Future University in Egypt
Faculty of Engineering & Technology
Electrical Engineering Dept.

جامعة المستقبل
كلية الهندسة والتكنولوجيا
قسم الهندسة الكهربائية

Program Specifications

Communication and Computer Engineering (CCE) Program
2024 / 2025

September 2024

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Program Specifications

Communication and Computer Engineering (CCE) Program

1 Basic Information

1. **Programme title: Communication and Computer Engineering**
2. **Programme type:** Single ✓ Double □ Multiple □
3. **Faculty:** Faculty of Engineering & Technology
4. **Department offering the program:** Electrical Engineering Department
5. **Coordinator: Dr. Mohamed Mousa**
6. **External evaluator(s):**
7. **Internal evaluator(s) :**
8. **By-Law date of programme approval:** January 2022
9. **Starting Date of the program:** September 2021
10. **No. of graduating groups:** 0
11. **Date of recent programme specifications approval:**
    - Department Council: August 2024
    - Faculty Council: September 2024

2 Professional Information

2.1 Communication and Computer Engineering (CCE) Program Mission

The mission of the CCE program was approved by the Electrical Engineering Department Council on its session dated 1/3/2022 and was approved by the Faculty Council on its session dated 28/5/2022.

رسالة برنامج هندسة الاتصالات والحاسبات

يوفر برنامج هندسة الاتصالات والحاسبات بيئة أكاديمية وثقافية واعدة بمعايير دولية تمكن من " تأهيل مهندس متميز قادر على المنافسة محلياً وإقليمياً والامتثال لمتطلبات سوق العمل مهنياً وأخلاقياً ، ويحفز البحث العلمي المبتكر ، ويساهم في خدمة المجتمع والتنمية المستدامة".

Communication and Computer Engineering Program Mission

"*The Communication and Computer Engineering is a promising academic and cultural environment with international standards that enables the qualifying of a distinguished engineer who can compete locally and regionally and comply with the requirements of the labor market professionally and ethically, stimulates innovative scientific research, contributes to community service and sustainable development*"

Breakdown of CCE Program Mission

The **Communication and Computer** Engineering program provides a promising academic environment that:

PM1- Enables the qualifying of a distinguished engineer who can compete locally and regionally
PM2- Comply with the requirements of the labor market professionally and ethically
PM3- Stimulates innovative scientific research
PM4- Contributes to community service and sustainable development

2.2 Communication and Computer Engineering (CCE) Program Aims

The graduate of the CCE program must:

PA1. Identify, formulate, and solve complex communication and computer engineering problems by applying principles of engineering, science, and mathematics.

PA2. Apply communication and computer engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

PA3. Communicate effectively with a range of audiences.

PA4. Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of communication and computer engineering solutions in global, economic, environmental, and societal contexts.

PA5. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

PA6. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

PA7. Acquire and apply new knowledge as needed, using appropriate learning strategies.

PA8. Use techniques, skills and modern engineering tools necessary for communication and computer engineering practice.

PA9. Demonstrate leadership qualities, business administration and entrepreneurial skills.

PA10. Recognize his/her role in promoting the engineering field and contribute in the development of the profession and the community.

Appendix (A) shows the mapping between CCE program aims and program mission.

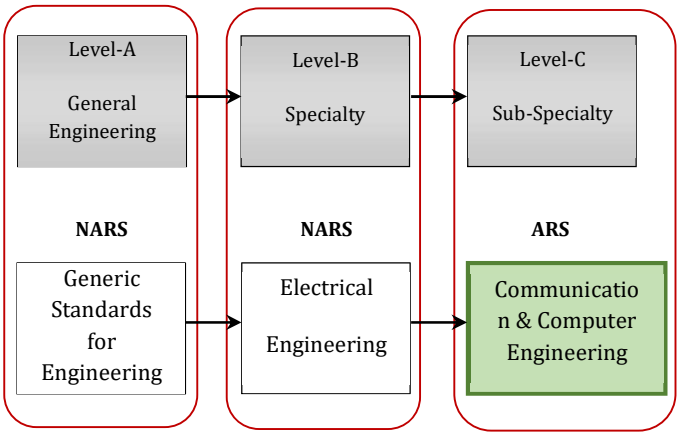
Appendix (B) shows the mapping between CCE program aims and Graduate Attributes.

3 Outcomes of CCE Program

The Faculty of Engineering & Technology at FUE adopts the general Engineering National Academic Reference Standards (**NARS**) 2018 for the B.Sc. degree of Engineering published by the National Authority for Quality Assurance and Accreditation of Education (NAQAAE), along with the relevant NARS for the Electrical Engineering program. and the Academic Reference

Standard (**ARS**) for the "***Communication and Computer Engineering***" program, developed by the Faculty, **Appendix (C)**.

NATIONAL ACADEMIC REFERENCE STANDARDS (**NARS**)
AND ACADEMIC REFERENCE STANDARDS (**ARS**)



Different Levels of Competencies, as per NAQAAE.

Also, the development of the program considers the conditions and constraints specified by the Accreditation Board for Engineering and Technology (ABET): criteria for accrediting Engineering Programs", 2020-2021 Accreditation Cycle, November 2019.

3.1 *General Outcomes for CCE Program* (*Level A*)

PO1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.

PO2. 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.

PO3. 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.

PO4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.

PO5. Practice research techniques and methods of investigation as an inherent part of learning.

PO6. Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.

PO7. Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.

PO8. Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.

PO9. Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.

PO10. Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.

3.2 Specialization Outcomes for CCE Program (*Level B*)

PO11. 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.

PO12. Design, model and analyze an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.

PO13 Design and implement: elements, modules, sub-systems or systems in electrical/ electronic/ digital engineering using technological and professional tools.

PO14. 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.

PO15. Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain electrical/electronic/digital equipment, systems and services.

3.3 Sub-Specialization Outcomes for CCE Program (*Level C*)

PO16. Use software packages pertaining to communication and/or computer subsystems or systems and select the appropriate software for the purpose of simulation, analysis, design, and/or control of a specific application.

PO17. Plan and manage engineering activities during the diverse implementation phases of the communication/ computer sub-systems and systems, and present relevant technical reports.

PO18. Investigate the defects and failures of components, modules, systems, and processes relevant to communication and/or computer systems based on appropriate fault diagnosis methodology.

PO19. Integrate components and modules to build up an assigned communication and/or computer system with specific requirements considering compatibility constraints.

PO20. Design appropriate schemes for performing the necessary measurements of the main parameters of communication and/or computer subsystems and systems, as well as interpret the measurements.

Appendix (D) shows the mapping between CCE program outcomes and program aims.

Appendix (E) shows the mapping between CCE program outcomes and ARS.

4 Curriculum Structure and Contents

4.1 Program duration:

The teaching plan includes **164** Cr.H., *with one contact hour of a weekly lecture and two-three contact hours of a weekly tutorial/lab/workshop over a 15-week semester*. The program study duration should not be less than 8 main semesters. The average student is expected to finish the program in Five Years. However, excellent students can finish the program in 4 years through a prepared fast-track scenario. The maximum allowed study duration is 20 main semesters (10 years), not including the semesters suspended for reasons accepted by the Faculty Council. After such period, the student is dismissed from the program.

