Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department

Academic Program and Course Description Guide

2024

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: Diyala

Faculty/Institute: College of Engineering

Scientific Department: Department of Communication Engineering

Academic or Professional Program Name: Bachelor

Final Certificate Name: Bachelor of science in Communication ngineering

Academic System: Course
Description Preparation Date: 24/4/2024

File Completion Date: 24/4/2024

Signature:

Head of Department Name:Date: S. Saleh
Assit.Prof. Mohammed

Signature:

Scientific Associate Name:Date:

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance
Department:Date:
Signature:

Approval of the Dean

Prof. Dr. Anees A-Khatun
25, April 2024

1. Program Vision

The department going to develop the curriculum in line with modern scientific developments in the field of communications engineering in addition to completing all the special requirements of scientific laboratories in the department. We seek to improve the staffed of teaching by dispatching members of Department of postgraduate in both inside and outside the country, and configure the appropriate conditions for scientific research in order to get Degrees required to be a Department able to compete in its own right and marked with the corresponding sections only local of which or the Arab and international Our ambitions We aspire to open graduate studies for a master's certificate in the disciplines of engineering various communication to be Department of scientific expertise to attract local and international center of which to open the horizons of cooperation through conferences, consulting, training, scientific research and development through broad and orderly opening to the community.

2. Program Mission

Expanding educational base and their applications in modern field of telematics and communications across both the international network and devices and cellular all advanced communication systems form that meets the need of institutions, both belonging to the state or the private sector through education, training and rehabilitation input from Human Resources (students) and make them able to deal with modern techniques and working in different institutions efficiently and effectively serve our dear country march.

3. Program Objectives

Teach students studying in the department on techniques required in all areas of modern communication systems and their applications in scientific and field state departments. Qualify graduates capable of working in government departments and the private sector engineering staff specialist efficiently and effectively. Contribute to provide an advanced level of related activities and the realization of the institutions experience and lead to the fulfillment of their need of human resources in order to achieve their success and the evolution and continuation.

4. Program Accreditation

None

5. Other external influences

None

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution requirements	5	6	4.24%	
College requirements	9	20	14.20%	
Department requirements	46	115	81.56%	
Summer Training				Graduation Requirements
Others				

7. Program Description

Course Name	Course Code	Level/Year	Credit Hours	
			Practical	Theory
Democracy & human Rights	U 101	Second - First	-	2
Workshop skills	COE 107	Second - First	3	-
Computer skills	U 103	First - First	3	1
English Language	U 104	First - First	-	2
Engineering Drawing	COE 106	First - First	3	-
Mathematics -I	E 101	First - First	-	4
Mathematics -II	E 102	Second - First	-	4
Electronic Physics	COE 104	Second - First	-	4
C++ Programming	COE 105	Second - First	3	1
Digital Techniques	COE103	First - First	2	4
Electrical Engineering Fundamentals I	**COE 101**	First - First	2	6
Electrical Engineering Fundamentals II	**COE102**	Second - First	2	6
Arabic Language	**U 108**	Second - First	-	2
Applied Mathematics –I	E201	First - Second	-	4
Applied Mathematics –II	E202	Second -Second	-	4
Electronic Circuits I	COE201	First - Second	2	2
Signals and Systems	COE202	First - Second	2	3

Course	Code	Term		
Communication Transmission Lines	**COE203**	First - Second	-	2
Probability and Random Processes	**COE204**	First - Second	-	4
Electric Circuits I	**COE205**	First - Second	2	3
Electromagnetic Fields I	**COE206**	First - Second	-	2
MATLAB Programming	**COE207**	First - Second	2	1
Electromagnetic Fields II	**COE208**	Second -Second	-	3
Analog Communication Systems	**COE209**	Second -Second	2	3
Electric Circuits II	**COE210**	Second -Second	2	3
Electronic Circuits II	**COE211**	Second -Second	2	2
Neural Network Engineering	**COE212**	Second -Second	2	1
Numerical Methods	**COE213**	Second -Second	2	2
Automatic Control Theory	**COE214**	Second -Second	-	2
Engineering Economy	**E301**	First - Third	-	2
Engineering Analysis	**COE301**	First - Third	-	2
Digital Communication I	**COE302**	First - Third	2	3
Antenna Theory and Design	**COE303**	First - Third	2	3
Digital Signal Processing	**COE304**	First - Third	2	3
Microcontroller and DSP Systems	**COE305**	First - Third	2	2
Communication Electronics -I	**COE306**	First - Third	2	3
Optical Communication Systems	**COE307**	First - Third	-	2
Detection and Estimation Theory	**COE308**	Second -Third	-	3
Digital Communication II	**COE309**	Second -Third	2	3
Image Processing	**COE310**	Second -Third	2	2
Information Theory	**COE311**	Second -Third	-	3
Radar Systems	**COE312**	Second -Third	2	2
Computer Networks	**COE313**	Second -Third	2	2
Waves Propagation	**COE314**	Second -Third	-	2
Communication Electronics -II	**COE315**	Second -Third	2	2
Engineering Profession Ethics	**E401**	First - Fourth	-	1
Graduation Project	**E402**	Fourth	8	-
Microwave Engineering-I	**COE401**	First - Fourth	2	3
Modern Communication Systems	**COE402**	First - Fourth	-	3
Cellular Mobile Networks	**COE403**	First - Fourth	-	2
Cryptography for Communication Systems	**COE404**	First - Fourth	-	2
Satellite Communication Systems	**COE405**	First - Fourth	-	2
Microwave Engineering-II	**COE406**	Second - Fourth	2	3
Global Positioning Systems	**COE407**	Second - Fourth	-	2
Multimedia Communication	**COE408**	Second - Fourth	-	2
Telecom Switching Systems	**COE409**	Second - Fourth	-	2
Television and Broadcasting Systems	**COE410**	Second - Fourth	-	2

8. Expected learning outcomes of the program

Knowledge

A. Cognitive goals

A1. - Understanding and teaching the student the principles of how signal work and how to deal with communication algorithms.

A2- Enabling students to obtain knowledge and understanding in working on and designing signal and system .

A3- The student understands the methods of forming signal and system parts and their interconnection.

A4- Enabling students to obtain knowledge and understanding of designing everything related to optical signal and system.

A5- Enabling students to obtain knowledge and understanding of diagnosing faults and maintaining various signal and system devices.

A6- The student understands the foundations of solving communication problems, cellular networks, and etc.

Skills

A. The skills goals special to the program.

B1 - Explanation of communication principles topics by specialists in the subject, with an emphasis on the use of mathematics as a basis for understanding and learning.

B2 - Providing them with skills to solve practical problems related to various communication systems and algorithms for addressing and solving technical problems in various fields of Communication engineering.

B3 – Obtaining experience to explore and develop communication systems and its algorithms.

Ethics

A. Affective and value goals

C1- Enabling students to think and analyze topics related to the engineering framework, such as various logical circuits.

C2- Enabling students to think and analyze topics related to Communication systems related to the engineering framework.

C3- Enabling students to think and analyze topics related to solving practical problems.

9. Teaching and Learning Strategies

☐ Providing students with the basics, additional topics, and field experiences related to the outcomes of thinking and analysis.

☐ Forming discussion circles during or outside lectures to discuss scientific

engineering topics that require thinking and analysis.
☐ Asking students a set of thinking questions during lectures, such as (what, how, when, why) for specific topics.

10. Evaluation methods

☐ Daily exams with practical and scientific questions.
☐ Participation marks for difficult competition questions among students.
☐ Assigning grades to homework assignments and reports assigned to them.
☐ Semester exams for the curriculum in addition to the final exam.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor	Electronic & communications	Communications			1	
Assist. Prof.	Communications	Communications techniques			1	
Assist. Prof.	Electronic & communications	Communications			3	
Assist. Prof.	Electric Eng.	Electronic & communications			3	
Assist. Prof.	Physics	Electro=optics			1	
Assist. Prof.	Physics	Nano technology			1	
Assist. Prof.	Communications	Communications			1	
Assist. Prof.	Info. & Comm. Eng.	Image processing			1	
Assist. Prof.	Elect. & Electronic Eng.	Communications				1
Assist. Prof.	Electro-optics and laser	Optoelectronics			1	
Lecturer	Elect. & Electronic Eng.	Electronics			1	1

Lecturer	Communications	Communications			1	1
Assist. Lecturer	Communications	Communications			3	
Assist. Lecturer	Elect. & Electronic Eng.	Electronics			1	
Assist. Lecturer	Electronic & communications	Communications			2	
Assist. Lecturer	Electric Eng.	Electronic & communications			1	

Professional Development

Mentoring new faculty members

Faculty members are instructed to hold regular meetings and review questionnaires received from students with the Scientific Committee.

Professional development of faculty members

The teaching staff undergoes development through training, workshops, and seminars. Progress is evaluated by subject performance.

12. Acceptance Criterion

According to the rules and regulations of Ministry of Higher Education and Scientific Research.

13. The most important sources of information about the program

- College website.
- The department's website and contact the department by email.

14. Program Development Plan

- The courses are updated annually to keep up with developments of the world.
- The laboratories are also updated under academic curricula.
- Additionally, postgraduate programs are now being offered.

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Second/First	E 201	Applied Math. I	Basic	√	√	√	√	√	√	√		√	√	√	

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Course Description Form

1. Course Name:
Applied Math. I

2. Course Code:
E 201

3. Semester / Year:
First/Second

4. Description Preparation Date:
24-4-2024

5. Available Attendance Forms:
None

6. Number of Credit Hours (Total) / Number of Units (Total)
4/3

7. Course administrator's name (mention all, if more than one name)

8. Course Objectives

Course Objectives	In this course, –students will learn:
	• Help students appreciate the use of mathematics as a form of communication;
	• Help students acquire a range of mathematical techniques and skills and to foster and maintain the awareness of the importance of accuracy;
	• Make Mathematics relevant to the interests and experiences of students by helping them to recognize Applied Mathematics in their environment;
	• Help students to develop positive attitudes, such as open-mindedness, self-reliance, persistence and a spirit of enquiry;
	• Prepare students for the use of Mathematics in further studies;
	• Help students to develop an appreciation of the wide application of Mathematics and its influence in the development and advancement of civilization;
	• Help students become increasingly aware of the unifying structure of Mathematics.

9. Teaching and Learning Strategies

Strategy	• The module will be delivered using a combination of lectures, tutorials, and directed and independent learning.
	• The learning and teaching approach will include the introduction of theoretical basis in the lecture form and the application aspects will be further

studied throughout the tutorial sessions, including problem solving. In direct learning, you will be instructed to prepare for the lectures including reading the notes, finding and analyzing relevant information in advance.
- Working group (2-3 students per group) will be formed to encourage you to engage critical discussion in class.
- Case studies will be used to demonstrate and reinforce the lectures and labs.

Solving examples, problems will give experience to understand the complex cases in communication field.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2,3	6	Understanding the differential eq.	Differential equation (first and second order)	Visual	Discussion and quiz
4.5.6	6	Understanding Multiple Integration	Double and triple integrations	Visual	Discussion and quiz
7,8,9	6	Understanding partial derivatives	Partial derivatives and the high degree of derivatives	Visual	Discussion and quiz
10,11,12	6	Understanding of sequence and series	Sequence and series	Visual	Discussion and quiz
13,14,15	6	Understanding of Vectors	Vectors and free space	Visual	Discussion and quiz

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports......etc

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

<u>Text book</u>

• Advanced Engineering Mathematics 10th Edition by Erwin Kreyszig

Landau, Edmund (2001). *Differential and Integral Calculus*. American Mathematical Society.

Larson, Ron; Edwards, Bruce H. (2010). *Calculus* (9th ed.). Brooks Cole Cengage Learning

Apostol, Tom M. (1969). *Calculus, Volume 2, Multi-Variable Calculus and Linear Algebra with Applications*. Wiley.

