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

2025-2026

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: AlMuthanna University

Faculty/Institute: Collage of Engineering

Scientific Department:

Department of Electronic and Communication Engineering

Academic or Professional Program Name:

Bachelor's degree (B.SC.) – Electronic and Communications Engineering

Final Certificate Name:

Bachelor's degree (B.SC.) in Electronic and Communications Engineering

Academic System: ..... Course / Bologna ...

Description Preparation Date: September 2025

File Completion Date: January 2026

Signature:

Head of Department Name:

Dr. Aws Hashim Neamah

Signature:

Scientific Associate Name:

Asst. Prof. Dr. Forat Yasir AlJaberi

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

1. Program Vision

Our vision is to support our community with a worthy engineering education that will allow our students to work in various fields of electronic and communications engineering to improve the infrastructure and achieve the economic well-being of the community. We look forward to maintaining a strong focus on undergraduate-level education so that our program is well recognized in the analysis and design of electronics and communications engineering work, and for a high-quality education.

2. Program Mission

The mission of the electronic and communications engineering program (ECE) is consistent with both the university and College of Engineering missions. The ECE mission highlights three primary goals of teaching, research, and service. The first component states that preparing successful engineers in the field of electronics and communications. The program's mission is to provide them with the confidence and experience to face the technical and social challenges of the future. The second component states that "conduct high quality and innovative research". The University's mission addresses this goal implicitly in statements such as "Students work side by side with some of the world's best faculty to advance, the sciences, and the professions". The Department's mission also addresses a similar goal in the statement, "Conducting research that produces new knowledge and new researchers for the future". The third component states that "serve the community and industry, by providing educational and research resources". The program educational objectives of the Electronics and Communication Engineering department are consistent with the mission of the department.

3. Program Objectives

Our program is devoted to prepare students within three to five years after graduation to:

1. Develop into competent and engaged engineering professionals and apply their technical and managerial qualifications in the planning, designing, constructing, operating, and/or maintaining of the infrastructure concerning the field of electronic and communications engineering.
2. Using their skills to analyze and design systems, identify project execution means and materials, carry out cost estimation and analyses, and participate in directing technical activities for electronic and communications engineering projects or projects related to other fields.
3. Be able to actively participate in their communities and their profession by developing their oral, written, visual and graphic modes communication abilities when working as team members or leaders.
4. Initiate a program of continuous learning which may include studies leading to proficient licensure or a higher degree in engineering that provides continued development of their technical abilities and management skills, and attainment of professional expertise.
5. Improve their understanding of sustainability, professionalism, ethics, quality performance, and safety that allows them to be professional influential to society when solving engineering problems and creating solutions in the field of electronic and communications engineering.

4. Program Accreditation

N/A

5. Other external influences

N/A

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	8		14%	optional
College Requirements	7		12%	basic
Department Requirements	40		72%	basic
Summer Training	1			
Other				

* This can include notes whether the course is basic or optional.

7. Program Description

Level/Year	Course code	Course name	**Theory**	Applied	Tutorial	**ECTS**
First year - First semester	ENG111	Mathematics I	3		1	6
	ECE112	Electrical circuits I	3	3	1	8
	ECE113	Electronics physics	3			7
	ENG114	Engineering Drawing	1	3		4
	UNI115	Computers I	1	2		3
	UNI116	Arabic Language I	2			2
First year - Second semester	ENG121	Mathematics II	3		1	6
	ECE122	Electrical circuits II	3	3	1	8
	UNI123	Human Rights and Democracy	2			2
	ECE124	Electronics Materials	3		1	8
	UNI125	English Language I	2			2
	ENG126	Workshop Technology	0	3		4
Second year - First semester	ECE211	Mathematics III	3		1	6
	ECE212	Electronics I	3	3		6
	ECE213	Network Analysis I	2			3
	ECE214	Electromagnetic fields I	3		1	5
	ECE215	Digital Electronics I	2	2		5
	UNI216	Computers II	2	2		3
	UNI217	The crimes of Baath regime	2			2
Second year - Second semester	ECE221	Mathematics IV	3		1	5
	ECE222	Electronics II	3	3		6
	ECE223	Network Analysis II	2		1	3
	ECE224	Electromagnetic fields II	3			4
	ECE225	Digital Electronics II	2	2		4
	UNI226	English Language II	2			4
	ECE227	chemistry	2	2		4
	UNI228	Arabic Language II	2			2
Third year - First semester	ECE311	Communication Systems I	3	3	1	4
	ECE312	Energy Conversion I	3			3
	ECE313	Electronics III	3	3	1	4
	ECE314	Wave Propagation	2			2
	ECE315	Microprocessor	2	3		3
	ECE316	Engineering statistics and Probability	3		1	3
Third year - second semester	ECE321	Communication Systems II	3	3	1	4
	ECE322	Industrial Management	1			1
	ECE323	Antennas	2		1	2
	ECE324	Computer Architecture	3			3
	ECE325	Numerical Analysis	3	3		4
	ECE326	Energy Conversion II	2	3		3
	ECE327	Electronic Instrumentation	2			2

Fourth year - First semester	ENG411	Project I		4		2
	ECE412	Microwave Engineering	3			3
	ECE413	Digital Signal Processing I	3			3
	ECE414	Digital System Design	3	3		4
	ECE415	Network and Communication Protocols	2		1	2
	ECE416	Control 1	3			
	ENG417	Ethics	1			1
	ECE418	Information Theory and Coding	2		1	2
fourth year - second semester	ENG421	Project II		4		2
	ECE422	VLSI Technology	3		1	3
	ECE423	Satellite Communications	3		1	3
	ECE424	Wireless and Mobil Communications	3			4
	ECE425	Optical Communications	2			2
	ECE426	Digital Signal Processing II	3	3		4
	ECE427	Control II	3	3		

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	Apply principles of mathematics, science, and engineering in a variety related to electronic and communications engineering.
Skills	
Learning Outcomes 2	Use the techniques, skills, and tools necessary for science and engineering practice.
Learning Outcomes 3	Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. Design and conduct experiments, as well as to analyze and interpret data related to electronic and communications engineering.
Ethics	
Learning Outcomes 4	Identify, formulate, and solve engineering problems related to electronic and communications engineering.

	Participate in projects that cross disciplines and function on multi-disciplinary teams.
Learning Outcomes 5	Understanding of professional and ethical responsibility A recognition of the need for, and an ability to engage in life-long learning and knowledge of contemporary issues.

9. Teaching and Learning Strategies

1. Communicative Approach: Emphasize interactive and meaningful communication. Encourage students to engage in pair work and group discussions.

2. Scaffolded Instruction: Provide structured support and gradually increase the difficulty level as students' progress. Start with simple mathematic concepts and number systems, .

3. Contextual Learning: Present the concepts of mathematic in meaningful contexts to enhance understanding and retention. Use real-life situations, visual aids, authentic materials, and multimedia resources to make the learning experience more relevant and engaging.

4. Active Learning: Encourage students to participate in the learning process actively. Incorporate hands-on activities and interactive exercises to promote engagement and develop design skills.

5. Multi-Sensory Approach: Utilize various senses to enhance learning. Incorporate visual aids, audio recordings, gestures, and kinesthetic activities to cater to different learning styles and reinforce understanding of the fundamentals of mathematic learning.

6. Formative Assessment: Regularly assess students' progress and provide constructive feedback. Use various assessment methods, such as quizzes,

speaking tasks, listening exercises, and short written assignments, to gauge their understanding and identify areas for improvement.

10. Evaluation methods

11. Faculty

Faculty Members

Auda Raheemah Odhaib	**| Ph.D. in Computer Engineering**	**| Assistant Prof.**
Email:	**| auda@mu.edu.iq**	
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Ali Abidul Jabbar Al-SAMAWI	**| Phd. in Electrical Power Engineering**	**| Lecturer**
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Mobile No.:	**| 07812211067**	

Professional Development
Mentoring new faculty members
Professional development of faculty members

12. Acceptance Criterion

Central admission

13. The most important sources of information about the program

14. Program Development Plan

Program Skills Outline

Curriculum Skills Map														
Please tick the boxes corresponding to the individual learning outcomes of the programme being assessed.														
			Required learning outcomes of the program											
Course code	Course name	Optional or essential	knowledge and understanding				Subject-specific skills					thinking skills		General and transferable skills (or other skills related to employability and personal development)	
			A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	D1	D2
ENG111	Mathematics I	essential	✓				✓								
ECE112	Electrical circuits I	essential		✓			✓		✓						
ECE113	Electronics physics	essential	✓					✓							
ENG114	Engineering Drawing	essential										✓			
UNI115	Computers I	essential										✓			
UNI116	Arabic Language	Optional													✓
ENG121	Mathematics II	essential	✓				✓								

ECE122	Electrical circuits II	essential		✓			✓		✓						
UNI123	Human Rights and Democracy	Optional											✓	✓	✓
ECE124	Electronics Materials	essential						✓							
UNI125	English Language I	Optional													✓
ENG126	Workshop Technology	essential										✓		✓	
ECE211	Mathematics III	essential	✓				✓								
ECE212	Electronics I	essential			✓				✓						
ECE213	Network Analysis I	essential		✓			✓		✓						
ECE214	Electromagnetic fields I	essential	✓				✓								
ECE215	Digital Electronics I	essential			✓				✓						
UNI216	Computers II	essential										✓			
UNI217	The crimes of Baath regime	essential											✓	✓	
ECE221	Mathematics IV	essential	✓				✓								
ECE222	Electronics II	essential			✓				✓						

ECE223	Network Analysis II	essential		✓			✓		✓						
ECE224	Electromagnetic fields II	essential	✓				✓								
ECE225	Digital Electronics II	essential			✓				✓						
UNI226	English Language II	Optional													✓
ECE227	chemistry	essential						✓							
UNI228	Arabic Language II	Optional													✓
ECE311	Communication Systems I	essential			✓				✓	✓		✓			
ECE312	Energy Conversion I	essential					✓								
ECE313	Electronics III	essential			✓				✓						
ECE314	Wave Propagation	essential			✓				✓						
ECE315	Microprocessor	essential							✓			✓			
ECE316	Engineering statistics and Probability	essential					✓								
ECE325	Numerical Analysis	essential	✓				✓								

ECE321	Communication Systems II	essential			✓				✓	✓		✓			
ECE324	Computer Architecture	essential							✓						
ECE327	Electronic Instrumentation	essential							✓			✓			
ECE323	Antennas	essential			✓					✓					
ECE322	Industrial Management	essential				✓							✓		
ECE326	Energy Conversion II	essential					✓								
ENG411	Project I	essential		✓					✓	✓		✓	✓	✓	✓
ECE418	Information Theory and Coding	essential			✓				✓						
ECE412	Microwave Engineering	essential			✓										
ECE413	Digital Signal Processing I	essential			✓				✓						
ECE414	Digital System Design	essential			✓				✓			✓			
ECE415	Network and Communication Protocols	essential							✓	✓					

ECE416	Control 1	essential		✓	✓	✓						✓	✓		
ENG417	Ethics	essential											✓		
ECE421	Project II	essential		✓					✓	✓		✓	✓	✓	✓
ECE422	VLSI Technology	essential			✓				✓	✓					
ECE423	Satellite Communications	essential			✓				✓						
ECE426	Digital Signal Processing II	essential			✓				✓	✓					
ECE424	Wireless and Mobil Communications	essential			✓				✓	✓					
ECE425	Optical Communications	essential		✓	✓		✓				✓				
ECE427	Control II	essential	✓	✓	✓				✓	✓	✓				

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

1. Course Name: Mathematics I

2. Course Code:

ENG111

3. Semester / Year:

1st / 1st

4. Description Preparation Date:

22/9/2025

5. Available Attendance Forms:

In-class attendance

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

60 /6

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

Name: Mohammed Zuhair Azeez
Email: mohammad.zuhair@mu.edu.iq

8. Course Objectives

Course Objectives	1. To develop students' understanding of the fundamental concepts limits, continuity, and differentiation. 2. To equip students with the ability to compute derivatives algebraic, trigonometric, exponential, logarithmic, and inver functions. 3. To apply differentiation techniques to solve real-world problem including curve sketching, optimization, and rates of change engineering contexts.

9. Teaching and Learning Strategies

Strategy	1. Delivering theoretical explanations supported by interactive examples and in-cla applications to reinforce conceptual understanding. 2. Assigning students a variety of exercises and applied problems to develop analytical skills. 3. Utilizing digital tools such as presentations and mathematical software to visuall and interactively illustrate key concepts.

10. Course Structure

Week	Hours/week	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5	4	• Ability to understand and distinguish the properties of	Functions, domain& range Drawing function	Theoretical lectures Group discussions Unannounced daily	Home assignments Periodic and final theoretical exams

6 7 8 9 10 11 12 13 14		functions, and accurately determine their domain and ran • Ability to graph functions and analyze their behavior. • Ability to calcul limits and understand thei role in studying the continuity o functions. • Ability to analy the continuity o functions and us it to infer graph characteristics. • Ability to understand and apply the theory derivatives and chain rule. • Ability to differentiate trigonometric, logarithmic, and exponential functions and apply them in various problem • Ability to differentiate inverse trigonometric a hyperbolic functions, as we as their inverses • Ability to use derivatives in graph analysis, including findin maxima, minim and points of inflection. • Ability to solve applied problem	Limits Continuity Theory of Derivative & Chain Rule Derivative of Trigonometri c Function Derivative of Trigonometri c Function Inverse Trigonometri c Functions. Exponential Function Derivative Derivative of Logarithmic Function Derivative of Logarithmic Function, Applications Derivatives of Hyperbolic Functions, The Inverse of Hyperbolic Functions Application of Differentiatio n. Review	quizzes In-class exercises a activities Guiding students to useful educational websites	Quizzes Homework tasks Classroom participation Presentation of activities

		using differentiation i scientific and engineering contexts. • Ability to utilize modern mathematical to and digital skills representing and applying differential concepts.			

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)	-Thomas, Calculus by Anton , Bivens and Davis
Main references (sources)	Advanced Engineering Mathematics by Alan Jeffrey
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	www.khanacademy.org

13. Course Name:
Computer I
14. Course Code:
UNI115
15. Semester / Year:
first/ first year
16. Description Preparation Date:
22/9/2025
17.Available Attendance Forms:
Face-to-face class attendance

18.Number of Credit Hours (Total) / Number of Units (Total)
48 / 3

19. Course administrator's name (mention all, if more than one name)
Name: Karrar Abdalameer Abbas Email: alakoulykarrar@mu.edu.iq

20. Course Objectives	
Course Objectives	1. Training students on the basics of using the computer and providing them with the necessary skills to deal with the computer with high efficiency. 2. Assisting the student in distinguishing and developing his scientific and artistic abilities. 3. Enriching the student's skills to be able to deal with the computer with high efficiency. Providing students with a way to use other modern technologies related to the educational process.

21. 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. • Encourage students to work in groups.

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3	3 3 3	1. Enabling the student to know the concepts of information technology by learning the	Introduction to Windows 10 Work with icon use windows	Lectures, Educational Lessons Lab	**Quiz exams. Homework, Reports**

		basics of the computer. 2. Enabling the student to know about the use of GUI operating systems. 3. Enabling the student to deal with the skills of using the operating system (Windows operating system) through exploring, customizing, and controlling its settings. 4. Enabling the student to work on the word processing program (Microsoft Word). 5. Enabling the student to work on the spreadsheet program (Microsoft Excel). Enabling the student to wo on the presentation progra (Microsoft PowerPoint			**Oral questions project Attending Mid−term Exam Final − exam**

4 5 6	3 3 3		files and folders Accessories The main interface of Microsoft Word 2010 / general settings	Lectures, Educational Lessons Lab	
7 8 9 10 11	3 3 3 3 3		Texts/graphics, ables Microsoft Office Excel: Getting Started with Excel Week 9 Microsoft Office Excel: Sorting, Selecting and Subtotaling data Week 10 Microsoft Office Excel: Formulas and Functions Week 11 Microsoft Office Excel: Worksheet Formatting and Presentation	Lectures, Educational Lessons Lab	
12	3		Microsoft Office PowerPoint:	Lectures	
13	3			Lectures	
14	3			Lectures	

			Getting Started with PowerPoi Microsoft Office PowerPoint: Developing a PowerPoint Presentation, Adding Graphic Elements to Yo Presentation ar Modifying Objects in Your Presentation. Microsoft Office PowerPoint: Adding Graphic Elements, table and charts to Your Presentation ar Modifying Objects in Your Presentation Microsoft Office PowerPoint: Prepare to deliver your presentation Preparatory week before the final exam		

23. Course Evaluation

1. Short tests (5 x 1) = 5 marks
2. Exam 2*10=20

Reports =15 marks 3*5

3. Mid-term Exam = 10 Marks
4. Final Exam =50 Marks

24. Learning and Teaching Resources

Required textbooks (curricular books, if any)	EXCEL Formulas –Almunther Saffan
Main references (sources)	

Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

25. Course Name:	
Electrical Circuits -I	
26. Course Code:	
ECE112	
27. Semester / Year:	
First semester / first year	
28. Description Preparation Date:	
22/9/2025	
29. Available Attendance Forms:	
Face-to-face class attendance	
30. Number of Credit Hours (Total) / Number of Units (Total)	
8	
31. Course administrator's name (mention all, if more than one name)	
Name: Assist. Prof. Dr. ali abeadajabar hussen Email: aliasamaw@mu.edu.iq	
32. Course Objectives	
Course Objectives	1. Obtain professional-level employment in the Electrical Engineering field 2. Practice Electrical Engineering in a wide variety of private and government institutions 3. Work in diverse, multi-disciplinary teams and possess leadership skills, ethical standards, environmental concerns and social awareness 4. Engage in lifelong-learning, participate in professional organizations and, if desired, pursue graduate studies 5. Obtain licensure as a professional engineer. 6. to develop professionally through lifelong learning, advanced education, and other creative pursuits in science and technology
33. Teaching and Learning Strategies	
Strategy	• Lecture presentation • Tutorials • Experimental learning.

34. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**4**	Introduction to electrical	Basic Concepts of Electrical Circuit Electrical Resistance Serial and Parallel Resistance	Lectures, Tutorials laboratory	**Quiz exams. Homework, Reports Oral questions Attending Mid-term Exam Final - exam**
2	**4**				
3	**4**				
4	**4**	Circuit Analysis Techniques	Ohm's Law, Voltage & current Divider Rule Source Conversion Kirchhoff's Laws	Lectures, Tutorials laboratory	
5	**4**				
6	**4**				
7	**4**	Circuit Theorems	Branch Current Analysis Method Mesh current node voltage analysis method Delta to Star Connection	Lectures, Tutorials, laboratory	
8	**4**				
9	**4**				
10	**4**				
11	**4**				
12	**4**	DC Circuit Analysis	Superposition Therom Th'evenin Therom Norton Therom Maximum power Transfer Therom	Lectures, Tutorials, laboratory	
13	**4**				
14	**4**				
15	**4**				

35. Course Evaluation

1. Quizzes (5 x 1)=5 Marks
2. Exam 2*10=20
3. Lab (1 x 7) = 7 +8=15 Marks.
4. Mid-term Exam = 10 Marks
5. Final Exam =50 Marks

36. Learning and Teaching Resources

Required textbooks (curricular boo if any)	Fundamentals of Electric Circuits
Main references (sources)	Fundamentals of Electric Circuits
Recommended books and references (scientific journals, reports...)	Electrical technology theraja book
Electronic References, Websites	

37. Course Name:
Electronic Physics
38. Course Code:
ECE113
39. Semester / Year:
First Semester / First Year
40. Description Preparation Date:
22/9/2025
41.Available Attendance Forms:
Face-to-face class attendance
42.Number of Credit Hours (Total) / Number of Units (Total)
3/7
43. Course administrator's name (mention all, if more than one name)
Name: Safa Abdulwahid raheem Email: safa.abdulwahid@mu.edu.iq
44. Course Objectives

Course Objectives	This module aims to: 1. Provide students with a fundamental understanding of the physical principles governing electronic devices. 2. Explain the behavior of charge carriers in different materials, including conductors, semiconductors, and insulators. 3. Develop knowledge of semiconductor physics, including energy bands, doping, and carrier transport mechanisms. 4. Introduce the operating principles and characteristics of electronic devices such as diodes, BJTs, and FETs. 5. Analyze the DC and AC behavior of semiconductor devices using mathematical models. 6. Enable students to understand and apply small-signal models in electronic circuit analysis. 7. Strengthen analytical and problem-solving skills related to electronic device physics.

	8. Prepare students for advanced courses in electronics and microelectronic systems.

45. Teaching and Learning Strategies

Strategy	The teaching and learning strategies adopted in this module include: 1. **Interactive Lectures** Delivering theoretical concepts related to engineering properties, atomic models, wave nature of light, and quantum mechanics using board explanation and multimedia presentations. 2. **Problem-Based Learning (PBL)** Solving numerical and conceptual problems related to wave functions, quantum numbers, electron distribution, and bonding to enhance analytical skills. 3. **Class Discussions** Encouraging students to discuss and compare atomic models (Thomson and Rutherford) and the dual nature of light to develop critical thinking. 4. **Mathematical Derivation Sessions** Step-by-step derivations of one-, two-, and three-dimensional electronic wave equations to strengthen mathematical understanding. 5. **Group Work Activities** Assigning small group tasks on topics such as ionic and covalent bonding or hydrogen molecule analysis to improve collaborative learning. 6. **Tutorial Sessions** Weekly problem-solving sessions focusing on quantum mechanics applications and electronic structure. 7. **Use of Visual Aids and Simulations** Employing diagrams and simulations to explain wave functions, probability density, and electron charge distribution. 8. **Formative Assessment** Short quizzes, homework assignments, and classroom questions to continuously evaluate student understanding.

46. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3		Engineering Properties: Mechanical, Electrical & thermal properties	Lecture	1. Quizzes and homework assignments. 2. Midterm and final written examinations. 3. Class participation and
2	3		Chemical and Magnetic properties	Lecture	
3	3		Atomic, Thomson Model of the Atom	Lecture	

4	3		Rutherford Model of the Atom	Lecture	problem-solving activities. 4. Continuous (formative) assessment throughout the semester 5. Report and Presentation
5	3		Wave nature of Light	Lecture	
6	3		Dual nature of Light	Lecture	
7	3		Probability and wave Function	Lecture	
8	3		Mid Exam		
9	3		One dimension Electronic Wave	Lecture	
10	3		Two dimension and Three dimension Electronic Wave	Lecture	
11	3		Wave Function and the four quantum number	Lecture	
12	3		The Pauli principle and quantization of energy	Lecture	
13	3		Electronic charge distribution and period table	Lecture	
14	3		Bounding , Hydrogen molecule	Lecture	
15	3		Ionic bound, covalent bound	Lecture	

47. Course Evaluation

1. Exam (2 x 14) =28 Marks
2. Homework (1 x 4) = 4 Marks
3. Quiz (1 x 4) = 4 Marks
4. Report & Presentation (1 x 4)=4 marks
5. Mid-term Exam = 10 Marks
6. Final Exam =50 Marks

48. Learning and Teaching Resources

Required textbooks (curricular books, if a	
Main references (sources)	Jadhav, Ghanshyam. (2016). A textbook of physics and electronics.
Recommended books and references (scientific journals, reports…)	W. Demtröder, Atoms, Molecules and Photons: An Introduction to Atomic-, Molecular- and Quantum Physics. Berlin, Germany: Springer, 2006.
Electronic References, Websites	https://appliedscincesheet.uoanbar.edu.iq/catalog/Atoms%2C%20Molecules%20and%20Photons_%20An%20Introduction%20to%20Atomic-%2C%20Molecular%20and%20Quantum%20Physics%20%28%20PDFDrive%20%29.pdf

1. Course Name:

Engineering workshops (electrical installations + electrical control)

2. Course Code:

ENG126

3. Semester / Year:

Second/ first year

4. Description Preparation Date:

22/9/2025

5. Available Attendance Forms:

Face-to-face class attendance

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

45 / 4

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

Name: Abbas Suwaih Atiyathe
Email: abbasswayeh22@mu.edu.iq

8. Course Objectives

Course Objectives	1.Get a professional-level job in electrical engineering 2. Practicing electrical engineering in a wide range of private andgovernmental institutions 3. Working in diverse, multidisciplinary teams and possessing ,leadership skills, ethical standards, environmental concerns .and social awareness 4. Participate in lifelong learning, engage in professional .organizations, and, if desired, pursue postgraduate studies 5. .Obtain a professional engineer license 6. To develop professionally through lifelong learning, advancededucation, and other creative pursuits in science and technology

9. Teaching and Learning Strategies

Strategy	Presentation of a lecture • Educational lessons

	• Experiential learning

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3	3 3 3	Electrical installations	Basic concepts Occupational safety in workshops Measures to take in case of electric shock Types of electrical installations Series and parallel connection methods with Connecting a simple electrical circuit	Lectures, Educational Lessons Lab	**Quiz exams. Homework, Reports Oral questions project Attending Mid-term Exam Final – exam**
4 5 6	3 3 3	Electrical installations	Connecting an electrical circuit containing one light bulb, one socket, and one switch Connecting a series electrical circuit Connecting a parallel circuit Connecting the fan circuit Connecting the electric bell circuit	Lectures, Educational Lessons Lab	
7 8 9 10 11	3 3 3 3 3	**electrical control**	Identifying the most important elements used in control and their symbols The control circuit consists of one contactor and one bushing Page 12 Connecting a circuit	Lectures, Educational Lessons Lab	

			containing three contactors Main references (sources) Recommended books and references (scientific journals , reports (... Electronic references and websites		
12	3	**electrical control**	**Connecting a circuitats 2 sources** **Connecting a circuitats 3 sources** **Connecting the electric raft circuit** Connecting the photocell circuit	Lectures	
13	3			Lectures	
14	3			Lectures	

11. Course Evaluation

1. Short tests (5 x 1) = 5 marks
2. Exam 2*10=20

Reports =15 marks 3*5

3. Mid-term Exam = 10 Marks
4. Final Exam =50 Marks

12. Learning and Teaching Resources

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

13. Course Name:
Electronic Materials
14. Course Code:
ECE124
15. Semester / Year:
First Semester / First Year
16. Description Preparation Date:
22/9/2025
17. Available Attendance Forms:
Face-to-face class attendance
18. Number of Credit Hours (Total) / Number of Units (Total)
3/7
19. Course administrator's name (mention all, if more than one name)
Name: Safa Abdulwahid raheem Email: safa.abdulwahid@mu.edu.iq
20. Course Objectives

Course Objectives	9. Have a background on the Energy bound Theory in Crystals. 10. Understand the Conductors, Semiconductor and insulator. 11. Study in detail Fermi level. 12. Understand the electrical conduction. 13. Study the metallic crystal under magnetic field. 14. Analyze the resistance, temperature, and super conductivity. 15. Have a detailed background on semiconductors. 16. Understand the crystal structure representative. 17. Study the intrinsic semiconductor and intrinsic conductors 18. understand P-N junction, diode equation and biasing 19. Analyze the junction transistors

21. Teaching and Learning Strategies

Strategy	Here are the strategies that can be employed in teaching Electronic Materials to First-year students: 1. Develop into competent and engaged engineering professionals and apply their technical and managerial qualifications in the planning, designing, constructing, operating, and/or maintaining of the infrastructure concerning the field of electronic and communications engineering. 9. Using their skills to analyze and design systems, identify project execution means and materials, carry out cost estimation and analyses, and participate in directing technical activities for electronic and communications engineering projects or projects related to other fields. 10. Be able to actively participate in their communities and their profession by developing their oral, written, visual and graphic modes communication abilities when working as team members or leaders. 11. Initiate a program of continuous learning which may include studies leading to proficient licensure or a higher degree in engineering that provides continued development of their technical abilities and management skills, and attainment of professional expertise. 12. Improve their understanding of sustainability, professionalism, ethics, quality performance, and safety that allows them to be professional influential to society when solving engineering problems and creating solutions in the field of electronic and communications engineering.

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Energy bound Theory in Crystals	Electronic structure of solids, bonding in crystals, Energy Bands and Band Gaps Lattice Dynamics and Electron Behavior Interatomic Potentials and Binding Energy	Lecture	1. Quizzes and homework assignments. 2. Midterm and final written examinations. 3. Class participation and problem-solving activities. 4. Continuous (formative) assessment throughout the semester 5. Report and Presentation
2	3	Conductors, Semiconductors and insulators	Classification of Solids: Conductors, Semiconductors, a Insulators Electronic Band Structure of Materials Electrical Conductivity in Solid Band Theory and Electrical Properties Charge Transport in Materials	Lecture	
3	3	Fermi level	Fermi Energy and Fermi-Dirac Statistics Fermi Level and Carrier Concentration in Semiconducto Electronic Band Structure and Fermi Level Quantum Statistics of Electrons Solids Fermi Level in	Lecture	

			Intrinsic and Extrinsic Semiconductors		
4	3	Electrical Conduction	Electrical Conduction in Solids Charge Transport Mechanisms Classical and Quantum Models of Conduction	Lecture	
5	3	Metallic Crystal und Magnetic Fiel	Behavior of Metallic Crystals i Magnetic Fields Magneto transport in Crystallin Solids Quantum Effects in Metals under Magnetic Fields	Lecture	
6	3	Resistance and Temperature, Super Conductivity	Temperature Dependence of Electrical Resistance Electrical Resistivity and Thermal Effects Introduction to Superconductiv Critical Temperature and Zero Resistance Types of Superconductors and Meissner Effect	Lecture	
7	3	Semiconductors	Introduction to Semiconductors Intrinsic and Extrinsic Semiconductors Carrier Generation and Recombination P-N Junction Theory Energy Bands in Semiconducto	Lecture	
8	3	Crystal structure representative	Crystal Structures and Unit Cel Types of Crystals and Lattices Representation of Crystalline Solids Bravais Lattices and Crystal Systems		
9	3	Intrinsic Semiconductors, Intrinsic Conductors	Intrinsic and Extrinsic Semiconductors Properties of Intrinsic Conducto and Semiconductors Carrier Generation in Intrinsic Semiconductors Band Theory a Intrinsic Materials Charge Transport in Intrinsic Solids	Lecture	
10	3	Extrinsic Semiconductors	Extrinsic Semiconductors and Doping N-type and P-type Semiconduc Charge Carriers in Doped Semiconductors Energy Bands in Extrinsic Semiconductors Donor and Acceptor Impurities	Lecture	
11	3	Conduction of Charge	Charge Carrier Conduction in Semiconductors	Lecture	

		Carrier in Semiconductors	Electron and Hole Transport Mechanisms Carrier Mobility and Scattering Drift and Diffusion of Charge Carriers Electrical Conductivity in Semiconductors		
12	3	The P-N junction Diode	The P-N Junction: Formation ar Characteristics Operation of the P-N Junction Diode Diode I-V Characteristics Charge Transport in P-N Junctions	Lecture	
13	3	Diode Equation and biasing	Diode Current-Voltage (I-V) Characteristics and Equation The Diode Equation: Derivation and Interpretation and Reverse Biasing of Diodes Diode Behavior Under Different Bias Conditions	Lecture	
14	3	The junction Transistors	the Bipolar Junction Transistor (BJT): Structure and Operation Working Principles of Junction Transistors BJT Characteristics and Modes of Operation NPN and PNP Transistors Transistor Biasing and Amplification	Lecture	
15	3	Preparatory week befor the final Exan		Lecture	

23. Course Evaluation

1. Exam (2 x 14) =28 Marks
2. Homework (1 x 4) = 4 Marks
3. Quiz (1 x 4) = 4 Marks
4. Report & Presentation (1 x 4)=4 marks
5. Mid-term Exam = 10 Marks
6. Final Exam =50 Marks

24. Learning and Teaching Resources

Required textbooks (curricular books, if any)	"Solid state electronic devices " By Ben G. Streetman, Sanjay Kumar Banerjee.
Main references (sources)	"Electronic devices and circuit theory 11th ed." By Boylestad, Robert L., and Louis Nashelsky.
Recommended books and references (scientific journals, reports…)	Journal of Electrical Engineering-Elektrotechnicky Casopis
Electronic References, Websites	https://ostad.nit.ac.ir/payaidea/ospic/file7947.pdf

25. Course Name: Mathematics II
26. Course Code:
ENG121
27. Semester / Year:
2nd / 1st
28. Description Preparation Date:
22/9/2025
29. Available Attendance Forms:
In-class attendance
30. Number of Credit Hours (Total) / Number of Units (Total)
60 /6
31. Course administrator's name (mention all, if more than one name)
Name: Mohammed Zuhair Azeez Email: mohammad.zuhair@mu.edu.iq

32. Course Objectives	
Course Objectives	• **To introduce students to the fundamental concepts and techniques of definite and indefinite integration.** • **To develop students' ability to apply integration methods and matrix operations in solving mathematical and engineering problems.** • **To enhance students' proficiency in using mathematical software tools for solving integrals, systems of equations, and matrix-related problems.**

33. Teaching and Learning Strategies	
Strategy	4. Delivering theoretical explanations supported by interactive examples and in-class applications to reinforce conceptual understanding. 5. Assigning students a variety of exercises and applied problems to develop analytic skills. 6. Utilizing digital tools such as presentations and mathematical software to visually and interactively illustrate key concepts.

34. Course Structure

Week	Hours/week	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14	4	1. Ability to understa and apply the theo of integration, including both definite and indefinite integral 2. Ability to accurate and efficiently integrate trigonometric, exponential, and logarithmic functions. 3. Ability to use advanced integrat techniques such a integration by par 4. Ability to apply definite integrals t solve practical problems, such as calculating the are under curves. 5. Ability to analyze solve mathematic problems involvin matrices, determinants, and Cramer's Rule. 6. Ability to use mathematical concepts as a foundation for analyzing and solv engineering problems. 7. Ability to utilize modern mathematical tool and software in representing and solving mathemat equations.	Theory of Integration The Definite + Indefinite Integrals Integral of Trigonometric Functions Integral of Exponential Functions Integral of Logarithmic Functions Integration by Parts. Application of Definite Integrals (Area) Matrices Determin s & Gramma Rule.	Theoretical lectures Group discussions Unannounced daily quizzes In-class exercises and activities Guiding students to useful educational websites	Home assignments Periodic and final theoretical exams Quizzes Homework tasks Classroom participation Presentation of activities
35. 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	
36. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	-Thomas, Calculus by Anton , Bivens and Davis
Main references (sources)	Advanced Engineering Mathematics by Alan Jeffrey
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	www.khanacademy.org

37. Course Name:	
Mathematics IV	
38. Course Code:	
ECE221	
39. Semester / Year:	
Second semester/Second year	
40. Description Preparation Date:	
11/9/2025	
41.Available Attendance Forms:	
42.Number of Credit Hours (Total) / Number of Units (Total)	
125/5.00	
43. Course administrator's name (mention all, if more than one name)	
Name: Hasanain Kareem Atiyah Email: hasanainatiyah@mu.edu.iq	
44. Course Objectives	
Course Objectives	The course aims to develop proficiency in high-level mathematical domains that are foundational for advanced engineering modules: **Complex Analysis:** Understanding line and contour integrals, Taylor and Laurent series, and the Residue Theorem to evaluate complex real-world integrals. **Linear Algebra & Matrix Theory:** Learning eigenvalues, eigenvectors, and Singular Value Decomposition (SVD) for applications in signal processing and machine learning.

	Discrete Transforms: Gaining fluency in Z-Transforms to analyze discrete-time signals and systems in computer and electrical engineering Also Engineers must often handle uncertainty and systems that cannot be solved with exact equations: Numerical Methods: Developing skills to approximate solutions for ordinary and partial differential equations using techniques like Runge-Kutta and Milne's methods. Probability & Statistics: Mastering sampling theory, hypothesis testing, and joint probability distributions to analyze experimental data and system reliability.

45. Teaching and Learning Strategies

Strategy	Here are the strategies that can be employed in teaching mathematic I to first-year students: 1. Communicative Approach: Emphasize interactive and meaningful communication. Encourage students to engage in pair work and group discussions. 2. Scaffolded Instruction: Provide structured support and gradually increase the difficulty level as students' progress. Start with simple mathematic concepts and number systems, . 3. Contextual Learning: Present the concepts of mathematic in meaningful contexts to enhance understanding and retention. Use real-life situations, visual aids, authentic materials, and multimedia resources to make the learning experience more relevant and engaging. 4. Active Learning: Encourage students to participate in the learning process actively. Incorporate hands-on activities and interactive exercises to promote engagement and develop design skills. 5. Multi-Sensory Approach: Utilize various senses to enhance learning. Incorporate visual aids, audio recordings, gestures, and kinesthetic activities to cater to different learning styles and reinforce understanding of the fundamentals of mathematic learning. 6. Formative Assessment: Regularly assess students' progress and provide constructive feedback. Use various assessment methods, such as quizzes, speaking tasks, listening exercises, and short written assignments, to gauge their understanding and identify areas for improvement.

46. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	4	Understand and connected with first year	Laplace transformer : definition and property, LT of different time domain function	Express the engineering application	Hand assessment provide students
Week 2	4	Identify the instruments	Inverse LT, solution of ODE	Related with above subject	Activity, of the above assessment
Week 3	4	Understand the real problem and applied on the above assessment	LT of periodic functions	Development the skills	Solution of some examples the above assessment

Week 4	4	Understand real problems and applied on the above assessment	Engineering applications of LT	Real design for students	Applied of the above assessment
Week 5	4	Using real problems to applied of shapes	Complex function : complex number , curve and region in complex plane , limit , derivative power , line integer in complex plane	Real design students	Applied of the above assessment
Week 6	4		Complex function, analytic function, Cauchy-Riemman equation, Laplace equation: exponential function. trigonometric & hyperbolic function, logarithm and general power , line integer in complex plane	Real design	applied assessment
Week 7	4		**Mid-term Exam**		
Week 8	4	Identify the complex function	Complex functions , power series , residues theorem	Real design for students	Fourth paragraph of above assessment
Week 9	4	Accurately applied of power series	Power series : definition and classification (ordinary point) regular and irregular singular point	Real design for students	the above assessment
Week 10	4	Apply gamma function	Gamma functions , Bessel's equations , Legendre equation	Real design for students	the above assessment
Week 11	4	Common types include intellectual skills	Engineering applications	Real design for students	the above assessment
Week 12	4	Define and explain	Differential equation : solution of one dimensional wave heat equation , solution of two dimensional Laplace equation	Real design for students	the above assessment
Week 13	4	Construct basic knowledge	Z transform : direct Z transform , invers Z transform	Real design for students	the above assessment
Week 14	4	Analyze domain function	Properties of Z transform , solution of differential equation	Real design for students	the above assessment
Week 15	4	Analyze Z transform and applied on engineering application	Engineering applications	Real design for students	the above assessment
Week 16	4		**Preparatory week before the final Exam**		

47. Course Evaluation

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 3, 4,5, and 6
	Assignments	2	10% (10)	2, 12	LO # 3, 8, and 9
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

48. Learning and Teaching Resources

Required textbooks (curricular books, if any)	mathematic, by Thomas L.
Main references (sources)	
Recommended books and references (scientific journals, reports…)	Thomas-calculus
Electronic References, Websites	http://dl.konkur.in/post/Book/Paye/Thomas-Calculus-14th-Edition-%5Bkonkur.in%5D.pdf

1. **Educational Institution**
Muthanna University / College of Engineering
2. **Scientific Department / Center**
Department of Electronics and Communication Engineering
3. **Course Name/Code**
Computers II / UNI216
4. **Available Forms of Attendance**
Presence
5. **Semester/Year**
Second 2025-2026
6. **Number of Hours (Total)**
7. **Date this description was prepared**
15/9/2025
8. Course administrator name (if more than one name mentioned)

●	Asst. Prof. ghusoon jawad abd alkadhum

9.

10. Course Structure for the Second Course					
		Credit Hours	**Course or course name**	**Course or course code**	**Stage of study**
		4	Week 1 Programming Basics in C/C++: variables, data types, arithmetic and logical operations.	**UNI005**	Second
		4	Week 2 Program Flow Control in C++: conditional statements (if, switch) and loops (for, while, while)		
		4	Week 3 Functions and Pointers in C++: writing functions, passing parameters, pointers, organizi code and improving reusability		
		4	Week 4 MATLAB Environment and Basic Tools: getting familiar with the MATLAB interface, writing commands, variables, performing calculations.		
		4	Week 5 Arrays and Vectors in MATLAB: creating arrays and matrices, performing matrix operations, logical operations		
		4	Week 6 Indexing and Matrix Processing in MATLAB: accessing array elements, matrix manipulation, built-in matrix functions, analyzing engineering data		
		4	Week 7 Mid-term Exam		
		4	Week 8 Functions in MATLAB: creating scripts and user-defined functions, passing variables, modular programming and code organization		
		4	Week 9 Control Flow in MATLAB: conditional statements (if, elseif, else), logical operators, FOR and WHILE loops		
		4	Week 10 Arrays, Strings and File Management in MATLAB: working with arrays and strings, reading and writing file organizing and storing engineering data.		
		4	Week 11 Improving Program Efficiency and Professionalism in MATLAB: structured programming, debugging basics, code optimization, writing organized and reusable programs.		
		4	Week 12 C++ Review: integrating programming basics, functions, arrays and pointers.		
		4	Week 13 MATLABReview:		

		4 4 4	integrating arrays, functions, indexing, loops and file management Week 14 Advanced Practical Applications in C++ and MATLAB: applying learned concepts to real engineering problems (signal analysis, circuit equations, data processing) Week 15 Practical Labs and Small Projects in MATLAB: hands-on exercises and mini-projects Week 16 Preparatory week before the final Exam		
.11					
.12					

1. Course Name:	
Crimes of the Ba'ath Party	
2. Course Code:	
: UNI217	
3. Semester / Year:	
First Semester / Second Stage	
4. Description Preparation Date:	
22/9/2025	
5. Available Attendance Forms:	
Face-to-face classes	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 hours per week	
7. Course administrator's name (mention all, if more than one name)	
Name: Assist. Lecturer Noor Ameen Ahmed Email: noorameain@mu.edu.iq	
8. Course Objectives	
Course Objectives	**Familiarity and knowledge of the crimes of the Ba regime in Iraq and their vocabulary, and reviewing a**

	confirming the documentation of these crim internationally and the most important judicial rulin related to the subject. **● . Historical understanding** **● Identifying the origin of the Arab Socialist Baath Pa and its intellectual and political development.** **● Documenting violations** **● Study cases of political repression and arbitr arrests.** **● Analysis of the crimes of genocide and forc displacement (such as the Anfal campaigns in Iraq).** **Discussing the use of internationally prohibited weapo** **● Legal analysis** **● Classification of crimes according to international (crimes against humanity, war crimes, genocide).** **● Understand the role of national and international cou in holding officials accountable.** **● Promoting human rights awareness** **● Establishing the concepts of human rights a transitional justice.** **● Promote a culture of accountability and impunity.** **● Critical thinking** **● Analyzing the political and media discourse related the period of the party's rule.** **● Assessing the impact of these crimes on society a the state until today**
9. Teaching and Learning Strategies	
Strategy	1. Problem-based learning • Presenting a real case (e.g.: legal description of a particular incider • Students are required to analyze it in accordance with internatio law • Enhances research and reasoning skills 2. Case Study • Analysis of a historically or legally specific case.

	• Discussion of the parties, evidence, and results. • Linking the theoretical aspect to practical application. 3. Brainstorming • Ask a central question: How do political crimes affect state-buildin • Recording, then organizing and analyzing ideas. 4. Collaborative Learning Strategies • Working in groups • Dividing students into teams. • A team that documents events historically. • A team that analyzes legally. • A team that studies social impact. • Present the results and discuss them collectively. 5. Scientific debate • Discuss issues such as transitional justice and reconciliation. • Training students to present evidence-supported arguments. 6: Strategies based on sources and research • Document analysis • Studying legal texts or human rights reports. • Training students to verify sources. 7. Research-based learning • Assigning students to prepare short research on a specific topic. • Documenting references according to a scientific method. 8. Calendar Strategies • Formative calendar • Short questions during the lecture. • Analytical work papers.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understanding the crimes of t baath party	The concept crimes and th divisions	Lecture	exam
2	2			Lecture	report

		Understanding the crimes of t baath party	Crimes of t Baath regi according to t documentation the Iraqi Supre Criminal Co Law in 2005		
3	2	Understanding the crimes of t baath party	Types international crimes	Lecture	report
4	2	Understanding the crimes of t baath party	Decisions issu by the Supre Criminal Court	Lecture	report
5	2	Understanding the crimes of t baath party	Psychological crimes	Lecture	Class discussion
6	2	Understanding the crimes of t baath party	Mechanisms psychological crimes	Lecture	exam
7	2	Understanding the crimes of t baath party	Mechanisms psychological crimes	Lecture	Class discussion
8	2	Understanding the crimes of t baath party	Effects psychological crimes	Lecture	Class discussion
9	2		Social Crimes	Lecture	Class discussion

		Understanding the crimes of t baath party			
10	2	Understanding the crimes of t baath party	The Baath regime's positi on religion	Lecture	report
11	2	Understanding the crimes of t baath party	Violations of Ira laws	Lecture	exam
12	2	Understanding the crimes of t baath party	Pictures of hum rights violatio and crimes of t authority	Lecture	report
13	2	Understanding the crimes of t baath party	Some decisions political a military violations of t Baath regime	Lecture	exam
14	2	Understanding the crimes of t baath party	Places of prisc and detention the Baath regim	Lecture	exam
15	2	Understanding the crimes of t baath party	Environmental Crimes of t Baath Regime Iraq	Lecture	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 exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	asser Al-Zayadi, Geography of Cri Principles and Foundations / Dar Al-Has / Damascus / 2015. 2. Dr. Hussein Aliwi Nasser Al-Zayadi a Dr. Abbas Attia Al-Quraishi, Environmen Crimes during the Baathit Regime, Ira Center for Documenting the Crimes Extremism, Al-Kafil Printing Hou Karbala, 2023. 3- Jundi Abdul Malik, Crimi Encyclopedia, Part III, Arab Herita Neighborhood, Beirut, 1990. 4- The Law on the Affairs and Protection Mass Graves No. (5) of 2006 and Instructions No. (1) of 2019, Iraq

13. **Educational Institution**	
Muthanna University / College of Engineering	
14. **Scientific Department / Center**	
Department of Electronics and Communication Engineering	
15. **Course Name/Code**	
Electronics II / ECE 222	
16. **Available Forms of Attendance**	
Presence	
17. **Semester/Year**	
Second 2025-2026	
18. **Number of Hours (Total)**	
105 hours	
19. **Date this description was prepared**	
15/9/2025	
20. Course administrator name (if more than one name mentioned)	
●	Dr. Mustafa Hussein
21.	

22. Course Structure for the Second Course					
		Credit Hours	Course or course name	Course or course code	Stage of study
		14 7 14 35 35	1. Dio 2. Capacito 3. Filte 4. Transistor E 5. JFET Transist	ECE 223	The th
.23					
.24					

49. Course Name:
Energy Conversion I
50. Course Code:
ECE312
51. Semester / Year:
First / Third
52. Description Preparation Date:
22/9/2025
53.Available Attendance Forms:
54.Number of Credit Hours (Total) / Number of Units (Total)
3 hours/3 units
55. Course administrator's name (mention all, if more than one name)
Name: Aws Hashim Neamah Email: aws.hashim@mu.edu.iq

56. Course Objectives	
Course Objectives	• **Understand the concept of magnetic circuit and their relevance to electronics and communication engineering.** • **Explain Flux density, magnetic materials and Inductance as a parameters of energy conversion in magnetic circuits.** • **Study the Transformer principle as an example of energy conversion system.** • **Explain the DC and AC Machines types and operations.** • **Understand the Types of controlled switched and operation principles like gate turn off thyristors , Power MOSFET Diode rectifier, single phase rectifie** • **Understand the DC–DC converters and inverter a their applications with an Example for Gate derive circuit.** • **Understand the DC–AC inverter and their applications.** • **Understand the concept of Renewable source general (Solar , photovoltaic , wind) and explain renewable energy operation and circuits.**

57. Teaching and Learning Strategies	
Strategy	• Here are the strategies that can be employed in teaching Energy conversion to third -year students: • 1. Communicative Approach: Emphasize interactive and meaningful communication. Encourage students to engage in pair work and group discussions. • 2. Scaffolded Instruction: Provide structured support and gradually increase the difficulty level as students' progress. Start with simple

	Magnetic circuit concepts as a basic for energy conversion, and progressively introduce the DC-DC and DC-AC power electronics converters as another term of energy conversion used in renewable energy system and other industrial appliances. • 3. Contextual Learning: Present the concepts of energy conversion in meaningful contexts to enhance understanding and retention. Use real-life situations, visual aids, authentic materials, and multimedia resources to make the learning experience more relevant and engaging. Here are the strategies that can be employed in teaching Energy conversion to third -year students: 1. Communicative Approach: Emphasize interactive and meaningful communication. Encourage students to engage in pair work and group discussions. 2. Scaffolded Instruction: Provide structured support and gradually increase the difficulty level as students' progress. Start with simple Magnetic circuit concepts as a basic for energy conversion, and progressively introduce the DC-DC and DC-AC power electronics converters as another term of energy conversion used in renewable energy system and other industrial appliances. 3. Contextual Learning: Present the concepts of energy conversion in meaningful contexts to enhance understanding and retention. Use real-life situations, visual aids, authentic materials, and multimedia resources to make the learning experience more relevant and engaging. 4. Active Learning: Encourage students to participate in the learning process actively. Incorporate hands-on activities and interactive exercises to promote engagement and develop design skills. 5. Multi-Sensory Approach: Utilize various senses to enhance learning. Incorporate visual aids, audio recordings, gestures, and kinesthetic

	activities to cater to different learning styles and reinforce understanding of the fundamentals of energy conversion. 6. Formative Assessment: Regularly assess students' progress and provide constructive feedback. Use various assessment methods, such as quizzes, speaking tasks, listening exercises, and short written assignments, to gauge their understanding and identify areas for improvement.

58. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14	3	1.An ability to apply knowledge of principl of electric machines circuits and power electronics. 2. An ability to conduct the main concepts of Energy conversion. 3. Ability to understand a recognize the variety application of energy conversion such as DC machine , AC machine , DC-DC converter and renewable energy resources. 4.An understanding of professional and ethic responsibility. 5. An education necessa to understand the impa of engineering solution a global, economic, environmental, and societal context. ability to use the techniques, skills, and modern engineering too	1. Magnetic circuit: 2. Transform er principle: 3. DC Machines types: 4. DC Machines operations : 5. AC Machines types: 6. AC Machines operations : 7. Special Machines 8. Types of controlled switches 9. Diode rectifier	•	• Homework • Critical evaluating • Attendances • Quizzes • Assessment • Presentation

		necessary for engineeri practice.	and single-phase rectifier 10. DC-DC converters and applications 11. DC-AC inverter principles and applications 12. Renewable sources of Energy (Solar, Photovoltaic): 13. Renewable source of Energy (Wind		

59. 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

60. Learning and Teaching Resources

Required textbooks (curricular books, if any)	PRINCIPLES OF ELECTRIC MACHINES AND POWER ELECTRONICS (THIRD EDITION) by DR. P. C. SEN
Main references (sources)	PRINCIPLES OF ELECTRIC MACHINES AND POWER ELECTRONICS (THIRD EDITION) by DR. P. C. SEN
Recommended books and references (scientific journals, reports…)	POWER ELECTRONICS HANDBOOK DEVICES, CIRCUITS, AND APPLICATIONS Third Edition BY Muhammad H. Rashid
Electronic References, Websites	

61. Course Name:	
Energy Conversion II	
62. Course Code:	
ECE326	
63. Semester / Year:	
Second / Third	
64. Description Preparation Date:	
22/9/2025	
65.Available Attendance Forms:	
66.Number of Credit Hours (Total) / Number of Units (Total)	
3 hours/3 units	
67. Course administrator's name (mention all, if more than one name)	
Name: Aws Hashim Neamah Email: aws.hashim@mu.edu.iq	
68. Course Objectives	
Course Objectives	• **Understand the Types of controlled switched and operation principles like gate turn off thyristors , Power MOSFET Diode rectifier, single phase rectifie** • **Understand the DC–DC converters and inverter a their applications with an Example for Gate derive circuit.** • **Understand the DC–AC inverter and th applications.** • **Understand the concept of Renewable source general (Solar , photovoltaic , wind) and explain renewable energy operation and circuits.**
69. Teaching and Learning Strategies	
Strategy	• Here are the strategies that can be employed in teaching Energy conversion to third -year students:

	• 1. Communicative Approach: Emphasize interactive and meaningful communication. Encourage students to engage in pair work and group discussions. • 2. Scaffolded Instruction: Provide structured support and gradually increase the difficulty level as students' progress. Start with simple Magnetic circuit concepts as a basic for energy conversion, and progressively introduce the DC-DC and DC-AC power electronics converters as another term of energy conversion used in renewable energy system and other industrial appliances. • 3. Contextual Learning: Present the concepts of energy conversion in meaningful contexts to enhance understanding and retention. Use real-life situations, visual aids, authentic materials, and multimedia resources to make the learning experience more relevant and engaging. Here are the strategies that can be employed in teaching Energy conversion to third -year students: 1. Communicative Approach: Emphasize interactive and meaningful communication. Encourage students to engage in pair work and group discussions. 2. Scaffolded Instruction: Provide structured support and gradually increase the difficulty level as students' progress. Start with simple Magnetic circuit concepts as a basic for energy conversion, and progressively introduce the DC-DC and DC-AC power electronics converters as another term of energy conversion used in renewable energy system and other industrial appliances. 3. Contextual Learning: Present the concepts of energy conversion in meaningful contexts to enhance understanding and retention. Use real-life situations, visual aids, authentic materials, and multimedia resources to make the learning experience more relevant and engaging.

	4. Active Learning: Encourage students to participate in the learning process actively. Incorporate hands-on activities and interactive exercises to promote engagement and develop design skills. 5. Multi-Sensory Approach: Utilize various senses to enhance learning. Incorporate visual aids, audio recordings, gestures, and kinesthetic activities to cater to different learning styles and reinforce understanding of the fundamentals of energy conversion. 6. Formative Assessment: Regularly assess students' progress and provide constructive feedback. Use various assessment methods, such as quizzes, speaking tasks, listening exercises, and short written assignments, to gauge their understanding and identify areas for improvement.

70. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14	2	1. An ability to conduct the main concepts of Energy conversion. 3. Ability to understand a recognize the variety application of DC-DC converter and renewal energy resources. 4.An understanding professional and ethi responsibility. 5. An education necessa to understand the imp of engineering solution a global, economic, environmental, and societal context. 6.An ability to use the techniques, skills, and modern engineering to	14. Types of controlled switches 15. Diode rectifier and single-phase rectifier 16. DC-DC converters and applications 17. DC-AC inverter principles and applications	•	• Homework • Critical evaluating • Attendances • Quizzes • Assessment • Presentation

		necessary for engineeri practice.	18. Renewable sources of Energy (Solar, Photovolta ic): 19. Renewable source of Energy (Wind		

71. 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

72. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	POWER ELECTRONICS HANDBOOK DEVICES, CIRCUITS, AND APPLICATIONS Third Edition BY Muhammad H. Rashid
Main references (sources)	POWER ELECTRONICS HANDBOOK DEVICES, CIRCUITS, AND APPLICATIONS Third Edition BY Muhammad H. Rashid
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

73. Course Name:
Electronics Instrumentation
74. Course Code:
ECE327
75. Semester / Year:
second / 2026
76. Description Preparation Date:
22/9/2025
77.Available Attendance Forms:
78.Number of Credit Hours (Total) / Number of Units (Total)
2 hours/2 units

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

Name: Yaqdhan Mahmood Hussein
Email: yaqdhan.mahmood@mu.edu.iq

80. Course Objectives

Course Objectives	Understand measurement fundamentals such as accuracy, precision, resolution, sensitivity, repeatability, loading effects, and error analysis in electronic measurements. Explain the working principles and characteristics of common electronic measuring instruments (analog and digital). Use basic laboratory instruments effectively, including DC/AC voltmeters, ammeters, multimeters, function generators, power supplies, frequency counters, and LCR meters. Analyze and apply transducers and sensors for measuring physical quantities like temperature, pressure, displacement, strain, and light, including signal conditioning needs. Study oscilloscope operation and waveform analysis, including triggering, probe compensation, bandwidth limitations, and measurement of amplitude, frequency, phase, and time parameters. Apply calibration and standards concepts and perform basic instrument calibration and performance verification. Develop troubleshooting skills for instrumentation systems and interpret measurement results for practical engineering problems. Demonstrate safe lab practices and proper documentation for experimental setup, observations, and reporting.

