to second year the student must pass external summer training for (16 days \* 5 hours = 80 hours) in different companies related to the field.
- From second to third year the student must pass external summer training for (16 days \* 5 hours = 80 hours) in different companies related to the field.
- From third to fourth year the student must pass external summer field training for (4 weeks \* 4 days \* 6 hours = 96 hours).



Moreover, the institute added **Lab hours** to some courses (as a result of the program report of year 2018/2019 – enhancement plan) as shown in Appendix (3).

#### 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		
<b>Level A (NARS)</b>	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		
<b>Level B (NARS)</b>	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		
<b>Level C (ARS)</b>	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)



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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



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

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



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### 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 (173), Lab/Exercise (111), Total (284)
5.2.2	No. of contact hours / week	26 - 31
5.2.3	No. of courses	Compulsory (57), Elective (2)
5.2.4	No. of contact hours of university requirements' courses	8(3%)
5.2.5	No. of contact hours of institute requirements' courses	97 (34.6%)
5.2.6	No. of credit hours of general specification' courses	175 (62.4%)
5.2.7	No. of credit 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 / 1<sup>st</sup>Term

Code	Course Title	Teaching Hours				Marking				
		Lecture	Exercise / Class W	Lab	Total Hours	Year works	Practical exam	Written exam	Total	Wr. exam duration
MAT 011	Mathematics (1) A *	4	2		6	45		130	175	3
PHY 012	Physics (1) A *	4		2	6	40	10	125	175	3
MEC 013	Mechanics (1) A *	3	2		5	35		90	125	3
DEP 014	Engineering Drawing & Projection (1) A *	2	3		5	40		60	100	3
CHE 015	Chemistry	3		2	5	35	10	80	125	3
GNS 016	English Technical Language	2	-		2	10		40	50	2
<b>TOTAL</b>		<b>18</b>	<b>7</b>	<b>4</b>	<b>29</b>				<b>750</b>	

#### Prep. Year / 2<sup>nd</sup>Term

Code	Course Title	Teaching Hours				Marking				
		Lecture	Exercise / Class W	Lab	Total Hours	Year works	Practical exam	Written exam	Total	Wr. exam duration
MAT 021	Mathematics (1) B *	4	2		6	45		130	175	3
PHY 022	Physics (1) B *	4		2	6	40	10	125	175	3
MEC 023	Mechanics (1) B *	2	2		4	30		70	100	2
DEP 024	Engineering Drawing & Projection (1) B *	2	3		5	35		90	125	3
TIN 025	Introduction to Engineering & Production	3		2	5	20	10	70	100	2
COP 026	Computer and Programming	2		1	3	15	10	50	75	2
<b>TOTAL</b>		<b>17</b>	<b>7</b>	<b>5</b>	<b>29</b>				<b>750</b>	

(\*) means a continuous course.

**1<sup>st</sup> Year / 1<sup>st</sup> Term**

Code	Course Title	Teaching Hours				Marking			
		Lecture	Exercise / Class W	Lab	Total Hours	Class works	Practical / Oral exam	Written exam	Total
CEE 111	Electronic Engineering	4	1	1	6	30	10	100	150
CEE 112	Electric circuits (1) A*	4	1	1	6	30	10	100	150
CEE 113	Advanced programming	2	-	4	6	20	20	100	150
CEE 114	Mathematics (2)	3	2		5	30	-	70	100
CEE 115	Physics (2)	2	2		4	30	-	70	100
CEE 116	Properties of materials	2	2		4	30	-	70	100
<b>TOTAL</b>		<b>17</b>	<b>8</b>	<b>6</b>	<b>31</b>				<b>750</b>

**1<sup>st</sup> Year/ 2<sup>nd</sup> Term**

Code	Course Title	Teaching Hours				Marking				
		Lecture	Exercise / Class W	Lab	Total Hours	Class works	Practical / Oral exam	Written exam	Total	Wr. exam duration
CEE 121	Electronic circuits (1)	4	1	1	6	30	10	100	150	3
CEE 122	Electric circuits (1) B*	3	1	1	5	30	10	100	150	3
CEE 123	Logic circuits and systems	4	1	1	6	30	10	100	150	3
CEE 124	Signal analysis	3	2		5	50	-	100	150	3
CEE 125	Mathematics (3)	3	2		5	30	-	70	100	3
CEE 126	Technical writing	2	--		2	10	-	40	50	2
<b>TOTAL</b>		<b>19</b>	<b>7</b>	<b>3</b>	<b>29</b>				<b>750</b>	

(\*) means a continuous course.



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**2<sup>nd</sup> Year / 1<sup>st</sup> Term**

Code	Course Title	Teaching Hours				Marking				
		Lecture	Exercise / Class W	Lab	Total Hours	Class works	Practical / Oral exam	Written exam	Total	Wr. exam duration
CEE ٢١١	Electronic circuits (2)	2	١	١	٤	٣٥	١٥	١٠٠	١٥٠	٣
CEE ٢١٢	Electronic measurements (1) A*	2	١	١	٤	٢٠	١٠	٧٠	١٠٠	٣
CEE ٢١٣	Field theory	٤	٢		٦	٥٠	-	١٠٠	١٥٠	٣
CEE ٢١٤	Microprocessors and microcontrollers	٢	1	١	٤	٢٠	١٠	٧٠	١٠٠	٣
CEE ٢١٥	Introduction to Communications	٤	1	١	٦	٣٠	٣٠	٩٠	١٥٠	٣
CEE ٢١٦	Mathematics (4)	٣	٢		٥	٣٠	-	٧٠	١٠٠	٣
<b>TOTAL</b>		<b>17</b>	<b>٨</b>	<b>٤</b>	<b>٢٩</b>				<b>٧٥٠</b>	