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4. Program Accreditation

None

5. Other external influences

None

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
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7. Program Description

Course Name	Course Code	Level/Year	Credit Hours	
			Practical	Theory
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Workshop skills	COE 107	Second - First	3	-
Computer skills	U 103	First - First	3	1
English Language	U 104	First - First	-	2
Engineering Drawing	COE 106	First - First	3	-
Mathematics -I	E 101	First - First	-	4
Mathematics -II	E 102	Second - First	-	4
Electronic Physics	COE 104	Second - First	-	4
C++ Programming	COE 105	Second - First	3	1
Digital Techniques	COE103	First - First	2	4
Electrical Engineering Fundamentals I	**COE 101**	First - First	2	6
Electrical Engineering Fundamentals II	**COE102**	Second - First	2	6
Arabic Language	**U 108**	Second - First	-	2
Applied Mathematics –I	E201	First - Second	-	4
Applied Mathematics –II	E202	Second -Second	-	4
Electronic Circuits I	COE201	First - Second	2	2
Signals and Systems	COE202	First - Second	2	3

Course Name	Code	Semester		
Communication Transmission Lines	**COE203**	First - Second	-	2
Probability and Random Processes	**COE204**	First - Second	-	4
Electric Circuits I	**COE205**	First - Second	2	3
Electromagnetic Fields I	**COE206**	First - Second	-	2
MATLAB Programming	**COE207**	First - Second	2	1
Electromagnetic Fields II	**COE208**	Second -Second	-	3
Analog Communication Systems	**COE209**	Second -Second	2	3
Electric Circuits II	**COE210**	Second -Second	2	3
Electronic Circuits II	**COE211**	Second -Second	2	2
Neural Network Engineering	**COE212**	Second -Second	2	1
Numerical Methods	**COE213**	Second -Second	2	2
Automatic Control Theory	**COE214**	Second -Second	-	2
Engineering Economy	**E301**	First - Third	-	2
Engineering Analysis	**COE301**	First - Third	-	2
Digital Communication I	**COE302**	First - Third	2	3
Antenna Theory and Design	**COE303**	First - Third	2	3
Digital Signal Processing	**COE304**	First - Third	2	3
Microcontroller and DSP Systems	**COE305**	First - Third	2	2
Communication Electronics -I	**COE306**	First - Third	2	3
Optical Communication Systems	**COE307**	First - Third	-	2
Detection and Estimation Theory	**COE308**	Second -Third	-	3
Digital Communication II	**COE309**	Second -Third	2	3
Image Processing	**COE310**	Second -Third	2	2
Information Theory	**COE311**	Second -Third	-	3
Radar Systems	**COE312**	Second -Third	2	2
Computer Networks	**COE313**	Second -Third	2	2
Waves Propagation	**COE314**	Second -Third	-	2
Communication Electronics -II	**COE315**	Second -Third	2	2
Engineering Profession Ethics	**E401**	First - Fourth	-	1
Graduation Project	**E402**	Fourth	8	-
Microwave Engineering-I	**COE401**	First - Fourth	2	3
Modern Communication Systems	**COE402**	First - Fourth	-	3
Cellular Mobile Networks	**COE403**	First - Fourth	-	2
Cryptography for Communication Systems	**COE404**	First - Fourth	-	2
Satellite Communication Systems	**COE405**	First - Fourth	-	2
Microwave Engineering-II	**COE406**	Second - Fourth	2	3
Global Positioning Systems	**COE407**	Second - Fourth	-	2
Multimedia Communication	**COE408**	Second - Fourth	-	2
Telecom Switching Systems	**COE409**	Second - Fourth	-	2
Television and Broadcasting Systems	**COE410**	Second - Fourth	-	2

8. Expected learning outcomes of the program

Knowledge

A. Cognitive goals

A1. - Understanding and teaching the student the principles of how signal work and how to deal with communication algorithms.

A2- Enabling students to obtain knowledge and understanding in working on and designing signal and system .

A3- The student understands the methods of forming signal and system parts and their interconnection.

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A5- Enabling students to obtain knowledge and understanding of diagnosing faults and maintaining various signal and system devices.

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Skills

A. The skills goals special to the program.

B1 - Explanation of communication principles topics by specialists in the subject, with an emphasis on the use of mathematics as a basis for understanding and learning.

B2 - Providing them with skills to solve practical problems related to various communication systems and algorithms for addressing and solving technical problems in various fields of Communication engineering.

B3 – Obtaining experience to explore and develop communication systems and its algorithms.

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A. Affective and value goals

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☐ Forming discussion circles during or outside lectures to discuss scientific

engineering topics that require thinking and analysis.
☐ Asking students a set of thinking questions during lectures, such as (what, how, when, why) for specific topics.

10. Evaluation methods

☐ Daily exams with practical and scientific questions.
☐ Participation marks for difficult competition questions among students.
☐ Assigning grades to homework assignments and reports assigned to them.
 ☐ Semester exams for the curriculum in addition to the final exam.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor	Electronic & communications	Communications			1	
Assist. Prof.	Communications	Communications techniques			1	
Assist. Prof.	Electronic & communications	Communications			3	
Assist. Prof.	Electric Eng.	Electronic & communications			3	
Assist. Prof.	Physics	Electro=optics			1	
Assist. Prof.	Physics	Nano technology			1	
Assist. Prof.	Communications	Communications			1	
Assist. Prof.	Info. & Comm. Eng.	Image processing			1	
Assist. Prof.	Elect. & Electronic Eng.	Communications				1
Assist. Prof.	Electro-optics and laser	Optoelectronics			1	
Lecturer	Elect. & Electronic Eng.	Electronics			1	1

Lecturer	Communications	Communications			1	1
Assist. Lecturer	Communications	Communications			3	
Assist. Lecturer	Elect. & Electronic Eng.	Electronics			1	
Assist. Lecturer	Electronic & communications	Communications			2	
Assist. Lecturer	Electric Eng.	Electronic & communications			1	

Professional Development

Mentoring new faculty members

Faculty members are instructed to hold regular meetings and review questionnaires received from students with the Scientific Committee.

Professional development of faculty members

The teaching staff undergoes development through training, workshops, and seminars. Progress is evaluated by subject performance.

12. Acceptance Criterion

According to the rules and regulations of Ministry of Higher Education and Scientific Research.

13. The most important sources of information about the program

- College website.
- The department's website and contact the department by email.

14. Program Development Plan

- The courses are updated annually to keep up with developments of the world.
- The laboratories are also updated under academic curricula.
- Additionally, postgraduate programs are now being offered.

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	**Course Code**	**Course Name**	**Basic or optional**	**Knowledge**				**Skills**				**Ethics**			
				A1	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**
Second /1st	COE201	Electronics I	Basic	√	√	√	√	√	√	√		√	√	√	

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Course Description Form

1. Course Name: Electronics I	
2. Course Code: COE201	
3. Semester / Year: 1st / 2nd	
4. Description Preparation Date:	
24-4-2024	
5. Available Attendance Forms: mandatory	
None	
6. Number of Credit Hours (Total) / Number of Units (Total) : 30	
7. Course administrator's name (mention all, if more than one name)	

Lecture :Name : wisam hayed mahdi Email: wisam_haider@uodiyala.edu.iq	....	

8. Course Objectives	

Course Objectives	1. The student learns about the basic construction and operation of a bipolar transistor. And be able to apply appropriate biasing to secure operation in the active area. 2. Identify and be able to explain the characteristics of an NPN or PNP transistor, and the student learns about the important parameters that determine the response of the transistor. 3. Being able to test the transistor and identify its three terminals. 4. The student will then be able to determine DC current levels for a variety of important BJT configurations. 5. Understand how to measure the important voltage levels of a BJT transistor configuration and use them to determine if the network is working properly.

	6. The student will also be familiar with the saturation and cut-off conditions of the BJT network and the expected voltage and current levels determined by each condition.

6. The student will also be familiar with the saturation and cut-off conditions of the BJT network and the expected voltage and current levels determined by each condition.
7. Be able to perform load line analysis for the most common BJT configurations.
8. Learn about the design process of BJT loudspeakers.
9. Understand the basic operation of transistor switching networks.
10. Begin to understand the troubleshooting process as applied to BJT configurations.

Develop a sense of the stability factors of BJT formation and how they affect its operation as a result of changes in specific properties and environmental changes.

9. Teaching and Learning Strategies

Strategy	☐ The Lecture gives detailed theoretical lectures. ☐ The Lecture requests periodic reports on the basic topics of the subject.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Basic transistor operation BJT volte ampere questions	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams
Second	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	BJT an amplifier	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams
Third	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Small signal model analysis of CE	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams

Fourth	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Small signal model analysis of CC	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams
Fifth	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Small signal model analysis of CB	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams
Sixth	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Switch Current source using BJT	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams
Seventh	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	JFET physical operation and characteristics	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams
Eighth	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	MOSFET- depletion type	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams
Ninth	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	MOSFET- enhancement type	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams
Tenth	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	DC analysis of FET	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams

Eleventh	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	FET as amplifier	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams
Twelfth	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Graphical analysis	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams
Thirteenth	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Small signal FET models, Analysis of CS CD CG configuration	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams
Fourteenth	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Using FET as switch, Voltage variable resistor and constant current source	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports......etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

1. Program Vision

The department going to develop the curriculum in line with modern scientific developments in the field of communications engineering in addition to completing all the special requirements of scientific laboratories in the department. We seek to improve the staffed of teaching by dispatching members of Department of postgraduate in both inside and outside the country, and configure the appropriate conditions for scientific research in order to get Degrees required to be a Department able to compete in its own right and marked with the corresponding sections only local of which or the Arab and international Our ambitions We aspire to open graduate studies for a master's certificate in the disciplines of engineering various communication to be Department of scientific expertise to attract local and international center of which to open the horizons of cooperation through conferences, consulting, training, scientific research and development through broad and orderly opening to the community.

2. Program Mission

Expanding educational base and their applications in modern field of telematics and communications across both the international network and devices and cellular all advanced communication systems form that meets the need of institutions, both belonging to the state or the private sector through education, training and rehabilitation input from Human Resources (students) and make them able to deal with modern techniques and working in different institutions efficiently and effectively serve our dear country march.

3. Program Objectives

Teach students studying in the department on techniques required in all areas of modern communication systems and their applications in scientific and field state departments. Qualify graduates capable of working in government departments and the private sector engineering staff specialist efficiently and effectively. Contribute to provide an advanced level of related activities and the realization of the institutions experience and lead to the fulfillment of their need of human resources in order to achieve their success and the evolution and continuation.

4. Program Accreditation

None

5. Other external influences

None

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution requirements	5	6	4.24%	
College requirements	9	20	14.20%	
Department requirements	46	115	81.56%	
Summer Training				Graduation Requirements
Others				

7. Program Description

Course Name	Course Code	Level/Year	Credit Hours	
			Practical	Theory
Democracy & human Rights	U 101	Second - First	-	2
Workshop skills	COE 107	Second - First	3	-
Computer skills	U 103	First - First	3	1
English Language	U 104	First - First	-	2
Engineering Drawing	COE 106	First - First	3	-
Mathematics -I	E 101	First - First	-	4
Mathematics -II	E 102	Second - First	-	4
Electronic Physics	COE 104	Second - First	-	4
C++ Programming	COE 105	Second - First	3	1
Digital Techniques	COE103	First - First	2	4
Electrical Engineering Fundamentals I	**COE 101**	First - First	2	6
Electrical Engineering Fundamentals II	**COE102**	Second - First	2	6
Arabic Language	**U 108**	Second - First	-	2
Applied Mathematics –I	**E201**	First - Second	-	4
Applied Mathematics –II	**E202**	Second -Second	-	4
Electronic Circuits I	**COE201**	First - Second	2	2
Signals and Systems	**COE202**	First - Second	2	3

Course	Code	Semester - Year	Practical	Theory
Communication Transmission Lines	**COE203**	First - Second	-	2
Probability and Random Processes	**COE204**	First - Second	-	4
Electric Circuits I	**COE205**	First - Second	2	3
Electromagnetic Fields I	**COE206**	First - Second	-	2
MATLAB Programming	**COE207**	First - Second	2	1
Electromagnetic Fields II	**COE208**	Second -Second	-	3
Analog Communication Systems	**COE209**	Second -Second	2	3
Electric Circuits II	**COE210**	Second -Second	2	3
Electronic Circuits II	**COE211**	Second -Second	2	2
Neural Network Engineering	**COE212**	Second -Second	2	1
Numerical Methods	**COE213**	Second -Second	2	2
Automatic Control Theory	**COE214**	Second -Second	-	2
Engineering Economy	**E301**	First - Third	-	2
Engineering Analysis	**COE301**	First - Third	-	2
Digital Communication I	**COE302**	First - Third	2	3
Antenna Theory and Design	**COE303**	First - Third	2	3
Digital Signal Processing	**COE304**	First - Third	2	3
Microcontroller and DSP Systems	**COE305**	First - Third	2	2
Communication Electronics -I	**COE306**	First - Third	2	3
Optical Communication Systems	**COE307**	First - Third	-	2
Detection and Estimation Theory	**COE308**	Second -Third	-	3
Digital Communication II	**COE309**	Second -Third	2	3
Image Processing	**COE310**	Second -Third	2	2
Information Theory	**COE311**	Second -Third	-	3
Radar Systems	**COE312**	Second -Third	2	2
Computer Networks	**COE313**	Second -Third	2	2
Waves Propagation	**COE314**	Second -Third	-	2
Communication Electronics -II	**COE315**	Second -Third	2	2
Engineering Profession Ethics	**E401**	First - Fourth	-	1
Graduation Project	**E402**	Fourth	8	-
Microwave Engineering-I	**COE401**	First - Fourth	2	3
Modern Communication Systems	**COE402**	First - Fourth	-	3
Cellular Mobile Networks	**COE403**	First - Fourth	-	2
Cryptography for Communication Systems	**COE404**	First - Fourth	-	2
Satellite Communication Systems	**COE405**	First - Fourth	-	2
Microwave Engineering-II	**COE406**	Second - Fourth	2	3
Global Positioning Systems	**COE407**	Second - Fourth	-	2
Multimedia Communication	**COE408**	Second - Fourth	-	2
Telecom Switching Systems	**COE409**	Second - Fourth	-	2
Television and Broadcasting Systems	**COE410**	Second - Fourth	-	2

8. Expected learning outcomes of the program

Knowledge

A. Cognitive goals

A1. - Understanding and teaching the student the principles of how signal work and how to deal with communication algorithms.