81. Teaching and Learning Strategies

Strategy	• Interactive **Lectures** • Use board work, slides, and real instrument demonstrations to explain measurement concepts, instrument blocks, and operating principles. • Laboratory **Experiments (Hands-on Practice)**

- Regular lab sessions to practice using DMM, CRO/DSO, function generator, power supply, frequency counter, and LCR meter.
- Emphasis on correct connections, range selection, grounding, and safe handling.

• Demonstration**-Based Learning**

- Live demonstrations of calibration, probe compensation, triggering on oscilloscope, noise effects, and loading errors.

• Problem**-Solving Tutorials**

- Numerical problems on accuracy, error analysis, measurement uncertainty, sensitivity, bandwidth, and resolution.
- Short worksheets and tutorial sessions to strengthen calculations and interpretation.

• Mini**-Projects / Design Activities**

- Small group tasks such as building a temperature measurement unit (sensor + conditioning + display) or a simple data acquisition setup.

82. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1		introduction to measuremen measurement units, measurement system application, elements of measurement system			• Homework • Critical evaluating • Attendances • Quizzes • Assessment • Presentation
2		instrument types and performance characteristics review of instrument types, static characteristics, dynam characteristics			
3	2	instrument types and performance characteristics review of instrument types, static characteristics, dynam characteristics			
4		Errors during the measurem process: sources of systema analysis, graphical analysis, aggregation of measuremen system errors			

5		Calibration of measuring sensors and instrument s: principle of calibration, con of calibration environment, calibration chain and traceability			
6		Measurement noise and sig processing; source of measurement noise; techniq for noise reduction			
7		Exam I			
8		Measurement noise and sig processing; Analogue signa processing operation: filteri amplification, attenuation, linearization, bias removal, integration, voltage followe			
9		Measurement noise and sig processing; digital signal processing: signal sampling sample and hold circuits, A/ converter, D/A converter, Digital filtering, auto correction			
10		Electrical indicating instruments and test instruments: digital meters; analog meters; cathode ray oscilloscopes; digital storag oscilloscopes			
11		Variable conversion elemen bridge circuits; resistance measurement; inductance measurement; capacitance measurement frequency measurement; phase measurement			
12		Exam II			
13		Variable conversion elemen bridge circuits; resistance measurement; inductance measurement; capacitance measurement; frequency			

14 15		measurement; phase measurement Signal transmission: electric transmission; pneumatic transmission; fiber-optic transmitting; radio wireless transmission; digital transmission protocols Intelligent devices: Principl of digital computation; intelligent instrument; smar sensors ; smart transmitters; computation in intelligent devices			

83. 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	
84. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Measurement and Instrumentation Principles
Main references (sources)	Electronic Measurements and Instrumentation
Recommended books and references (scientific journals, reports…)	ELECTRONIC INSTRUMENTATION AND MEASUREMENT TECHNIQUES William David Cooper Algonquin College of Applied Arts and Technology Ottawa, Ontario, Canada
Electronic References, Websites	

85. Course Name:
Engineering Statistics and Probability
86. Course Code:
ECE316
87. Semester / Year:
First / 2025
88. Description Preparation Date:
22/9/2025
89.Available Attendance Forms:

90. Number of Credit Hours (Total) / Number of Units (Total)

3 hours/3 units

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

Name: Yaqdhan Mahmood Hussein
Email: yaqdhan.mahmood@mu.edu.iq

92. Course Objectives

Course Objectives	Understand probability concepts including sample space, events, conditional probability, Bayes' theorem, and independence. apply random variable theory using probability distributions (discrete and continuous) and compute expectation, variance, and other moments. Use standard probability distributions such as Binomial, Poisson, Normal, Exponential, and related models to solve engineering problems. Analyze data using descriptive statistics, including measures of central tendency, dispersion, correlation, and graphical representations. Perform statistical inference through estimation methods, confidence intervals, and hypothesis testing for engineering decisions. Apply regression and correlation techniques to model relationships between variables and interpret results. Use statistical quality control tools such as control charts and process capability to support quality and reliability in engineering systems. Interpret and communicate statistical results clearly using appropriate methods, tables, and graphs for technical reporting.

93. Teaching and Learning Strategies

Strategy	1. **Interactive Lectures** o Concept-focused teaching using real engineering examples (quality control, reliability, traffic flow, communication systems, manufacturing). 2. **Tutorial / Problem-Solving Sessions** o Regular practice of numerical problems on probability, distributions, expectation/variance, sampling, confidence intervals, and hypothesis testing. 3. **Data-Based Learning (Real Datasets)** o Use small datasets from engineering contexts to compute descriptive statistics, fit distributions, and interpret results.

4. **Computer/Software-Assisted Learning**
    - Demonstrate and practice using tools such as Excel, MATLAB, Python, R, or statistical calculators for analysis, plotting, and simulation.
5. **Activity-Based Learning**
    - Classroom activities like coin/dice experiments, sampling exercises, and random number simulations to build intuition of probability concepts.
6. **Case Studies and Applications**
    - Discuss practical cases: process variation in manufacturing, failure-time data, inspection sampling, and decision-making under uncertainty.
7. **Mini Projects / Assignments**
    - Group or individual projects such as collecting data, analyzing it (mean/SD, correlation, regression), and presenting conclusions.
8. **Quizzes and Continuous Assessment**
    - Short quizzes, unit tests, and practice worksheets to reinforce key concepts and improve problem-solving speed and accuracy.
9. **Collaborative Learning**
    - Team-based problem solving, peer explanation, and discussion of alternative solution methods.
10. **Feedback and Remedial Support**

- Timely feedback on assignments and tests; extra practice sessions for challenging topics like Bayes' theorem, hypothesis testing, and regression.

94. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5	3	Sample Spaces and Events Interpretations and Axioms Probability, Addition Rules Conditional Probability Multipretation and Total, Probability Rules, Independence, Bayes' Theorem, Random Variable Discrete Random Variables Probability Distripution and Probability Mass Functions, Cumulative Distribution Functions. Mean and Variance of a Discrete Random Variable, Discrete Uniform Distributi			• Homework • Critical evaluating • Attendances • Quizzes • Assessment • Presentation

6		Binomial Distribution, Pois Distribution			
7		Continuous Random Variables, Probability Distribution and Probability Density Functions, Cumulat Distribution Functions			
8		Exam I			
9		mean and Variance of a Continuous Random Variab Continuous Uniform Distribution			
10		Normal Distribution, Norma approximation to the Binom and Poisson Distribution			
11		Exponential Distribution, Erlang and Gamma Distribution			
12		Joint Probability Distributio Marginal Probabilty Distribution, conditional Probability Distribution, Independence			
13		Covariance and Correlation Moment Generating Functi			
14		Descriptive Statistics, Numerical Summaries of D Stem-and Loaf Diagrams			
15		Frequency Distribution and Histograms, Box Plots, Tim Sequence Diagrams			
16		Exam II			

95. 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

96. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Statistics and Probability for Engineering Applications 7th

Main references (sources)	W.J. DeCoursey College of Engineering, University of Saskatchewan Saskatoon
Recommended books and references (scientific journals, reports…)	Probability and Statistics: The Science of Uncertainty Michael J. Evans and Jeffrey S. Rosenthal University of Toronto
Electronic References, Websites	

1. Course Name:
Computer Architecture
2. Course Code:
ECE 324
3. Semester / Year:
Third year, first semester
4. Description Preparation Date:
22/9/2025
5. Available Attendance Forms:
Face-to-face class attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
3.00
7. Course administrator's name (mention all, if more than one name)
Name: Auda Raheemah Odhaib Email: auda@mu.edu.iq
8. Course Objectives

Course Objectives	The Computer Architecture course aims to enable students to understand the internal and external design of computers, how data is processed, and the relationship between hardware and software. Key objectives include studying von Neumann architecture, CPU design, memory management, and I/O technologies. Objectives of Teaching Computer Architecture:

	• Understanding the structural components: Identifying the basic components of a computer (CPU, memory, and I/O units) and how they relate to each other. • Analyzing CPU performance: Learning how the CPU is designed and functions, and understanding the Fetch-Decode-Execute cycle. • Understanding Machine Language (ISA): Studying the Instruction Set Architecture, which forms the machine's programming interface. • Memory architecture: Understanding the memory hierarchy and how main memory and cache are managed. • I/O mechanisms: Studying how computers communicate with the outside world through I/O units and bus systems. • Performance Evaluation: Acquire the ability to evaluate, measure, and improve the performance of computer systems. • Software-Hardware Interconnection: Understand how high-level code is translated into physical processes within hardware components. • Advanced Concepts: Learn about techniques such as pipelining and parallelism to increase computer speed.
9. Teaching and Learning Strategies	

Strategy	The following strategies can be used in teaching computer architecture to third-year students: 1. Communicative Approach: Focus on interactive and purposeful communication. Encourage students to work in pairs and participate in group discussions. 2. Progressive Instruction: Provide structured support and gradually increase the level of difficulty as students progress. Begin with the concepts of computer architecture and computer organization. 3. Contextual Learning: Introduce computer architecture and organization concepts using real-life situations, visual aids, authentic materials, and multimedia resources to make the learning experience more relevant and engaging. 4. Active Learning: Encourage students to actively participate in the learning process. Integrate practical activities and interactive exercises to enhance participation and develop design skills. 5. Multisensory Approach: Use different senses to enhance learning. Utilize visual aids, audio recordings, gestures, and movement activities to cater to different learning styles and reinforce understanding of the fundamentals of computer design and architecture. 6. Formative Assessment: Regularly assess student progress and provide constructive feedback. Use a variety of assessment methods, such as short quizzes, speaking tasks, listening exercises, and short writing assignments, to measure their understanding and identify areas that need improvement.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
		A View of Computer Function and Interconnection		Lectures	**Quiz exams. Homework, Reports Oral questions project Attending Mid-term Exam Final - exam**
		Bus Interconnection Elements of Bus Design		Lectures	
	3	PCI Bus Structure, PCI Commands, PCI Express		Lectures	
4	3	Computer Memory System: Internal memory, SRAM, DRAM, ROM A View of Computer Function and Interconnection		Lectures	
5	3	Memory Interfacing, Advance DRAM Organization		Lectures	
6	3	Cache Memory principles and elements of cache design		Lectures	
7	3	Mid-term Exam		Lectures	
8	3	Computer Memory System: External memory, Hard disk, optical disks		Lectures	
9	3	Mid-term Exam		Lectures	
10	3	Computer Architecture: Integer representation and arithmetic, Addition and Subtraction, Division and multiplication		Lectures	

11	3	Computer architecture Floating Point representation, Floating-Point arithmetic		Lectures	
12	3	introduction to pipelining, instruction pipelining, instruction level parallelism and superscalar processor		Lectures	
13	3	control unit operation, the instruction cycle, control unit logic (hard wired implementation)		Lectures	
14	3	Microprogramming control : organization of control memory, microinstruction execution		Lectures	

11. Course Evaluation

1. Quizzes (2 x 14) =28Marks
2. Online assignments (1 x 4) = 4 Marks
3. Onsite Assignments (1 x 4) 4 Marks
4. Homework Assignment = (1 x 4)=4 Marks
4. Mid-term Exam = 10 Marks
6. Final Exam =50 Marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Computer Organization and Architecture Designing for Performance Eleventh Edition, 2010, by William Stalings, 20
Main references (sources)	digital electronics, principles, devices and applications
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

49.Course Name:
Engineering drawing
50.Course Code:
ENG114
51.Semester / Year:
First/ First
52.Description Preparation Date:
22/9/2025
53.Available Attendance Forms:
54.Number of Credit Hours (Total) / Number of Units (Total)

4 hours (1 theoretical and 3 practical)/2 units

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

Name: Hasanain Atiyah
Email:hasanainatiyah@mu.edu.iq

56.Course Objectives

Course Objectives	• Equip students with the skills to effectively communicate technical information through drawing • Understanding various projection methods • Dimensioning techniques, industry standards • Built up with computer added design app.

57.Teaching and Learning Strategies

Strategy	A good strategy for engineering drawings involves clarity, precision, and adherence to standards. Key aspects include using clear line weights, dimensioning only critical features, and providing sufficient detail through views and notes. Standardization, through templates and following established conventions, improves consistency and ease of understanding

58.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11	4	• Building fluency • Accuracy • Confidence All this categories using English for everyday communication.	Introduction to engineering drawing Lines and lettering Geometric constructions Multi view projection Dimensioning	Effective methods include • Understand the basics • Accuracy is Key • Use standard symbols and conventions	• Homework • Critical evaluating • Attendances • Quizzes • Assessment • Presentation

12 13 14			Sectional views Developments of surfaces	• Practice orthographical projection	

59.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	
60.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	AutoCAD programmer essential. Software.
Main references (sources)	Engineering drawing. Al kafaf university of technology, Baghdad.
Recommended books and references (scientific journals, reports...)	Baghdad university
Electronic References, Websites	Engineering drawing Lecture-YouTube. Engineering drawing lecturer-free study help.

1. Course name: Arabic Language I
2. Course code :
UNI116
3. Semester/Year 2025-2026
4. Date of preparation of this description : 22/9/2025
5. Available attendance forms: In-person
6. Number of study hours (total) 30 / Number of units) total) 2
7. Course Supervisor Name (if more than one name is mentioned(
Name: M.M. Ahmed Qasim Mohammed

Email :ahmed.kasim@mu.edu.iq

8. A course goal

• Empowering students with Arabic language skills and l levels: phonetics, morphology, grammar, semantics ,stylistics, and • The ability to interpret basic theories, concepts and terms nguistics. • Develop students' listening, reading and expression skills. • Deepening the student's connection to the Arab and itage so that he may draw from its moral and social values in a t is compatible with our contemporary Arab society. • Advancing Arabic linguistic and literary knowledge in an l and cultural manner. • To hone creative and literary talents, acquire linguistic n, and the ability to distinguish good texts from bad ones. • Applying linguistic knowledge in reading, writing, nd listening, so that students can write reports in Arabic correctly inguistic, spelling, and stylistic errors. • Establishing self-learning habits among students and felong learning trends.	Goals Study material

9. Teaching and learning strategies

The educational strategy can be described as a roadmap for dents to optimally use language in their academic and professional g the boundaries for creativity and developing their language skills, g them to avoid making linguistic errors of all kinds: grammatical, ical, spelling, and stylistic. The strategies we follow are diverse and ding on the curriculum vocabulary , learner levels, and individual among them. The most important of these strategies are: Active learning strategy to break the monotony and and involve the learner in the educational process so that he is the , the dialogue strategy, the storytelling strategy, the project strategy, the role-sharing strategy, and the self-learning and active	**Strategy**

10. Course structure

Learning	Name of ic	Requi ng	w	we
a lecture	The origin e, its theories, ctions.	Learn	2	the
Lecture and	Characteris Arabic nd its ons and its types , st prominent	Knowl abic ciences c ons and he most linguists	2	the
Lecture and poetic verses and rses	Parts of un, verb, nd types of nominal, quasi-	Formi sentences Gram nd ically	2	the
Lecture and pplication on literary	Non-	Knowi clinable their marks	2	Fo
Critical readings ialogue to express view in tasting and ing texts	Literary e most poetic themes slamic and s.	Knowi ory of ing owledge, ering the f xts	2	Fif
Lecture and al applications on Quranic texts	The verbs :kāna ers, and inna ers.	Knowi s of n the guage and ntences o its rules	2	Si
Written test	Test the	Knowi ntific level ous	2	Se
Critical reading s of texts, then we issues.	The era and its most characteristics purposes.	Text	2	Th

Lecture and al applications on xts and verses	The sound noun and its nt.	Knowi and ally , ically and ically tences	2	Ni
Lecture and pplications	Spelling ation.	Knowi s of ording to cademic nethod	2	ten
Analytical	The a and its most characteristics and prose	Under e f xts	2	ele
Lecture and pplications	The six	Knowi s of the reating a of rrors	2	tw
Grammar lecture tions	Parsing of and the	Knowi s for nbers and ngs	2	thi
panel discussion	The and its most characteristics purposes.	Under e cultural, l cal issues	2	fift

11. Course Evaluation

- tests.
- Daily and surprise exams.
- The student senses the extent to which the students have comprehended the assigned

- questions.
- Reports.
- Critical and research papers.

12. Learning and teaching resources

Lectures prepared according to the set by the department	Required textbooks (methodology if
Ibn Aqil's criticism of Ibn Malik's Alfiyyah Qatar Al-Nada and Mel Al-Sada by Ibn -Ansari Rhetoric and Application by Ahmed Jewels of Eloquence by Taha Al-Hashemi	Main References (Sources(
Iraqi Linguistic Academy - Al-Manhal - brary The Egyptian Academy of the Arabic n Cairo	Recommended supporting books and (scientific journals, reports, etc(.
https://youtube.com/playlist?list=PLUbGxXv xO9JFfwR-Z_xPvMJv-&si=Q- AyvBCt1	Electronic references, websites

13. Course Name:	
Electrical Circuits -II	
14. Course Code:	
ECE122	
15. Semester / Year:	
First semester / first year	
16. Description Preparation Date:	
22/9/2025	
17. Available Attendance Forms:	
Face-to-face class attendance	
18. Number of Credit Hours (Total) / Number of Units (Total)	
8	
19. Course administrator's name (mention all, if more than one name)	
Name: . Dr. ali abeadajabar hussen Email: aliasamaw@mu.edu.iq	
20. Course Objectives	
Course Objectives	7. 1. Obtain professional-level employment in the Electrical Engineering field 8. 2. Practice Electrical Engineering in a wide variety of private and government institutions 9. 3. Work in diverse, multi-disciplinary teams and possess leadership skills, ethical standards, environmental concerns and social awareness 10. 4. Engage in lifelong-learning, participate in professional organizations and, if desired, pursue graduate studies 11. 5. Obtain licensure as a professional engineer.

	12. 6. to develop professionally through lifelong learning, advanced education, and other creative pursuits in science and technology

21. Teaching and Learning Strategies

Strategy	• Lecture presentation • Tutorials • Experimental learning.