**2<sup>nd</sup> Year / 2<sup>nd</sup> Term**

Code	Course Title	Teaching Hours				Marking				
		Lecture	Exercise / Class W	Lab	Total Hours	Class works	Practical / Oral exam	Written exam	Total	Wr. exam duration
CEE ٢٢١	Mathematics (5)	٣	-		٣	٥٠	-	١٠٠	١٥٠	٣
CEE ٢٢٢	Communication systems	٤	1	١	٦	٣٥	١٥	١٠٠	١٥٠	٣
CEE ٢٢٣	Data base systems	٢	2	١	٥	٢٠	٣٠	٩٠	١٥٠	٣
CEE ٢٢٤	Electromagnetic Waves	٤	٢		٦	٥٠	-	١٠٠	١٥٠	٣
CEE ٢٢٥	Electronic measurements (1) B*	2	١	١	٤	٢٠	١٠	٧٠	١٠٠	٣
CEE ٢٢٦	Engineering economics	٢	-		٢	١٠	-	٤٠	٥٠	٣
<b>TOTAL</b>		<b>17</b>	<b>6</b>	<b>٣</b>	<b>٢٦</b>				<b>٧٥٠</b>	

(\*) means a continuous course.



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**3<sup>rd</sup> Year/ / 1<sup>st</sup>Term**

Code	Course Title	Teaching Hours				Marking				
		Lecture	Exercise / Class W	Lab	Total Hours	Class works	Practical / Oral exam	Written exam	Total	Wr. exam duration
CEE ٣١١	Mobile communication	٢	١		٣	٥٠	-	١٠٠	١٥٠	٣
CEE ٣١٢	Linear systems and control (1) A*	٢	٢		٤	٣٠	-	٧٠	١٠٠	٣
CEE ٣١٣	Design and simulation of electronic circuits	٢	1	١	٤	٣٠	٣٠	٩٠	١٥٠	٣
CEE ٣١٤	Digital Signal Processing	٤	1	١	٦	٣٥	١٥	١٠٠	١٥٠	٣
CEE ٣١٥	Electric machines	٣	٢		٥	٣٠	-	٧٠	١٠٠	٣
CEE ٣١٦	Microwave Engineering	٣	٢		٥	٣٠	-	٧٠	١٠٠	٣
<b>TOTAL</b>		<b>١٦</b>	<b>9</b>	<b>٢</b>	<b>٢٧</b>				<b>٧٥٠</b>	

**3<sup>rd</sup> Year/ / 2<sup>st</sup>Term**

Code	Course Title	Teaching Hours				Marking				
		Lecture	Exercise / Class W	Lab	Total Hours	Class works	Practical / Oral exam	Written exam	Total	Wr. exam duration
CEE ٣٢١	Optical communication	٣	١		٤	٣٠	-	٧٠	١٠٠	٣
CEE ٣٢٢	Linear systems and control (1) B *	٣	٢		٥	٥٠	-	١٠٠	١٥٠	٣
CEE ٣٢٣	Power electronics	2	١	١	4	٣٠	٣٠	٩٠	١٥٠	٣
CEE ٣٢٤	Computer architecture	٣	١		٤	٣٠	-	٧٠	١٠٠	٣
CEE ٣٢٥	Consumer Electronics	٣	1	١	٥	٢٠	١٠	٧٠	١٠٠	٣
CEE ٣٢٦	Antennas	٣	1	١	٥	٣٥	١٥	١٠٠	١٥٠	٣
<b>TOTAL</b>		<b>١٧</b>	<b>7</b>	<b>٣</b>	<b>٢٧</b>				<b>٧٥٠</b>	

(\*) means a continuous course.

**4<sup>th</sup> Year/ 1<sup>st</sup>Term**

Code	Course Title	Teaching Hours				Marking				
		Lecture	Exercise / Class W	Lab	Total Hours	Class works	Practical / Oral exam	Written exam	Total	Wr. exam duration
CEE ٤١١	Digital communication	٤	١	١	٦	٣٥	١٥	١٠٠	١٥٠	٣
CEE ٤١٢	Presentation skills	٢	--		٢	٢٠	-	30	50	٢
CEE ٤١٣	Integrated Circuit Fabrications	٣	١		٤	٢٠	٢٠	٦٠	100	٣
CEE ٤١٤	Acoustics	٣	٢		٥	٥٠	-	١٠٠	١٥٠	٣
CEE ٤١٥	Graduation project *	--	2	٢	٤					
CEE ٤١٦X	Elective Course (1)	٣	٢		٥	٥٠		١٠٠	١٥٠	٣
<b>TOTAL</b>		<b>١٥</b>	<b>8</b>	<b>٣</b>	<b>٢٦</b>				<b>٦٠٠</b>	

**4<sup>th</sup> Year/ 2<sup>nd</sup>Term**

Code	Course Title	Teaching Hours				Marking				
		Lecture	Exercise / Class W	Lab	Total Hours	Class works	Practical / Oral exam	Written exam	Total	Wr. exam duration
CEE ٤٢١	Satellite communications	٤	٢		٦	50		١٠٠	١٥٠	3
CEE ٤٢٢	Communication networks	٤	٢		٦	50		١٠٠	١٥٠	3
CEE ٤٢٣	Network security	٤	٢		٦	50		١٠٠	١٥٠	3
CEE ٤٢٤	Graduation project *	--	2	٢	٤	100		١٠٠	٢٠٠	
CEE 425	Telecommunication Networks	٤	-		٤	30		٧٠	١٠٠	3
CEE ٤٢6X	Elective Course (2)	٣	٢		٥	50		١٠٠	١٥٠	3
<b>TOTAL</b>		<b>١٥</b>	<b>10</b>	<b>٢</b>	<b>٣١</b>				<b>٩٠٠</b>	

(\*) means a continuous course.