A2- Enabling students to obtain knowledge and understanding in working on and designing signal and system .

A3- The student understands the methods of forming signal and system parts and their interconnection.

A4- Enabling students to obtain knowledge and understanding of designing everything related to optical signal and system.

A5- Enabling students to obtain knowledge and understanding of diagnosing faults and maintaining various signal and system devices.

A6- The student understands the foundations of solving communication problems, cellular networks, and etc.

Skills

A. The skills goals special to the program.

B1 - Explanation of communication principles topics by specialists in the subject, with an emphasis on the use of mathematics as a basis for understanding and learning.

B2 - Providing them with skills to solve practical problems related to various communication systems and algorithms for addressing and solving technical problems in various fields of Communication engineering.

B3 – Obtaining experience to explore and develop communication systems and its algorithms.

Ethics

A. Affective and value goals

C1- Enabling students to think and analyze topics related to the engineering framework, such as various logical circuits.

C2- Enabling students to think and analyze topics related to Communication systems related to the engineering framework.

C3- Enabling students to think and analyze topics related to solving practical problems.

9. Teaching and Learning Strategies

☐ Providing students with the basics, additional topics, and field experiences related to the outcomes of thinking and analysis.

☐ Forming discussion circles during or outside lectures to discuss scientific

engineering topics that require thinking and analysis.
□ Asking students a set of thinking questions during lectures, such as (what, how, when, why) for specific topics.

10. Evaluation methods

□ Daily exams with practical and scientific questions.
□ Participation marks for difficult competition questions among students.
□ Assigning grades to homework assignments and reports assigned to them.
 □ Semester exams for the curriculum in addition to the final exam.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor	Electronic & communications	Communications			1	
Assist. Prof.	Communications	Communications techniques			1	
Assist. Prof.	Electronic & communications	Communications			3	
Assist. Prof.	Electric Eng.	Electronic & communications			3	
Assist. Prof.	Physics	Electro=optics			1	
Assist. Prof.	Physics	Nano technology			1	
Assist. Prof.	Communications	Communications			1	
Assist. Prof.	Info. & Comm. Eng.	Image processing			1	
Assist. Prof.	Elect. & Electronic Eng.	Communications				1
Assist. Prof.	Electro-optics and laser	Optoelectronics			1	
Lecturer	Elect. & Electronic Eng.	Electronics			1	1

Lecturer	Communications	Communications			1	1
Assist. Lecturer	Communications	Communications			3	
Assist. Lecturer	Elect. & Electronic Eng.	Electronics			1	
Assist. Lecturer	Electronic & communications	Communications			2	
Assist. Lecturer	Electric Eng.	Electronic & communications			1	

Professional Development

Mentoring new faculty members

Faculty members are instructed to hold regular meetings and review questionnaires received from students with the Scientific Committee.

Professional development of faculty members

The teaching staff undergoes development through training, workshops, and seminars. Progress is evaluated by subject performance.

12. Acceptance Criterion

According to the rules and regulations of Ministry of Higher Education and Scientific Research.

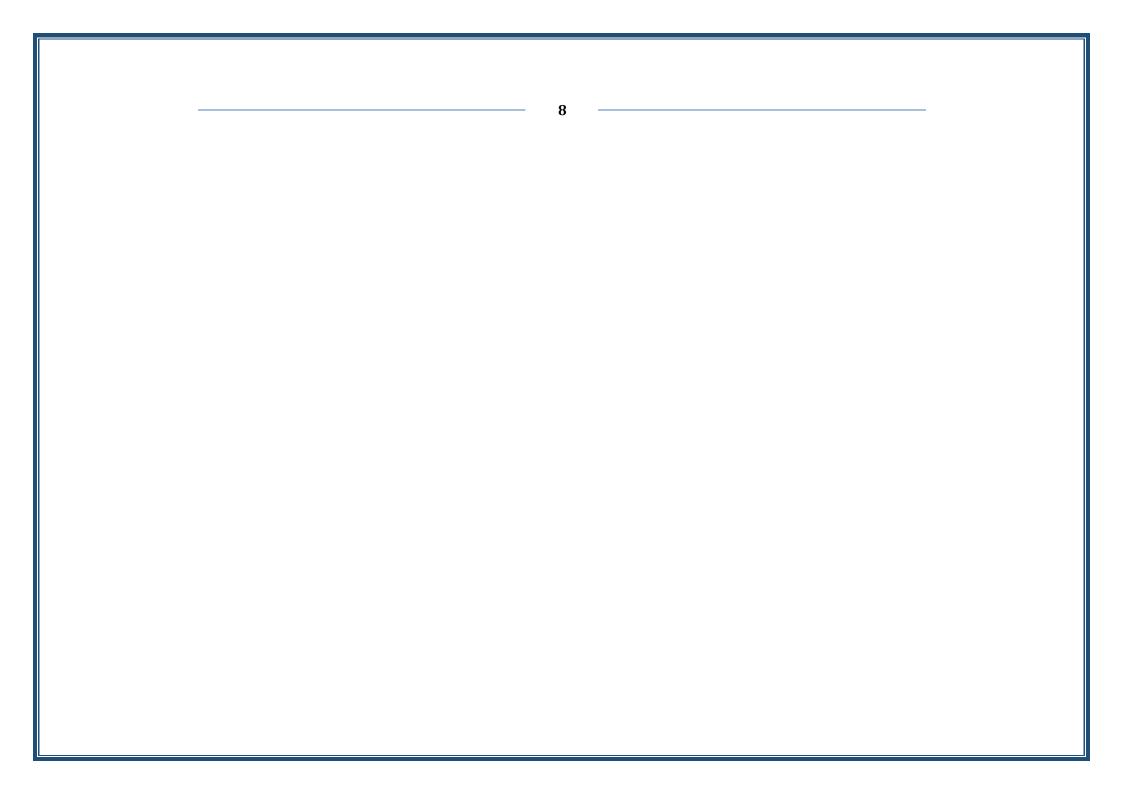## 13. The most important sources of information about the program

- College website.
- The department's website and contact the department by email.

14. Program Development Plan

- The courses are updated annually to keep up with developments of the world.
- The laboratories are also updated under academic curricula.
- Additionally, postgraduate programs are now being offered.

Year/Level	Course Code	Course Name	Basic or optional	Required program Learning outcomes											
				Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Second/ First semester	**COE**203	Communication Transmission Lines	Basic	√	√	√	√	√	√	√		√	√	√	

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Course Description Form

1. Course Name:
Communication Transmission Lines

2. Course Code:
COE203

3. Semester / Year:
First - Second

4. Description Preparation Date:
24-4-2024

5. Available Attendance Forms:
None

6. Number of Credit Hours (Total) / Number of Units (Total)
30h

7. Course administrator's name (mention all, if more than one name)
Name:Asisst. Lecturer Ilham Hameed Qaddoori Email: llham.Hameed@uodiyala.edu.iq

8. Course Objectives

Course Objectives	1. An idea about electromagnetic waves, methods of generating and propagating them, and their applications in the field of antennas and microwaves. ..... 2. The calculation of the transmission constant and the reflection constant. 3. The foundations of transmitting electromagnetic signals through various media such as air, conductors, and insulators. 4. The electromagnetic vectors, such as propagation using transmission lines or vector transmission tubes, as well as the use of optical fibers and satellite technologies. 5. About the devices used to generate electromagnetic waves. 6. The components that go into the devices used to generate electromagnetic waves.

9. Teaching and Learning Strategies

Strategy	**In this course, students are guided by:** • **Using different examples.** • **Using different styles of discussion that aim to connect the theoretical and practical sides.** • **Asking questions and giving exercises that require analysis and conclusions related to lectures.** • **Encourage students to participate in discussions and do the practical work.**

- **Encourage students to work in groups.**

10. Course Structure

Week	Hou	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1st	2	The student studies the types of directed transportation methods, such as wires and optical fibers	**Guided transmission line**	Lecture PDF power point Video	Daily exams + monthly exams
2nd	2	Study of wireless transmission methods	**Unguided transmission line**	Lecture PDF power point Video	Daily exams + monthly exams
3rd	2	The student studies the derivation of the equation of transmission lines	**Transmission line equation**	Lecture PDF power point Video	Daily exams + monthly exams
4th	2	Study of the reflection constant and the standing wave constant .	**Reflection coefficient and SWR**	Lecture PDF power point Video	Daily exams + monthly exams
5th	2	Introducing the student to short circuits and open circuits	**Short and open cct.**	Lecture PDF power point Video	Daily exams + monthly exams
6th	2	Wave properties of infinite circuits	**Wave characteristic on an infinite T.L**	Lecture PDF power point Video	Daily exams + monthly exams

7th	2	The student studies the factors on which transmission lines depend	**Transmission lines parameters**	Lecture PDF power point Video	Daily exams + monthly exams
8th	2	Study of the decay constant and its relationship with power	**Attenuation constant from power relations**	Lecture PDF power point Video	Daily exams + monthly exams
9th	2	The most important components of the transmission lines department	**Transmission lines as circuit elements. Lines with resistive termination**	Lecture PDF power point Video	Daily exams + monthly exams
10th	2	The student learns the components of the circuit in a good clutch	**Lines with arbitrary termination. T.L. circuits**	Lecture PDF power point Video	Daily exams + monthly exams
11th	2	Characteristics of the Smith chart and how to draw	**Smith chart: Smith chart calculation for lossy lines**	Lecture PDF power point Video	Daily exams + monthly exams
12th	2	Knowledge of the stub circuit	**stub matching**	Lecture PDF power point Video	Daily exams + monthly exams
13th	2	The student learns how to achieve an mutching circuit	**T.L impedance matching:**	Lecture PDF power point Video	Daily exams + monthly exams

14th	2	Study of impedance matching using quarter-wavelength transformation	12 Impedance matching by quarter wave transformer	Lecture PDF power point Video	Daily exams + monthly exams
15th	2	Engage using Single stub circle	**Single stub matching**	Lecture PDF power point Video	Daily exams + monthly exams

11. Course Evaluation

Distributing the score out of 100 according to Exams (hour monthly exam 15%, three hours final exam 60%). Reports and seminars 15% , H.W and class activities 10%.

12. Learning and Teaching Resources

Required textbooks (curcumin books, if any)	• *Grebennikov, Andrei, 2011, RF and Microwave Transmitter Design, John Wiley & Sons.* • *David Pozar,2004, Microwave Engineering, Second Edition, Wiley.*
Main references (sources)	• Lectures given by the subject teacher • Books available in the college library
Recommended books and references (scientific journals, reports, etc.)	• Michael Steer, 2010, Microwave and RF Design: A Systems Approach, SciTech Pub. • Inder Bahl,2003, Lumped Elements for RF and Microwave Circuits, Artech House.
Electronic references, websites	All websites that specialize in explaining transmission lines

1. Program Vision

The department going to develop the curriculum in line with modern scientific developments in the field of communications engineering in addition to completing all the special requirements of scientific laboratories in the department. We seek to improve the staffed of teaching by dispatching members of Department of postgraduate in both inside and outside the country, and configure the appropriate conditions for scientific research in order to get Degrees required to be a Department able to compete in its own right and marked with the corresponding sections only local of which or the Arab and international Our ambitions We aspire to open graduate studies for a master's certificate in the disciplines of engineering various communication to be Department of scientific expertise to attract local and international center of which to open the horizons of cooperation through conferences, consulting, training, scientific research and development through broad and orderly opening to the community.