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**4**	Introduction to AC Circuit	Basic concepts of AC circuit Average and RMS Value Representation of AC (Voltage and Current) By Phasors	Lectures, Tutorials laboratory	**Quiz exams. Homework, Reports Oral questions Attending Mid-term Exam Final - exam**
2	**4**				
3	**4**				
4	**4**	AC Circuit Analysis	Single Phase AC Circuits Series AC Circuits Parallel AC Circuits	Lectures, Tutorials laboratory	
5	**4**				
6	**4**				
7	**4**	Circuit Theorems	Power in AC Circuits Representation of AC Circuits using J operator Analysis of AC Circuits Analysis of AC Circuits	Lectures, Tutorials, laboratory	
8	**4**				
9	**4**				
10	**4**				
11	**4**				
12	**4**	AC Circuit Analysis Techniques:	S Analysis of AC Circuits Analysis of AC Circuits Series Resonance Parallel Resonance	Lectures, Tutorials, laboratory	
13	**4**				
14	**4**				
15	**4**				

23. Course Evaluation

6. Quizzes (5 x 1)=5 Marks
7. Exam 2*10=20
8. Lab (1 x 7) = 7 +8=15 Marks.

9. Mid-term Exam = 10 Marks 10. Final Exam =50 Marks	
24. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Fundamentals of Electric Circuits
Main references (sources)	Fundamentals of Electric Circuits
Recommended books and references (scientific journals, reports...)	Electrical technology theraja book
Electronic References, Websites	

61. Course Name:	
Human Rights and Democracy	
62. Course Code:	
UNI123	
63. Semester / Year:	
Second Semester - Academic Year 2025-2026	
64. Description Preparation Date: 22/9/2025	
Students are registered in the semester and on Excel lists based on the number of lectures and according to the dates mentioned in the schedule - and it is sent weekly to the Absences Committee.	
65. Available Attendance Forms:	
My presence	
66. Number of Credit Hours (Total) / Number of Units (Total)	
2 hours per week - 30 hours per semester - 4 units	
67. Course administrator's name (mention all, if more than one name)	
Name: Dr- anwar kareem najeem Email: anwar.kareem@mu.edu.iq	
68. Course Objectives	
Course Objectives	• Teaching the general principles of human rights, including what is stated in international covenants and important state documents, and what is stipulated in the Constitution of the Republic of Iraq for the year 2005, which gives the student the ability to use them in his life and rely on them in many cases to defend his clients and the oppressed.
69. Teaching and Learning Strategies	
	• Using active assessment • Using interactive lectures • Using experiential learning • Using positive feedback • Using early learning • Using problem-based learning

	• Comprehensive and formative assessment.

70. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2hour	A General Introduction to Rights, Human Rights, and Individual Rights	A General Introduction to Rights, Human Rights, and Individual Rights	1- Present the lesson on the board and screen 2- iscussion 3- Question and answer method	tests 1-
2	2hour	Stages of Development Human Rights	Stages of Development Human Rights		
3	2hour	Rights in Islam			
4	2hour	Rights in the Middle Ages			
5	2hour	The Universal Declaration of Human Rights	The Universal Declaration of Human Rights		
6	2hour	Rights in Islam	Rights in Islam		
7	2hour	Rights in Western Countries Human Rights in Iraqi Civilizations	Rights in Western Countries Human Rights in Iraqi Civilizations		
8	2hour	Rights in Western Civilizations	Rights in Western Civilizations		
9	2hour	Rights and Monocracy			
10	2hour	Rights and the Principle of Shura	Rights and the Principle of Shura		
11	2hour	Rights and the Principle of the Great Covenant	Rights and the Principle of Shura		
12	2hour	Rights in the Divine Religions	Rights in the Divine Religions		
13	2hour	Rights and Democracy.	Rights and Democracy.		
14	2hour	Rights and Dictatorship.	Rights and Dictatorship.		

15	2hour	Rights in Iraqi Civilizations	Rights in Iraqi Civilizations		

71. Course Evaluation

72. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	The Human Rights Book by Dr. Salim Abdul Karim Al-Salami.
Main references (sources)	The Treatise on Rights by Imam Al-Sajjad The Human Rights Document: A Comparative Study Islam and Human Rights.
Recommended books and references (scientific journals, reports...)	Taylor & Francis Online Magazine - The Arab Journal of International Humanitarian Law and Human Rights.
Electronic References, Websites	Human Rights Watch website.

73. Course Name:
English I
74. Course Code:
UNI125
75. Semester / Year:
Second/ First
76. Description Preparation Date:
22/9/2025
77. Available Attendance Forms:
78. Number of Credit Hours (Total) / Number of Units (Total)
2 hours/2 units
79. Course administrator's name (mention all, if more than one name)
Name: Hasanain Atiyah Email:hasanainatiyah@mu.edu.iq

80. Course Objectives	
Course Objectives	• **Communication confidence** • **Vocabulary& grammar proficiency** • **Speaking and listening** • **Reading and writing** • **Academic skills** • **Whole cultural**

81. Teaching and Learning Strategies	
Strategy	• It is essential develop a variety of tasks that provide intermediate level. • Improved skills that I prefer to use are tiered or differentiated sentence stem and paragraph frames, also writers struggle with writing sentences in the past tense and complex sentence structures. • Paragraph frames support students to develop organization structure of writing associated with content- level standards so that they can strengthen their writhing skills by learning.

82. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14	2	• Building fluency • Accuracy • Confidence All this categories using English for everyday communication.	Hello Your world All about you Family and friends The way I live Every day How My favourties. Where I live	Effective methods include • Active listening • Speaking practice • Reading accessible texts • Reviewing previously learned material	• Homework • Critical evaluating • Attendances • Quizzes • Assessment • Presentation

83. 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

84. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Series of IELTS booklet, edition by University of Cambridge, 2019, UK.
Main references (sources)	New Headway beginner for student's, e-book, New edition by John and Liz Soars, Oxford, UK.
Recommended books and references (scientific journals, reports...)	Every English language Beginner Handbook courses.
Electronic References, Websites	English Lecture-YouTube. English lecturer-free study help, English-literaturer.com.

85. Course Name:

Math. III

86. Course Code:

ECE211

87. Semester / Year:

First/ Second

88. Description Preparation Date:

22/9/2025

89. Available Attendance Forms:

90. Number of Credit Hours (Total) / Number of Units (Total)

3 hours (2 theoretical, 1 tutorial)/3 units

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

Name: Hasanain Atiyah
Email:hasanainatiyah@mu.edu.iq

92. Course Objectives

Course Objectives	• **Developing a strong foundation in mathematical** • **Applying mathematical methods to solve engineering problems** • **Familiarizing students with computational tools** • **Enhancing problem-solving and analytical skills** • **Preparing students for advanced studies and research**

	• **Promoting interdisciplinary understanding**

93. Teaching and Learning Strategies

Strategy	Here are the strategies that can be employed in teaching mathematic I to first-year students: • Communicative Approach: Emphasize interactive and meaningful communication. Encourage students to engage in pair work and group discussions. • Scaffolded Instruction: Provide structured support and gradually increase the difficulty level as students' progress. Start with simple mathematic concepts and number systems, . • Contextual Learning: Present the concepts of mathematic in meaningful contexts to enhance understanding and retention. Use real-life situations, visual aids, authentic materials, and multimedia resources to make the learning experience more relevant and engaging. • Active Learning: Encourage students to participate in the learning process actively. Incorporate hands-on activities and interactive exercises to promote engagement and develop design skills. • Multi-Sensory Approach: Utilize various senses to enhance learning. Incorporate visual aids, audio recordings, gestures, and kinesthetic activities to cater to different learning styles and reinforce understanding of the fundamentals of mathematic learning. • Formative Assessment: Regularly assess students' progress and provide constructive feedback. Use various assessment methods, such as quizzes, speaking tasks, listening exercises, and short written assignments, to gauge their understanding and identify areas for improvement.

94. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14	3	1. an ability to apply knowledge of Laplace transformer 2. Solution of ordinary differential equation 3. Sequence &series : definition of sequence , limit theorem , definition of infinite series tables and formulae) to be able to evaluate engineering solutions 4. selecting and applying standard mathematical Triple integral : in Cartesian coordination , cylindrical ,	ODE Solution of ODE Second ODE Engineering application Vector analysis Divergence theorem Multiple integral Triple integral Sequence and series Fourier series Expontial form Fourier transform Inverse of fourier Engineering application	The aims of teaching and learning mathematics are to encourage and enable students to: -Recognize that mathematics permeates the world around us, appreciate the usefulness, power and beauty of mathematics. Enjoy mathematics and develop patience and persistence when solving problems -understand and be able to use the language, symbols and notation of mathematics ,develop mathematical curiosity and use inductive and deductive reasoning when solving problems, become -confident in using mathematics to analyze and solve problems both in school and in real-life situations -develop the knowledge, skills and attitudes necessary to pursue further	• Homework • Critical evaluating • Attendances • Quizzes • Assessment • Presentation

95. 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	
96. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	mathematic, by Thomas L.
Main references (sources)	mathematic, by Thomas L.
Recommended books and references (scientific journals, reports...)	Thomas-calculus
Electronic References, Websites	http://dl.konkur.in/post/Book/Paye/Thomas-Calculus-14th-Edition-%5Bkonkur.in%5D.pdf

14.	**13. Course name: Arabic Language II**	
16.	**15. Course code :**	
	UNI228	
18.	**17. Semester/Year 2025-2026**	
20.	**19. Date of preparation of this description :** 22/9/2025	
22.	**21. Available attendance forms: In-person**	
24.	**23. Number of study hours (total) 30 / Number of units) total) 2**	
26.	**25. Course Supervisor Name (if more than one name is mentioned(**	
	Name: M.M. Ahmed Qasim Mohammed Email :ahmed.kasim@mu.edu.iq	
28.	**27. A course goal**	
•	• Empowering students with Arabic language skills and issues at all levels: phonetics, morphology, grammar, semantics ,stylistics, and writing. • The ability to interpret basic theories, concepts and terms in Arabic linguistics. • Develop students' listening, reading and expression skills. • Deepening the student's connection to the Arab and Islamic heritage so that he may draw from its moral and social values in a manner that is compatible with our contemporary Arab society. • Advancing Arabic linguistic and literary knowledge in an educational and cultural manner. • To hone creative and literary talents, acquire linguistic appreciation, and the ability to distinguish good texts from bad ones. • Applying linguistic knowledge in reading, writing, speaking, and listening, so that students can write reports in Arabic correctly and avoid linguistic, spelling, and stylistic errors. • Establishing self-learning habits among students and instilling lifelong learning trends.	Goals Study material

30.	**29. Teaching and learning strategies**	
	The educational strategy can be described as a roadmap for guiding students to optimally use language in their academic and professional lives, setting the boundaries for creativity and developing their language skills, and guiding them to avoid making linguistic errors of all kinds: grammatical, morphological, spelling, and stylistic. The strategies we follow are diverse and vary depending on the curriculum vocabulary , learner levels, and individual differences among them. The most important of these strategies are: Active learning strategy to break the monotony and stagnation, and involve the learner in the educational process so that he is the main focus, the dialogue strategy, the storytelling strategy, the project preparation strategy, the role-sharing strategy, and the self-learning and active strategy.	**Strategy**
32.	**31. Course structure**	

Evaluation method	**Learning method**	**Name of unit or topic**	**Required learning outcomes**	**watches**	**week**
Oral questions	a lecture	The origin of language, its theories, and its functions.	Learn the course vocabulary	2	the first
General and cultural oral questions	Lecture and discussion	Characteristics of the Arabic language and its classifications Linguistics and its types , and the most prominent linguists .	Knowledge of Arabic language sciences Its linguistic classifications and types, and the most prominent linguists	2	the second
Daily paper test	Lecture and analysis of poetic verses and Quranic verses	Parts of speech: noun, verb, particle. And types of sentences: nominal, verbal, and quasi-sentence.	Forming correct sentences Grammatically and orthographically	2	the third
Daily electronic test via Google Form	Lecture and practical application on literary texts	Non-inflected	Knowing the indeclinable nouns and their diacritical marks	2	Fourth
Intellectual and cultural participation through the presentation of a	Critical readings and open dialogue to express the pain of view in tasting and understanding texts	Literary eras, and the most important poetic themes in the pre-Islamic and Islamic eras.	Knowing the history of literature , understanding literary knowledge, and discovering the aesthetics of creative texts	2	Fifth

research paper					
And my house is over	Lecture and grammatical applications on literary and Quranic texts	The abrogating verbs :kāna and its sisters, and inna and its sisters.	Knowing the types of sentences in the Arabic language and forming sentences according to its rules and styles	2	Sixth
Written test	Written test	Test the tide.	Knowing the scientific level in the previous lectures	2	Seventh
a report	Critical reading and analysis of texts, then we discuss the issues.	The Umayyad era and its most important characteristics and poetic purposes.	Text analysis	2	The eighth
Home work	Lecture and grammatical applications on Quranic texts and verses	The sound masculine noun and its complement.	Knowing its rules and writing grammatically , morphologically and orthographically correct sentences	2	Ninth
Class work	Lecture and practical applications	Spelling and punctuation.	Knowing the rules of writing according to the solid academic scientific method	2	tenth
a report	Analytical lecture	The Abbasid era and its most important characteristics and poetic and prose purposes.	Understanding the aesthetics of creative texts	2	eleventh
Class test	Lecture and linguistic applications	The six names.	Knowing the rules of the topic and creating a speech free of linguistic errors	2	twelfth
Test via Google Form	Grammar lecture and applications	Parsing of the number and the counted	Knowing the rules for writing numbers and counted things	2	thirteenth
banknote	panel discussion	The modern era and its most important characteristics and poetic purposes.	Understanding the cultural, literary and philosophical issues of the era	2	fifteenth
34.	**33. Course Evaluation** • tests. • Daily and surprise exams. • The student senses the extent to which the students have comprehended the assigned material. • questions. • Reports. • Critical and research papers.				

36.	35. Learning and teaching resources	
	Lectures prepared according to the curriculum set by the department	Required textbooks (methodology if available(
	Ibn Aqil's criticism of Ibn Malik's Alfiyyah Qatar Al-Nada and Mel Al-Sada by Ibn Hisham Al-Ansari Rhetoric and Application by Ahmed Matloub Jewels of Eloquence by Taha Al-Hashemi	Main References (Sources(
	Iraqi Linguistic Academy - Al-Manhal - Al-Noor Library The Egyptian Academy of the Arabic Language in Cairo	Recommended supporting books and references (scientific journals, reports, etc(.
	https://youtube.com/playlist?list=PLUbGxXvC8t7GC9xxO9JFfwR-Z_xPvMJv-&si=Q-AEnHbXfAyvBCt1	Electronic references, websites

1. Course Name:	
English Language II	
2. Course Code:	
UNI226	
3. Semester / Year:	
2ND semester / Second	
4. Description Preparation Date:	
22/9/2025	
5. Available Attendance Forms:	
In attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
Thirty Horses	
7. Course administrator's name (mention all, if more than one name)	
Name: Thabit Fadhil **Email: thabit,fadil@mu,edu.iq**	
8. Course Objectives	
Course Objectives	**Help students to achieve pre-intermediates level in English langu**

9. Teaching and Learning Strategies

Strategy	**(1) Theoretical lectures supported by illustration learning methods, for example audio, pictures and videos.** **(2) Make the students participant in different activities to achieve fast progress.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Get well understood For the lecture in order to reach pre-intermediate level in English language	Tenses Tenses What matters to me What matters to me Adverbs Adverbs Exam My favorites Passions and fashions Passions and fashions have to/don't have to should/must Exam time for a story time for a story	Reading, speaking and listening throw all the lecturers	Exame, presentation, And report

11. Course Evaluation

Two written exams (10 marks each) , daily test (overall 5 marks), presentation (10 marks), attendance (5 marks), mid exam (10 marks) , final exam (50 marks)

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Headway / pre-intermediate
Main references (sources)	Headway / pre-intermediate
Recommended books and references (scientific journals, reports…)	Books focus on pre-intermediate level
Electronic References, Websites	Just credible sources

97. Course Name:	
Chemistry	
98. Course Code:	
ECE227	
99. Semester / Year:	
Second Semster \2025 − 2026	
100. Description Preparation Date:	
22/9/2025	
101. Available Attendance Forms:	
Theoretical / In - person	
102. Number of Credit Hours (Total) / Number of Units (Total)	
28 houre \2 units	
103. Course administrator's name (mention all, if more than one name)	
Name: Ahmed Baqer Email: ahmed.baqer@mu.edu.iq	
104. Course Objectives	
Course Objectives	The students will understand core concepts of chemistry: matter, properties of matter (physical vs. chemical), states of matter, energy, atoms, molecules, compounds, and atomic structure. They will identify and quantify chemical components of materials using qualitative and quantitative analysis. and understand chemical equilibrium and solubility product (Ksp)
105. Teaching and Learning Strategies	
Strategy	Traditional, modern, and electronic teaching methods like:

	1- Enhancing a supportive and encouraging classroom environment where students feel comfortable, while also providing constructive feedback and recognizing their efforts to boost their self-confidence. 2- Regularly assessing student progress and providing timely feedback on their performance, along with offering guidance and support

106. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction to Chemistry	Introduction to Chemistry	lecture	Class participation
2	2	Equivalent weight, Mole, Atomic weight, Molecular weight	Equivalent weight for Acids, Bases, Salts, Reduction and Oxidation reactions	lecture	Class participation
3	2	Equivalent weight, Mole, Atomic weight, Molecular weight	Calculations of Mole, Atomic wei d Molecular weight	lecture	Homework
4	2	Calculate solution concentrations	Molarity and Normality and the relati between them	lecture	Exam
5	2	Calculate solution concentrations	olality, formal concentration, perc omposition (% w/w, % w/v, % v/	lecture	Homework
6	2	Calculate solution concentrations	Mole Fraction and ppm, ppb, and ppt.	lecture	Class Disscution
7	2	Density and specific gravity	Density and specific gravity, Weigh Percentage	lecture	Class participation
8	2	Prepare standard solutions accurately	sing dilution laws and data such a nsity and percentage composition	lecture	Exam
9	2	Analysis of samples by titration with a standard solution	Analysis of samples by titration with standard solution	lecture	Homework
10	2	Analysis of samples by titration with a standard solution	Direct titration and back titration	lecture	Report
11	2	Analyze chemical equilibrium and solubility	y applying equilibrium constants (nd solubility product (Ksp) concep o predict precipitation and reactio direction	lecture	Class participatio
12	2	Analyze chemical equilibrium and solubility	by applying equilibrium constants (K) and solubility product (Ksp) concepts to predict precipitation and reaction direction	lecture	Exam
13	2	COMMON ION EFFECT	Calculations of COMMON ION EFFECT	lecture	Report

14	2	EQUILIBRIUM CONSTANTS For Pair ACIDS AND BASES	Understand the EQUILIBRIUM CONSTANTS	lecture	Homework
15	2	IONIZATION EQUILIBRIUM	Understanding the concept of IONIZATION EQUILIBRIUM	lecture	Homework

107. Course Evaluation

Daily and monthly quizzes, reports, homework assignments, and class attendance compliance.
Formative assessment: 40%
Midterm exam: 10%
Final exam: 50%

108. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Chemistry by (Melvin Winokur
Main references (sources)	1-Skoog A. Douglas ,"Fundamental of Analytical Chemistry ",8 th edition ,Canada (2004) 2-Daniel C .Harris ,"Quantitative chemical
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

25. Course Name:
Electronics I
26. Course Code:
ECE212
27. Semester / Year:
second semester / Second year
28. Description Preparation Date:
22/9/2025
29. Available Attendance Forms:
Face-to-face class attendance
30. Number of Credit Hours (Total) / Number of Units (Total)
3
31. Course administrator's name (mention all, if more than one name)
Name: Dr. Mustafa Hussein Email:
32. Course Objectives

Course Objectives	13. Explain the basic differences between digital and analog quantities. 14. Explain the basic logic operations of NOT, AND, and OR. 15. Explain the universal logic gates (NAND and NOR) and use them to implement any combinational logic function.