### 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
MAT 011	Mathematics (1) A *	4	2		6		6					
PHY 012	Physics (1) A *	4		2	6		4				2	
MEC 013	Mechanics (1) A *	3	2		5		5					
DEP 014	Engineering Drawing & Projection (1) A *	2	3		5			5				
CHE 015	Chemistry	3		2	5		3				2	
GNS 016	English Technical Language	2	-		2	2						
MAT 021	Mathematics (1) B *	4	2		6		6					
PHY 022	Physics (1) B *	4		2	6		4				2	
MEC 023	Mechanics (1) B *	2	2		4		4					
DEP 024	Engineering Drawing & Projection (1)B*	2	3		5			5				
TIN 025	Introduction to Engineering & Production	3		2	5			3			2	
COP 026	Computer and Programming	2		1	3					2	1	
CEE 111	Electronics Engineering	4	1	1	6			6				
CEE 112	Electric Circuits (1) A	4	1	1	6			6				
CEE 113	Advanced Programming	2		4	6			2		2	2	
CEE 114	Mathematics (2)	3	2	-	5		5					
CEE 115	Physics (2)	2	2	-	4		4					
CEE 116	Properties of Materials	2	2	-	4	2	2					
CEE 121	Electronic Circuit (1)	4	1	1	6			6				
CEE 122	Electric Circuits (1) B	3	1	1	5			5				
CEE 123	Logic Circuits and Systems	4	1	1	6			2	2		2	
CEE 124	Signal Analysis	3	2	-	5		3	2				
CEE125	Mathematics (3)	3	2	-	5		5					
CEE 126	Technical writing	2	-	-	2	2						
CEE 211	Electronics Circuits (2)	2	1	1	4				3		1	
CEE 212	Electronic Measurements (1) *A	2	1	1	4			1	2		1	
CEE 213	Field Theory	4	2	-	6			3	3			
CEE 214	Microprocessor and Microcontroller	2	1	1	4					4		
CEE 215	Introduction to Communications	4	1	1	6	2		2			2	
CEE 216	Mathematics (4)	3	2	-	5		5					
CEE 221	Mathematics (5)	3	-	-	3		3					
CEE 222	Communication Systems	4	1	1	6	2		2	2			
CEE 223	Data base System	2	2	1	5					4	1	
CEE 224	Electromagnetic Waves	4	2	-	6	2		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
CEE 225	Electronic Measurements (1) *B	2	1	1	4				2		2	
CEE 226	Engineering Economics	2	-	-	2	2						
CEE 311	Mobile Communication	2	1	-	3	1			2			
CEE 312	Linear System and Control (1) *A	2	2	-	4			2	2			
CEE 313	Design and simulation of electronic circuits	2	1	1	4			1	2		1	
CEE 314	Digital Signal Processing	4	1	1	6		2	2	1		1	
CEE 315	Electric Machines	3	2	-	5			1	2		2	
CEE 316	Microwave Engineering	3	2	-	5			2	3			
CEE 321	Optical Fiber Communication	3	1	-	4				4			
CEE 322	Linear System and Control (1) *B	3	2	-	5			2	2		1	
CEE 323	Power Electronics	2	1	1	4			2	1		1	
CEE 324	Computer Architecture	3	1	-	4					4		
CEE 325	Consumer Electronics	3	1	1	5	2			3			
CEE 326	Antenna	3	1	1	5			1	3		1	
CEE 411	Digital Communications	4	1	1	6		2	2	1		1	
CEE 412	Presentation Skills	2	-	-	2	2						
CEE 413	Integrated Circuit Fabrications	3	1	-	4				1	2	1	
CEE 414	Acoustic	3	2	-	5			3	2			
CEE 415	Graduation Project	-	2	2	4			2			2	
CEE4162	Image Processing (elective)	3	2	-	5							5
CEE 4261	Radar Systems (elective)	3	2	-	5							5
CEE 421	Satellite Communications	4	2	-	6				6			
CEE 422	Communication Networks	4	2	-	6	2			4			
CEE 423	Networks security	4	2	-	6	2				4		
CEE 425	Telecommunication Networks	4	-	-	4				4			
CEE 424	Graduation Project *	-	2	2	4				2		2	
<b>TOTAL CONTACT HOURS</b>						<b>23</b>	<b>63</b>	<b>٧٢</b>	<b>٦١</b>	<b>٢٢</b>	<b>٣٢</b>	<b>١٠</b>
<b>AVAILABLE % OF THE SUBJECT AREA</b>						<b>8%</b>	<b>22%</b>	<b>25%</b>	<b>22%</b>	<b>8%</b>	<b>11%</b>	<b>4%</b>



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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
	NARS %					11	21	21	21	10	9	7
	TOLERANCE					9-12	20-26	20-23	20-22	9-11	8-10	6-8



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## 6. Course contents

### Preparatory Year - First Term

#### **MAT 011 Mathematics (1) A**

Introduction to functions – inverse function – elementary functions – trigonometric and inverse trigonometric functions – exponential function – logarithmic functions – hyperbolic and inverse hyperbolic functions – limits – continuity – the intermediate value theorem – the extreme value theorem – derivative – applications on derivative – mean value theorem – curve sketching – convexity and concavity – extreme of functions – approximation of functions. indefinite integrals – methods of integration – definite integrals. the fundamental theorem of calculus – improper integrals – l' Ho pital rule – applications on integration – areas – volumes of solids of revolution – are length and areas of surfaces of revolution – numerical integrator.

#### **PHY 012 Physics (1) A**

Properties of matter, physical quantities, units, properties of mech. and electric materials – gravitational field and it's 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 – entropy and the second law of heat dynamics – applications.

#### **MEC 013 Mechanics (1) A**

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

#### **DEP 014 Engineering Drawing & Projection (1) A**

Projection of a Point, line, plane simple bodies – Assisted Projections. Intersection of planes and surfaces. Unfolding body surfaces. Orthogonal projection. Drawing technology and skills. Engineering operations – Projection theory – Writing dimensions. Isometric.

#### **CHE 015 Chemistry**

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

#### **GNS 016 English Technical Language**

Introduction – characteristics of technical English language – revision of English grammar – 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.



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## Preparatory Year - Second Term

### **MAT 021 Mathematics (1) B**

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 – equation of sphere and surfaces of revolution – equations of straight lines and planes in space.

### **PHY 022 Physics (1) B**

Electricity and magnetism - charge, matter and electric field – Gauss law - elec. Potential – capacitors and insulating materials – current, resistance, and elec. Field – magnetic field – Ampere law – Savart and Biota laws – Faraday's law coefficient .... – magnetic properties of materials – Maxwell's equations – integral form – heat effect of current – optics – properties of optics – electromagnetic waves – optical phenomena deviation of optics – mirrors – lenses – optical fibers.

### **MEC 023 Mechanics (1) B**

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.

### **DEP 024 Engineering Drawing & Projection (1) B**

Obtaining missing views – principles of sectioning – applications on machines parts drawing – steel connections – principles of electronics , mechanical and civil drawings.

### **TIN 025 Introduction to Engineering & Production Technology**

Introduction to engineering material (ferrous & non-ferrous) – polymers – ceramic – composite materials: types and characteristics – casting – sand casting – forming – forging – rolling – drawing – festinating & joining – riveting – welding – cutting – hand operations – machine operations – turning – shaping – drilling – milling – grinding – measurement tools – Vernier caliper – micrometer. Definitions – history of technology and engineering and it's different branches – historical interconnection between science and technology – Examples on the development of different engineering activities.

### **COP 026 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.

## Communications and Electronics Engineering Department - First Year - First Term

### **CEE 111 Electronic Engineering**

Semiconductors – Different impurities – Conduction in semiconductors: p –n junction diode – Forward and reverse biased – Load line – Diode application – Zener diode – Power supplies circuits – Bipolar junction transistor: V –I relations. Common base, common emitter and common collector characteristics High frequency effects - Field effect transistors – FET– JFET– MOSFET – Small signal equivalent circuit – Amplifiers in low frequency – Integrated circuit: Fabrication and characteristics.



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### CEE 112 Electric circuits (1) A\*

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.

### CEE 113 Advanced programming

Introduction to programming with C – Programming with C++ – and C sharp.

### CEE 114 Mathematics (2)

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.

### CEE 115 Physics (2)

Modern physics: Plank's theory of quantization of energy of radiation, Photo-electric effect, x-rays and Compton's effect, Wave properties of matter and wave function, Principles of quantum mechanics and Schrödinger equation, atomic structure and study of the tunneling phenomenon. Solution of Schrödinger equations in Quantum well, quantum dot and periodic structures. Bloch function, Kronig-Penny model. Quantum theory of free electrons in metals, Statistical distribution laws. Fermi-Dirac Distribution.

### CEE 116 Properties of material

Atomic and Crystal structure of materials – Engineering materials – 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.

## Communications and Electronics Engineering Department - First Year – Second Term

### CEE 121 Electronic circuits (1)

Single stage amplifiers – Frequency response of one stage amplifier – Bypass capacitors – Emitter and source follower – Input and output impedance – Multistage amplifiers – Coupling between stages – Bandwidth of a multistage – Operational amplifiers: Ideal practical properties of op –amps – Inverting, noninverting, summing, differential and integrator op –amps – Simple analog computers – Comparators – Schmitt trigger – Sample and hold.

### CEE 122 Electric circuits (1) B \*

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.

### CEE 123 Logic circuits and systems

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



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#### **CEE 124 Signal analysis**

Different types of signals and ways of measurements – Time domain analysis – Special signals like impulse – step – and ramp – Furrier series and transform – properties – and definitions – Frequency domain analysis – phase – Linear systems – Input and output relations – Analog filters – theory and types.

#### **CEE 125 Mathematics (3)**

First order differential equation (different methods) – second order differential equation – Higher order differential equation (different methods). Laplace transform – Inverse Laplace transform – Initial value theorem.

#### **CEE 126 Technical writing**

Methods of technical writing – properties and margins – comparisons – definitions – experiments properties – tables and graphs – Contents of technical report – Steps to write a technical report – Standard abbreviations – Letters – Catalogs.

### **Communications and Electronics Engineering Department - Second Year - First Term**

#### **CEE 211 Electronic circuits**

Untuned power amplifier – Efficiency of ideal amplifier – Loudspeaker as a load – Complementary push pull amplifier – Feedback amplifiers – Effect of feedback on noise – sensitivity – bandwidth – and input and output impedence – Tuned amplifiers – Active filters – Butterworth – Chebyshev – and elliptic active filters – Oscillators – RC phase shift – Wien Bridge – Crystal – Multivibrators – Voltage controlled oscillators.

#### **CEE 212 Electronic measurements (1) A\***

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 213 Field Theory**

Vector analysis – Electric field intensity and the potential for different charge distributions – Electric flux density – Gauss law – 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.

#### **CEE 214 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(Z80) – Memory Interfacing – Input output interfacing – Programmable peripheral interface – PPI

#### **CEE 215 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.

#### **CEE 216 Mathematics (4)**

Complex functions – Harmonic functions – Cauchy theorem – Cauchy integral formula – Laurent series – Residues – Real integral – Z transform – Inverse Z transform – Difference equations. Using Z transform to solve difference equations – probability theory

### **Communications and Electronics Engineering Department - Second Year - Second Term**



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### **CEE 221 Mathematics (5)**

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

### **CEE 222 Communication systems**

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.

### **CEE 223 Data base systems**

Introduction to database systems – forms of relational patterns and relational algebra – Programming with SQL and QBE – relations and events – keys and functions – operation management and synchronous control – distributed databases – databases and internet.

### **CEE 224 Electromagnetic Waves**

Maxwell's equations in harmonic time dependent form, plane wave propagation in lossless and lossy dielectrics, reflection of plane wave at normal and oblique incidence, Brewster's and critical angles, transmission line analysis, matching techniques, Smith chart, rectangular and circular waveguides, cavity resonators.

### **CEE 225 Electronic measurements (1) B\***

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.

### **CEE 226 Engineering economics**

The economic system principles – curves for money flow and interest rates – analysis of the equilibrium point – loses – comparison of alternatives – evaluation of general projects.

## **Communications and Electronics Engineering Department - Third Year - First Term**

### **CEE 311 Mobile communication**

General principles for cellular communication – Technologies used in mobile communication – Techniques used to reach a system – Study and analysis of the CDMA – TDMA – FDMA systems – Study transmission systems in mobile systems – relation between cellular system and different public networks.

### **CEE 312 Linear systems and control (1) A\***

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

### **CEE 313 Design and simulation of electronic circuits**

Schematics of an electronic circuits – Analysis of static and dynamic circuits using computers – Errors and sensitivity – Monte-carol 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 Digital Signal Processing**



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Linear system overview – analog system processing – discrete time signals and systems - Z-transform – discrete Fourier transform (DFT), and fast Fourier transform (FFT) – Digital filter realization and design – application in telecommunications.

#### **CEE 315 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.

#### **CEE 316 Microwave Engineering**

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

### **Communications and Electronics Engineering Department - Third Year - Second Term**

#### **CEE 321 Optical communication**

Optical electronics – optical radiation – radiation sources – radiation measurement – light detectors – optical couplers – light emitting system – fiber optical cables: construction and analysis – analysis of transmitters and receivers – fiber optical cable and optical coupler technology.

#### **CEE 322 Linear systems and control (1) B \***

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 323 Power electronics**

Properties of power semiconductor devices – Power diodes – Power transistors – Thyristors – Triacs – Power electronic circuits – Application of microprocessors in power electronics.

#### **CEE 324 Computer architecture**

Processor level design – CPU – ALU – basic ALU organization – control unit control logic design – hardwired logic – microprogrammed logic – memory systems – associative memory – cache memory – virtual memory – register transfer – memory transfer – IO techniques – peripherals – programmed IO – DMA – interrupt – IOP – hand shaking.

#### **CEE 325 Consumer Electronics**

Sound recording systems, Hi Fi sound systems, video cameras, TV system Facsimile systems.

#### **CEE 326 Antennas**

Classification of antennas, antenna types, antenna parameters, radiation from an ideal dipole and line source, antenna impedance and radiation efficiency, antenna above ground plane, small loop antennas, antenna arrays, helical antenna, microstrip antennas, frequency independent antennas, antenna in communication system, antenna measurements.

### **Communications and Electronics Engineering Department - Fourth Year - First Term**

#### **CEE 411 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 412 Presentation skills**





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Preparing a presentation – preparing your self – delivering a presentation – handling an audience.

### **CEE 413 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 414 Acoustics**

Acoustic waves – plane wave – Sound intensity – Propagation – reflection – and refraction of acoustic waves – Standing wave patterns – Spherical waves – pressure and intensity distribution – resonator and Filters – Microphones and loudspeakers – hearing and noise – Acoustics in buildings – Amplification and attenuation of sound intensity.

### **CEE 415 Graduation project \***

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.

## **Communications and Electronics Engineering Department - Fourth Year - Second Term**

### **CEE 421 Satellite communications**

Satellite communication systems and calculation of path – synchronous satellite – Ground station system – Effect of noise – Receiving systems – modulation and digital detection – Methods of communication – CDMA – TDMA – FDMA.

### **CEE 422 Communication networks**

Network functions: signaling – transmission – switching – management. – Network services: traffic characterization and quality of service – Topologies – Transmission techniques. Multiplexing (TDM – FDM – CDM) and multiple access (TDMA – FDMA – CDMA) Switching techniques: circuit switching – packet switching. OSI model: layered protocol architectures. ARQ protocols: stop and wait – go back N – selective repeat. Layer 1 Transmission media. Access (ISDN – ADSL – PON) and transport (SDH – PDH) networks. Layer 2 Protocols: HDLC – LAP –B – LLC – LAP – F Frame relay ATM – LAN (Local Area Networks) – MAC (Medium Access Control) protocols: Ethernet – Bridging and switching – Layer 3: Routing protocols and algorithms Introduction to Internet IP – ICMP – routing UDP and TCP Application layer protocols: DNS – SMTP and HTTP – Sniffing over LANs.

### **CEE 423 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 424 Graduation project \***

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.

**Tables of Elective Courses**

The Course	Code Symbol	Title and Code symbol of Elective Course
<b>Elective Course (1)</b>	CEE 416X	CEE 4161 Telephone circuits and switches
		CEE 4162 Image Processing
		CEE 4163 Optoelectronics
		CEE 4164 Medical electronics
<b>Elective Course (2)</b>	CEE 426X	CEE 4261 Radar systems
		CEE 4262 Advanced Automatic control
		CEE 4263 RF Circuit Design
		CEE 4264 Selected Topics in Electronics
		CEE 4265 Embedded System Design
		CEE 4266 Analog Circuits

**Elective Courses Description**

**CEE 416X Elective Course (1)**

**CEE 4161 Telephone circuits and switches**

Introduction to telephone networks – Methods of connection to switches – Control system of switches – Control using readymade programs – Control signals – One channel control system – Numbering system – Methods of switching – Planning of telephone networks.

**CEE 4162 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 4163 Optoelectronics**

Light radiation – light radiation sources – optical modulation and detection – optically coupled electronic systems – optoelectronic displays – applications of light – emitting diodes and photo detectors.

**CEE 4164 Medical electronics**

Electrical properties of living cells – Excitable cells – Resting potential – Action potential – Transfer of action potential – Properties of different electrodes – Biopotential signals – ECG – EMG – EEG – Isolation amplifiers – Safety of medical devices.



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## CEE 425X Elective Course (2)

### **CEE 4261 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 4262 Advanced Automatic control**

Optimization – variationally calculus – dynamic programming – multivariable systems – discrete data systems – digital control systems – application of microprocessor in automatic control.

### **CEE 4263 RF Circuit Design**

RF transceivers, Noise figure, harmonic distortion, Low Noise Amplifiers, Mixers, LC Oscillators, phase noise, RF frequency synthesis, RF Power Amplifiers (class A, class B, class C, class AB), Integration artifacts.

### **CEE 4264 Selected Topics in Electronics**

This course provides study of selected topics in electronic engineering such as; Microwave integrated circuits – Laser and Maser – Digital electronics – Digital circuits Design – Microprocessor applications – etc.

### **CEE 4265 Embedded System Design**

Adders, multipliers, barrel shifters, technology scaling, interconnects, substrate and package modest

### **CEE 4266 Analog Circuits**

Elementary transistor stages, Common source, Common gate, Source follower, feedback amplifiers, stability, root locus analysis, poles and zeros, multivibrators, pulse circuits, switched circuits.



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## 7. 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.

## 8. Regulations for progression and program completion:

- a) The student gets a B.Sc. degree if he passed all courses of the 10 terms.
- 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: from 65% to less than 75% of the 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.

## 9. 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.



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

Program Competencies	Teaching methods and Strategies								
	Lecture	Tutorial	Practical	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						√		√	



## 10. Student Assessment Methods

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

## 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

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: \_\_\_\_\_



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## **Appendix (1)**

### **Contribution of Courses to Program Competencies**



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### 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
MAT 011	Mathematics (1)A*	√																				
PHY012	Physics (1) A*	√	√			√																
MEC013	Mechanics (1)A*	√			√	√																
DEP014	Engineering Drawing &Projection (1)A*								√													
CHE015	Chemistry	√	√		√																	
GNS016	English Technical Language								√													
MAT 021	Mathematics (1) B*	√																				
PHY 022	Physics (1) B*	√	√			√																
MEC023	Mechanics (1)B*	√				√																
DEP024	Engineering Drawing & Projection (1)B*								√													
TIN025	Introduction to Engineering &Production		√					√														
COP026	Computer and Programming		√		√					√												
CEE 111	Electronics Engineering	√	√											√			√	√				
CEE 112	Electric Circuits (1) A	√	√											√								
CEE 113	Advanced Programming		√											√				√			√	√
CEE 114	Mathematics (2)	√																				
CEE 115	Physics (2)	√	√			√					√											
CEE 116	Properties of Materials				√	√																
CEE 121	Electronic Circuit (1)	√	√											√			√	√				
CEE 122	Electric Circuits (1) B	√	√											√	√							
CEE 123	Logic Circuits and Systems												√	√								
CEE 124	Signal Analysis	√											√		√							
CEE125	Mathematics (3)	√																				
CEE 126	Technical writing							√	√													
CEE 211	Electronics Circuits (2)													√			√	√	√			
CEE 212	Electronic Measurements (1) *A	√	√	√								√	√				√	√				
CEE 213	Field Theory	√				√									√		√					
CEE 214	Microprocessor and Microcontroller						√	√						√	√		√		√			





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### 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 215	Introduction to Communications	√	√										√		√						√	
CEE 216	Mathematics (4)	√									√											
CEE 221	Mathematics (5)	√				√				√	√											
CEE 222	Communication Systems			√									√	√							√	
CEE 223	Data base System		√											√			√	√	√			
CEE 224	Electromagnetic Waves	√				√						√	√	√			√					
CEE 225	Electronic Measurements (1) *B	√	√	√								√	√				√					
CEE 226	Engineering Economics	√	√																			
CEE 311	Mobile Communication	√				√							√		√			√				
CEE 312	Linear System and Control (1) *A	√	√			√								√	√		√					
CEE 313	Design and simulation of electronic circuits		√	√								√	√				√					
CEE 314	Digital Signal Processing	√	√												√		√					
CEE 315	Electric Machines	√	√			√								√	√		√					
CEE 316	Microwave Engineering	√				√							√		√		√			√		
CEE 321	Optical Communication	√				√							√	√				√				
CEE 322	Linear System and Control (1) *B	√	√			√								√	√		√					
CEE 323	Power Electronics	√	√			√								√	√		√					
CEE 324	Computer Architecture			√				√					√	√			√	√				
CEE 325	Consumer Electronics		√	√								√	√				√					
CEE 326	Antenna	√	√											√	√		√					
CEE 411	Digital Communications	√	√												√		√					
CEE 412	Presentation Skills						√		√		√											√
CEE 413	Integrated Circuit Fabrications		√	√								√	√				√					
CEE 414	Acoustic	√											√		√							
CEE 415	Graduation Project		√	√	√	√	√	√	√	√	√	√		√				√	√	√	√	√
CEE4162	Image Processing (elective)	√												√	√							
CEE 421	Satellite Communications	√				√							√		√		√					



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### 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 422	Communication Networks					√							√		√		√				√	
CEE 423	Networks security			√				√							√		√	√	√			
CEE 425	Telecommunication Networks	√											√				√					
CEE 424	Graduation Project *		√	√	√	√	√	√	√	√	√	√		√				√	√	√	√	√
CEE 4261	Radar Systems (elective)	√	√	√								√	√				√					
	Summer Training		√		√		√	√	√	√						√	√	√	√			
	<b>No. Of courses covering the competencies</b>	<b>38</b>	<b>30</b>	<b>11</b>	<b>7</b>	<b>20</b>	<b>5</b>	<b>8</b>	<b>8</b>	<b>6</b>	<b>6</b>	<b>8</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>1</b>	<b>27</b>	<b>12</b>	<b>7</b>	<b>3</b>	<b>6</b>	<b>4</b>



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# Appendix (2)

**Contribution of Teaching/learning Methods and  
Strategies to the Courses**



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

Teaching/learning Methods		Lecture	Class work (tutorial)	Practical and Lab. Experiment	Discussion	Brain Storming	Research and Report	Case study	Project	Practical training	Self-Study
<b>Course</b>											
MAT 011	Mathematics (1) A *	X	X			X					
PHY 012	Physics (1) A *	X	X		X		X				
MEC 013	Mechanics (1) A *	X	X		X	X					
DEP 014	Engineering Drawing & Projection (1) A *	X	X		X	X					
CHE 015	Chemistry	X	X	X	X		X				
GNS 016	English Technical Language	X	X		X		X				
MAT 021	Mathematics (1) B *	X	X		X	X					
PHY 022	Physics (1) B *	X	X	X	X		X				
MEC 023	Mechanics (1) B *	X	X		X	X					
DEP 024	Engineering Drawing & Projection (1) B *	X	X		X	X					
TIN 025	Introduction to Engineering & Production	X	X	X	X						
COP 026	Computer and Programming	X	X	X	X	X					
CEE 111	Electronics Engineering	X	X	X	X		X		X		
CEE 112	Electric Circuits (1) A	X	X	X	X		X				
CEE 113	Advanced Programming	X	X		X						
CEE 114	Mathematics (2)	X	X		X	X					X
CEE 115	Physics (2)	X	X	X	X						
CEE 116	Properties of Materials	X	X		X						
CEE 121	Electronic Circuit (1)	X	X	X	X		X		X		
CEE 122	Electric Circuits (1) B	X	X	X	X		X		X		X
CEE 123	Logic Circuits and Systems	X	X	X					X		
CEE 124	Signal Analysis	X	X		X						
CEE125	Mathematics (3)	X	X		X	X					
CEE 126	Technical writing	X	X				X				X
CEE 211	Electronics Circuits (2)	X	X	X	X					X	
CEE 212	Electronic Measurements (1) *A	X	X	X	X		X				
CEE 213	Field Theory	X	X	X							
CEE 214	Microprocessor and Microcontroller	X	X	X	X		X			X	
CEE 215	Introduction to Communications	X	X	X			X	X			
CEE 216	Mathematics (4)	X	X		X	X					
CEE 221	Mathematics (5)	X	X		X	X					





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# Appendix (3)

## Department Action Plan



وزارة التعليم العالي  
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## الخطة التنفيذية لتحسين وتعزيز الفاعلية التعليمية (2024 / 2023)

المحاور	الأهداف	الإطار الزمني (المدة بالشهر)	المسئول عن التنفيذ	الأنشطة
تأهيل المعهد للحصول على الاعتماد المؤسسي	إعداد دراسة ذاتية للمعهد	٢٠٢٣/١٠	جميع إدارات المعهد	
تطوير البنية الأساسية الخادمة للبرنامج	استمرار تفعيل لجان العمل بالبرنامج للعام الدراسي الجديد	٢٠٢٣/١٠	القسم	تنفيذ أنشطة واضحة وذات فاعلية لكل لجنة وقيام لجنة التقييم والتطوير المستمر بمراجعة ملفات المقررات وتوصيف وتقرير البرنامج والمقررات
	صيانة أجهزة المعامل	٢٠٢٣/١٠	إدارة الصيانة	استمرار إحاطة مجالس القسم بأعمال اللجان
تطوير قاعات الدراسة والمدرجات (صوتيات، داتا شو، ستائر، سبورات)	شراء أجهزة جديدة (ناقصة)	٢٠٢٤/٢	الإدارة المالية	صيانة أجهزة معامل الاتصالات والموجات
	تطوير قاعات الدراسة والمدرجات (صوتيات، داتا شو، ستائر، سبورات)	٢٠٢٣/٩	إدارة المتابعة التعليمية	شراء أجهزة ووحدات جديدة لمعمل الاتصالات - معمل الموجات- معمل المعالجات الدقيقة
تحديث وتطوير العملية التعليمية	تحديث الغرفة المخصصة كمعرض لمشاريع ونماذج طلاب القسم	٢٠٢٣/١٢	إدارة المتابعة التعليمية	تطوير قاعات الدراسة والمدرجات
	عمل مراجعة خارجية لبرنامج لائحة ٢٠٢٢/٢٠٢١	٢٠٢٣/١٠	الإدارة	تشكيل لجنة من طلاب الفرق الدراسية المختلفة لتحديث وتزويد الغرفة ببعض الأدوات الاسترشادية وتشكيل لجنة من القسم من أعضاء هيئة التدريس والهيئة المعاونة للمتابعة
تطوير التدريب العملي للطلاب	تطبيق المعايير القومية المرجعية القياسية NARS 2018	ممتد خلال العام	القسم + وحدة ضمان الجودة	تكاليف مراجع خارجي معتمد من هيئة ضمان الجودة
	تطوير التدريب العملي للطلاب	صيف ٢٠٢٤	القسم	استمرار التطبيق الفعلي لتحديثات توصيف المقررات والبرنامج طبقاً لـ NARS2018
				<ul style="list-style-type: none"><li>التدريب يغطي جميع السنوات الدراسية</li><li>عمل بروتوكولات تعاون مع شركات كبرى في المجالات المختلفة</li><li>تنوع طرق تقييم التدريب عن طرق عمل ابحاث ومشاريع عملية للطلاب وتقييمها من خلال لجنة التدريب العملي المشكلة من القسم</li></ul>

 <ul style="list-style-type: none"> <li>• اجراء استبيان آراء الطلاب وجهات التدريب ومعالجة نقاط القصور لدي الطرفين</li> </ul>				
<ul style="list-style-type: none"> <li>• تقارير المقررات</li> <li>• تقييم قوائم الاعتناء</li> <li>• استبيانات آراء الطلاب عن المقرر</li> <li>• وعضو هيئة التدريس والهيئة المعاونة</li> <li>• وأخذ آراء الطلاب في الاعتبار بالنسبة للكورسات التي تحتوي على نسبة ارضاء جيد او اقل واتخاذ اللازم لتحسين مستوي المقرر</li> <li>• تقرير البرنامج</li> </ul>	<p>وحدة ضمان الجودة</p>	<p>نهاية كل موسم QUALITY ASSURANCE UNIT</p>	<p>مراجعة تحقق مستهدفات العملية التعليمية</p>	<p>GIZA HIGHER INSTITUTE OF ENGINEERING</p>
<ul style="list-style-type: none"> <li>• تعديل الجدارات عن طريق تقليل الجدارات A و زيادة الجدارات C لكي تتماشى مع مخرجات التعلم للمواد التخصصية للفرقة الثالثة والفرقة الرابعة</li> </ul>	<p>القسم</p>	<p>٢٠٢٣/١٠</p>	<p>معالجة نقاط الضعف في تحقيق الجدارات المستهدفة في NARS 2018</p>	
<p>استمرار التطبيق الفعلي لوسائل التعليم والتعلم الواردة في تحديثات توصيف المقررات طبقاً لـ NARS2018 ومتابعة تطبيق ذلك في توصيف المقررات من خلال لجنة التقييم والتطوير المستمر</p>	<p>القسم + وحدة ضمان الجودة</p>	<p>ممتد خلال العام</p>	<p>تطبيق تنوع وسائل التعليم والتعلم في المقررات</p>	
<p>عمل دورات متنوعة فيما يخص الجودة واخذ دورات تنمية قدرات أعضاء هيئة التدريس بالمراكز المختصة بالجامعات الحكومية</p>	<p>وحدة التدريب</p>	<p>على مدار العام</p>	<p>تنمية الجدارات المهنية لجميع اعضاء هيئة التدريس ومعاونيهم في مجالات التدريس الفعال وضمان جودة التعليم والمهارات البيئية والسلوكية والمهارات التطبيقية</p>	<p>تنمية قدرات أعضاء هيئة التدريس والهيئة المعاونة</p>
<p>متابعة موقف معاوني أعضاء هيئة التدريس من الترقى للدرجة الاعلى</p>	<p>وحدة الجودة</p>	<p>٢٠٢٣/١٠ &amp; ٢٠٢٤/٨</p>	<p>متابعة التقدم في الحصول على الدرجة العلمية الأعلى</p>	<p>التقدم العلمي لمعاوني أعضاء هيئة التدريس</p>
<ul style="list-style-type: none"> <li>• تعديل محتوى وتغيير عضو هيئة التدريس مقرر نظم قواعد البيانات</li> <li>• تعديل محتوى مقرر دوائر الكترونية وتنوع طرق التقييم</li> <li>• تحسين الجزء العملي واستخدام ادوات المحاكاة في المقررات التي تحتوي على ساعات عملي وعمل مشروعات عملية صغيرة للطلاب باستخدام ادوات المحاكاة المختلفة للتعرف على أحدث ادوات المحاكاة التي تتواكب مع تكنولوجيا العصر</li> <li>• استخدام وسيلة التعلم عن بعد في طرق واستراتيجيات التدريس والتعلم لمساعدة الطلاب ذوي القدرات المحدودة على الاسئلة والمناقشة دون حرج</li> <li>• تنوع طرق التقييم في العديد من المقررات لإكساب الطالب مهارات مختلفة</li> <li>• زيادة بعض الموضوعات المتقدمة الي محتوى بعض المقررات التخصصية مثل مادة الاتصالات الرقمية ومادة انظمة الرادار ومادة الاتصالات عن بعد</li> </ul>				<p>تحسينات خاصة بتقارير المقررات بناءً على استطلاع آراء الطلاب في تقارير مقررات العام السابق</p>

رئيس القسم

لجنة التقييم والتطوير المستمر

عن أعضاء هيئة التدريس:

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