2. Program Mission

Expanding educational base and their applications in modern field of telematics and communications across both the international network and devices and cellular all advanced communication systems form that meets the need of institutions, both belonging to the state or the private sector through education, training and rehabilitation input from Human Resources (students) and make them able to deal with modern techniques and working in different institutions efficiently and effectively serve our dear country march.

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4. Program Accreditation

None

5. Other external influences

None

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution requirements	5	6	4.24%	
College requirements	9	20	14.20%	
Department requirements	46	115	81.56%	
Summer Training				Graduation Requirements
Others				

7. Program Description

Course Name	Course Code	Level/Year	Credit Hours Practical	Credit Hours Theory
Democracy & human Rights	U 101	Second - First	-	2
Workshop skills	COE 107	Second - First	3	-
Computer skills	U 103	First - First	3	1
English Language	U 104	First - First	-	2
Engineering Drawing	COE 106	First - First	3	-
Mathematics -I	E 101	First - First	-	4
Mathematics -II	E 102	Second - First	-	4
Electronic Physics	COE 104	Second - First	-	4
C++ Programming	COE 105	Second - First	3	1
Digital Techniques	COE103	First - First	2	4
Electrical Engineering Fundamentals I	COE 101	First - First	2	6
Electrical Engineering Fundamentals II	COE102	Second - First	2	6
Arabic Language	U 108	Second - First	-	2
Applied Mathematics –I	E201	First - Second	-	4
Applied Mathematics –II	E202	Second -Second	-	4
Electronic Circuits I	COE201	First - Second	2	2
Signals and Systems	COE202	First - Second	2	3

Course	Code	Semester		
Communication Transmission Lines	**COE203**	First - Second	-	2
Probability and Random Processes	**COE204**	First - Second	-	4
Electric Circuits I	**COE205**	First - Second	2	3
Electromagnetic Fields I	**COE206**	First - Second	-	2
MATLAB Programming	**COE207**	First - Second	2	1
Electromagnetic Fields II	**COE208**	Second -Second	-	3
Analog Communication Systems	**COE209**	Second -Second	2	3
Electric Circuits II	**COE210**	Second -Second	2	3
Electronic Circuits II	**COE211**	Second -Second	2	2
Neural Network Engineering	**COE212**	Second -Second	2	1
Numerical Methods	**COE213**	Second -Second	2	2
Automatic Control Theory	**COE214**	Second -Second	-	2
Engineering Economy	**E301**	First - Third	-	2
Engineering Analysis	**COE301**	First - Third	-	2
Digital Communication I	**COE302**	First - Third	2	3
Antenna Theory and Design	**COE303**	First - Third	2	3
Digital Signal Processing	**COE304**	First - Third	2	3
Microcontroller and DSP Systems	**COE305**	First - Third	2	2
Communication Electronics -I	**COE306**	First - Third	2	3
Optical Communication Systems	**COE307**	First - Third	-	2
Detection and Estimation Theory	**COE308**	Second -Third	-	3
Digital Communication II	**COE309**	Second -Third	2	3
Image Processing	**COE310**	Second -Third	2	2
Information Theory	**COE311**	Second -Third	-	3
Radar Systems	**COE312**	Second -Third	2	2
Computer Networks	**COE313**	Second -Third	2	2
Waves Propagation	**COE314**	Second -Third	-	2
Communication Electronics -II	**COE315**	Second -Third	2	2
Engineering Profession Ethics	**E401**	First - Fourth	-	1
Graduation Project	**E402**	Fourth	8	-
Microwave Engineering-I	**COE401**	First - Fourth	2	3
Modern Communication Systems	**COE402**	First - Fourth	-	3
Cellular Mobile Networks	**COE403**	First - Fourth	-	2
Cryptography for Communication Systems	**COE404**	First - Fourth	-	2
Satellite Communication Systems	**COE405**	First - Fourth	-	2
Microwave Engineering-II	**COE406**	Second - Fourth	2	3
Global Positioning Systems	**COE407**	Second - Fourth	-	2
Multimedia Communication	**COE408**	Second - Fourth	-	2
Telecom Switching Systems	**COE409**	Second - Fourth	-	2
Television and Broadcasting Systems	**COE410**	Second - Fourth	-	2

8. Expected learning outcomes of the program

Knowledge

A. Cognitive goals

A1. - Understanding and teaching the student the principles of how signal work and how to deal with communication algorithms.

A2- Enabling students to obtain knowledge and understanding in working on and designing signal and system .

A3- The student understands the methods of forming signal and system parts and their interconnection.

A4- Enabling students to obtain knowledge and understanding of designing everything related to optical signal and system.

A5- Enabling students to obtain knowledge and understanding of diagnosing faults and maintaining various signal and system devices.

A6- The student understands the foundations of solving communication problems, cellular networks, and etc.

Skills

A. The skills goals special to the program.

B1 - Explanation of communication principles topics by specialists in the subject, with an emphasis on the use of mathematics as a basis for understanding and learning.

B2 - Providing them with skills to solve practical problems related to various communication systems and algorithms for addressing and solving technical problems in various fields of Communication engineering.

B3 – Obtaining experience to explore and develop communication systems and its algorithms.

Ethics

A. Affective and value goals

C1- Enabling students to think and analyze topics related to the engineering framework, such as various logical circuits.

C2- Enabling students to think and analyze topics related to Communication systems related to the engineering framework.

C3- Enabling students to think and analyze topics related to solving practical problems.

9. Teaching and Learning Strategies

☐ Providing students with the basics, additional topics, and field experiences related to the outcomes of thinking and analysis.

☐ Forming discussion circles during or outside lectures to discuss scientific

engineering topics that require thinking and analysis.
☐ Asking students a set of thinking questions during lectures, such as (what, how, when, why) for specific topics.

10. Evaluation methods

☐ Daily exams with practical and scientific questions.
☐ Participation marks for difficult competition questions among students.
☐ Assigning grades to homework assignments and reports assigned to them.
☐ Semester exams for the curriculum in addition to the final exam.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor	Electronic & communications	Communications			1	
Assist. Prof.	Communications	Communications techniques			1	
Assist. Prof.	Electronic & communications	Communications			3	
Assist. Prof.	Electric Eng.	Electronic & communications			3	
Assist. Prof.	Physics	Electro=optics			1	
Assist. Prof.	Physics	Nano technology			1	
Assist. Prof.	Communications	Communications			1	
Assist. Prof.	Info. & Comm. Eng.	Image processing			1	
Assist. Prof.	Elect. & Electronic Eng.	Communications				1
Assist. Prof.	Electro-optics and laser	Optoelectronics			1	
Lecturer	Elect. & Electronic Eng.	Electronics			1	1

Lecturer	Communications	Communications			1	1
Assist. Lecturer	Communications	Communications			3	
Assist. Lecturer	Elect. & Electronic Eng.	Electronics			1	
Assist. Lecturer	Electronic & communications	Communications			2	
Assist. Lecturer	Electric Eng.	Electronic & communications			1	

Professional Development

Mentoring new faculty members

Faculty members are instructed to hold regular meetings and review questionnaires received from students with the Scientific Committee.

Professional development of faculty members

The teaching staff undergoes development through training, workshops, and seminars. Progress is evaluated by subject performance.

12. Acceptance Criterion

According to the rules and regulations of Ministry of Higher Education and Scientific Research.

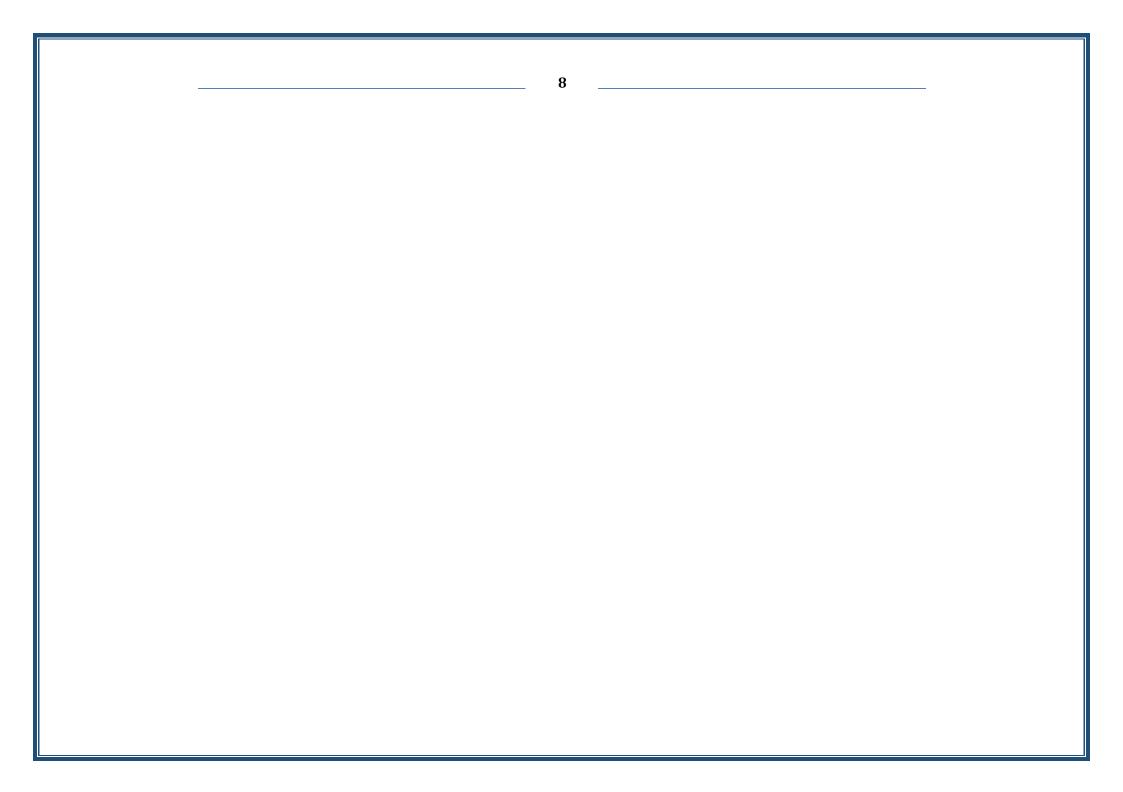## 13. The most important sources of information about the program

- College website.
- The department's website and contact the department by email.

14. Program Development Plan

- The courses are updated annually to keep up with developments of the world.
- The laboratories are also updated under academic curricula.
- Additionally, postgraduate programs are now being offered.

Program Skills Outline

Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				Required program Learning outcomes											
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
fourth /1st	**COE204**	Probability and Random Processes	Basic	√	√	√	√	√	√	√		√	√	√	

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Course Description Form

1. Course Name: Probability and random processes	
2. Course Code: COE204	
3. Semester / Year: 1st / 4th	
4. Description Preparation Date:	
24-9-2024	
5. Available Attendance Forms: mandatory	
None	
6. Number of Credit Hours (Total) / Number of Units (Total) : 30	
4/4	

7. Course administrator's name (mention all, if more than one name)

Lectur Name: haider ali jasim Email: haider .alsha mary @uodi yala.e du.iq	....

8. Course Objectives

Course Objectives	In this course, –Students will learn:
	• Axion of probability, union, interaction, low of total probability.
	• Estimation fundamental low.
	• With and without draw counting methods
	• Idea of random variable, mean variance correlation.
	• Cumulative distribution function, probability density function
	• Different types of Discrete random distribution
	• Variance types of continuous random variables
	• Joint distribution functions

9. Teaching and Learning Strategies

Strategy	□ The Lecture gives detailed theoretical lectures.
	□ The Lecture requests periodic reports on the basic topics of the subject.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	4	The student learns an introduction to statistical signal processing and the and main concepts of probability	Basic concepts of probability	Lectures, PDF, power point and Video	Daily exams + monthly exams
Second - fifth	16	Review of set theory, and explore random experiment and probabilities and Bayses' rule	Set theory	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams
Sixth-eighth	12	The student will be learning the counting methods and the proper way to differentiate between the cases of counting	Counting Methods	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams
Ninth - twelfth	16	The student learns discrete random variable and different types of distributions.	Discrete Random Variables	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams
Thirteenth - fifteenth	12	The student learns continuous random variable and different types of distributions.	Continuous random variables	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams

11. Course Evaluation

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

1. Program Vision

The department going to develop the curriculum in line with modern scientific developments in the field of communications engineering in addition to completing all the special requirements of scientific laboratories in the department. We seek to improve the staffed of teaching by dispatching members of Department of postgraduate in both inside and outside the country, and configure the appropriate conditions for scientific research in order to get Degrees required to be a Department able to compete in its own right and marked with the corresponding sections only local of which or the Arab and international Our ambitions We aspire to open graduate studies for a master's certificate in the disciplines of engineering various communication to be Department of scientific expertise to attract local and international center of which to open the horizons of cooperation through conferences, consulting, training, scientific research and development through broad and orderly opening to the community.

2. Program Mission

Expanding educational base and their applications in modern field of telematics and communications across both the international network and devices and cellular all advanced communication systems form that meets the need of institutions, both belonging to the state or the private sector through education, training and rehabilitation input from Human Resources (students) and make them able to deal with modern techniques and working in different institutions efficiently and effectively serve our dear country march.

3. Program Objectives

Teach students studying in the department on techniques required in all areas of modern communication systems and their applications in scientific and field state departments. Qualify graduates capable of working in government departments and the private sector engineering staff specialist efficiently and effectively. Contribute to provide an advanced level of related activities and the realization of the institutions experience and lead to the fulfillment of their need of human resources in order to achieve their success and the evolution and continuation.

4. Program Accreditation

None

5. Other external influences

None

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution requirements	5	6	4.24%	
College requirements	9	20	14.20%	
Department requirements	46	115	81.56%	
Summer Training				Graduation Requirements
Others				

7. Program Description

Course Name	Course Code	Level/Year	Credit Hours	
			Practical	Theory
Democracy & human Rights	U 101	Second - First	-	2
Workshop skills	COE 107	Second - First	3	-
Computer skills	U 103	First - First	3	1
English Language	U 104	First - First	-	2
Engineering Drawing	COE 106	First - First	3	-
Mathematics -I	E 101	First - First	-	4
Mathematics -II	E 102	Second - First	-	4
Electronic Physics	COE 104	Second - First	-	4
C++ Programming	COE 105	Second - First	3	1
Digital Techniques	COE103	First - First	2	4
Electrical Engineering Fundamentals I	COE 101	First - First	2	6
Electrical Engineering Fundamentals II	COE102	Second - First	2	6
Arabic Language	U 108	Second - First	-	2
Applied Mathematics –I	E201	First - Second	-	4
Applied Mathematics –II	E202	Second -Second	-	4
Electronic Circuits I	COE201	First - Second	2	2
Signals and Systems	COE202	First - Second	2	3

Communication Transmission Lines	**COE203**	First - Second	-	2
Probability and Random Processes	**COE204**	First - Second	-	4
Electric Circuits I	**COE205**	First - Second	2	3
Electromagnetic Fields I	**COE206**	First - Second	-	2
MATLAB Programming	**COE207**	First - Second	2	1
Electromagnetic Fields II	**COE208**	Second -Second	-	3
Analog Communication Systems	**COE209**	Second -Second	2	3
Electric Circuits II	**COE210**	Second -Second	2	3
Electronic Circuits II	**COE211**	Second -Second	2	2
Neural Network Engineering	**COE212**	Second -Second	2	1
Numerical Methods	**COE213**	Second -Second	2	2
Automatic Control Theory	**COE214**	Second -Second	-	2
Engineering Economy	**E301**	First - Third	-	2
Engineering Analysis	**COE301**	First - Third	-	2
Digital Communication I	**COE302**	First - Third	2	3
Antenna Theory and Design	**COE303**	First - Third	2	3
Digital Signal Processing	**COE304**	First - Third	2	3
Microcontroller and DSP Systems	**COE305**	First - Third	2	2
Communication Electronics -I	**COE306**	First - Third	2	3
Optical Communication Systems	**COE307**	First - Third	-	2
Detection and Estimation Theory	**COE308**	Second -Third	-	3
Digital Communication II	**COE309**	Second -Third	2	3
Image Processing	**COE310**	Second -Third	2	2
Information Theory	**COE311**	Second -Third	-	3
Radar Systems	**COE312**	Second -Third	2	2
Computer Networks	**COE313**	Second -Third	2	2
Waves Propagation	**COE314**	Second -Third	-	2
Communication Electronics -II	**COE315**	Second -Third	2	2
Engineering Profession Ethics	**E401**	First - Fourth	-	1
Graduation Project	**E402**	Fourth	8	-
Microwave Engineering-I	**COE401**	First - Fourth	2	3
Modern Communication Systems	**COE402**	First - Fourth	-	3
Cellular Mobile Networks	**COE403**	First - Fourth	-	2
Cryptography for Communication Systems	**COE404**	First - Fourth	-	2
Satellite Communication Systems	**COE405**	First - Fourth	-	2
Microwave Engineering-II	**COE406**	Second - Fourth	2	3
Global Positioning Systems	**COE407**	Second - Fourth	-	2
Multimedia Communication	**COE408**	Second - Fourth	-	2
Telecom Switching Systems	**COE409**	Second - Fourth	-	2
Television and Broadcasting Systems	**COE410**	Second - Fourth	-	2

8. Expected learning outcomes of the program

Knowledge

A. Cognitive goals

A1. - Understanding and teaching the student the principles of how signal work and how to deal with communication algorithms.

A2- Enabling students to obtain knowledge and understanding in working on and designing signal and system .

A3- The student understands the methods of forming signal and system parts and their interconnection.

A4- Enabling students to obtain knowledge and understanding of designing everything related to optical signal and system.

A5- Enabling students to obtain knowledge and understanding of diagnosing faults and maintaining various signal and system devices.

A6- The student understands the foundations of solving communication problems, cellular networks, and etc.

Skills

A. The skills goals special to the program.

B1 - Explanation of communication principles topics by specialists in the subject, with an emphasis on the use of mathematics as a basis for understanding and learning.

B2 - Providing them with skills to solve practical problems related to various communication systems and algorithms for addressing and solving technical problems in various fields of Communication engineering.

B3 – Obtaining experience to explore and develop communication systems and its algorithms.

Ethics

A. Affective and value goals

C1- Enabling students to think and analyze topics related to the engineering framework, such as various logical circuits.

C2- Enabling students to think and analyze topics related to Communication systems related to the engineering framework.

C3- Enabling students to think and analyze topics related to solving practical problems.

9. Teaching and Learning Strategies

☐ Providing students with the basics, additional topics, and field experiences related to the outcomes of thinking and analysis.

☐ Forming discussion circles during or outside lectures to discuss scientific

engineering topics that require thinking and analysis.
☐ Asking students a set of thinking questions during lectures, such as (what, how, when, why) for specific topics.

10. Evaluation methods

☐ Daily exams with practical and scientific questions.
☐ Participation marks for difficult competition questions among students.
☐ Assigning grades to homework assignments and reports assigned to them.
 ☐ Semester exams for the curriculum in addition to the final exam.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor	Electronic & communications	Communications			1	
Assist. Prof.	Communications	Communications techniques			1	
Assist. Prof.	Electronic & communications	Communications			3	
Assist. Prof.	Electric Eng.	Electronic & communications			3	
Assist. Prof.	Physics	Electro=optics			1	
Assist. Prof.	Physics	Nano technology			1	
Assist. Prof.	Communications	Communications			1	
Assist. Prof.	Info. & Comm. Eng.	Image processing			1	
Assist. Prof.	Elect. & Electronic Eng.	Communications				1
Assist. Prof.	Electro-optics and laser	Optoelectronics			1	
Lecturer	Elect. & Electronic Eng.	Electronics			1	1

Lecturer	Communications	Communications			1	1
Assist. Lecturer	Communications	Communications			3	
Assist. Lecturer	Elect. & Electronic Eng.	Electronics			1	
Assist. Lecturer	Electronic & communications	Communications			2	
Assist. Lecturer	Electric Eng.	Electronic & communications			1	

Professional Development

Mentoring new faculty members

Faculty members are instructed to hold regular meetings and review questionnaires received from students with the Scientific Committee.

Professional development of faculty members

The teaching staff undergoes development through training, workshops, and seminars. Progress is evaluated by subject performance.

12. Acceptance Criterion

According to the rules and regulations of Ministry of Higher Education and Scientific Research.

13. The most important sources of information about the program

- College website.
- The department's website and contact the department by email.

14. Program Development Plan

- The courses are updated annually to keep up with developments of the world.
- The laboratories are also updated under academic curricula.
- Additionally, postgraduate programs are now being offered.

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	**Course Code**	**Course Name**	**Basic or optional**	**Knowledge**				**Skills**				**Ethics**			
				A1	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**
			Basic	√	√	√	√	√	√	√		√	√	√	

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Course Description Form

1. Course Name:
Matlab

2. Course Code:
COE207

3. Semester / Year:
First - Second

4. Description Preparation Date:
24-4-2024

5. Available Attendance Forms:
None

6. Number of Credit Hours (Total) / Number of Units (Total)
2/2

7. Course administrator's name (mention all, if more than one name)
Name: Email:

8. Course Objectives

Course Objectives	
	• The student learns about the basic construction and operation programing language. And be able to apply appropriate biasing to secure operation in the active area. • The student learns about the MATLAB Interactive Sessions, Menus and the toolbar, Computing with Matlab, Script files and the Editor Debugger, and Matlab Help System. • Identify and be able to explain the variables and how treat with its. • Being able to test and running the program to solve some equations. • The student will be able to write Arrays, Multidimensional, Arrays, Element by Element Operations, Polynomial Operations Using Arrays. • be able to grate Elementary Mathematical Functions, User Defined Functions, Advanced Function Programming, Working with Data Files. • The student will also be able to Programming Techniques: Program Design and Development, Relational Operators and Logical Variables, Logical Operators and Functions, Conditional Statements, Loops, The Switch Structure, Debugging Mat Lab Programs. • Be able to Plotting: XY- plotting functions, Subplots and Overlay plots, Special Plot types, Interactive plotting, Function Discovery, 3-D plots. • The student will also be able to Linear Algebraic Equations: Elementary Solution Methods, solving system of linear equations. • Introduction Symbolic Processing with Matlab: Symbolic Expressions,

	Algebra, Calculus (Limits and series), Symbolic Linear Algebra, symbolic plotting.

9. Teaching and Learning Strategies

Strategy	• Using different examples. • Using different styles of discussion that aim to connect the theoretical and practical sides. • Asking questions and giving exercises that require analysis and conclusions related to lectures. • Encourage students to participate in discussions and do the practical work.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-15	30	Student study the matlab programing and operation in it	Introduction to MATLAB, MATLAB Interactive Sessions, Menus and the toolbar, Computing with Matlab, Script files and the Editor Debugger, and Matlab Help System. Programming Techniques: Program Design and Development, Relational Operators and Logical Variables, Logical Operators and Functions, Conditional Statements Loops The Switch Structure, Debugging Mat Lab Programs. Symbolic Processing With Matlab: Symbolic Expressions, Algebra, Calculus (Limits and series), Symbolic Linear Algebra, Linear Algebraic Equations: Elementary Solution Methods, solving system of linear equations Arrays: Arrays,	Lecture PDF and power point Video	Daily exams and semester exams

			Multidimensional Arrays, Element by Element Operations,	
			Polynomial Operations Using Arrays	
			Plotting: XY- plotting functions,	
			Subplots and Overlay plots	
			Special Plot types, Interactive plotting, Function Discovery, 3-D plots.	
			Functions & Files: Elementary Mathematical Functions,	
			User Defined Functions, Working with Data Files	
			Introduction to Simulink.	
			Preparatory week before the final exam	

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exam, reports........etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	• Any matlab book
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

1. Program Vision

The department going to develop the curriculum in line with modern scientific developments in the field of communications engineering in addition to completing all the special requirements of scientific laboratories in the department. We seek to improve the staffed of teaching by dispatching members of Department of postgraduate in both inside and outside the country, and configure the appropriate conditions for scientific research in order to get Degrees required to be a Department able to compete in its own right and marked with the corresponding sections only local of which or the Arab and international Our ambitions We aspire to open graduate studies for a master's certificate in the disciplines of engineering various communication to be Department of scientific expertise to attract local and international center of which to open the horizons of cooperation through conferences, consulting, training, scientific research and development through broad and orderly opening to the community.