	4. Perform basic arithmetic calculations in binary, octal, decimal, and hexadecimal number systems; 5. Converting between different number systems. 6. Apply the basic Laws and rules of Boolean algebra. 7. Analyze and synthesize combinational logic circuits; 8. Simplification the combinational circuits using Boolean algebra and Karnaugh map. 9. Design basic combinational logic circuits.

33. Teaching and Learning Strategies

Strategy	• Lecture presentation • Tutorials

34. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**3**	Semiconductor diode	Semiconductor diode, ideal versus practical Resistance levels, diode equivalent circuit Transition and diffusion capacitance, reverse recovery time , diode specification sheet , diode testing , Zener diodes , light- emitting diodes	Lectures, Tutorials	**Quiz exams.** **Homework,** **Oral questions** **Attending** **Final - exam**
2	**3**				
3	**3**				
4	**3**	Half-wave	Load line analysis , series diode configuration , parallel and series- parallel configuration , AND/OR gates Half-wave rectification , full-wave rectification Clippers , clampers	Lectures, Tutorials	
5	**3**				
6	**3**				
7	**3**	Zener diode	Zener diode , voltage – multiplier circuit Exam I BJT transistor construction and operation , common – bias configuration , common – emitter configuration, common – collector configuration	Lectures, Tutorials,	
8	**3**				
9	**3**				
10	**3**	Transistor	Transistor test , operation point (Q- point) , fixed bias configuration Emitter- bias configuration, voltage divider bias configuration	Lectures, Tutorials,	
11	**3**				

			Collector feedback configuration, emitter – follower configuration, common – base configuration		
12	**3**	Divider bias	Voltage – Divider bias Emitter – follower configuration , Common – Base configuration, collector feedback configuration , collector feedback configuration Effect of RL and RS determining the current Gain Cascaded system, Darlington connection Cascaded system, Darlington connection The hybrid equivalent model , approximate hybrid equivalent model Exam I BJT frequency response , low – frequency response of BJT High Frequency response of BJT, multistage frequency effects, square – wave testing Power amplifier, series – fed class A amplifier , transformer – coupled class A amplifier	Lectures, Tutorials,	
13	**3**				
14	**3**				
15	**3**				

35. Course Evaluation

11. Quizzes
12. Final Exam

36. Learning and Teaching Resources

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

37. Course Name:

Electromangnetic I

38. Course Code:

ECE214

39. Semester / Year:

First semester / Second year

40. Description Preparation Date:

22/9/2025

41. Available Attendance Forms:

Face-to-face class attendance

42. Number of Credit Hours (Total) / Number of Units (Total)

3

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

Name: Prof. Dr. Riyadh Dakhil Mansoor
Email: riyadhdmu@mu.edu.iq

44. Course Objectives

Course Objectives	16. Electromagnetics provides the mathematical description of all electrical phenomena, and therefore it is the physical foundation of all Electrical and Computer Engineering disciplines. Modern applications of electromagnetics are broad and include wireless communication systems, global navigation systems, bioelectrical phenomena, high speed computers and computer networks, and electromagnetic phenomena in Earth's near-space environment (space weather) as well as electrical, optical, and photonic devices. This course provides instruction in the fundamental engineering science and also the basics of modern applications. This course builds on the mathematics concepts learned in EC 211.

45. Teaching and Learning Strategies

Strategy	• Lecture presentation • Tutorials

46. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**3**		Review of Transmission lines:	Lectures,	**Quiz exams. Attending**

2	**3**		Distributed elements concept, Telegrapher's equations, lossless and lossy lines, line impedance and junction, Smith Chart. General solutions for TEM, TE and TM waves		**Final - exam**
3	**3**				
4	**3**		Waveguides: Rectangular, circular, coaxial cable and modes of propagation. Introduction to stripline and microstripline.	Lectures,	
5	**3**				
6	**3**				
7	**3**		Microwave networks: N-port microwave networks, impedance, admittance, transmission and scattering matrix representations, reciprocal and lossless networks, network matrices transformations.	Lectures,	
8	**3**				
9	**3**				
10	**3**		Transistor test , operation point (Q-point) , fixed bias configuration Emitter- bias configuration, voltage divider bias configuration Collector feedback configuration, emitter – follower configuration, common – base configuration Microwave passive circuits: Waveguide cavity resonators. Principles of E-plane Tee, Hplane Tee,	Lectures,	
11	**3**				

			hybrid Tee, isolator, circulator, directional couplers, attenuators and phase shifters. Microstrip: Design of Wilkinson power divider		
12	**3**		Impedance matching and tuning: L-section impedance matching, single and double stub matching, Quarter wave transformer.Exam I BJT frequency response , low – frequency response of BJT High Frequency response of BJT, multistage frequency effects, square – wave testing Power amplifier, series – fed class A amplifier , transformer – coupled class A amplifier	Lectures,	
13	**3**				
14	**3**				
15	**3**				

47. Course Evaluation
13. Quizzes 14. Final Exam

48. Learning and Teaching Resources	
Required textbooks (curricular boc if any)	.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

49. Course Name:
Network Analysis I
50. Course Code:
ECE213
51. Semester / Year:
First / Second
52. Description Preparation Date:
22/9/2025
53. Available Attendance Forms:
54. Number of Credit Hours (Total) / Number of Units (Total)
2 hours/2 units
55. Course administrator's name (mention all, if more than one name)
Name: Aws Hashim Neamah Email: aws.hashim@mu.edu.iq
56. Course Objectives

Course Objectives	• **Understand the concept of energy storage elements in electrical networks such as inductor , capacitor and Mutual Inductance and their relevance to electronics and communication engineering.** • **Explain each storage element in detail and how to calculate the specific parameters of each storage element like current and voltage. Study the series-parallel combinations of each storage element to calculate the equivalent value in a given circuit.** • **Explain the Natural and Step Response of First order RL and RC circuits Forms in terms of voltage and current response and calculate the time constant for each combination RL or RC and its effect on the natural and force response of the circuit.** • **Understand the RLC Circuits and how to find the general solution .** • **Understand the concept of Sequential Switching and how its work and what is the effect of this switching in analyzing the response of RLC circuits and Explain the complete response of the circuits with two energy storage elements,** • **Discuss the Natural and Step response of Second order series and Parallel RLC Circuits and general solution with three types of response (Underdamped response, Critically and Overdamped damped response).** • **Understand the Natural and Step response of unforced Second order series and Parallel RLC Circuits.**

57. Teaching and Learning Strategies	
Strategy	Here are the strategies that can be employed in teaching Network Analysis I to second-year students:

	1. Communicative Approach: Emphasize interactive and meaningful communication. Encourage students to engage in pair work and group discussions. 2. Scaffolded Instruction: Provide structured support and gradually increase the difficulty level as students' progress. Start with simple electrical network analysis concepts, and progressively introduce the natural and force responses of two and three storage elements circuits. 3. Contextual Learning: Present the concepts of network analysis circuits in meaningful contexts to enhance understanding and retention. Use real-life situations, visual aids, authentic materials, and multimedia resources to make the learning experience more relevant and engaging. 4. Active Learning: Encourage students to participate in the learning process actively. Incorporate hands-on activities and interactive exercises to promote engagement and develop design skills. 5. Multi-Sensory Approach: Utilize various senses to enhance learning. Incorporate visual aids, audio recordings, gestures, and kinesthetic activities to cater to different learning styles and reinforce understanding of the fundamentals of network analysis. 6. Formative Assessment: Regularly assess students' progress and provide constructive feedback. Use various assessment methods, such as quizzes, speaking tasks, listening exercises, and short written assignments, to gauge their understanding and identify areas for improvement.

58. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14	2	1. An ability to apply knowledge of mathematics and principles of electric circuits. 2. An ability to conduct the main concepts of electrical network analysis. 3. Ability to analyze electrical network circuit response with one or two storage elements. 4. The ability to analyze the natural and step responses of second-order series and parallel RLC (resistor-inductor-capacitor) circuits. 5. The ability to compute the complete circuit response in time and frequency domain. 6. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	Energy Storage Elements Inductance Capacitance Mutual Inductance Series-Parallel Combinations Natural and Step Response of First order RL circuits Forms Natural and Step Response of First order RC circuits Forms Time Constant RLC Circuits and general solution Sequential Switching Natural and Step response of Second order series and Parallel RLC Circuits and general solution (Underdamped response) Natural and Step response of Second order series and Parallel RLC		• Homework • Critical evaluating • Attendances • Quizzes • Assessment • Presentation

			Circuits and general solution (Critically , Overdamped damped response) Natural and Step response of unforced Second order series RLC Circuits Natural and Step response of unforced Second order Parallel RLC Circuits		

59. 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	
60. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Introduction to electric circuits 9th edition by James A. Svoboda and Richard C. Dorf
Main references (sources)	Introduction to electric circuits 9th edition by James A. Svoboda and Richard C. Dorf
Recommended books and references (scientific journals, reports...)	ELECTRIC CIRCUITS by James W. Nilsson and Susan A. Riedel TENTH EDITION
Electronic References, Websites	

61. Course Name:	
Digital Electronics I	
62. Course Code:	
ECE215	
63. Semester / Year:	
Third semester / Second year	
64. Description Preparation Date:	
22/9/2025	
65. Available Attendance Forms:	
Face-to-face class attendance	
66. Number of Credit Hours (Total) / Number of Units (Total)	
4 / 5	
67. Course administrator's name (mention all, if more than one name)	
Name: Assist. Prof. Dr. Auda Raheemah Odhaib Email: auda@mu.edu.iq	
68. Course Objectives	
Course Objectives	17. Explain the basic differences between digital and analog quantities. 18. Explain the basic logic operations of NOT, AND, and OR.

	19. Explain the universal logic gates (NAND and NOR) and use them to implement any combinational logic function. 4. Perform basic arithmetic calculations in binary, octal, decimal, and hexadecimal number systems; 5. Converting between different number systems. 10. Apply the basic Laws and rules of Boolean algebra. 11. Analyze and synthesize combinational logic circuits; 12. Simplification the combinational circuits using Boolean algebra and Karnaugh map. 13. Design basic combinational logic circuits.

69. Teaching and Learning Strategies

Strategy	• Lecture presentation • Tutorials • Experimental learning.

70. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Introduction to Number systems	Number system operation and code , Signed number , arithmetic operation, Hexadecimal number , octal number , BCD code	Lectures, Tutorials	**Quiz exams. Homework, Reports Oral questions Attending Mid-term Exam Final - exam**
2	4				
3	4				
4	4	Principles of Logic gates	Logic gate, Boolean algebra operation and expression, Boolean analysis of logic	Lectures, Tutorials	
5	4				
6	4				
7	4	Minimization of Logic circuits	Karnugh map, SOP minimization, POS minimization and 5 variable, Karnugh	Lectures, Tutorials, laboratory	
8	4				
9	4				

			map, SOP minimization		
10	**4**	implementation of combinational logic	implementation of combinational logic, Universal property of NAND and NOR gats	Lectures, Tutorials, laboratory	
11	**4**				
12	**4**	combinational logic circuits	Basic adder and parallel adder , Comparators , decoder and encoder , Code converter and parity, Multiplexer and demultiplexer	Lectures, Tutorials, laboratory	
13	**4**				
14	**4**				
15	**4**				

71. Course Evaluation

15. Quizzes (2 x 12)=24 Marks
16. Online assignments (1 x 4) = 4 Marks
17. Onsite Assignments (1 x 3) = 3 Marks
18. Lab (3 x 3) = 9 Marks.
19. Mid-term Exam = 10 Marks
20. Final Exam =50 Marks

72. Learning and Teaching Resources

Required textbooks (curricular boc if any)	Digital Fundamental, by Thomas L. Floyed
Main references (sources)	Digital Fundamental, by Thomas L. Floyed
Recommended books and references (scientific journals, reports…)	digital electronics, principles, devices and applications
Electronic References, Websites	https://www.shahucollegelatur.org.in/Department/Studymaterial/s it/BCA/FY/digielec.pdf

73. Course Name:
Electromangnetic II
74. Course Code:
ECE224
75. Semester / Year:
Second semester / Second year
76. Description Preparation Date:
22/9/2025
77. Available Attendance Forms:
Face-to-face class attendance
78. Number of Credit Hours (Total) / Number of Units (Total)

3

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

Name: Prof. Dr. Riyadh Dakhil Mansoor
Email: riyadhdmu@mu.edu.iq

80. Course Objectives

Course Objectives	This course examines electric and magnetic quasistatic forms of Maxwell's equations applied to the dielectric, conduction, and magnetization boundary value problems. Topics covered include: electromagnetic forces, force densities, and stress tensors, including magnetization and polarization; thermodynamics of electromagnetic fields, equations of motion, and energy conservation; applications to synchronous, induction, and commutator machines; sensors and transducers; microelectromechanical systems; propagation and stability of electromechanical waves; and charge transport phenomena. This course builds on the fundamental EM field concepts learned in EC 214.

81. Teaching and Learning Strategies

Strategy	• Lecture presentation • Tutorials

82. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**3**		Review of Transmission lines: Distributed elements concept, Telegrapher's equations, lossless and lossy lines, line impedance and junction, Smith Chart. General solutions for TEM, TE and TM waves.	Lectures,	**Quiz exams. Attending** **Final - exam**
2	**3**				
3	**3**				
4	**3**		Waveguides: Rectangular, circular, coaxial cable and modes of propagation. Introduction to	Lectures,	
5	**3**				
6	**3**				

			stripline and microstripline.		
7	**3**		Microwave networks: N-port microwave networks, impedance, admittance, transmission and scattering matrix representations, reciprocal and lossless networks, network matrices transformations	Lectures,	
8	**3**				
9	**3**				
10	**3**		Impedance matching and tuning: L-section impedance matching, single and double stub matching, Quarter wave transformer.	Lectures,	
11	**3**				
12	**3**		Microwave passive circuits: Waveguide cavity resonators. Principles of E-plane Tee, Hplane Tee, hybrid Tee, isolator, circulator, directional couplers, attenuators and phase shifters. Microstrip: Design of Wilkinson power divider	Lectures,	
13	**3**				
14	**3**				
15	**3**				

83. Course Evaluation	
21. Quizzes 22. Final Exam	
84. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

85. Course Name:	
Digital Electronics II	
86. Course Code:	
ECE225	
87. Semester / Year:	
Fourth semester / Second year	
88. Description Preparation Date:	
22/9/2025	
89.Available Attendance Forms:	
Face-to-face class attendance	
90.Number of Credit Hours (Total) / Number of Units (Total)	
4 / 5	
91. Course administrator's name (mention all, if more than one name)	
Name: Assist. Prof. Dr. Auda Raheemah Odhaib Email: auda@mu.edu.iq	
92. Course Objectives	
Course Objectives	1. Understand the concept of multivibrator devices. 2. Recognize the difference Latches and Flip flops. 3. Apply flip flops in basic applications. 4. Understand the basic operation of counters 5. Recognize the difference synchronous and Asynchronous counters. 6. Determine the sequence of the counters. 7. Learn how to design counters. 8. Identify the basic forms of data movement in shift register 9. Know the different types of shiftt registers and the function of each one of them.
93. Teaching and Learning Strategies	
Strategy	• Lecture presentation • Tutorials • Experimental learning.

94. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Introduction to sequential circuits	Latches S-R and D latch Flip-flops ., JK , SR, T and D	Lectures	Quiz exams. Homework, Reports Oral questions Attending Mid–term Exam Final – exam
2	4		Master slave FF and FF operation		
3	4	Application of Flip Flops	Frequency division counters and shift registers	Lectures	
4	4	Counters	Asynchronous counter and modulus , synchronous counter , Decade Counter, Design of synchronous counter , Cascaded counter and decoding counter	Lectures, Tutorials	
5	4				
6	4				
7	4				
8	4				
9	4				
10	4	Shift Registers	Basic shift register SISO, SIPO and PISO shift reg., PIPO and bidirectional SR, shift register counter , shift register counter applications	Lectures, Tutorials,	
11	4				
12	4				
13	4				
14	4	Memory and Storage	Basic of semiconductor Memories, Special types memory, Magnetic and optical Storage	Lectures	
15	4				

95. Course Evaluation

23. Quizzes (2 x 12)=24 Marks
24. Online assignments (1 x 4) = 4 Marks
25. Onsite Assignments (1 x 3) = 3 Marks
26. Lab (3 x 3) = 9 Marks.
27. Mid-term Exam = 10 Marks
28. Final Exam =50 Marks

96. Learning and Teaching Resources

Required textbooks (curricular books, if a	Digital Fundamental, by Thomas L. Floyed
Main references (sources)	Digital Fundamental, by Thomas L. Floyed

Recommended books and references (scientific journals, reports…)	digital electronics, principles, devices and applications
Electronic References, Websites	https://www.shahucollegelatur.org.in/Department/Studymaterial/sc BCA/FY/digielec.pdf

97. Course Name:	
Network Analysis II	
98. Course Code:	
ECE223	
99. Semester / Year:	
Second / Second	
100. Description Preparation Date:	
22/9/2025	
101. Available Attendance Forms:	
102. Number of Credit Hours (Total) / Number of Units (Total)	
3 hours/2 units	
103. Course administrator's name (mention all, if more than one name)	
Name: Aws Hashim Neamah Email: aws.hashim@mu.edu.iq	
104. Course Objectives	
Course Objectives	• **. Explain the tool use to analyze the network circuits in frequency domain using Laplace Transform.** • **2. Explain the terms of step and impulse function, functional and operational LT and Applying LT and inverse LT and Poles and Zeroes of F(s).** • **3. Explain the use of LT in circuit analysis and applications** • **4. Discuss Transfer function, Partial functions expansions and Convolution integral as a part of LT method.** • **5. Understand the Steady state sinusoidal response , The impulse function in circuit analysis and give an introduction about frequency selective circuits.**
105. Teaching and Learning Strategies	
Strategy	1. Communicative Approach: Emphasize interactive and meaningful communication. Encourage students to engage in pair work and group discussions.