4.2 *Program structure*

Contact Hours Distribution (H)		%
Lectures	121	50 %
Tutorial	76	31 %
Lab	46	19 %
Total	243	100 %

Credit Hours Distribution (Cr.H.)		%
Compulsory	152	92.6 %
Elective	12	7.4 %
Total	164	100 %

Credit Hours Distribution to the Graduation Requirements			
CCE Credit Hours Distribution to the Graduation Requirements			Reference framework for engineering programs
Requirement	**Credit Hours**	**%**	**Min %**
University	13	8 %	8 %
Faculty	32	20 %	20 %
Discipline	64	39 %	35 %
Program	55	33 %	Max 30 %
Total	164	100 %	

4.3 *Program Requirements*

4.3.1 University Requirements (13 *credit hours*)

Compulsory Courses List (9 CH)

No.	Code	Course Title	CH
1	CSC 101	Introduction to Computers	2
2	ENG KET	English KET	2
3	ENG PET	English PET	2
4	GEN201	Practical Training 1	0
5	GEN301	Practical Training 2	0
6	GEN401	Practical Training 3	1
7	PSC 110	Human Rights	2

Elective Courses List (4 *CH*)

No.	Code	Course Title	CH
1	BSA H01	Administration of Small Projects	2
2	ENV 101	Environmental Science	2
3	HUM H09	Specific Computer Applications	2
4	PSC 101	Psychology	2
5	SCT 101	Scientific Thinking	2
6	SOC 101	Sociology	2

4.3.2 Faculty Requirements (32 *CH*)

No.	Code	Course Title	CH
1	EED160	Computer Programming	2
2	EMP111	Differentiation with Applications and Algebra	3
3	EMP112	Integration with Applications and Analytical Geometry	3
4	EMP121	Properties of Matter and Thermodynamics	4
5	EMP122	Electricity and Magnetism	4
6	EMP130	Engineering Mechanics	4
7	EMP140	Engineering Graphics	4
8	EMP150	General Chemistry	2
9	GENx11	Communication and presentation skills	2
10	GENx12	Engineering Ethics and Legislations	2
11	MEC161	Production Technology	2

4.3.3 Electrical Engineering Specialty Requirements (64 CH)

No.	Code	Course Title	CH
1	EED201	Electrical Circuits 1	4
2	EED202	Electrical Circuits 2	3
3	EED210	Electronics	3
4	EED220	Logic Design	3
5	EED230	Signals & Systems	3
6	EED301	Measurements & Instrumentation	3
7	EED302	Control Systems	3
8	EED303	Digital Control Systems	2
9	EED311	Electronic Circuits	4
10	EED320	Computer Organization	3
11	EED321	Microcontroller-based Systems	3
12	EED331	Electromagnetic Fields	3
13	EED340	Electrical Power Engineering	3
14	EED498	Graduation Project 1	1
15	EED499	Graduation Project 2	4
16	EMP213	Differential Equations	3

No.	Code	Course Title	CH
17	EMP214	Transformations & Complex Analysis	3
18	EMP221	Solid State Physics	3
19	EMP311	Discrete Mathematics & Numerical Methods	3
20	EMP312	Probability & Statistics	3
21	GEN442	Project Management & Entrepreneurship	2
22	MEC460	Engineering Economy	2

4.3.4 Communication & Computer Engineering

Sub-Specialty Requirements (55 CH)

4.3.4.1 CCE Common Compulsory Courses (35 CH)

No.	Code	Course Title	CH
1	EED312	Integrated Circuits Devices	3
2	EED330	Analog Communication Systems	3
3	EED332	Digital Signal Processing	3
4	EED333	Electromagnetic Waves	3
5	EED361	Advanced Computer Programming	3
6	EED410	Digital Integrated-Circuits	3
7	EED420	Real-time Embedded Systems	3
8	EED430	Digital Communication Systems	3
9	EED457	Electrical Power Sources	2
10	EED460	Data Structures and Algorithms	2
11	EED464	Database Management Systems	2
12	EED470	Artificial Intelligence	2
13	EED480	Data Communication and Computer Networks	3

4.3.4.2 Concentration Courses (12 CH)

4.3.4.2.1 Communication Engineering Concentration Compulsory Courses (12 CH)

No.	Code	Course Title	CH
1	EED411	Electronic-Circuits for Communication	3
2	EED412	Analog Integrated Circuits	3
3	EED434	Microwave Engineering	3
4	EED435	Antenna and Propagation	3

4.3.4.2.2 Computer Engineering Concentration Compulsory Courses (12 CH)

No.	Code	Course Title	CH
1	EED461	Analysis and Design of Algorithms	3
2	EED462	Software Engineering	3
3	EED463	Operating Systems	3
4	EED472	Machine Learning and Pattern Recognition	3

4.3.5 CCE Elective Courses (8 CH)

Four courses are to be selected from this list

No.	Code	Course Title	CH	Prerequisite Courses
1	EED413	Microwave Devices	2	EED434
2	EED414	RF Circuits and Systems	2	EED311
3	EED415	VLSI Testing and Design for Testability	2	EED410
4	EED416	VLSI Design Automation	2	EED410
5	EED417	Optical Electronics	2	EMP221
6	EED421	Advanced Computer Hardware:	2	EED320
7	EED423	Introduction to Robotics	2	EED320
8	EED431	Wireless Communication	2	EED430
9	EED432	Satellite Communication	2	EED430
10	EED433	Optical Fiber Communication Systems	2	EED430
11	EED436	Digital Image Processing	2	EED230
12	EED465	Fundamentals of Big Data Analysis	2	EED160, EMP312
13	EED471	Computational Intelligence	2	EED321
14	EED481	Modelling and Analysis of Telecommunication	2	EED430
15	EED482	Cryptography and Security	2	EED430
16	EED491	Selected Topics in Electronics and Communication Engineering	2	As advised
17	EED492	Selected Topics in Computer Engineering	2	As advised

Appendix (F) shows the mapping between CCE Program Courses mapped to Program Outcomes

4.4 *Program Study Plan*

Level 1 (Freshman)

(Common to All Engineering Students)

First Semester

No	Course		Weekly Contact Hours				CH	Prerequisite Courses
	Code	Title	Lec.	Tut.	Lab.	Total		
1	CSC 101	Introduction to Computers	2	0	0	2	2	
2	EMP111	Differentiation with Applications & Algebra	2	2	0	4	3	
3	EMP121	Properties of Matter & Thermodynamics	3	2	1	6	4	
4	EMP140	Engineering Graphics	2	6	0	8	4	
5	EMP150	General Chemistry	2	1	0	3	2	
6	ENG KET	English KET	2	0	0	2	2	
		Total	**13**	**11**	**1**	**25**	**17**	

Second Semester

No	Course		Weekly Contact Hours				CH	Prerequisite Courses
	Code	Title	Lec.	Tut.	Lab.	Total		
1	EED160	Computer Programming	1	0	2	3	2	CSC 101
2	EMP112	Integration with Applications & Analytical Geometry	2	2	0	4	3	EMP111
3	EMP122	Electricity & Magnetism	3	2	1	6	4	
4	EMP130	Engineering Mechanics	4	2	0	6	4	
5	MEC161	Production Technology	1	0	3	4	2	
6	PSC 110	Human Rights	2	0	0	2	2	
		Total	**13**	**6**	**6**	**25**	**17**	

Level 2 (Sophomore)

Third Semester

(Common to All Electrical Engineering Students)

No	Course		Weekly Contact Hours				CH	Prerequisite Courses
	Code	Title	Lec.	Tut.	Lab.	Total		
1	EED201	Electrical Circuits 1	3	2	1	6	**4**	EMP122
2	EED220	Logic Design	2	2	1	5	**3**	CSC 101
3	EMP213	Differential Equations	2	2	0	4	**3**	EMP112
4	EMP221	Solid State Physics	2	2	0	4	**3**	EMP122
5	ENG PET	English PET	2	0	0	2	**2**	ENG KET
6	GENx11	Communication & Presentation Skills	2	1	0	3	**2**	-
		Total	**13**	**9**	**2**	**24**	**17**	

Fourth Semester

(Common to All Electrical Engineering Students)

No	Course		Weekly Contact Hours				CH	Prerequisite Courses
	Code	Title	Lec.	Tut.	Lab.	Total		
1	EED202	Electrical Circuits 2	2	2	1	5	**3**	EED201
2	EED210	Electronics	2	2	1	5	**3**	EED201& EMP221
3	EED230	Signals & Systems	2	2	1	5	**3**	EED201& EMP213
4	EMP214	Transformations & Complex Analysis	2	2	0	4	**3**	EMP213
5	MEC460	Engineering Economy	2	1	0	3	**2**	-
6	UNV E01	University Elective 1	2	0	0	2	**2**	-
		Total	**12**	**9**	**3**	**24**	**16**	

Summer Training

No	Course		Contact Hours	CH	Prerequisite Courses
	Code	Title			
1	GEN201	Practical Training 1	80 Contact Hours (2 Weeks × 40 hrs/Week)	**0**	Completion of 50 CH

Level 3 (Junior)

Fifth Semester

(Common to All Electrical Engineering Students)

No	Course		Weekly Contact Hours				CH	Prerequisite Courses
	Code	Title	Lec.	Tut.	Lab.	Total		
1	EED301	Measurements & Instrumentation	2	1	2	5	**3**	EED201& EED220
2	EED302	Control Systems	2	2	1	5	**3**	EED230& EMP214
3	EED320	Computer Organization	2	2	1	5	**3**	EED220
4	EED340	Electrical Power Engineering	2	2	0	4	**3**	EED202
5	EMP311	Discrete Mathematics & Numerical Methods	2	2	0	4	**3**	EMP213
6	UNV E02	University Elective 2	2	0	0	2	**2**	-
		Total	**12**	**9**	**4**	**25**	**17**	

Sixth Semester

(Common to All Electrical Engineering Students)

No	Course		Weekly Contact Hours				CH	Prerequisite Courses
	Code	Title	Lec.	Tut.	Lab.	Total		
1	EED303	Digital Control Systems	2	1	0	3	**2**	EED302
2	EED311	Electronic Circuits	3	2	1	6	**4**	EED210
3	EED321	Microcontroller-based Systems	2	2	1	5	**3**	EED320
4	EED331	Electromagnetic Fields	2	2	0	4	**3**	EMP311
5	EMP312	Probability & Statistics	2	2	0	4	**3**	EMP213
6	GENx12	Engineering Ethics & Legislations	2	0	0	2	**2**	-
		Total	**13**	**9**	**2**	**24**	**17**	

Summer Training

No	Course		Contact Hours	CH	Prerequisite Courses
	Code	Title			
1	GEN301	Practical Training 2	80 Contact Hours (2 Weeks × 40 hrs/Week)	**0**	GEN201

Level 3 (Junior) – *Continued*

Seventh Semester

(Communication and Computer Engineering Students)

No	Course		Weekly Contact Hours				CH	Prerequisite Courses
	Code	Title	Lec.	Tut.	Lab.	Total		
1	EED312	Integrated Circuits Devices	2	2	1	5	3	EMP221
2	EED330	Analog Communication Systems	2	2	1	5	3	EED230
3	EED332	Digital Signal Processing	2	1	1	4	3	EED230
4	EED333	Electromagnetic Waves	2	2	0	4	3	EED331
5	EED361	Advanced Computer Programming	2	0	2	4	3	EED160
6	GEN442	Project Management & Entrepreneurship	2	1	0	3	2	----
		Total	**12**	**8**	**5**	**25**	**17**	

Level 4 (Senior)

Eighth Semester

(Communication and Computer Engineering Students)

No	Course		Weekly Contact Hours				CH	Prerequisite Courses
	Code	Title	Lec.	Tut.	Lab.	Total		
1	EED410	Digital Integrated-Circuits	2	2	1	5	3	EED312, EED320
2	EED420	Real-time Embedded Systems	2	0	3	5	3	EED321
3	EED430	Digital Communication Systems	2	2	1	5	3	EED330
4	EED460	Data Structures and Algorithms	2	0	1	3	2	EED361
5	EED470	Artificial Intelligence	2	0	1	3	2	EMP312
6	EED457	Electrical Power Sources	2	1	0	3	2	EED202
		Total	**12**	**5**	**7**	**24**	**15**	

Summer Training

No	Course		Contact Hours	CH	Prerequisite Courses
	Code	Title			
1	GEN401	Practical Training 3	80 Contact Hours (2 Weeks × 40 hrs/Week)	**1**	GEN301

Level 4 (Senior) - *Continued*

Ninth Semester

*(**Communication Engineering Concentration** Students)*

No	Course		Weekly Contact Hours				CH	Prerequisite Courses
	Code	Title	Lec.	Tut.	Lab.	Total		
1	EED411	Electronic-Circuits for Communication	2	2	1	5	3	EED311
2	EED434	Microwave Engineering	2	2	1	5	3	EED333
3	EED480	Data Communication and Computer Networks	2	2	1	5	3	EED430
4	EED498	Graduation Project 1	0	0	3	3	1	120 CH completed
5	EED E01	Technical Elective 1	2	0	1	3	2	See 4B.6.3
6	EED E02	Technical Elective 2	2	0	1	3	2	See 4B.6.3
		Total	**10**	**6**	**8**	**24**	**14**	

Tenth Semester

(Communication Engineering Concentration Students)

No	Course		Weekly Contact Hours				CH	Prerequisite Courses
	Code	Title	Lec.	Tut.	Lab.	Total		
1	EED412	Analog Integrated Circuits	2	2	1	5	3	EED411
2	EED435	Antenna and Propagation	2	2	1	5	3	EED333
3	EED464	Database Management Systems	2	0	1	3	2	EED460
4	EED499	Graduation Project 2	1	0	3	4*	4	EED498
5	EED E03	Technical Elective 3	2	0	1	3	2	See 4B.6.3
6	EED E04	Technical Elective 4	2	0	1	3	2	See 4B.6.3
		Total	**11**	**4**	**8**	**23**	**16**	

* *This number does not include the contact hours during the four weeks following the final exams*

Ninth Semester

(Computer Engineering Concentration Students)

No	Course		Weekly Contact Hours				CH	Prerequisite Courses
	Code	Title	Lec.	Tut.	Lab.	Total		
1	EED480	Data Communication and Computer Networks	2	2	1	5	3	EED430
2	EED461	Analysis and Design of Algorithms	2	2	1	5	3	EED460
3	EED462	Software Engineering	2	1	2	5	3	EED361
4	EED498	Graduation Project 1	0	0	3	3	1	120 CH completed
5	EED E01	Technical Elective 1	2	0	1	3	2	See 4B.6.3
6	EED E02	Technical Elective 2	2	0	1	3	2	See 4B.6.3
Total			**10**	**5**	**9**	**24**	**14**	

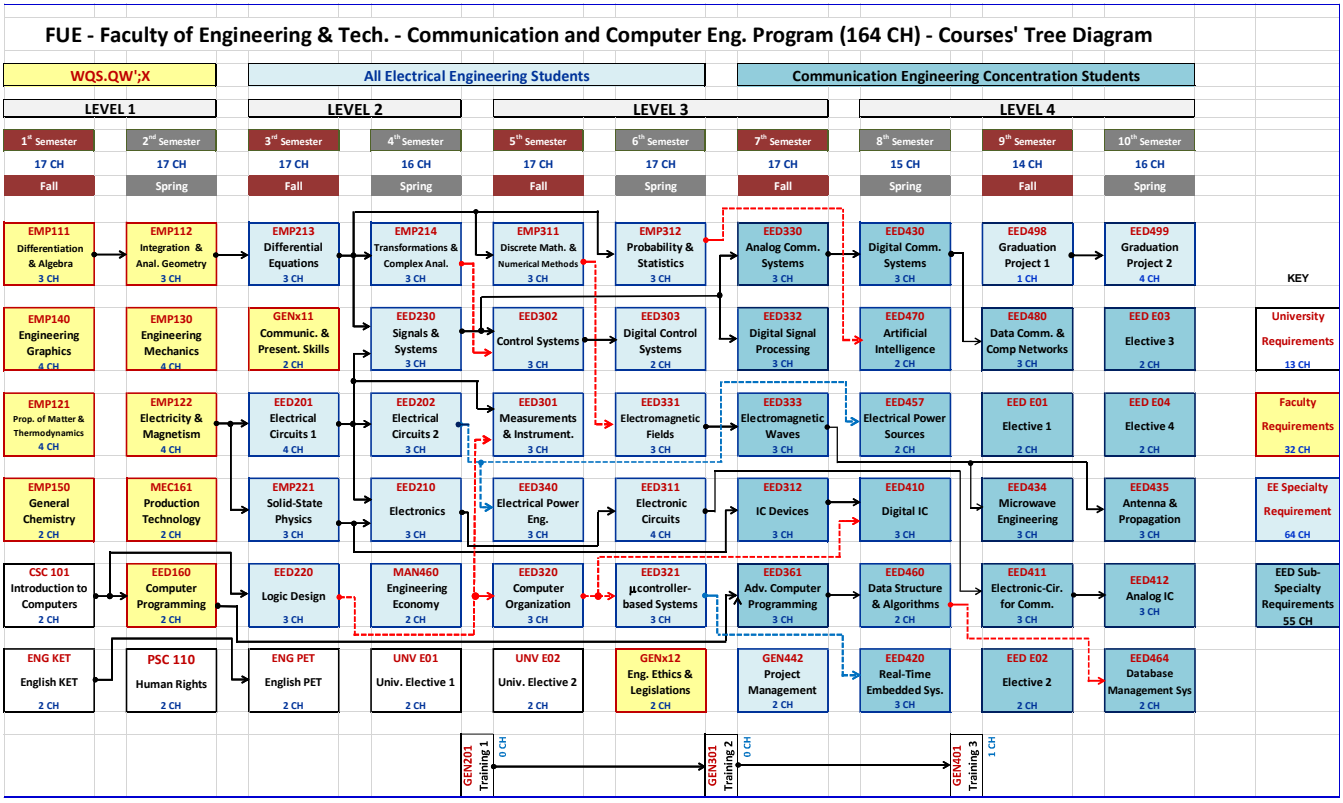
Tenth Semester

(Computer Engineering Concentration Students)

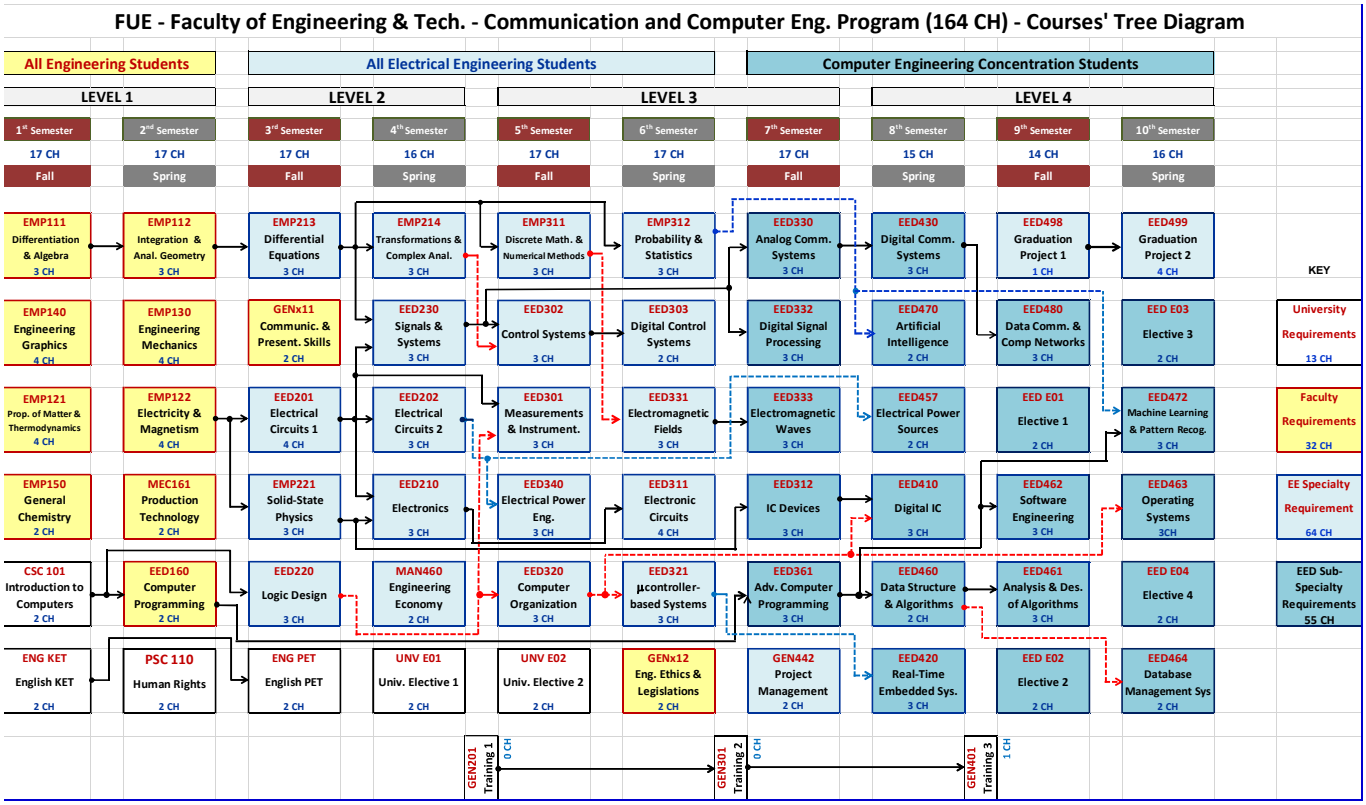
No	Course		Weekly Contact Hours				CH	Prerequisite Courses
	Code	Title	Lec.	Tut.	Lab.	Total		
1	EED463	Operating Systems	2	1	2	5	3	EED320
2	EED464	Database Management Systems	2	0	1	3	2	EED460
3	EED472	Machine Learning and Pattern Recognition	2	1	2	5	3	EED361, EMP312
4	EED499	Graduation Project 2	1	0	3	4*	4	EED498
5	EED E03	Technical Elective 3	2	0	1	3	2	See 4B.6.3
6	EED E04	Technical Elective 4	2	0	1	3	2	See 4B.6.3
Total			**11**	**2**	**10**	**23**	**16**	

* *This number does not include the contact hours during the four weeks following the final exams*

4.5 *Communication Engineering Concentration Courses' Tree (164 CH)*



4.6 *Computer Engineering Concentration Courses' Tree (164 CH)*



5 Graduation Project

The Graduation Project represents the crowning achievement of an Engineering student's undergraduate experience. The student will be eligible to register the first course of the graduation project upon completing not less than 120 CH. The Faculty Council may permit decreasing this limit to 115 CH upon a request by the Academic Advisor and subject to special cases. The graduation project spans two main semesters.

Graduation projects apply both engineering knowledge and skills to the solution and design of real-world applications. The work done has to be based on the knowledge and skills acquired during the course work. The first part of the project should include a survey of the project subject area with reference to appropriate literature, and the time schedule for the design and implementation phases of the project. The project is considered as a decision-making process in which the basic science and mathematics as well as engineering sciences are integrated to convert resources optimally to meet a stated objective. Among the fundamental elements of the design process are the establishment of objectives and criteria, synthesis, analysis, construction, testing and evaluation. The student has to take into consideration the appropriate engineering standards and multiple constraints during the different phases of the project.

The engineering design must include most of the following features: development of student creativity, use of open-ended problems, development and use of modern design theory and methodology, formulation of design problem statements and specification, consideration of alternative solutions, feasibility considerations, concurrent engineering design, and detailed system description. Further, it is essential to include a variety of realistic constraints, such as economic factors, safety, reliability, aesthetics, ethics and social impact.

One extra month after the end of the second semester is available for the students to finalize their work. The supervisor evaluates the contribution of each student during the different phases of the project. A printed version of the project report beside the final product of the project work should be submitted to the Department prior to the date of discussion. The jury members from academy and industry evaluate the student work based on a submitted documents and final product, oral presentation and discussion. In case the student failed in the project, he/she is given a grace semester and will be eligible to present and defend the project by the end of the grace semester.

6 Practical Training

Practical training is a part of all the study programs of the Faculty. The overall duration of the training is 240 hours, divided over 3 modules (80 hours each), and should be carried out during two or three summer semesters at one or more engineering facilities (inside or outside Egypt).

The training program shall be related to the specialization of the study program in which the student is registered and must be approved by the scientific department offering the program. The student is eligible to register the first training module after completing the courses of Level Two (or a minimum of 50 CH). The student may practice at most one on-campus training module (80 hours) offered by the Faculty. After completing each module, the student shall submit a report and conduct a presentation to be evaluated by the scientific department. The three training modules are equivalent to 1 CH.

7 Program Admission Requirements

Students eligible for enrolment in the Faculty are those holding the Egyptian General Secondary Education Certificate (Thanaweya Amma) or any equivalent certificate, or those transferred from other universities, in accordance with the rules and conditions issued annually by the Egyptian Council of Private and Community Universities (CPU).

8 Internal Regulations

8.1 Registration Procedure and Academic Load

The academic year is composed of three study semesters:

- The first main semester (Fall Semester) usually starts late September and lasts for 15 weeks, followed by final exams for 3 weeks. Courses are registered within three weeks before the start of the semester.
- The second main semester (Spring Semester) usually starts early February and lasts for 15 weeks, followed by final exams for 3 weeks. Courses are registered during the week before the start of the semester.
- The Summer semester, which is an elective semester, starts late June or early July and lasts for 7 weeks, followed by 1-week final exams. Courses are registered during the week before the start of the semester.

In a main semester (Fall or Spring), the academic load of the student, which he/she selects with the help of the academic advisor, may reach:

a. Up to 21 credit hours for students with Cumulative Grade Point Average (CGPA) greater than or equal to 3.0.
b. Up to 18 credit hours for students with CGPA greater than or equal to 2.0.
c. Up to14 credit hours for students with CGPA less than 2.0.

- During the final semester of his/her study, the student can register an overload of no more than 3 CH over the upper limits mentioned before, based on the academic advisor's recommendation and approval of the Dean.
- In the Summer semester, the student may register up to 7 credit hours for any student, regardless of his/her CGPA.

8.2 Course Withdrawal and Addition

A student may add/drop courses within the first two weeks of a main semester, or the first week in a Summer semester, without incurring any penalty. After such time and no later than the 12th week of a main semester, or the 4th week of a Summer semester, a student may withdraw registered courses. In this case, the course(s) fees will not be refunded; nonetheless, the student is given a Withdrawn grade (W), and his/her CGPA will not be affected on account of such course(s) withdrawal.

8.3 Attendance Policy

The student is required to attend all classes of the course he/she registers for. A student who is absent for more than 15% of the total contact hours of the course without an acceptable excuse is given an academic warning. A student who is absent for more than 25% of the course hours without a valid excuse accepted by the Faculty Council shall be deprived from taking all the following activities and/or examinations scheduled for that course and shall be given a Fail (F) grade.

The student can withdraw from a course if his absence ratio exceeds 25% during the first 12 weeks of the semester. If the absence ratio exceeds 25 % after the first 12 weeks, the student will not be allowed to withdraw the course.

8.4 Semester Withdrawal

The student has the right to withdraw from an academic semester within the withdrawal period announced in the academic calendar of the semester. He/She will be considered to have failed if he withdraws after the aforementioned period, unless he has a valid reason which is acceptable to his/her advisor, and the faculty Dean.

8.5 Course Assessment Policy

The final mark of a given course is composed of the sum of semester work (60% of final mark) and the final examination mark (40% of final mark).

Students are to be informed about their grades two times: 25% by the 6th week and 50% by the 11th week.

A. The Marks of a given course (100 Marks) are distributed on the semester's work and the final exam according to the nature of the course. The assessment policy must be declared to the students through course syllabus before the start of the course. Most of the Faculty courses comply with the regular assessment scheme of marks distribution, given below:

A1. Final Exam

The final exam constitutes 40 Marks. It shall be a comprehensive exam covering all course topics.

A2. Midterm Exam

The midterm exam constitutes 30 Marks. It shall be conducted during the 8th-9th weeks. Exam date should be announced to students. The graded midterm exam and its model answer should be discussed in class.

A3. Other assessment components

Other assessment components, which constitute 30 Marks, include: Quizzes, Assignments, Practical exams (if exist), Oral exams (if any), Course report/ project (if any), student's Performance and Participation.

B. Courses not complying with the regular assessment scheme of item (A) are characterized by adding a row, containing the adopted marks distribution, to the corresponding table of the course description of this Bylaw.

C. The distribution of marks of a course can be modified after the approval of the Faculty Council based on a proposal by the Scientific Department offering that course.

8.6 Incomplete Courses

If the student did not attend the final exam of the course with an excuse accepted by the Faculty Council, he/she gets a final grade Incomplete (I) in this course. The grade "I" is not included in calculating the Cumulative Grade Point Average (CGPA). In this case, the final exam will be postponed for the student till the beginning of the next semester while the student's semester work marks are kept. If the student didn't attend the final exam on the announced date without an excuse accepted by the Faculty Council, he/she gets a Fail (F) grade in the final examination.

8.7 Semester Withdrawal

The student has the right to withdraw from an academic semester within the withdrawal period, announced in the academic calendar of the semester. The student will be considered failed if he/she withdraws after the withdrawal period unless he/she has a valid reason which is accepted by the Faculty Council.

8.8 Grading System

- There are two conditions to pass a regular course:
  1- The student must attend the final exam and obtain at least 40% of its grade.
  2- The overall marks of the student for all assessment components of the course must be at least 60 Marks out of 100 Marks.
- For non-credit courses (0 CH), the earned grade is either Pass or Fail (P/F). Pass grade means the student obtained at least 60% of the course marks. The grade of non-credit courses shall not be included in the CGPA calculation.
- The following grading system is adopted by the Faculty for all the offered courses:

Grade	Percentage Marks	Grade Points	Grade	Percentage Marks	Grade Points
A+	97% and higher	**4.0**	**C+**	73% to less than 76%	**2.3**
A	93% to less than 97%	**4.0**	**C**	70% to less than 73%	**2.0**
A-	89% to less than 93%	**3.7**	**C-**	67% to less than 70%	**1.7**
B+	84% to less than 89%	**3.3**	**D+**	64% to less than 67%	**1.3**
B	80% to less than 84%	**3.0**	**D**	60% to less than 64%	**1.0**
B-	76% to less than 80%	**2.7**	**F**	Less than 60%	**0.0**

- In addition to the regular grades, the non-credit grades are

Grade	Meaning	Description
P/F	Pass/Fail	Grades for non-credit hour courses
I	Incomplete	According to the conditions of Article 8.6
W	Withdrawn	According to the conditions of Article 8.7

8.9 Repetition of courses in the case of failure

If a student fails a compulsory course in any semester, he/she should restudy this course. However, if he fails an elective course, he may restudy the same course or register in another elective course with the approval of the academic advisor. If the student succeeds a repeated course, the (F) grade remains in his academic record, but its mark is replaced by the new mark which is then used in calculating his G.P.A.

8.10 Repetition of courses for improving the G.P.A

A student is allowed to register one course or more in order to improve his G.P.A. In this case the student gets his new mark whatever its value and the old mark is removed with its credit hours from his academic record. In case a student wants to re-register a course for the second time, he/she has to take the permission of his advisor and the approval of the college council.

8.11 Registration for a student with low G.P.A.

If the G.P.A of a student in any semester drops below 2.0, he is put on probation (under close observation) for the next two semesters and is not allowed to register more than 12 credit hours in these semesters.

8.12 Degree Requirements

To be awarded the Bachelor of Science Degree in Architecture Engineering, students must earn 176 credit hours. The student must earn a grade of D or better in all the required courses and earn a grade-point average (GPA) of (C) or better in order to graduate. To get the rank of honor the student should have not failed any course during his study.

G.P.A	RATING	Rank of Honor *
3.7- 4.0	Distinction	First Rank
3.3 - Less than 3.7	Very Good	Second Rank
2.3 - Less than 3.3	Good	-
2.0 - Less than 2.3	Pass	-

9 Program Teaching and Learning Strategies

The following table illustrates the adopted teaching/learning methods and the corresponding learning outcomes in most cases. However, for further details refer to the course specifications.

Teaching and Learning Strategies		Teaching and Learning Methods
Teacher-centered Strategies	Interactive Teaching	Interactive Lecture
		Field Trip
		Field Training
Student-centered Strategies	Interactive Learning	Self-Study
		Essay or Report
		Debate & Discussion
		Problem Solving
		Case Study
		Individual Projects
		Experiential Learning
	Cooperative Learning	Brain Storming
		Collaborative Projects
		Collaborative Research

10 Program Assessment Methods

The following table illustrates the assessment methods and what they assess in most cases. But for further details refer to the course's specifications.

Formative Assessment	Quizzes
	Midterm Written Exams
	Oral Exams
	Presentations
	Reports and Research Papers
	Assignments
	Lab Experiments
Summative Assessment	Final Written Exams
	Final Oral Exams
	Final Practical Exams
	Course Projects

11 Evaluation of Program Outcomes

Evaluator	Tool	Sample
1. Program Coordinator	Final Exams Results	1
2. Faculty Staff	Evaluation sheet	100 %
3. Senior students	Evaluation sheet	50 %
4. Alumni	Evaluation sheet	25 %
5. Stakeholders	Evaluation sheet	Different Representative Sectors
6. Internal & External Reviewers	Evaluation report	2

Appendices

Appendix (A): CCE Program Aims mapped to Program Mission

CCE Program Mission The Communication and Computer Engineering is a promising academic and cultural environment with international standards that enables the qualifying of a distinguished engineer who can compete locally and regionally and comply with the requirements of the labor market professionally and ethically, stimulates innovative scientific research, contributes to community service and sustainable development		Enables the qualifying of a distinguished engineer who can compete locally and regionally	Comply with the requirements of the labor market professionally and ethically.	Stimulates innovative scientific research	Contributes to community service and sustainable development
Communication and Computer Engineering (CCE) Program Aims		PM1	PM2	PM3	PM4
PA1.	Identify, formulate, and solve complex electronics and communication engineering problems by applying principles of engineering, science, and mathematics.	X			
PA2.	Apply Communication and Computer engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	X			
PA3.	Communicate effectively with a range of audiences.		X		
PA4.	Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of communication and computer engineering solutions in global, economic, environmental, and societal contexts.		X		X
PA5.	Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.		X		
PA6.	Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	X		X	
PA7.	Acquire and apply new knowledge as needed, using appropriate learning strategies.			X	
PA8.	Use techniques, skills and modern engineering tools necessary for communication and computer engineering practice.	X	X		
PA9.	Demonstrate leadership qualities, business administration and entrepreneurial skills.		X		
PA10.	Recognize his/her role in promoting the engineering field and contribute in the development of the profession and the community.				X

Appendix (B): **The Graduate Attributes (GA) of the Faculty of Engineering & Technology (FET) - FUE**		GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10
Program Aims: The graduate of the CCE program must		Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and	Communicate effectively with a range of audiences.	Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider	Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment,	Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw	Acquire and apply new knowledge as needed, using appropriate learning strategies.	Use techniques, skills and modern engineering tools necessary for engineering practice.	Demonstrate leadership qualities, business administration and entrepreneurial skills.	Recognize his/her role in promoting the engineering field and contribute in the development of the profession and the community.
PA1	Identify, formulate, and solve complex electronics and communication engineering problems by applying principles of engineering, science, and mathematics.	**x**									
PA2	Apply Communication and Computer engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.		**x**								
PA3	Communicate effectively with a range of audiences.			**x**							

PA4	Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of communication and computer engineering solutions in global, economic, environmental, and societal contexts.				**x**						
PA5	Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.					**x**					
PA6	Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.						**x**				
PA7	Acquire and apply new knowledge as needed, using appropriate learning strategies.							**x**			
PA8	Use techniques, skills and modern engineering tools necessary for communication and computer engineering practice.								**x**		
PA9	Demonstrate leadership qualities, business administration and entrepreneurial skills.									**x**	
PA10	Recognize his/her role in promoting the engineering field and contribute in the development of the profession and the community.										**x**

Appendix (C): ARS FOR Communication and Computer Engineering (CCE) Program.

ARS1.	**Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.**
ARS2.	**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.**
ARS3.	**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.**
ARS4.	**Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.**
ARS5.	**Practice research techniques and methods of investigation as an inherent part of learning.**
ARS6.	**Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.**
ARS7.	**Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.**
ARS8.	**Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.**
ARS9.	**Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.**
ARS10.	**Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.**
ARS11.	**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.**
ARS12.	**Design, model and analyze an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.**

ARS13	**Design and implement: elements, modules, sub-systems or systems in electrical/ electronic/ digital engineering using technological and professional tools.**
ARS14.	**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.**
ARS15.	**Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain electrical/electronic/digital equipment, systems and services.**
ARS16.	**Use software packages pertaining to communication and/or computer subsystems or systems and select the appropriate software for the purpose of simulation, analysis, design, and/or control of a specific application.**
ARS17.	**Plan and manage engineering activities during the diverse implementation phases of the communication/ computer sub-systems and systems, and present relevant technical reports.**
ARS18.	**Investigate the defects and failures of components, modules, systems, and processes relevant to communication and/or computer systems based on appropriate fault diagnosis methodology.**
ARS19.	**Integrate components and modules to build up an assigned communication and/or computer system with specific requirements considering compatibility constraints.**
ARS20.	**Design appropriate schemes for performing the necessary measurements of the main parameters of communication and/or computer subsystems and systems, as well as interpret the measurements.**

Appendix (D): The CCE Program Outcomes mapped Program Aims

Communication and Computer Engineering Program Aims (PA): The CCE program graduate must		**PA1**	**PA2**	**PA3**	**PA4**	**PA5**	**PA6**	**PA7**	**PA8**	**PA9**	**PA10**
CCE Program Outcomes		Identify, formulate, and solve complex electronics and communication engineering problems by applying principles of engineering, science, and	Apply Communication and Computer engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and	Communicate effectively with a range of audiences.	Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of communication and computer engineering solutions in global, economic, environmental, and societal contexts.	Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks,	Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	Acquire and apply new knowledge as needed, using appropriate learning strategies.	Use techniques, skills and modern engineering tools necessary for communication and computer engineering practice.	Demonstrate leadership qualities, business administration and entrepreneurial skills.	Recognize his/her role in promoting the engineering field and contribute in the development of the profession and the community.
PO1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**X**									
PO2	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.						**X**		**X**		
PO3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic,		**X**		**X**						**X**

	environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.										
PO4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.				**X**				**X**		**X**
PO5	Practice research techniques and methods of investigation as an inherent part of learning.							**X**			
PO6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.		**X**			**X**					
PO7	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.					**X**				**X**	
PO8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.			**X**							
PO9	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.		**X**							**X**	
PO10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.							**X**			
PO11	Select, model and analyze electrical power systems applicable to the specific discipline by applying the concepts of:		**X**								

	generation, transmission and distribution of electrical power systems.										
PO12	Design, model and analyze an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.		**X**								
PO13	Design and implement: elements, modules, sub-systems or systems in electrical/ electronic/ digital engineering using technological and professional tools.		**X**						**X**		
PO14	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.						**X**				
PO15	Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain electrical/electronic/digital equipment, systems and services.				**X**						
PO16	Use software packages pertaining to communication and/or computer subsystems or systems and select the appropriate software for the purpose of simulation, analysis, design, and/or control of a specific application.	**X**	**X**				**X**		**X**		
PO17	Plan and manage engineering activities during the diverse implementation phases of the communication/ computer sub-systems		**X**	**X**		**X**				**X**	

	and systems, and present relevant technical reports.										
PO18	Investigate the defects and failures of components, modules, systems, and processes relevant to communication and/or computer systems based on appropriate fault diagnosis methodology.	**X**			**X**		**X**		**X**		
PO19	Integrate components and modules to build up an assigned communication and/or computer system with specific requirements considering compatibility constraints.		**X**		**X**						
PO20	Design appropriate schemes for performing the necessary measurements of the main parameters of communication and/or computer subsystems and systems, as well as interpret the measurements.						**X**				

Appendix (E1): **ARS-CCE General Outcomes:** The CCE program graduate must		**ARS1**	**ARS2**	**ARS3**	**ARS4**	**ARS5**	**ARS6**	**ARS7**	**ARS8**	**ARS 9**	**ARS10**
CCE program Outcomes		Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	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.	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.	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	Practice research techniques and methods of investigation as an inherent part of learning.	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.
PO1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.										
PO2	Develop and conduct appropriate experimentatio n and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering										

	judgment to draw conclusions.										
PO3	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.										
PO4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.										
PO5	Practice research techniques and methods of investigation as an inherent part of learning.										
PO6	Plan, supervise and monitor implementation of engineering projects, taking into consideration										

	other trades requirements.										
PO7	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.										
PO8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.										
PO9	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.										
PO10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.										

Appendix (E2): **ARS-CCE Specialization Outcomes:** The CCE program graduate must		**ARS11**	**ARS12**	**ARS13**	**ARS14**	**ARS15**
CCE Program Specialization Outcomes		Select, model and analyze electrical power systems applicable to the specific discipline by applying the concepts of: generation, transmission and distribution of electrical power	Design, model and analyze an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.	Design and implement: elements, modules, sub-systems or systems in electrical/ electronic/ digital engineering using technological and professional tools.	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.	Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain electrical/electronic/digital equipment, systems and services.
PO11	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.	**X**				
PO12	Design, model and analyze an electrical/electronic/digital system or component for a specific application; and identify the tools required to optimize this design.		**X**			
PO13	Design and implement: elements, modules, sub-systems or systems in electrical/ electronic/ digital engineering using technological and professional tools.			**X**		
PO14	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.				**X**	
PO15	Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain electrical/electronic/digital equipment, systems and services.					**X**

Appendix (E3): **ARS-CCE Sub-Specialization Outcomes:** The CCE program graduate must		**ARS16**	**ARS17**	**ARS18**	**ARS19**	**ARS20**
CCE Program Sub-Specialization Outcomes		Use software packages pertaining to communication and/or computer subsystems or systems and select the appropriate software for the purpose of simulation, analysis, design,	Plan and manage engineering activities during the diverse implementation phases of the communication/ computer sub-systems and systems, and present relevant technical reports.	Investigate the defects and failures of components, modules, systems, and processes relevant to communication and/or computer systems based on appropriate fault diagnosis	Integrate components and modules to build up an assigned communication and/or computer system with specific requirements considering compatibility constraints.	Design appropriate schemes for performing the necessary measurements of the main parameters of communication and/or computer subsystems and systems, as well as interpret the measurements.
PO16	Use software packages pertaining to communication and/or computer subsystems or systems and select the appropriate software for the purpose of simulation, analysis, design, and/or control of a specific application.	**X**				
PO17	Plan and manage engineering activities during the diverse implementation phases of the communication/ computer sub-systems and systems, and present relevant technical reports.		**X**			
PO18	Investigate the defects and failures of components, modules, systems, and processes relevant to communication and/or computer systems based on appropriate fault diagnosis methodology.			**X**		
PO19	Integrate components and modules to build up an assigned communication and/or computer system with specific requirements considering compatibility constraints.				**X**	
PO20	Design appropriate schemes for performing the necessary measurements of the main parameters of communication and/or computer subsystems and systems, as well as interpret the measurements.					**X**

Appendix (F): CCE Program Courses mapped to Program Outcomes												
1- University and Faculty Requirements' Courses mapped to CCE Program Graduate General Competencies												
	Code	**Course Title**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
University Requirements	CSC 101	Introduction to Computers	1			1						
	ENG KET	English KET					1		1	1		1
	ENG PET	English PET					1		1	1		1
	PSC 110	Human Rights			1				1			
	UNV E01	University Elective 1			1							
	UNV E02	University Elective 2			1							
	GENx01	Practical Training				1	1		1	1		1
Faculty Requirements	EMP150	General Chemistry	1									
	EED160	Computer Programming	1									
	GENx11	Communication and presentation skills					1			1		
	GENx12	Engineering Ethics and Legislations				1						1
	EMP140	Engineering Graphics	1	1								
	MEC161	Production Technology	1	1								1
	EMP130	Engineering Mechanics	1									
	EMP111	Differentiation with Applications and Algebra	1									
	EMP112	Integration with Applications and Analytical Geometry	1									
	EMP121	Properties of Matter and Thermodynamics	1									
	EMP122	Electricity and Magnetism	1									

Electrical Eng. Requirements' Courses Mapped to Program Graduate Competencies

Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PO16	PO17	PO18	PO19	PO20
EED201	Electrical Circuits 1	1						1	1						1						
EED202	Electrical Circuits 2	1						1	1						1						
EED210	Electronics		1			1	1		1				1	1	1		1				
EED220	Logic Design	1	1										1				1	1	1		
EED230	Signals & Systems	1													1		1				
EED301	Measurements & Instrumentation		1		1										1				1	1	
EED302	Control Systems	1	1	1					1								1			1	
EED303	Digital Control Systems												1	1			1				
EED311	Electronic Circuits	1	1		1			1	1				1	1			1		1		
EED320	Computer Organization		1	1									1	1						1	
EED321	Microcontroller-based Systems		1	1	1								1				1			1	
EED331	Electromagnetic Fields	1											1				1				
EED340	Electrical Power Engineering	1				1		1	1			1									
EED498	Graduation Project 1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EED499	Graduation Project 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EMP213	Differential Equations	1			1																
EMP214	Transformations & Complex Analysis	1			1																
EMP221	Solid State Physics	1																			
EMP311	Discrete Mathematics & Numerical Methods	1	1		1								1				1				
EMP312	Probability & Statistics	1	1																		
GEN442	Project Management & Entrepreneurship	1					1	1		1											
MEC460	Engineering Economy	1						1	1	1	1										

Compulsory Courses Mapped to Program Learning Outcomes for Communication and Computer Engineering

Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PO16	PO17	PO18	PO19	PO20
EED312	Integrated Circuits Devices		■										■	■			■				
EED330	Analog Communication Systems	■	■											■			■			■	■
EED332	Digital Signal Processing	■											■				■				
EED333	Electromagnetic Waves	■											■				■				
EED361	Advanced Computer Programming	■	■										■				■				
EED410	Digital Integrated-Circuits		■				■						■				■	■		■	
EED420	Real-time Embedded Systems		■		■	■	■								■						
EED430	Digital Communication Systems	■	■											■						■	
EED457	Electrical Power Sources			■	■															■	
EED460	Data Structures and Algorithms		■										■				■				
EED464	Database Management Systems		■										■				■				
EED470	Artificial Intelligence		■											■			■				
EED480	Data Communication and Computer Networks		■		■	■					■		■				■				

Communication Engineering Concentration Compulsory

Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PO16	PO17	PO18	PO19	PO20
EED411	Electronic-Circuits for Communication	■	■											■	■		■			■	
EED412	Analog Integrated Circuits		■											■			■			■	
EED434	Microwave Engineering	■	■	■																■	■
EED435	Antenna and Propagation	■											■				■				

Computer Engineering Concentration Compulsory

Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PO16	PO17	PO18	PO19	PO20
EED461	Analysis and Design of Algorithms					■		■		■						■		■	■	■	
EED462	Software Engineering					■		■							■			■	■		
EED463	Operating Systems				■	■									■		■	■			
EED472	Machine Learning and Pattern Recognition		■											■			■				

Elective Courses Mapped to Program Learning Outcomes for Communication and Computer Engineering																				
Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PO16	PO17	PO18	PO19	PO20
EED413	Microwave Devices	■	■									■		■			■				
EED414	RF Circuits and Systems	■	■		■								■		■		■			■	
EED415	VLSI Testing and Design for Testability		■		■										■				■		
EED416	VLSI Design Automation	■	■				■						■				■				
EED417	Optical Electronics	■	■												■					■	■
EED421	Advanced Computer Hardware:				■	■							■							■	
EED423	Introduction to Robotics		■	■									■							■	
EED431	Wireless Communication		■	■	■											■				■	■
EED432	Satellite Communication	■	■		■								■							■	
EED433	Optical Fiber Communication Systems	■	■												■					■	■
EED436	Digital Image Processing	■			■										■				■		
EED465	Fundamentals of Big Data Analysis	■	■	■													■				
EED471	Computational Intelligence	■			■										■				■		
EED481	Modelling and Analysis of Telecommunication		■	■										■		■				■	
EED482	Cryptography and Security	■	■													■				■	
EED491	Selected Topics in Electronics and Communication Engineering	■	■	■							■					■				■	
EED492	Selected Topics in Computer Engineering	■	■	■							■					■				■	

Course Specs are attached in the following folders