2. Program Mission

Expanding educational base and their applications in modern field of telematics and communications across both the international network and devices and cellular all advanced communication systems form that meets the need of institutions, both belonging to the state or the private sector through education, training and rehabilitation input from Human Resources (students) and make them able to deal with modern techniques and working in different institutions efficiently and effectively serve our dear country march.

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4. Program Accreditation

None

5. Other external influences

None

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution requirements	5	6	4.24%	
College requirements	9	20	14.20%	
Department requirements	46	115	81.56%	
Summer Training				Graduation Requirements
Others				

7. Program Description

Course Name	Course Code	Level/Year	Credit Hours	
			Practical	Theory
Democracy & human Rights	U 101	Second - First	-	2
Workshop skills	COE 107	Second - First	3	-
Computer skills	U 103	First - First	3	1
English Language	U 104	First - First	-	2
Engineering Drawing	COE 106	First - First	3	-
Mathematics -I	E 101	First - First	-	4
Mathematics -II	E 102	Second - First	-	4
Electronic Physics	COE 104	Second - First	-	4
C++ Programming	COE 105	Second - First	3	1
Digital Techniques	COE103	First - First	2	4
Electrical Engineering Fundamentals I	COE 101	First - First	2	6
Electrical Engineering Fundamentals II	COE102	Second - First	2	6
Arabic Language	U 108	Second - First	-	2
Applied Mathematics –I	E201	First - Second	-	4
Applied Mathematics –II	E202	Second -Second	-	4
Electronic Circuits I	COE201	First - Second	2	2
Signals and Systems	COE202	First - Second	2	3

Course	Code	Term		
Communication Transmission Lines	COE203	First - Second	-	2
Probability and Random Processes	COE204	First - Second	-	4
Electric Circuits I	COE205	First - Second	2	3
Electromagnetic Fields I	COE206	First - Second	-	2
MATLAB Programming	COE207	First - Second	2	1
Electromagnetic Fields II	COE208	Second -Second	-	3
Analog Communication Systems	COE209	Second -Second	2	3
Electric Circuits II	COE210	Second -Second	2	3
Electronic Circuits II	COE211	Second -Second	2	2
Neural Network Engineering	COE212	Second -Second	2	1
Numerical Methods	COE213	Second -Second	2	2
Automatic Control Theory	COE214	Second -Second	-	2
Engineering Economy	E301	First - Third	-	2
Engineering Analysis	COE301	First - Third	-	2
Digital Communication I	COE302	First - Third	2	3
Antenna Theory and Design	COE303	First - Third	2	3
Digital Signal Processing	COE304	First - Third	2	3
Microcontroller and DSP Systems	COE305	First - Third	2	2
Communication Electronics -I	COE306	First - Third	2	3
Optical Communication Systems	COE307	First - Third	-	2
Detection and Estimation Theory	COE308	Second -Third	-	3
Digital Communication II	COE309	Second -Third	2	3
Image Processing	COE310	Second -Third	2	2
Information Theory	COE311	Second -Third	-	3
Radar Systems	COE312	Second -Third	2	2
Computer Networks	COE313	Second -Third	2	2
Waves Propagation	COE314	Second -Third	-	2
Communication Electronics -II	COE315	Second -Third	2	2
Engineering Profession Ethics	E401	First - Fourth	-	1
Graduation Project	E402	Fourth	8	-
Microwave Engineering-I	COE401	First - Fourth	2	3
Modern Communication Systems	COE402	First - Fourth	-	3
Cellular Mobile Networks	COE403	First - Fourth	-	2
Cryptography for Communication Systems	COE404	First - Fourth	-	2
Satellite Communication Systems	COE405	First - Fourth	-	2
Microwave Engineering-II	COE406	Second - Fourth	2	3
Global Positioning Systems	COE407	Second - Fourth	-	2
Multimedia Communication	COE408	Second - Fourth	-	2
Telecom Switching Systems	COE409	Second - Fourth	-	2
Television and Broadcasting Systems	COE410	Second - Fourth	-	2

8. Expected learning outcomes of the program

Knowledge

A. Cognitive goals

A1. - Understanding and teaching the student the principles of how signal work and how to deal with communication algorithms.

A2- Enabling students to obtain knowledge and understanding in working on and designing signal and system .

A3- The student understands the methods of forming signal and system parts and their interconnection.

A4- Enabling students to obtain knowledge and understanding of designing everything related to optical signal and system.

A5- Enabling students to obtain knowledge and understanding of diagnosing faults and maintaining various signal and system devices.

A6- The student understands the foundations of solving communication problems, cellular networks, and etc.

Skills

A. The skills goals special to the program.

B1 - Explanation of communication principles topics by specialists in the subject, with an emphasis on the use of mathematics as a basis for understanding and learning.

B2 - Providing them with skills to solve practical problems related to various communication systems and algorithms for addressing and solving technical problems in various fields of Communication engineering.

B3 – Obtaining experience to explore and develop communication systems and its algorithms.

Ethics

A. Affective and value goals

C1- Enabling students to think and analyze topics related to the engineering framework, such as various logical circuits.

C2- Enabling students to think and analyze topics related to Communication systems related to the engineering framework.

C3- Enabling students to think and analyze topics related to solving practical problems.

9. Teaching and Learning Strategies

☐ Providing students with the basics, additional topics, and field experiences related to the outcomes of thinking and analysis.

☐ Forming discussion circles during or outside lectures to discuss scientific

engineering topics that require thinking and analysis.
☐ Asking students a set of thinking questions during lectures, such as (what, how, when, why) for specific topics.

10. Evaluation methods

☐ Daily exams with practical and scientific questions.
☐ Participation marks for difficult competition questions among students.
☐ Assigning grades to homework assignments and reports assigned to them.
☐ Semester exams for the curriculum in addition to the final exam.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor	Electronic & communications	Communications			1	
Assist. Prof.	Communications	Communications techniques			1	
Assist. Prof.	Electronic & communications	Communications			3	
Assist. Prof.	Electric Eng.	Electronic & communications			3	
Assist. Prof.	Physics	Electro=optics			1	
Assist. Prof.	Physics	Nano technology			1	
Assist. Prof.	Communications	Communications			1	
Assist. Prof.	Info. & Comm. Eng.	Image processing			1	
Assist. Prof.	Elect. & Electronic Eng.	Communications				1
Assist. Prof.	Electro-optics and laser	Optoelectronics			1	
Lecturer	Elect. & Electronic Eng.	Electronics			1	1

Lecturer	Communications	Communications			1	1
Assist. Lecturer	Communications	Communications			3	
Assist. Lecturer	Elect. & Electronic Eng.	Electronics			1	
Assist. Lecturer	Electronic & communications	Communications			2	
Assist. Lecturer	Electric Eng.	Electronic & communications			1	

Professional Development

Mentoring new faculty members

Faculty members are instructed to hold regular meetings and review questionnaires received from students with the Scientific Committee.

Professional development of faculty members

The teaching staff undergoes development through training, workshops, and seminars. Progress is evaluated by subject performance.

12. Acceptance Criterion

According to the rules and regulations of Ministry of Higher Education and Scientific Research.

13. The most important sources of information about the program

- College website.
- The department's website and contact the department by email.

14. Program Development Plan

- The courses are updated annually to keep up with developments of the world.
- The laboratories are also updated under academic curricula.
- Additionally, postgraduate programs are now being offered.

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Second/ Two	COE211	Electronics II	Basic	√	√	√	√	√	√	√		√	√	√	

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Course Description Form

1. Course Name: Electronics II

2. Course Code: COE211

3. Semester / Year: 2nd / 2nd

4. Description Preparation Date:
24-4-2024

5. Available Attendance Forms: Attendance is mandatory.
None

6. Number of Credit Hours (Total) / Number of Units (Total)
30 hours

7. Course administrator's name (mention all, if more than one name)
Name: wisam hayed mahdiEmail: wisam_haider@uodiyala.edu.iq

8. Course Objectives	
Course Objectives	The subject of electronics II aims to teach the student the concepts of amplifiers, single amplifiers, multistage amplifiers, analysis of multistage amplifier circuits, and to identify the types of connections between multistage amplifiers. He also studies tuning amplifiers, as well as studying tuned amplifiers and four-layer devices. The student also studies the description and operation of the rate or rectifier from silicon control, triacs and GTO. The student also studies feedback amplifiers, operational amplifiers and their applications.

9. Teaching and Learning Strategies	
Strategy	☐ The Lecture gives detailed theoretical lectures. ☐ The Lecture requests periodic reports on the basic topics of the subject.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

First	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Multistage amplifier: Analysis of multistage amplifiers (voltage gain, current gain, etc.), and types of multistage amplifiers (cascade….etc.).	Lectures presented in writing and power point format	Daily exams + practical experiments + monthly exams
Second	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Multistage amplifier: Analysis of multistage amplifiers (voltage gain, current gain, etc.), and types of multistage amplifiers (cascade….etc.).	Lectures presented in writing and power point format	Daily exams + practical experiments + monthly exams
Third	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Multistage amplifier: Analysis of multistage amplifiers (voltage gain, current gain, etc.), and types of multistage amplifiers (cascade….etc.).	Lectures presented in writing and power point format	Daily exams + practical experiments + monthly exams
Fourth	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Multistage amplifier: Analysis of multistage amplifiers (voltage gain, current gain, etc.), and types of multistage amplifiers (cascade….etc.).	Lectures presented in writing and power point format	Daily exams + practical experiments + monthly exams
Fifth	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Tuned amplifiers: Transformer- coupled amplifiers; signal- tuned, and tapped and double tuned amplifiers.	Lectures presented in writing and power point format	Daily exams + practical experiments + monthly exams
Sixth	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Tuned amplifiers: Transformer- coupled amplifiers; signal- tuned, and tapped and double tuned amplifiers.	Lectures presented in writing and power point format	Daily exams + practical experiments + monthly exams
Seventh	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Tuned amplifiers: Transformer- coupled amplifiers; signal- tuned, and tapped and double tuned amplifiers.	Lectures presented in writing and power point format	Daily exams + practical experiments + monthly exams

Eighth	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Tuned amplifiers: Transformer- coupled amplifiers; signal- tuned, and tapped and double tuned amplifiers.	Lectures presented in writing and power point format	Daily exams + practical experiments + monthly exams
Ninth	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Introduction to four-layer devices: Description and operation of silicon control rectifier, disc, thirstier, GTO, and triac.	Lectures presented in writing and power point format	Daily exams + practical experiments + monthly exams
Tenth	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Introduction to four-layer devices: Description and operation of silicon control rectifier, disc, thirstier, GTO, and triac.	Lectures presented in writing and power point format	Daily exams + practical experiments + monthly exams
Eleventh	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Introduction to four-layer devices: Description and operation of silicon control rectifier, disc, thirstier, GTO, and triac.	Lectures presented in writing and power point format	Daily exams + practical experiments + monthly exams
Twelfth	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Introduction to four-layer devices: Description and operation of silicon control rectifier, disc, thirstier, GTO, and triac.	Lectures presented in writing and power point format	Daily exams + practical experiments + monthly exams
Thirteenth	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Feedback Amplifier, Op-Amp and Application.	Lectures presented in writing and power point format	Daily exams + practical experiments + monthly exams
Fourteenth	2	The student will be able to understand and analyze all the requirements of this subject in handwriting and in laboratory application.	Feedback Amplifier, Op-Amp and Application.	Lectures presented in writing and power point format	Daily exams + practical experiments + monthly exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports......etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

1. Program Vision

The department going to develop the curriculum in line with modern scientific developments in the field of communications engineering in addition to completing all the special requirements of scientific laboratories in the department. We seek to improve the staffed of teaching by dispatching members of Department of postgraduate in both inside and outside the country, and configure the appropriate conditions for scientific research in order to get Degrees required to be a Department able to compete in its own right and marked with the corresponding sections only local of which or the Arab and international Our ambitions We aspire to open graduate studies for a master's certificate in the disciplines of engineering various communication to be Department of scientific expertise to attract local and international center of which to open the horizons of cooperation through conferences, consulting, training, scientific research and development through broad and orderly opening to the community.

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Expanding educational base and their applications in modern field of telematics and communications across both the international network and devices and cellular all advanced communication systems form that meets the need of institutions, both belonging to the state or the private sector through education, training and rehabilitation input from Human Resources (students) and make them able to deal with modern techniques and working in different institutions efficiently and effectively serve our dear country march.

3. Program Objectives

Teach students studying in the department on techniques required in all areas of modern communication systems and their applications in scientific and field state departments. Qualify graduates capable of working in government departments and the private sector engineering staff specialist efficiently and effectively. Contribute to provide an advanced level of related activities and the realization of the institutions experience and lead to the fulfillment of their need of human resources in order to achieve their success and the evolution and continuation.

4. Program Accreditation

None

5. Other external influences

None

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution requirements	5	6	4.24%	
College requirements	9	20	14.20%	
Department requirements	46	115	81.56%	
Summer Training				Graduation Requirements
Others				

7. Program Description

Course Name	Course Code	Level/Year	Credit Hours Practical	Credit Hours Theory
Democracy & human Rights	U 101	Second - First	-	2
Workshop skills	COE 107	Second - First	3	-
Computer skills	U 103	First - First	3	1
English Language	U 104	First - First	-	2
Engineering Drawing	COE 106	First - First	3	-
Mathematics -I	E 101	First - First	-	4
Mathematics -II	E 102	Second - First	-	4
Electronic Physics	COE 104	Second - First	-	4
C++ Programming	COE 105	Second - First	3	1
Digital Techniques	COE103	First - First	2	4
Electrical Engineering Fundamentals I	COE 101	First - First	2	6
Electrical Engineering Fundamentals II	COE102	Second - First	2	6
Arabic Language	U 108	Second - First	-	2
Applied Mathematics –I	E201	First - Second	-	4
Applied Mathematics –II	E202	Second -Second	-	4
Electronic Circuits I	COE201	First - Second	2	2
Signals and Systems	COE202	First - Second	2	3

Course	Code	Semester		
Communication Transmission Lines	**COE203**	First - Second	-	2
Probability and Random Processes	**COE204**	First - Second	-	4
Electric Circuits I	**COE205**	First - Second	2	3
Electromagnetic Fields I	**COE206**	First - Second	-	2
MATLAB Programming	**COE207**	First - Second	2	1
Electromagnetic Fields II	**COE208**	Second -Second	-	3
Analog Communication Systems	**COE209**	Second -Second	2	3
Electric Circuits II	**COE210**	Second -Second	2	3
Electronic Circuits II	**COE211**	Second -Second	2	2
Neural Network Engineering	**COE212**	Second -Second	2	1
Numerical Methods	**COE213**	Second -Second	2	2
Automatic Control Theory	**COE214**	Second -Second	-	2
Engineering Economy	**E301**	First - Third	-	2
Engineering Analysis	**COE301**	First - Third	-	2
Digital Communication I	**COE302**	First - Third	2	3
Antenna Theory and Design	**COE303**	First - Third	2	3
Digital Signal Processing	**COE304**	First - Third	2	3
Microcontroller and DSP Systems	**COE305**	First - Third	2	2
Communication Electronics -I	**COE306**	First - Third	2	3
Optical Communication Systems	**COE307**	First - Third	-	2
Detection and Estimation Theory	**COE308**	Second -Third	-	3
Digital Communication II	**COE309**	Second -Third	2	3
Image Processing	**COE310**	Second -Third	2	2
Information Theory	**COE311**	Second -Third	-	3
Radar Systems	**COE312**	Second -Third	2	2
Computer Networks	**COE313**	Second -Third	2	2
Waves Propagation	**COE314**	Second -Third	-	2
Communication Electronics -II	**COE315**	Second -Third	2	2
Engineering Profession Ethics	**E401**	First - Fourth	-	1
Graduation Project	**E402**	Fourth	8	-
Microwave Engineering-I	**COE401**	First - Fourth	2	3
Modern Communication Systems	**COE402**	First - Fourth	-	3
Cellular Mobile Networks	**COE403**	First - Fourth	-	2
Cryptography for Communication Systems	**COE404**	First - Fourth	-	2
Satellite Communication Systems	**COE405**	First - Fourth	-	2
Microwave Engineering-II	**COE406**	Second - Fourth	2	3
Global Positioning Systems	**COE407**	Second - Fourth	-	2
Multimedia Communication	**COE408**	Second - Fourth	-	2
Telecom Switching Systems	**COE409**	Second - Fourth	-	2
Television and Broadcasting Systems	**COE410**	Second - Fourth	-	2

8. Expected learning outcomes of the program

Knowledge

A. Cognitive goals

A1. - Understanding and teaching the student the principles of how signal work and how to deal with communication algorithms.

A2- Enabling students to obtain knowledge and understanding in working on and designing signal and system .

A3- The student understands the methods of forming signal and system parts and their interconnection.

A4- Enabling students to obtain knowledge and understanding of designing everything related to optical signal and system.

A5- Enabling students to obtain knowledge and understanding of diagnosing faults and maintaining various signal and system devices.

A6- The student understands the foundations of solving communication problems, cellular networks, and etc.

Skills

A. The skills goals special to the program.

B1 - Explanation of communication principles topics by specialists in the subject, with an emphasis on the use of mathematics as a basis for understanding and learning.

B2 - Providing them with skills to solve practical problems related to various communication systems and algorithms for addressing and solving technical problems in various fields of Communication engineering.

B3 – Obtaining experience to explore and develop communication systems and its algorithms.

Ethics

A. Affective and value goals

C1- Enabling students to think and analyze topics related to the engineering framework, such as various logical circuits.

C2- Enabling students to think and analyze topics related to Communication systems related to the engineering framework.

C3- Enabling students to think and analyze topics related to solving practical problems.

9. Teaching and Learning Strategies

☐ Providing students with the basics, additional topics, and field experiences related to the outcomes of thinking and analysis.

☐ Forming discussion circles during or outside lectures to discuss scientific

engineering topics that require thinking and analysis.
☐ Asking students a set of thinking questions during lectures, such as (what, how, when, why) for specific topics.

10. Evaluation methods

☐ Daily exams with practical and scientific questions.
☐ Participation marks for difficult competition questions among students.
☐ Assigning grades to homework assignments and reports assigned to them.
 ☐ Semester exams for the curriculum in addition to the final exam.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor	Electronic & communications	Communications			1	
Assist. Prof.	Communications	Communications techniques			1	
Assist. Prof.	Electronic & communications	Communications			3	
Assist. Prof.	Electric Eng.	Electronic & communications			3	
Assist. Prof.	Physics	Electro=optics			1	
Assist. Prof.	Physics	Nano technology			1	
Assist. Prof.	Communications	Communications			1	
Assist. Prof.	Info. & Comm. Eng.	Image processing			1	
Assist. Prof.	Elect. & Electronic Eng.	Communications				1
Assist. Prof.	Electro-optics and laser	Optoelectronics			1	
Lecturer	Elect. & Electronic Eng.	Electronics			1	1

Lecturer	Communications	Communications			1	1
Assist. Lecturer	Communications	Communications			3	
Assist. Lecturer	Elect. & Electronic Eng.	Electronics			1	
Assist. Lecturer	Electronic & communications	Communications			2	
Assist. Lecturer	Electric Eng.	Electronic & communications			1	

Professional Development

Mentoring new faculty members

Faculty members are instructed to hold regular meetings and review questionnaires received from students with the Scientific Committee.

Professional development of faculty members

The teaching staff undergoes development through training, workshops, and seminars. Progress is evaluated by subject performance.

12. Acceptance Criterion

According to the rules and regulations of Ministry of Higher Education and Scientific Research.

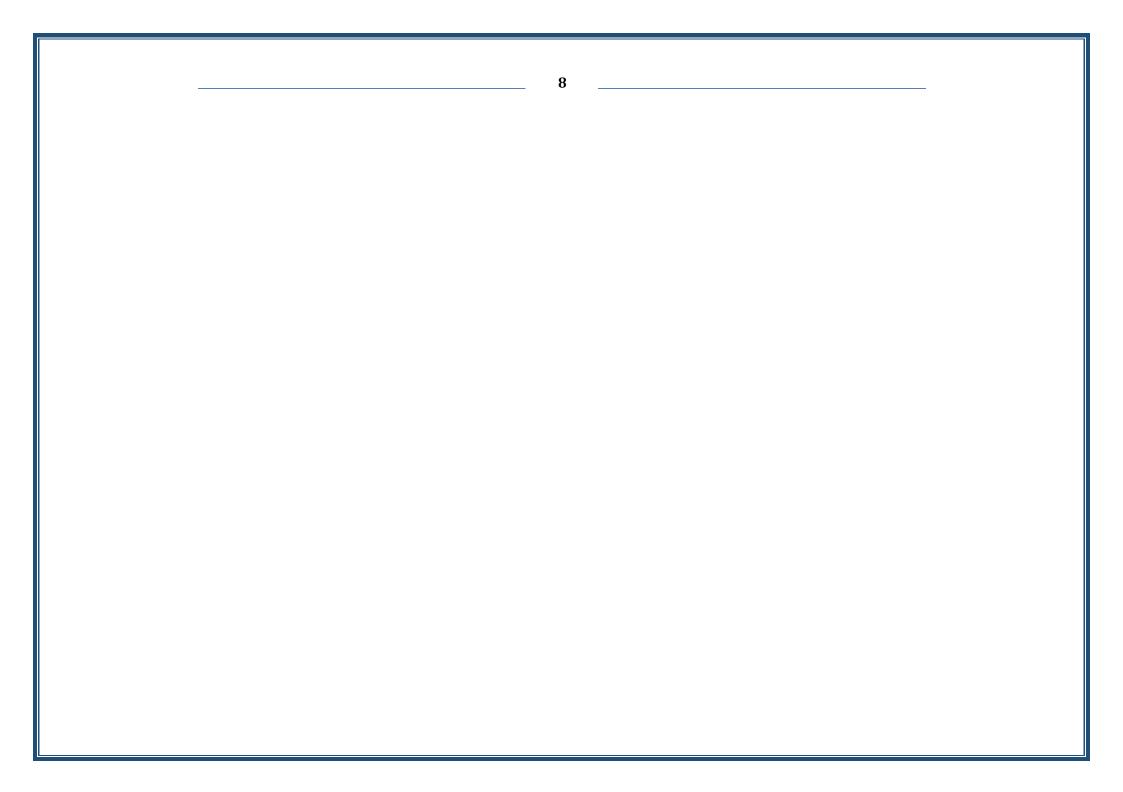## 13. The most important sources of information about the program

- College website.
- The department's website and contact the department by email.

14. Program Development Plan

- The courses are updated annually to keep up with developments of the world.
- The laboratories are also updated under academic curricula.
- Additionally, postgraduate programs are now being offered.

Year/Level	Course Code	Course Name	Basic or optional	Required program Learning outcomes											
				Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
fourth /1st	**COE204**	Neural Network Engineering	Basic	√	√	√	√	√	√	√		√	√	√	

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Course Description Form

1. Course Name: Neural Network Engineering
2. Course Code: **COE212**
3. Semester / Year: 1st / 4th
4. Description Preparation Date:
24-9-2024
5. Available Attendance Forms: mandatory
None
6. Number of Credit Hours (Total) / Number of Units (Total) : 30
4/4

7. Course administrator's name (mention all, if more than one name)

Lectur Name: Mohmmed Selman Saleh

Email: mohselman@uodiyala.edu.iq

8. Course Objectives

Course Objectives	After successful completion of this module, students will: - Demonstrate an understanding of the structure and function of a neural computing unit. - Demonstrate an understanding of the following types of artificial neural networks: Perceptron, Multilayer perceptron, Deep, Associative, Hebbian, Competitive and Boltzmann networks. - Demonstrate an understanding of the range of learning rules applied to these networks, including: Widrow-Hoff, Back-propagation, Hebbian, Oja, Sanger, Competitive, Kohonen and Boltzmann rules. - Demonstrate an understanding of Spiking Neural Networks. - Use MATLAB to implement and apply a range of neural network algorithms. - Apply theoretical knowledge of neural networks to solve problems.

9. Teaching and Learning Strategies	
Strategy	☐ The Lecture gives detailed theoretical lectures. ☐ The Lecture requests periodic reports on the basic topics of the subject.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	4	- History of neural cells and network and the applications of NN	Basic concepts of neural cell	Lectures, PDF, power point and Video	Daily exams + monthly exams
3-4	4	- Neural Models single and multiple neuron	Set theory of NN	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams
5-6	4	- Neural network architecture: single and multiple NN.	Neural network architecture	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams
7-8	4	- Design of NN, Transfer functions.	Discrete Transfer functions of NN.	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams
9-10	4	- Neural learning methods	Neural learning methods	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams

11-15	12	- Hebb method - Adline method. - Perceptron method.	Hebb method, Adline method, Perceptron method.	Lectures, PDF, power point and Video	Daily exams + practical experiments + monthly exams

11. Course Evaluation

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

1. Program Vision

The department going to develop the curriculum in line with modern scientific developments in the field of communications engineering in addition to completing all the special requirements of scientific laboratories in the department. We seek to improve the staffed of teaching by dispatching members of Department of postgraduate in both inside and outside the country, and configure the appropriate conditions for scientific research in order to get Degrees required to be a Department able to compete in its own right and marked with the corresponding sections only local of which or the Arab and international Our ambitions We aspire to open graduate studies for a master's certificate in the disciplines of engineering various communication to be Department of scientific expertise to attract local and international center of which to open the horizons of cooperation through conferences, consulting, training, scientific research and development through broad and orderly opening to the community.

2. Program Mission

Expanding educational base and their applications in modern field of telematics and communications across both the international network and devices and cellular all advanced communication systems form that meets the need of institutions, both belonging to the state or the private sector through education, training and rehabilitation input from Human Resources (students) and make them able to deal with modern techniques and working in different institutions efficiently and effectively serve our dear country march.

3. Program Objectives

Teach students studying in the department on techniques required in all areas of modern communication systems and their applications in scientific and field state departments. Qualify graduates capable of working in government departments and the private sector engineering staff specialist efficiently and effectively. Contribute to provide an advanced level of related activities and the realization of the institutions experience and lead to the fulfillment of their need of human resources in order to achieve their success and the evolution and continuation.

4. Program Accreditation

None

5. Other external influences

None

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution requirements	5	6	4.24%	
College requirements	9	20	14.20%	
Department requirements	46	115	81.56%	
Summer Training				Graduation Requirements
Others				

7. Program Description

Course Name	Course Code	Level/Year	Credit Hours	
			Practical	Theory
Democracy & human Rights	U 101	Second - First	-	2
Workshop skills	COE 107	Second - First	3	-
Computer skills	U 103	First - First	3	1
English Language	U 104	First - First	-	2
Engineering Drawing	COE 106	First - First	3	-
Mathematics -I	E 101	First - First	-	4
Mathematics -II	E 102	Second - First	-	4
Electronic Physics	COE 104	Second - First	-	4
C++ Programming	COE 105	Second - First	3	1
Digital Techniques	COE103	First - First	2	4
Electrical Engineering Fundamentals I	COE 101	First - First	2	6
Electrical Engineering Fundamentals II	COE102	Second - First	2	6
Arabic Language	U 108	Second - First	-	2
Applied Mathematics –I	E201	First - Second	-	4
Applied Mathematics –II	E202	Second -Second	-	4
Electronic Circuits I	COE201	First - Second	2	2
Signals and Systems	COE202	First - Second	2	3

Communication Transmission Lines	**COE203**	First - Second	-	2
Probability and Random Processes	**COE204**	First - Second	-	4
Electric Circuits I	**COE205**	First - Second	2	3
Electromagnetic Fields I	**COE206**	First - Second	-	2
MATLAB Programming	**COE207**	First - Second	2	1
Electromagnetic Fields II	**COE208**	Second -Second	-	3
Analog Communication Systems	**COE209**	Second -Second	2	3
Electric Circuits II	**COE210**	Second -Second	2	3
Electronic Circuits II	**COE211**	Second -Second	2	2
Neural Network Engineering	**COE212**	Second -Second	2	1
Numerical Methods	**COE213**	Second -Second	2	2
Automatic Control Theory	**COE214**	Second -Second	-	2
Engineering Economy	**E301**	First - Third	-	2
Engineering Analysis	**COE301**	First - Third	-	2
Digital Communication I	**COE302**	First - Third	2	3
Antenna Theory and Design	**COE303**	First - Third	2	3
Digital Signal Processing	**COE304**	First - Third	2	3
Microcontroller and DSP Systems	**COE305**	First - Third	2	2
Communication Electronics -I	**COE306**	First - Third	2	3
Optical Communication Systems	**COE307**	First - Third	-	2
Detection and Estimation Theory	**COE308**	Second -Third	-	3
Digital Communication II	**COE309**	Second -Third	2	3
Image Processing	**COE310**	Second -Third	2	2
Information Theory	**COE311**	Second -Third	-	3
Radar Systems	**COE312**	Second -Third	2	2
Computer Networks	**COE313**	Second -Third	2	2
Waves Propagation	**COE314**	Second -Third	-	2
Communication Electronics -II	**COE315**	Second -Third	2	2
Engineering Profession Ethics	**E401**	First - Fourth	-	1
Graduation Project	**E402**	Fourth	8	-
Microwave Engineering-I	**COE401**	First - Fourth	2	3
Modern Communication Systems	**COE402**	First - Fourth	-	3
Cellular Mobile Networks	**COE403**	First - Fourth	-	2
Cryptography for Communication Systems	**COE404**	First - Fourth	-	2
Satellite Communication Systems	**COE405**	First - Fourth	-	2
Microwave Engineering-II	**COE406**	Second - Fourth	2	3
Global Positioning Systems	**COE407**	Second - Fourth	-	2
Multimedia Communication	**COE408**	Second - Fourth	-	2
Telecom Switching Systems	**COE409**	Second - Fourth	-	2
Television and Broadcasting Systems	**COE410**	Second - Fourth	-	2

8. Expected learning outcomes of the program

Knowledge

A. Cognitive goals

A1. - Understanding and teaching the student the principles of how signal work and how to deal with communication algorithms.

A2- Enabling students to obtain knowledge and understanding in working on and designing signal and system .

A3- The student understands the methods of forming signal and system parts and their interconnection.

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A5- Enabling students to obtain knowledge and understanding of diagnosing faults and maintaining various signal and system devices.

A6- The student understands the foundations of solving communication problems, cellular networks, and etc.

Skills

A. The skills goals special to the program.

B1 - Explanation of communication principles topics by specialists in the subject, with an emphasis on the use of mathematics as a basis for understanding and learning.

B2 - Providing them with skills to solve practical problems related to various communication systems and algorithms for addressing and solving technical problems in various fields of Communication engineering.

B3 – Obtaining experience to explore and develop communication systems and its algorithms.

Ethics

A. Affective and value goals

C1- Enabling students to think and analyze topics related to the engineering framework, such as various logical circuits.

C2- Enabling students to think and analyze topics related to Communication systems related to the engineering framework.

C3- Enabling students to think and analyze topics related to solving practical problems.

9. Teaching and Learning Strategies

☐ Providing students with the basics, additional topics, and field experiences related to the outcomes of thinking and analysis.

☐ Forming discussion circles during or outside lectures to discuss scientific

engineering topics that require thinking and analysis.
☐ Asking students a set of thinking questions during lectures, such as (what, how, when, why) for specific topics.

10. Evaluation methods

☐ Daily exams with practical and scientific questions.
☐ Participation marks for difficult competition questions among students.
☐ Assigning grades to homework assignments and reports assigned to them.
☐ Semester exams for the curriculum in addition to the final exam.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor	Electronic & communications	Communications			1	
Assist. Prof.	Communications	Communications techniques			1	
Assist. Prof.	Electronic & communications	Communications			3	
Assist. Prof.	Electric Eng.	Electronic & communications			3	
Assist. Prof.	Physics	Electro=optics			1	
Assist. Prof.	Physics	Nano technology			1	
Assist. Prof.	Communications	Communications			1	
Assist. Prof.	Info. & Comm. Eng.	Image processing			1	
Assist. Prof.	Elect. & Electronic Eng.	Communications				1
Assist. Prof.	Electro-optics and laser	Optoelectronics			1	
Lecturer	Elect. & Electronic Eng.	Electronics			1	1

5

Lecturer	Communications	Communications			1	1
Assist. Lecturer	Communications	Communications			3	
Assist. Lecturer	Elect. & Electronic Eng.	Electronics			1	
Assist. Lecturer	Electronic & communications	Communications			2	
Assist. Lecturer	Electric Eng.	Electronic & communications			1	

Professional Development

Mentoring new faculty members

Faculty members are instructed to hold regular meetings and review questionnaires received from students with the Scientific Committee.

Professional development of faculty members

The teaching staff undergoes development through training, workshops, and seminars. Progress is evaluated by subject performance.

12. Acceptance Criterion

According to the rules and regulations of Ministry of Higher Education and Scientific Research.

13. The most important sources of information about the program

- College website.
- The department's website and contact the department by email.

14. Program Development Plan

- The courses are updated annually to keep up with developments of the world.
- The laboratories are also updated under academic curricula.
- Additionally, postgraduate programs are now being offered.

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Second year	**COE213**	Numerical Methods	Basic	√	√	√	√	√	√	√		√	√	√	

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Course Description Form

1. Course Name:	
	Numerical Methods
2. Course Code:	
	COE213
3. Semester / Year:	
	II / Second Year
4. Description Preparation Date:	
	24-4-2024
5. Available Attendance Forms:	
	None
6. Number of Credit Hours (Total) / Number of Units (Total)	
	4Hours (2 Th., 2 Lab. Required)

7. Course administrator's name (mention all, if more than one name)

Name: Assist. Prof. Salam Nazhan Ahmed
Email: salam_nzhan@yahoo.com

8. Course Objectives

Course Objectives	In this course, –students will learn: Having successfully completed this module you will be able to: • Demonstrate knowledge and understanding of numerical methods to solve systems of linear equations, to compute quadratures and to solve Ordinary and Partial Differential Equations • Use a programming language such as MATLAB; its instructions and its programming language • Analyse a mathematical problem and determine which numerical technique to use to solve it • Show logical thinking in coding a mathematical problem in algorithmic form • Use your knowledge of a programming language to learn more easily any other programming language you will need to use in future

9. Teaching and Learning Strategies

Strategy	To explore complex systems, physicists, engineers, financiers and mathematicians require computational methods since mathematical models are only rarely solvable algebraically. Numerical methods, based upon sound computational mathematics, are the basic algorithms underpinning computer predictions in modern systems science. Such methods include techniques for simple optimization, interpolation from the known to the unknown, linear algebra underlying systems of equations, ordinary differential equations to simulate systems, and stochastic simulation under random influences. Topics covered are: the mathematical and computational foundations of the numerical approximation and solution of scientific problems;

Root of equations; varies numerical methods; polynomial; solution of large scale systems of linear and nonlinear equations; modelling and solution with sparse equations; explicit schemes to solve ordinary differential equations.

The nature of the module is eminently practical: we will cover relatively little of the mathematical background of the numerical techniques that we will study. On the other hand students will be required to do a reasonable amount of programming in a language such as Matlab or Python; part of the assessment will test their ability to code in Matlab or Python and to put into practice the theoretical methods studied at lectures. Computer laboratory sessions are associated to this module and will complement the lectures.

10. Course Structure

Week	Hours	Required Learning		Unit or subject name	Learning method	Evaluation
		Outco				method
1	4 Hours			• Errors in numerical solutions	Theory + Lab	Reports + Exam +presentation
2	4 Hours			• Roots of equations	Theory + Lab	
3	4 Hours			• Bracketing Methods	Theory + Lab	
				• Open Methods	Theory + Lab	
4	4 Hours			• Taylor Polynomials equations	Theory + Lab	
5	4 Hours			• Linear System Equations	Theory + Lab	
6	4 Hours			• Nonlinear system equations	Theory + Lab	
7	4 Hours			• Matrices	Theory + Lab	

Course Evaluation

1. Quizzes:
- There will be (4) closed books and notes quizzes during the semester.
- The quizzes will count 5% of the total module grade.
2. Quart &Mid-Term Tests, at least 2, will count 30% of the total module grade.
3. Homework and assignments, and will count 5% of the total module grade.
4. Seminars and oral & ppt. presentations, and will count 5% of the total module grade.
5- practical Activities, this will count 10% of the total module grade
6. Extracurricular Activities, this is optional and will count extra marks $(1-5\%)$ for the student, depending on the type of activity.
7. Final Exam:
- The final exam will be comprehensive, closed books and notes, and will take place on
(- June/ 2022) from 9:00 AM - 12:00 AM in rooms (Comm1)
- The final exam will count 50% of the total module grade.

Learning and Teaching Resources

- Required textbooks (curricular book, if any) - Main references (sources) - Recommended books and references - Electronic references, websites	• Recommended Resources 1. Numerical Methods for Engineer sand Scientists 2. An Introduction with ® Applications using MATLAB, Amos Gilat and Vish-Subramaniam 3. Numerical Methods For Scientific And Engineering Computation_M. K. Jain, S. R. K. Iyengar And R. K. Jain