	2. Scaffolded Instruction: Provide structured support and gradually increase the difficulty level as students' progress. Start with simple Laplace transform concepts used in network analysis, and progressively introduce the analysis and the complete response of electrical network circuits using frequency domain. 3. Contextual Learning: Present the concepts of Laplace transform used in network analysis in meaningful contexts to enhance understanding and retention. Use real-life situations, visual aids, authentic materials, and multimedia resources to make the learning experience more relevant and engaging. 4. Active Learning: Encourage students to participate in the learning process actively. Incorporate hands-on activities and interactive exercises to promote engagement and develop design skills. 5. Multi-Sensory Approach: Utilize various senses to enhance learning. Incorporate visual aids, audio recordings, gestures, and kinesthetic activities to cater to different learning styles and reinforce understanding of the fundamentals of network analysis II learning. 6. Formative Assessment: Regularly assess students' progress and provide constructive feedback. Use various assessment methods, such as quizzes, speaking tasks, listening exercises, and short written assignments, to gauge their understanding and identify areas for improvement

106. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14	3	1. An ability to apply knowledge of mathematics and principles of electric circuits. 2. An ability to conduct the main concepts of electrical network analysis II. 3. Ability to analyze electrical network circuit response with storage	Introduction to Laplace Transform Definition of step and impulse function functional and operational LT Applying LT and invers LT Poles and Zeroes of F(s) The use of LT in circuit analysis and applications Mid-term Exam Transfer function Partial functions expansions Convolution integral Steady state sinusoidal response The impulse function in circuit analysis	•	• Homework • Critical evaluating • Attendances • Quizzes • Assessment • Presentation

		elements in the frequency domain. 4. The ability to analyze the electrical network circuits with RLC load using Laplace transform. 5. The ability to compute the complete circuit response (natural and force) in the frequency domain. 6. Understanding the steady-state sinusoidal response and frequency selective circuits as an application of using LT in circuit analysis. 7. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice..	Introduction to frequency selective circuits (Low pass filter) Introduction to frequency selective circuits (high pass filter) Introduction to frequency selective circuits (band pass filter) Preparatory week before the final Exam		

107. 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	
108. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	ELECTRIC CIRCUITS by James W. Nilsson and Susan A. Riedel TENTH EDITION
Main references (sources)	ELECTRIC CIRCUITS by James W. Nilsson and Susan A. Riedel TENTH EDITION
Recommended books and references (scientific journals, reports...)	Fundamentals of Electric Circuits 5th edition by Charles K. Alexander and Matthew n. o. Sadiku.
Electronic References, Websites	

97. Course Name:
Wave Propagation
98. Course Code:
ECE314
99. Semester / Year:
First / Third
100. Description Preparation Date:
22/9/2025
101. Available Attendance Forms:
102. Number of Credit Hours (Total) / Number of Units (Total)
3 hours/3 units
103. Course administrator's name (mention all, if more than one name)
Name: HATEM ODAY HATEM HANOOSH Email: hatem.oday@mu.edu.iq
104. Course Objectives

Course Objectives	• **The Wave Propagation course aims to understand how energy is transmitted through different media, whether physical or vacuum. This includes the study of different types of waves (electromagnetic and mechanical), their properties such as frequency, wavelength, and amplitude, and how they interact with different materials (reflection, refraction, interference, and diffraction). It also aims to understand the applications of these concepts in diverse fields such as communications, radar, and seismic waves.**

105. Teaching and Learning Strategies	
Strategy	Here are the strategies that can be employed in teaching Wave Propagation to third -year students: 1. Communicative Approach: Emphasize interactive and meaningful communication. Encourage students to engage in pair work and group discussions. 2. Contextual Learning: Present the concepts of Wave Propagation in meaningful contexts to enhance understanding and retention. Use real-life situations, visual aids, authentic materials, and multimedia resources to make the learning experience more relevant and engaging. 3. Active Learning: Encourage students to participate in the learning process actively. Incorporate hands-on activities and interactive exercises to promote engagement and develop design skills. 4. Multi-Sensory Approach: Utilize various senses to enhance learning. Incorporate visual aids, audio recordings, gestures, and kinesthetic activities to cater to different learning styles and reinforce understanding of the fundamentals of Wave Propagation. 5. Formative Assessment: Regularly assess students' progress and provide constructive feedback. Use various assessment methods, such as quizzes, speaking tasks, listening exercises, and short written assignments, to gauge their understanding and identify areas for improvement.

106. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15		1-Review of Electromagnetic Theory 2-Herezian Dipole 3 -Radiation Pattern 4-Beam Solid Angle, Directory and Gain 5- Polarization 6-Free-Space Propagation 7 -Ground Reflection 8 - Midterm Exam 9 -Surface Waves 10 -Diffraction 11-Wave Propagation in Complex Environments 12-Tropospheric Propagation			• Homework • Critical evaluating • Attendances • Quizzes • Assessment • Presentation

		13-Tropospheric Scattering SCL 14-Tropospheric Propagation SUE 15 -Exam			

107. Course Evaluation	
108. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Antennas and Wave Propagation by Harish, A.R .; Sachidananda, M.
Main references (sources)	Antennas and Wave Propagation by Harish, A.R .; Sachidananda, M.
Recommended books and references (scientific journals, reports...)	Antennas and Wave Propagation by Harish, A.R .; Sachidananda, M.
Electronic References, Websites	

109. Course Name:
Antennas
110. Course Code:
ECE323
111. Semester / Year:
Second/ Third
112. Description Preparation Date:
22/9/2025
113. Available Attendance Forms:
114. Number of Credit Hours (Total) / Number of Units (Total)
3 hours/3 units
115. Course administrator's name (mention all, if more than one name)
Name: HATEM ODAY HATEM HANOOSH Email: hatem.oday@mu.edu.iq
116. Course Objectives

Course Objectives	• **The Antennas course aims to introduce students to electromagnetic waves and their applications in communications systems, focusing on the design of various antennas and their uses in**

	modern communications. Students will also learn how to design an antenna based on the required frequency and transmission type.

117. Teaching and Learning Strategies

Strategy	Here are the strategies that can be employed in teaching Antennas to third -year students: 1. Communicative Approach: Emphasize interactive and meaningful communication. Encourage students to engage in pair work and group discussions. 2. Contextual Learning: Present the concepts of Antennas in meaningful contexts to enhance understanding and retention. Use real-life situations, visual aids, authentic materials, and multimedia resources to make the learning experience more relevant and engaging. 3. Active Learning: Encourage students to participate in the learning process actively. Incorporate hands-on activities and interactive exercises to promote engagement and develop design skills. 4. Multi-Sensory Approach: Utilize various senses to enhance learning. Incorporate visual aids, audio recordings, gestures, and kinesthetic activities to cater to different learning styles and reinforce understanding of the fundamentals of Antennas. 5. Formative Assessment: Regularly assess students' progress and provide constructive feedback. Use various assessment methods, such as quizzes, speaking tasks, listening exercises, and short written assignments, to gauge their understanding and identify areas for improvement.

118. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15		1-**Antenna Fundamentals** Radiation pattern, Beam solid angle, Directivity, Gain, Input Impedance, Polarization, Bandwidth, Reciprocity, Effective Aperture, Vector Effective Length, Antenna Temperature 2-**Wireless Antennas** Short Dipole, Radiation Resistance, Directivity, Half-wave Dipole			• Homework • Critical evaluating • Attendances • Quizzes • Assessment • Presentation

		Antenna, Monopole Antenna, Small Loop Antenna 3- **Aperture Antennas** Magnetic Current, Uniqueness Theorem, Equivalence principle, Duality principle, methods of Images, Current Sheets 4- General Current Distribution, Aperture in a Conducting Screen, Slot Antenna, Open- Ended waveguide, horn Antenna, Pyramidal horn Antenna 5- Reflector Antenna: Flat-Plate Reflector, Corner Reflector, Curved Reflectors, Parabolic Cylinder Antenna, Paraboloidal Reflector Antenna, Cassegrain Reflector Antenna, Lens Antenna 6- Exam I 7-Linear Arrays, Pattern Multiplication, Two-element Array, Uniform Array 8-Non-uniform excitation array: binomial array, Chebyshev array synthesis 9- Special Antennas Monopole and Dipole Antennas, Long Wire			

		Antenna, V Antenna, Rhombic Antenna, Yagi-Uda Array 10-Turnstile Antenna, Batwing Antenna, Super-turnstile antenna, Helical Antenna 11- Biconical Antenna, Log-Periodic Dipole Array, Spiral Antenna, Microstrip Patch Antenna 12- EOT Review 15 Exam			

119. Course Evaluation	
120. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Antennas and Wave Propagation by Harish, A.R .; Sachidananda, M.
Main references (sources)	Antennas and Wave Propagation by Harish, A.R .; Sachidananda, M.
Recommended books and references (scientific journals, reports...)	Antennas and Wave Propagation by Harish, A.R .; Sachidananda, M.
Electronic References, Websites	

109. Course Name:
Numerical analysis
110. Course Code:
ECE325
111. Semester / Year:
First / Fourth
112. Description Preparation Date:
22/9/2025
113. Available Attendance Forms:

114. Number of Credit Hours (Total) / Number of Units (Total)

3 hours/3 units

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

Name: Tabarek Alwan Tuiab
Email: tabarik.alwan@mu.edu.iq

116. Course Objectives

Course Objectives	• The aims of teaching and learning mathematics are to encourage and enable students to: • - to a broad range of numerical methods for solving mathematical problems that arise in Science and Engineering. • - The goal is to provide a basic understanding of the derivation, analysis, and use of these numerical methods, along with a rudimentary understanding of finite precision arithmetic and the conditioning and stability of the various problems and methods. • - This will help you choose, develop and apply the appropriate numerical techniques for your problem, interpret the results, and assess accuracy. The problems cover • (i) systems of linear equations, linear least squares problems, and eigenvalue calculation. • (ii) Interpolation, approximation, and integration of functions.

117. Teaching and Learning Strategies

Strategy	

118. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12		1- TEM waves in parallel plate waveguides 2- TE/TM waves on a parallel plate waveguide 3- Power flow and attenuation on PP-WG 4- Rectangular waveguide partially filled rectangular waveguide circular waveguides 5- Coaxial transmission line 6- Grounded dielectric slab			• Homework • Critical evaluating • Attendances • Quizzes • Assessment • Presentation

13 14 15		and surface waves 7- Midcourse exam 8- Strip line and microstrip line 9- Impedance/ admittance / scattering matrices 10- Generalized scattering parameters 11- Microwave resonators 12- Power dividers and directional couplers 13- Ferrimagnetic materials 14- Microwave power sources 15- Review 16- Preparatory week before the final Exam			

119. Course Evaluation	
120. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	.
Main references (sources)	.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Microprocessors
2. Course Code:
ECE315
3. Semester / Year:
Third year, five semester
4. Description Preparation Date:
22/9/2025
5. Available Attendance Forms:
Face-to-face class attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
5.00
7. Course administrator's name (mention all, if more than one name)
Name: Tabarek Alwan Tuiab Email: tabarik.alwan@mu.edu.iq
8. Course Objectives

Course Objectives	This course introduces the programming, architecture, and interfacing of the Intel 85x86 microprocessors for the third-year students who had previous knowledge in both computer hardware and software. A student, after successfully passing this course will be able to: 1.Understand the main components and working principals of the Intel 85x86 microprocessor 2.Program and debug in assembly language 3.Understand the basic computer architecture 4.Understand the memory organization and memory interfacing 5.Perform input/output device programming in assembly 6.Understand the hardware and software interrupts and their applications. 7.Understand the properties and interfacing of the parallel and serial ports.

9. Teaching and Learning Strategies

Strategy	Here are the strategies that can be employed in teaching digital electronics to second-year students: 1. Communicative Approach: Emphasize interactive and meaningful communication. Encourage students to engage in pair work and group discussions. 2. Scaffolded Instruction: Provide structured support and gradually increase the difficulty level as students' progress. Start with simple digital electronics concepts and number systems, and progressively introduce to the design of simple logic gates. 3. Contextual Learning: Present the concepts of digital combinational circuits in meaningful contexts to enhance understanding and retention. Use real-life situations, visual aids, authentic materials, and multimedia resources to make the learning experience more relevant and engaging. 4. Active Learning: Encourage students to participate in the learning process actively. Incorporate hands-on activities and interactive exercises to promote engagement and develop design skills. 5. Multi-Sensory Approach: Utilize various senses to enhance learning. Incorporate visual aids, audio recordings, gestures, and kinesthetic activities to cater to different learning styles and reinforce understanding of the fundamentals of digital electronics learning.

	6. Formative Assessment: Regularly assess students' progress and provide constructive feedback. Use various assessment methods, such as quizzes, speaking tasks, listening exercises, and short written assignments, to gauge their understanding and identify areas for improvement.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	Introduction To Microprocessors and Microcomputer		Lectures, Lab	**Quiz exams. Homework, Reports Oral questions project Attending Mid–term Exam Final – exam**
2	5	Software Architecture Of The 8085 Microprocessor, data type		Lectures, Lab	
3	5	Segment Registers and Memory Segmentation, General purpose register, Status register		Lectures, Lab	
4	5	Generating a memory Address, The Stack, Input/output Address Space		Lectures, Lab	
5	5	Assembly Language Programming, Instruction Set, Addressing mode		Lectures, Lab	
6	5	Machine Language Coding, Encoding A Program		Lectures, Lab	
7	5	8085 Programming- Integer Instructions and Computation: Data Transfer Instruction, Arithmetic instruction		Lectures, Lab	
8	5	8085 Programming - Integer Instructions and Computations, Logic Instruction, Shift instructio Rotate instruction		Lectures, Lab	
9	5	8085 Programming- Control Flo Instructions and Program Structures: Flag Control instruction, Compare and Contro Flow Instructions		Lectures, Lab	
10	5	8085 Programming- Control Flo Instructions and Program Structures: Subroutine Handling, Loop, String handling instructior		Lectures, Lab	
11	5	8085 Hardware Specification, Pin Out, Clock Generator, Buffering and Latching		Lectures, Lab	
12	5	Minimum and Maximum Modes, Memory interfacing, Timing		Lectures, Lab	
13	5	Input/output interfacing.		Lectures, Lab	
14	5	I/O Bus Timing and instructions.		Lectures, Lab	

11. Course Evaluation

1. Quizzes (2 x 12) =24 Marks
2. Online assignments (1 x 4) = 4 Marks
3. Onsite Assignments (1 x 3) = 3 Marks
4. lab (1×9) =9 marks

5. Mid-term Exam = 10 Marks 6. Final Exam =50 Marks	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Understanding 8085/8086 Microprocessors and Peripheral Second Edition, 2010, by S.K.Sen, 2010
Main references (sources)	Microprocessor Architecture, Programming and applica with 8085, Fifth Edition, 2002
Recommended books and references (scientific journals, reports…)	Journal of basic and applied sciences
Electronic References, Websites	https://www.shahucollegelatur.org.in/Department/Studyma al/sci/it/BCA/FY/digielec.pdf

13. Course Name:	
Communication Systems I	
14. Course Code:	
ECE311	
15. Semester / Year:	
Third year, First semester	
16. Description Preparation Date:	
22/9/2025	
17. Available Attendance Forms:	
Face-to-face class attendance	
18. Number of Credit Hours (Total) / Number of Units (Total)	
6 hours/8 units	
19. Course administrator's name (mention all, if more than one name)	
Name: Ahmed Qabel Fahem Email: ahmed.qabel@mu.edu.iq	
20. Course Objectives	
Course Objectives	This module aims to: • Introduce students to the fundamental structure and operation of analog communication systems. • Develop analytical skills in amplitude and angle modulation techniques. • Provide mathematical and frequency-domain analysis of communication signals. • Study the impact of noise on analog communication systems. • Enable students to evaluate bandwidth, power efficiency, and system performance.

	• Integrate theoretical concepts with practical laboratory experiments.

21. Teaching and Learning Strategies

Strategy	The course is delivered using:
	• Interactive lectures with mathematical derivations.
	• Analytical problem-solving sessions.
	• Frequency-domain graphical interpretation.
	• MATLAB-based signal analysis (when required).
	• Laboratory experiments using:
	  ○ Function generators
	  ○ Oscilloscopes
	  ○ Spectrum analyzers
	  ○ Modulation trainer kits
	• Continuous formative assessment and feedback.

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introduction to Communication Systems		Lectures	Quiz exams. Homework, Reports Oral questions project Attending Mid-term Exam Final - exam
2	3	Signal Representation and Fourier Analysis Review		Lectures	
3	3	Amplitude Modulation (AM): Principle and Spectrum		Lectures	
4	3	AM Power and Bandwidth Analysis		Lectures	
5	3	Double Sideband Suppressed Carrier (DSB-SC)		Lectures	
6	3	Single Sideband (SSB) Modulation		Lectures	
7	3	Midterm Examination		Lectures	
8	3	Frequency Modulation (FM) Fundamentals		Lectures	
9	3	Phase Modulation (PM) and Its Relationship to FM		Lectures	
10	3	FM Bandwidth and Carson's Rule		Lectures	
11	3	Noise Models in Communication Systems		Lectures	
12	3	Noise in AM Systems		Lectures	
13	3	Noise in FM Systems		Lectures	
14	3	Pre-Emphasis and De-Emphasis Techniques		Lectures	
15	3	Multiplexing Techniques		Lectures	

23. Course Evaluation

1. Quizzes (2 x 10) =20Marks
2. Online assignments (1 x 5) = 5 Marks

3. Onsite Assignments (1 x 5) = 5 Marks 4. Homework Assignment = (2 x 5)=10 Marks 4. Mid-term Exam = 10 Marks 6. Final Exam =50 Marks	
24. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	1. Haykin, S., Communication Systems, 5th Edition, Wiley, 2009. 2. Lathi, B. P., Modern Digital and Analog Communication Systems, 4th Edition, Oxford University Press, 2009.
Recommended books and references (scientific journals, reports...)	1. Proakis, J. G., and Salehi, M., Fundamentals of Communication Systems, 2nd Edition, Pearson, 2014. 2. Roddy, D., and Coolen, J., Electronic Communications, 4th Edition, Pearson. 3. Oppenheim, A. V., and Willsky, A. S., Signals and Systems, 2nd Edition, Prentice Hall.
Electronic References, Websites	https://engineering.mu.edu.iq/?page_id=31977&lang=en

25. Course Name:
Communication Systems II
26. Course Code:
ECE321
27. Semester / Year:
Third year, Second semester
28. Description Preparation Date:
22/9/2025
29. Available Attendance Forms:
Face-to-face class attendance
30. Number of Credit Hours (Total) / Number of Units (Total)
6 hours/8 units
31. Course administrator's name (mention all, if more than one name)
Name: Ahmed Qabel Fahem Email: ahmed.qabel@mu.edu.iq
32. Course Objectives

Course Objectives	This module aims to:

	1. Develop a comprehensive understanding of digital communication principles. 2. Apply sampling theory and analog-to-digital conversion techniques. 3. Analyze pulse modulation and digital transmission systems. 4. Study digital modulation techniques and their bandwidth efficiency. 5. Introduce multiplexing and multicarrier transmission systems. 6. Evaluate system performance using error probability and Quality of Service (QoS) metrics. 7. Integrate theoretical knowledge with practical laboratory experiments.

33. Teaching and Learning Strategies

Strategy	The course is delivered through: • Interactive lectures with mathematical derivations • Analytical problem-solving sessions • Graphical interpretation of digital spectra • Laboratory experiments using digital communication trainer kits • MATLAB-based simulations (when required) • Continuous formative assessment and structured feedback

34. Course Structure

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

1	3	Introduction to digital communication systems		Lectures	Quiz exams. Homework, Reports Oral questions project Attending Mid-term Exam Final - exam
2	3	Sampling theorem, Nyquist rate, aliasing		Lectures	
3	3	Pulse modulation: PAM, PWM, PPM		Lectures	
4	3	Pulse Code Modulation (PCM) and quantization		Lectures	
5	3	Bit rate and bandwidth of PCM		Lectures	
6	3	Delta Modulation (DM)		Lectures	
7	3	Midterm Examination		Lectures	
8	3	Differential PCM (DPCM) and Adaptive DM		Lectures	
9	3	Baseband transmission and line coding		Lectures	
10	3	Digital modulation: ASK		Lectures	
11	3	Digital modulation: FSK		Lectures	
12	3	Digital modulation: PSK and QPSK		Lectures	
13	3	Multiplexing concepts: FDM and TDM		Lectures	
14	3	TDM frames, synchronization, data rate management		Lectures	
15	3	Error probability, Q-function, matched filter (conceptual)		Lectures	

35. Course Evaluation

1. Quizzes (2 x 10) =20Marks
2. Online assignments (1 x 5) = 5 Marks
3. Onsite Assignments (1 x 5) = 5 Marks
4. Homework Assignment = (2 x 5)=10 Marks
4. Mid-term Exam = 10 Marks
6. Final Exam =50 Marks

36. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	4. Lathi, B. P., Modern Digital and Analog Communication Systems, 4th Edition, Oxford University Press, 2009. 5. Haykin, S., and Moher, M., Introduction to Analog and Digital Communications, 2nd Edition, Wiley.
Recommended books and references (scientific journals, reports...)	1. Sklar, B., Digital Communications: Fundamentals and Applications, 2nd Edition, Pearson. 2. Proakis, J. G., Digital Communications, 5th Edition, McGraw-Hill.

	3. Stallings, W., Data and Computer Communications, Pearson.
Electronic References, Websites	https://engineering.mu.edu.iq/?page_id=31977&lang=en

13. Course Name:					
Electronics III					
14. Course Code:					
ECE313					
15. Semester / Year:					
First semester / Third year					
16. Description Preparation Date:					
22/9/2025					
17. Available Attendance Forms:					
Face-to-face class attendance					
18. Number of Credit Hours (Total) / Number of Units (Total)					
3					
19. Course administrator's name (mention all, if more than one name)					
Name: Dr. Durgham Al-Shebanee Email: durgham.alshebanee@mu.edu.iq					
20. Course Objectives					
Course Objectives	This course aims to provide students with a solid foundation in the analysis and design of electronic circuits, with emphasis on CMOS circuits, FET-based amplifiers, and operational amplifiers. Students will develop the ability to understand the operating principles and characteristics of MOSFET and other FET devices in analog circuit applications. The course focuses on DC biasing, small-signal modeling, and frequency response analysis of FET and CMOS amplifier configurations. Additionally, students will learn the design and practical application of operational amplifiers, including inverting, non-inverting, and differential amplifiers. Emphasis is placed on performance parameters such as gain, bandwidth, input/output impedance, and stability. By the end of the course, students will be able to analyze, and design basic analog electronic circuits using CMOS technology and op-amp architectures.				
21. Teaching and Learning Strategies					
Strategy	• Lecture presentation • Tutorials				
22. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	**3**		Construction and Characteristics of JFETs,	Lectures,	**Quiz exams. Attending**

2	**3**		Transfer Characteristics, Important Relationships. This unit introduces the construction and operating principles of JFETs, including their output and transfer characteristics under different biasing conditions. It also covers key relationships such as Shockley's equation, pinch-off voltage, and transconductance for circuit analysis.		**Final - exam**
3	**3**				
4	**3**		CMOS transistors, CMOS amplifiers These lectures cover the structure and operating principles of CMOS transistors, including their electrical characteristics and biasing techniques. They also address CMOS amplifier configurations and the analysis of key performance parameters such as voltage gain, input/output impedance, and frequency response.	Lectures,	
5	**3**				
6	**3**				
7	**3**		Differential amplifiers These lectures cover the operating principles and circuit configurations of differential amplifiers, including long-tailed pair structures. They analyze key parameters such as differential gain, common-mode gain, CMRR, input/output impedance, and frequency response.	Lectures,	
8	**3**				
9	**3**				
10	**3**		Current Mirrors These lectures cover the operating principles and circuit implementations of current mirrors using BJT and CMOS technologies. They analyze key performance parameters such as current accuracy, output resistance, compliance voltage, and the impact of device mismatches.	Lectures,	
11	**3**				
B	**3**		High frequency amplifiers	Lectures,	
13	**3**				

14	**3**		These lectures cover the analysis and design of high-frequency amplifiers, with emphasis on frequency response, bandwidth limitations, and parasitic effects. They examine gain–bandwidth product, stability considerations, and techniques for extending high-frequency performance.		
15	**3**				

23. Course Evaluation	
29. Quizzes 30. Final Exam	
24. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

121. Course Name:
Industrial Management
122. Course Code:
ECE322
123. Semester / Year:
Second/ third year
124. Description Preparation Date:
22/9/2025
125. Available Attendance Forms:
Face-to-face class attendance
126. Number of Credit Hours (Total) / Number of Units (Total)
2 hours weekly/ 30 hours for semester / 3 ECTS
127. Course administrator's name (mention all, if more than one name)
Name: Karrar Abdalameer Abbas Email: alakoulykarrar@mu.edu.iq

128. Course Objectives

Course Objectives	• **Linking the Engineering and Managerial Aspects:** Enabling students to understand the relationship between production and administrative processes. • Recognizing the importance of planning and organizing in improving the efficiency of chemical production. • • 2. **Developing Analytical Skills and Decision-Making:** Making effective decisions in managing operations and production units. • • 3. **Improving Industrial Performance:** Understanding the basic principles of production, quality control, equipment maintenance, and inventory management. • Applying modern management methods (Production and Total Quality Management - TQM). • • 4. **Preparing Students for the Industrial Job Market:** Qualifying students for supervisory and administrative roles in chemical plants. • Gaining knowledge about industrial environments, organizational behavior, and work ethics. • • 5. **Promoting Safety and Sustainability Concepts:** Integrating industrial safety principles and environmental management into planning and production. • Understanding sustainable management of resources and chemical processes. •

129. Teaching and Learning Strategies

Strategy	Essential facts, concepts, and principles along with an understanding of the constraints faced by engineers in making sound decisions.

	b. Fundamental mathematics, sciences, and technologies relevant to the field. **c. Core ideas and concepts of management.** **d. Improving computational and engineering problem-solving skills**

130. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3	2 2 2	-Understand the production and operation - Explain the plant location	INTRODUCTION TO PRODUCTION AND OPERATION MANAGEMENT TYPES OF PRODUCTIONS INTRODUCTION TO PRODUCTION AND OPERATION MANAGEMENT TYPES OF PRODUCTIONS PLANT LOCATION & LAYOUT		**Quiz exams. Homework, Reports Oral questions project Attending Mid–term Exam Final – exam**
4 5 6	2 2 2	Explain the material handling Understand the quality control Explain the types of qualities & Understand the TQM	Principles of Material Handling QUALITY CONTROL Details Q.C. & QUALITY ASSURANCES - TQM	Lectures,	
7 8 9 10 11	2 2 2 2 2	Explain ISO 9000 & ISO1400 Understand the Formulation Explain the Graphical	Types of ISO 9000, ISO1400 LINEAR PROGRAMMING PROBLEM I— FORMULATION	Lectures,	

		Explain the algebraic	LINEAR PROGRAMMING PROBLEM II—GRAPHICAL METHOD ALGEBRAIC METHOD		
12	2	Understand the assignment Understand the sequences Explain sequence	ASSIGNMENT PROBLEMS SEQUENCING	Lectures	
13	2			Lectures	
14	2			Lectures	

131. Course Evaluation

Daily, monthly and final exams, reports, class assignments and homework.
Course evaluation 40 %, Mid exam. 10%, Final exam. 50%

132. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Lectures • Production and Operation Management, S. A. KUMAR, N. SURASH, Second Edition, 2008, 2006 New Age International (P) Ltd., Publishers. • Engineering Economy, Leland Blank, A. Traquin, SEVENTH EDITION, 2012 McGraw-Hill,USA
Main references (sources)	• Industrial Engineering & Management , Jacobs University Undergraduate Handbook IEM - Matriculation Fall 2015 • Production and Operation Management, S. A. KUMAR, N. SURASH, Second Edition, 2008, 2006 New Age International (P) Ltd., Publishers.
Recommended books and references (scientific journals, reports…)	• Lectures of global universities • Scientific Webs
Electronic References, Websites	• Libraries of websites for international universities

133. Course Name:	
DSP I	
134. Course Code:	
ECE413	
135. Semester / Year:	
First / 2026	
136. Description Preparation Date:	
22/9/2025	
137. Available Attendance Forms:	
138. Number of Credit Hours (Total) / Number of Units (Total)	
3 hours/3 units	
139. Course administrator's name (mention all, if more than one name)	
Name: Yaqdhan Mahmood Hussein Email: yaqdhan.mahmood@mu.edu.iq	
140. Course Objectives	
Course Objectives	**1. Fundamental Concepts** • Understand the basic principles of discrete-time signals and systems. • Differentiate between continuous-time (analog) and discrete-time signals. • Learn about sampling, quantization, and analog-to-digital conversion (ADC). **2. Time-Domain Analysis** • Study discrete-time signals (sequences) and their representations. • Analyze linear time-invariant (LTI) systems. • Understand impulse response, convolution sum, and system stability. **3. Frequency-Domain Analysis** • Learn the Discrete-Time Fourier Transform (DTFT) and its properties. • Study the z-Transform and its role in analyzing LTI systems. • Understand poles, zeros, and the region of convergence (ROC). **4. Discrete Fourier Transform (DFT) & Fast Fourier Transform (FFT)** • Study the DFT and its applications in spectral analysis. • Learn efficient computation using FFT algorithms. • Understand windowing effects and

	spectral leakage. **5. Digital Filter Design** • Study Finite Impulse Response (FIR) and Infinite Impulse Response (IIR) filters. • Learn filter design techniques (window method, bilinear transform, etc.). • Analyze filter specifications (passband, stopband, ripple, transition band). **6. Sampling & Reconstruction** • Understand the Nyquist sampling theorem. • Study aliasing and anti-aliasing filters. • Learn about digital-to-analog conversion (DAC) and reconstruction.

141. Teaching and Learning Strategies

Strategy	**A. Lecture-Based Instruction** • **Conceptual Explanation**: Use clear, step-by-step explanations of DSP theory (e.g., Fourier transforms, z-transforms, filter design). • **Visual Aids**: Employ graphs, block diagrams, and animations (e.g., frequency responses, pole-zero plots). • **Real-World Examples**: Relate concepts to applications (e.g., audio processing, biomedical signals, telecommunications). **B. Problem-Solving Sessions** • **Worked Examples**: Solve key problems step-by-step (e.g., DFT calculations, convolution sums). • **Guided Exercises**: Provide structured problems with incremental difficulty. • **Case Studies**: Analyze real DSP systems (e.g., noise removal in audio, ECG signal filtering). **C. Practical Implementation** • **Coding Assignments**: Implement algorithms (e.g., FIR filter, FFT) in Python/MATLAB. • **Mini-Projects**: Build a tone generator, noise removal tool, or basic audio effects (e.g., echo, reverb). • **Competitions**: "Best filter design" contest with judging criteria (e.g., lowest ripple, fastest execution).

142. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Signals, Systems and Signal Processing Basic Elements of DSP Advanced of Digital over Analogue Signal Processing.			• Homework • Critical evaluating • Attendances • Quizzes • Assessment • Presentation

2		Types of Signals, The Concepts of Frequency in Continuous and Discrete Time Signal			
3		Sampling of Analogue Signals			
4		Discrete Time Signals, Classification & Manipulation			
5		Discrete Time Systems, Input/output Discerption, Classifications & Interconnection			
6		Analysis of Discrete Time LTI systems, Resolution of Discrete Time Signals into impulses, Response of LTI systems to Arbitrary input			
7		Convolution Sum , Properties of Convolution, Interconnection of LTI Systems			
8		Exam I			
9		Casual LTI systems, Stability, systems with Finite – Duration and infinite Duration			
10		Recursive and non-recursive Discrete Time Systems, Discrete Time Systems Describe by Difference Equations			

11		Solution of Linear Constant-Coefficient Difference Equations			
11		Impulse Response of LTI Recursive systems Structures for the Realization of LTI systems			
12		Correlation of Discrete Time Signals, Properties of Autocorrelation and Cross correlation Sequence			
13		Correlation of Periodic Signals, Input/output Correlation Sequence			
14		Exam II			

143. 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	
144. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	PRENTICE HALL SIGNAL PROCESSING SERIES Alan V. Oppenheim, Series Editor
Main references (sources)	PRENTICE HALL SIGNAL PROCESSING SERIES Alan V. Oppenheim, Series Editor
Recommended books and references (scientific journals, reports...)	Digital Signal Processing Fundamentals and Applications Book • Third Edition • 2019
Electronic References, Websites	

121. Course Name:
Microwave Engineering
122. Course Code:
ECE412
123. Semester / Year:
First / Fourth
124. Description Preparation Date:
22/9/2025

125. Available Attendance Forms:
126. Number of Credit Hours (Total) / Number of Units (Total)
3 hours/3 units
127. Course administrator's name (mention all, if more than one name)
Name: HATEM ODAY HATEM HANOOSH Email: hatem.oday@mu.edu.iq
128. Course Objectives

Course Objectives	• **The Microwave Engineering course aims to provide students with a comprehensive understanding of microwave fundamentals and technologies, enabling them to design, analyze, and operate various microwave systems. The general objectives of the course include: understanding the physical properties of microwaves, studying their behavior in various environments, designing various microwave components and circuits, and analyzing the performance of various systems that use microwaves, such as communications and radar systems.**

129. Teaching and Learning Strategies	
Strategy	Here are the strategies that can be employed in teaching Microwave Engineering to First - year students: 1. Communicative Approach: Emphasize interactive and meaningful communication. Encourage students to engage in pair work and group discussions. 2. Contextual Learning: Present the concepts of Microwave Engineering in meaningful contexts to enhance understanding and retention. Use real-life situations, visual aids, authentic materials, and multimedia resources to make the learning experience more relevant and engaging. 3. Active Learning: Encourage students to participate in the learning process actively. Incorporate hands-on activities and interactive exercises to promote engagement and develop design skills. 4. Multi-Sensory Approach: Utilize various senses to enhance learning. Incorporate visual aids, audio recordings, gestures, and kinesthetic activities to cater to different learning styles and reinforce understanding of the fundamentals of Microwave Engineering.

	5. Formative Assessment: Regularly assess students' progress and provide constructive feedback. Use various assessment methods, such as quizzes, speaking tasks, listening exercises, and short written assignments, to gauge their understanding and identify areas for improvement.

130. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15		17- TEM waves on a Parallel Plate Waveguide. 18- TE/TM waves on a Parallel Plate Waveguide . 19- Power Flow and Attenuation on a PP-WG. 20- Rectangular Waveguide Partially – filled Rectangular Waveguide Circular Rectangular Waveguides. 21- Coaxial Transmission Lines. 22- Grounded Dielectric slab and Surface waves. 23- Strip Line and Microstrip Line. 24- Exam I. 25- Impedance/Admittance / Scattering Matrices. 26- Generalized Scattering parameters, The Transmission Matrix, Signal flow Graph. 27- Microwave Resonators. 28- Power Dividers and Directional Couplers. 29- Ferrimagnetic Materials, Ferrite Isolators, Ferrite			• Homework • Critical evaluating • Attendances • Quizzes • Assessment • Presentation

		Phase Shifter, Ferrite Circulators. 30- Microwaves power Sources. 15 -Exam			

131. Course Evaluation

132. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	MICROWAVE ENGINEERING by DAVID M. POZAR.
Main references (sources)	MICROWAVE ENGINEERING by DAVID M. POZAR.
Recommended books and references (scientific journals, reports...)	MICROWAVE ENGINEERING by DAVID M. POZAR.
Electronic References, Websites	

133. Course Name:	
Control- I	
134. Course Code:	
ECE416	
135. Semester / Year:	
First semester / four year	
136. Description Preparation Date:	
22/9/2025	
137. Available Attendance Forms:	
Face-to-face class attendance	
138. Number of Credit Hours (Total) / Number of Units (Total)	
4	
139. Course administrator's name (mention all, if more than one name)	
Name: . Ahmed Qabel Fahem Email: Ahmed.qabel@mu.edu.iq	
140. Course Objectives	
Course Objectives	This course studies fundamentals of classical control. These fundamentals are supported by many practical problems that clarify the concept. The aims of the course include understanding the classification, modeling, and analyzing of linear control systems in both time domainand frequency domain. Additionally, this course also focuses on the stability of the linear control system.
141. Teaching and Learning Strategies	
Strategy	• Lecture presentation

142. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**4**	Introduction to automatic control system with examples.	control systems Types of control systems including Open loops and close loops control systems	Lectures,	**Quiz exams. Homework, Reports Oral questions Attending Mid-term Exam Final - exam**
2	**4**				
3	**4**				
4	**4**	Mathematical Modeling	Time resopons of first order systems for different types of inputs including step, ramp, and impulse Transient and Steady state Response for First Order System	Lectures,	
5	**4**				
6	**4**				
7	**4**	Stability	System Reduction, