BSc Program Specifications for Communications and Computers Engineering Program

Regulation 2020/2021

Faculty of Engineering
Mansoura University

Contents

/B.Sc. Program Specification

Communications and Computers Engineering Program

Basic Information

1- Program Title:Communications and Computers Engineering Program

2- Program Type: Multiple

3- Department responsible of the program:

Computers and Control Systems Engineering

Electronics and Communications Engineering

4- Date of approval of the Program: 27/9/2020

Professional information

Program Vision

Achieve leadership in the field of communications and computer engineering and gain the confidence of the local and regional community in the graduate of the program

Program Mission

The Communications and Computers Engineering program at Mansoura University committed to prepare scientifically and ethically qualified and professional engineers in the fields of communications and computers engineering, able to compete in the local and regional labor market and conduct scientific research to serve society and develop the environment.

1. Program Aims

1. Acquire knowledge of mathematics, natural science, necessary to solve engineering fundamental problems, design systems, conduct experiments, and analyze data.
2. Use practical, soft, presentation, management, and language skills to ensure effective communication, display professional, manage projects and ethical responsibilities, engage in self and life-long learning, and demonstrate knowledge of contemporary engineering issues.
3. Acquire specialized science for communications and Computer engineering, network, security, and electronics with an understanding the design, operation, maintenance and associated limitations in industrial applications.

4. Identify different kinds of Computer engineering systems, control, and electronics, embedded systems with an understanding the design, operation, maintenance and associated limitations in industrial applications.

5. Use current advanced techniques, skills, necessary to design, implement computer-based systems in diverse fields with appropriate attention to hardware installation, software design, data manipulation and system operations.

6. Incorporate economics and business practices on both operational and decision-making levels including projects and risks using system analysis tools and techniques.

2. Learning Outcomes (LO's)

Level A: Competencies of engineering graduate

The Engineering Graduate must be able to:

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 multicultural 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.

Level B: Competencies of basic Electrical engineering

Electrical engineering graduate must be able to:

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.

Level C: High specialized competencies

The graduates of communications and computers engineering program should be able to:

C1. Design, analyze and measure the performance of communication and control systems in various applications

C2. Designing and simulating different applications using computers and mobile phones

C3. Design electromagnetic applications as antennas, microwave resonators, optoelectronics and Fiber optics

C4. Acquire the concepts of artificial intelligence and bioengineering including signal processing and image processing

3. Academic Standards

National Academic Reference Standards 2018 for Engineering (NARS 2018)

which were issued by the National Authority for Quality Assurance & Accreditation of Education NAQAAE.

4. Reference standards

- None

5. Program Structure and Contents

5.1 Program duration:

The program duration is five years, 10 semesters.

5.2 Program structure:

- **Total hours of program :** 160 hours
- **Theoretical:** 106 hours
- **Practical/Exercises** : 54 hours
- **Compulsory** : 77 hours
- **Elective** : 18 hours
- **Selective :** none

- **Basic science courses: 45 Hrs. (28.12 %)**
- **Humanities and social science courses: 13 Hrs. (8.12 %)**
- **Discipline courses: 95 Hrs. (59.375 %)**
- **Projects and Practice: 7 Hrs. (4.375 %)**

5.3 Program levels (Credit Hours):

Defining the College's location with the study system	Program Levels	Compulsory	Elective	Selective
Freshman	000	34	0	0
Sophomore	100	31	0	0
Junior	200	29	0	0
	300	25	6	0
Senior	400	23	12	0

5.4 Program courses and subject area:

- **Level 000-Fall Semester:**

Code	Course Name	Hours/Week						Marks Distribution					Prerequisites
		Credit	Lecture	Tutorial	Lab.	Free work	SWL	Mid Term	Semester Work	Lab	Final Term	Total	
BAS 011	Mathematics (1)	3	2	2	-	4	8	20	30	-	50	100	-
BAS 021	Mechanics (1)	3	2	2	-	4	8	20	30	-	50	100	-
BAS 031	Physics (1)	3	2	1	1.5	4.5	9	20	20	10	50	100	-
BAS 041	Principals of Engineering Chemistry	3	2	1	1.5	4.5	9	20	20	10	50	100	-
PDE 052	Engineering Drawing	3	2	2	-	6	10	20	30	-	50	100	-
UNR 061	English (1)	2	1	2	-	2	5	20	30	-	50	100	-
Total		17	11	10	3	25	49	120	160	20	300	600	-
Total Contact hours = 24 hrs/week, Total SWL = 49 hrs/week													

- **Level 000-Spring Semester:**

Code	Course Name	Hours/Week						Marks Distribution					Prerequisites
		Credit	Lecture	Tutorial	Lab.	Free work	SWL	Mid Term	Semester Work	Lab	Final Term	Total	
BAS 012	Mathematics (2)	3	2	2	-	4	8	20	30	-	50	100	BAS011
BAS 022	Mechanics (2)	3	2	2	-	4	8	20	30	-	50	100	BAS021
BAS 032	Physics (2)	3	2	1	1.5	4.5	9	20	20	10	50	100	-
CSE 042	Introduction to Computer Systems	3	2	1	1.5	4.5	9	20	20	10	50	100	-
PDE 051	Principles of Manufacturing Engineering	3	2	-	3	3	8	20	20	10	50	100	-
UNR062	English (2)	2	1	2	-	2	5	20	30	-	50	100	UNR061
Total		17	11	8	6	22	47	120	160	30	300	600	
Total Contact hours = 25 hrs/week, Total SWL = 47 hrs/week													

- **Level 100 -Fall Semester:**

Code	Course Name	Hours/Week	Marks Distribution	e q u i s

		Credit	Lecture	Tutorial	Lab.	Free work	SWL	Mid Term	Semester Work	Lab	Final Term	Total	
BAS 113	Mathematics (3)	3	2	2	-	4	8	20	30	-	50	100	BAS 012
UNR 171	History of Engineering and Technology	1	1	-	-	1	2	20	30	-	50	100	-
ECE 121	Electrical Circuits	3	2	2	-	4	8	20	30	-	50	100	BAS 032
CSE 141	Digital Design (1)	3	2	1	1	4	8	20	20	-	50	100	CSE 042
ENG 111	Technical Reports Writing	2	1	2	-	3	6	20	30	10	50	100	UNR 061
ECE 122	Solid State Electronics	3	2	2	-	4	8	20	30	-	50	100	BAS 031
Total		15	10	9	1	20	40	120	170	10	300	600	
Total Contact hours = 20 hrs/week, Total SWL = 40 hrs/week													

- **Level 100 -Spring Semester:**

Code	Course Name	Hours/Week						Marks Distribution					Prerequisites
		Credit	Lecture	Tutorial	Lab.	Free work	SWL	Mid Term	Semester Work	Lab	Final Term	Total	
BAS 114	Mathematics (4)	3	2	2	-	4	8	20	30	-	50	100	BAS 113
CSE 112	Algorithms and Data Structure	3	2	1	1.5	4.5	9	20	20	10	50	100	CSE 042
BAS 115	Statistics and Probability Theory	2	1	2	0	2	5	20	30	-	50	100	BAS 012
ECE 131	Signals and Systems	2	2	0	0	4	6	20	30	-	50	100	BAS 113
ECE 123	Electronic Basics	3	2	1	1.5	4.5	9	20	20	10	50	100	ECE 121 ECE 122
ELE 151	Electrical Power and Machines	3	2	2	-	4	8	20	30	-	50	100	ECE 121
Total		16	11	8	3	23	45	120	160	20	300	600	
Total Contact hours = 22 hrs/week, Total SWL = 45 hrs/week													

- **Level 200-Fall Semester:**

Code	Course Name	Hours/Week	Marks Distribution	e q u i s

		Credit	Lecture	Tutorial	Lab.	Free work	SWL	Mid Term	Semester Work	Lab	Final Term	Total	
BAS 215	Mathematics (5)	3	2	2	-	5	8	20	30	-	50	100	BAS 113
CSE 211	Digital Design (2)	3	2	2	-	5	9	20	30	-	50	100	CSE 141
CSE 212	Data Base Systems	3	2	-	3	4	9	20	20	10	50	100	CSE 112
ECE 231	Digital Signal Processing	3	2	2	-	5	9	20	30	-	50	100	ECE 131
UNR 241	Communication and Presentation Skills	2	2	-	-	3	5	20	30	-	50	100	-
Total		14	10	6	3	22	41	100	140	10	250	500	
Total Contact hours = 19 hrs/week, Total SWL = 41 hrs/week													

- **Level 200-Spring Semester:**

Code	Course Name	Hours/Week						Marks Distribution					Prerequisites
		Credit	Lecture	Tutorial	Lab.	Free work	SWL	Mid Term	Semester Work	Lab	Final Term	Total	
CSE 221	Control (1)	3	2	2	-	4	8	20	30	-	50	100	BAS 113 ECE 121
CSE 213	Computer Architecture	3	2	-	2	5	9	20	20	10	50	100	CSE 211
ECE 232	Analog Communication Systems	3	2	2	-	4	8	20	30	-	50	100	BAS 114 ECE 131
ECE 221	Electronic Circuits	3	2	-	2	5	9	20	30	10	50	100	ECE 123
UNR 281	Law and Human Rights	2	2	-	-	2	4	20	30	-	50	100	-
CCE 271	Training (1)	1	-	-	-	-	3	-	-	-	-	-	-
Total		15	10	4	4	20	41	100	140	20	250	500	
Total Contact hours = 18 hrs/week, Total SWL = 41 hrs/week													

- **Level 300-Fall Semester:**

Code	Course Name	Hours/Week	Marks Distribution	e q u i s

		Credit	Lecture	Tutorial	Lab.	Free work	SWL	Mid Term	Semester Work	Lab	Final Term	Total	
CSE 311	Operating Systems	3	2	-	2	5	9	20	20	10	50	100	CSE 213
ECE 331	Digital Communication Systems	3	2	2	-	4	8	20	30	-	50	100	ECE 232
CSE 313	Microprocessors	3	2	2	-	5	9	20	30	-	50	100	CSE 213
ECE 341	Electromagnetic Fields	3	2	2	-	4	8	20	30	-	50	100	BAS 113 ECE 121
CSE 312	Computer Networks (1)	3	2	-	2	4	8	20	20	10	50	100	CSE 042
Total		15	10	6	4	22	42	100	130	20	250	500	
Total Contact hours = 20 hrs/week, Total SWL = 42 hrs/week													

- **Level 300-Spring Semester:**

Code	Course Name	Hours/Week						Marks Distribution					Prerequisites
		Credit	Lecture	Tutorial	Lab.	Free work	SWL	Mid Term	Semester Work	Lab	Final Term	Total	
ECE 342	Waveguides and Antennas	3	2	1	1.5	4.5	9	20	20	10	50	100	ECE 341
Elective	Elective course (1)	3	2	2	-	4	8	20	30	-	50	100	Course Specs.
	Elective course (2)	3	2	2	-	4	8	20	30	-	50	100	
CSE 315	Embedded Systems	3	2	1	1.5	4.5	9	20	20	10	50	100	CSE 213
CSE 314	Computer Drawing	3	2	-	2	5	9	20	20	10	50	100	CSE 042
CCE 371	Field Training (2)	1	-	-	-	-	3	-	-	-	-	-	CCE 271
Total		16	10	6	5	22	46	100	120	30	250	500	
Total Contact hours = 21 hrs/week, Total SWL = 46 hrs/week													

- **Level 400-Fall Semester:**

Code	Course Name	Hours/Week	Marks Distribution	e q u i s

		Credit	Lecture	Tutorial	Lab.	Free work	SWL	Mid Term	Semester Work	Lab	Final Term	Total	
CCE 481	Graduation Project (1)	2	1	-	3	2	6	-	50	-	50	100	Level 400
ECE 431	Mobile Communications	3	2	2	-	4	8	20	30	-	50	100	ECE 331
Elective	Elective course (3)	3	2	2	-	4	8	20	30	-	50	100	Course Specs.
	Elective course (4)	3	2	2	-	4	8	20	30	-	50	100	
CSE 411	Advanced Programming Techniques	3	2	-	2	5	9	20	20	10	50	100	CSE 042
UNR 461	Ethics and Morals of The Profession	2	2	-	-	4	6	20	30	-	50	100	-
ENG 412	Project Management	2	1	2	-	2	5	20	30	-	50	100	-
Total		18	12	8	5	25	50	120	220	10	350	700	
Total Contact hours = 25 hrs/week, Total SWL = 50 hrs/week													

- **Level 400-Spring Semester:**

Code	Course Name	Hours/Week						Marks Distribution					Prerequisites
		Credit	Lecture	Tutorial	Lab.	Free work	SWL	Mid Term	Semester Work	Lab	Final Term	Total	
CCE 482	Graduation Project (2)	3	1	-	6	2	9	-	50	-	50	100	CCE 481
Elective	Elective course (5)	3	2	2	-	4	8	20	30	-	50	100	Course Specs.
	Elective course (6)	3	2	2	-	4	8	20	30	-	50	100	
CSE 421	Programmable Logic Control	3	2	1	1.5	4.5	9	20	20	10	50	100	CSE 221
CSE 422	Artificial Intelligence	3	2	1	1.5	4.5	9	20	20	10	50	100	CSE 112
UNR 471	Marketing	2	2	-	-	4	6	20	30	-	50	100	-
Total		17	11	6	9	23	49	100	180	20	300	600	
Total Contact hours = 26 hrs/week, Total SWL = 49 hrs/week													

Elective Courses

Code	Course Name	Credit	Total SWL	Marks Distribution				Groups Name
				Mid Term	semester Works	Lab	Final Term	
Level 300								
CCE 311	Integrated Circuits	3	8	20	30	--	50	
CCE 331	Optical Fiber	3	8	20	30	--	50	
CCE 332	Microwave Engineering	3	8	20	30	--	50	
CCE 341	Distributed systems	3	8	20	30	--	50	
CCE 342	Multimedia	3	8	20	30	--	50	
CCE 343	Computer System	3	8	20	30	--	50	
CCE 344	Software Engineering	3	8	20	30	--	50	
CCE 345	Control (2)	3	8	20	30	--	50	
Level 400								
CCE 411	Industrial Electronics	3	8	20	30	--	50	
CCE 412	Introduction to	3	8	20	30	--	50	
CCE 421	Information Theory	3	8	20	30	--	50	
CCE 422	Selected Topics in Communications Engineering	3	8	20	30	--	50	
CCE 423	Satellite Communications	3	8	20	30	--	50	
CCE 424	Communication Security	3	8	20	30	--	50	
CCE 425	Adaptive Filters	3	8	20	30	--	50	
CCE 426	Phonics	3	8	20	30	--	50	
CCE 427	Wireless Communications	3	8	20	30	--	50	
CCE 441	Computer Networks (2)	3	8	20	30	--	50	
CCE 442	Design and Programming of Web server	3	8	20	30	--	50	
CCE 443	Big Data Analytics	3	8	20	30	--	50	
CCE 444	Selected Topics in Computers Engineering	3	8	20	30	--	50	
CCE 445	Game Theory and Decision	3	8	20	30	--	50	
CCE 446	Internet Engineering	3	8	20	30	--	50	
CCE 447	Languages Compilers	3	8	20	30	--	50	
CCE 461	Digital Image Processing	3	8	20	30	--	50	
CCE 462	Biomedical Engineering	3	8	20	30	--	50	
CCE 463	Communication Engineering for Genetics and Bioinformatics	3	8	20	30	--	50	
CCE 464	Neural Engineering	3	8	20	30	--	50	

6- Courses Specifications

Program – courses LO's Matrix is given in Appendix 2.

7- Program Admission Requirements

Article 7:

1. Secondary School Certificate Graduates of other countries are eligible to join this program if they met the minimum grades set by Admission Office of the Ministry of Higher Education.
2. The study begins with a freshman year for all students. Students' departmental allocation is in accordance with the Faculty Council regulations.

8-Regulations for Progression and Program Completion

Article 12:

Attendance of program is on full-time basis.

1. A student may be transferred to a following academic year if s/he passes all attended courses but a maximum of two in accumulation – excluding humanity or cultural courses.
2. The humanity and cultural courses are not counted as non-passing courses, but have to be completed before graduation.
3. The study follows the semester system with two semesters per year.
4. The time for the Bachelor degree is four years preceded by a preparatory year.
5. A minimum of 75 % student attendance to lectures, tutorials and laboratory exercises per course is conditional for taking the final exams, in accordance with the Departmental Board recommendation approved by the Faculty Council, otherwise students would be deprived from taking their final exam(s).
6. The student is entitled to re-set failed exam(s) with fellow-students undertaking the course(s) in following term(s).
7. A 65%+ score in re-set exam(s) is reduced to a ceiling of "Pass" grade, except for acceptable excuses.
8. Final-year students who fail no more than two courses plus any number of humanity cultural courses are re-examined in November.
9. If they fail re-set(s), they are entitled to be re-examined with fellow-students undertaking the course(s) in following term(s).
10. Except for those in final-year, students who provide evidence of successfully completing particular courses in parallel academic institutions, which are recognized by the Ministry of Higher Education, may be exempted from attending these courses. This may only take place after a decision from the Academy Chairman, following the Education & Student Affairs Council and the Faculty and Departmental Boards approval respectively; with no desecration of Article (36) of University Regulation Law.
11. The course which is taught in one semester and has one examination mark and more than examination answer sheets, is treated as one-course as regards the course evaluation.
12. If a course includes written and oral / lab tests, the course evaluation is made according to the total mark of all tests in addition to the academic standing throughout the year.

13. No mark is recorded for the student who fails to appear in the written examination.
14. **Appendix 2 also** gives the details of program progression and grades evaluation.

9- Teaching and learning methods

1. Face to face Lectures
2. Online Lectures
3. Interactive Sessions
4. Mini-Projects
5. Problem-Based Learning (PBL) sessions
6. Practical
7. Flipped classroom

10- Student assessment (Methods and rules for student assessment)

Assessment methods	ILO's
1- Written exam	To assess the competencies of level A, B, C.
2- Formative (Quizzes, reports ….)	
3- Oral exams	
4- Practical	
5- Project applied on a practical field problem	To assess the competencies of level C.

11- Program Evaluation

Evaluator	Tools	Sample evidence
1- Senior students	• Meeting • Questionnaires	**25% of the student**
2- Alumni	• Meeting • Questionnaires	
3- Stakeholders	• Meeting • Questionnaires	**Samples representative from all sectors**
4- External Evaluator(s)	• Reviewing according to external evaluator • Checklist report	**Reports**
5- Others	non	

Program coordinator: Prof. Nihal Fayez Areed **Signature:**

Date:

Appendix-1 Matching Matrices

Program Mission and Academic reference (Intended ILOs)

رسالة البرنامج "يلتزم برنامج هندسة الاتصالات و الحاسبات بجامعة المنصورة باعداد مهندسين مؤهلين علميا (1) و خلقيا (2) ومحترفين مهنيا في مجالات هندسة الاتصالات والحاسبات ، قادرين على المنافسة في سوق العمل المحلى و الاقليمى و اجراء البحث العلمى (3) لخدمة المجتمع و تنمية البيئة (4)"

توافق الرسالة مع المعايير الاكاديمية (مخرجات التعلم)			
الرسالة	**المعايير الأكاديمية (جدارات التعلم)**		
	الجدارات العامة	**الجدارات الاساسية للهندسة الكهربية**	**الجدارات التخصصية**
(1) التعليم والتعلم	A1, A2, A9, A10	B1, B2, B4	C1, C2
(2) القيم المجتمعية	A7, A8		
(3) البحث العلمى	A3, A4, A5	B3	
(4) خدمة المجتمع وتنمية البيئة	A3, A6	B5	

مصفوفات التوافق بين المعايير الاكاديمية NARS 2018 و توصيف البرنامج لائحة 2020

1. مواصفات الخريج مع اهداف البرنامج

Graduate Attributes and The CCE program Aims

	Graduate Attributes	Program aims
Attributes of Engineer	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.	1- Apply a wide spectrum of engineering knowledge, science and specialized skills with analytic, critical and systemic thinking to identify and solve engineering problems in real life situation.
	2- Apply analytic critical and systemic thinking to identify, diagnose, and solve engineering problems with a wide range of complexity and variation.	
	3. Behave professionally and adhere to engineering ethics and standards	2- Behave professionally and adhere to engineering ethics and standards and work to develop the profession and the community and promote sustainability principles.
	5. Recognize his/her role in promoting the engineering field and contribute to 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.	
	4. Work in and lead a heterogeneous team of professionals from different engineering	3- Work in and lead a heterogeneous team and display leadership qualities, business

	specialties and assume responsibility for own and team performance.	administration, and entrepreneurial skills.
	10. Demonstrate leadership qualities, business administration, and entrepreneurial skills.	
	7. Use techniques, skills, and modern engineering tools necessary for engineering practice	4- Use techniques, skills, and modern engineering tools necessary for 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.	5- Master self-learning and life -long learning strategies to communicate effectively using different modes, tools, and languages to deal with academic/professional challenges in a critical and creative manner.
	9. Communicate effectively using different modes, tools, and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner	
Attributes of Communications and Computers	11- Apply knowledge of mathematics, science and engineering in solving open ended problems.	6- In-depth knowledge: Acquire in-depth knowledge of the requirements of mathematics, natural sciences, and basic engineering concepts to practice communication engineering or advanced computer engineering, including accurate analysis and creative design, compact and real design and smart applications.
	13. Gaining knowledge of contemporary issues as the digital transformation and others related to communications and computers engineering.	7- Broad specialized science: Acquisition of specialized science for communications engineering, including knowledge of various contemporary engineering issues related to disciplines.
	15. Design, operate and maintain various systems as digital and analog communication, mobile communication, coding, and decoding systems, electronic circuits, networks, information security, control, and embedded systems	
	12. Design and conduct experiments and analyze and interpret data in the field of electronics, communications, computers and control systems.	8- Professional: Use practical and managerial skills to design systems, conduct experiments, analyze data, manage projects, identify and solve communications and computers engineering problems necessary for productive occupations in the public and private sectors, or to pursue higher education.
	14. Use techniques, skills and modern engineering tools in the field of communications and computers.	
	16. Design and simulate different applications on computers and cell phones	

2. التوافق بين المعايير الاكاديمية و اهداف البرنامج

The Academic reference NARS 2018 and the CCE Program aims

Academic Reference	The CCE Program Aims
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	1- Apply a wide spectrum of engineering knowledge, science and specialized skills with analytic, critical and systemic thinking to identify and solve engineering problems in real life situation.
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.	
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.	

A4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	2- Behave professionally and adhere to engineering ethics and standards and work to develop the profession and the community and promote sustainability principles.
A9. Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	3- Work in and lead a heterogeneous team and display leadership qualities, business administration, and entrepreneurial skills.
A7. Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.	
A5. Practice research techniques and methods of investigation as an inherent part of learning.	4- Use techniques, skills, and modern engineering tools necessary for engineering practice
A6. Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	
A8. Communicate effectively– graphically, verbally and in writing – with a range of audiences using contemporary tools.	5- Master self-learning and life -long learning strategies to communicate effectively using different modes, tools, and languages to deal with academic/professional challenges in a critical and creative manner.
A10. Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	
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.	6- In-depth knowledge: Acquire in-depth knowledge of the requirements of mathematics, natural sciences, and basic engineering concepts to practice communication engineering or advanced computer engineering, including accurate analysis and creative design, compact and real design and smart applications.
B5. Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain electrical/electronic/digital equipment, systems and services.	

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.	7- Broad specialized science: Acquisition of specialized science for communications engineering, including knowledge of various contemporary engineering issues related to disciplines.
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.	
B3. Design and implement: elements, modules, sub-systems or systems in electrical/electronic/digital engineering using technological and professional tools	8- Professional: Use practical and managerial skills to design systems, conduct experiments, analyze data, manage projects, identify and solve communications and computers engineering problems necessary for productive occupations in the public and private sectors, or to pursue higher education.
C1. Design, analyze and measure the performance of communication and control systems in various applications	
C2. Designing and simulating different applications using computers and mobile phones	

Appendix-2 Program – courses LO's Matrix and grades Evaluation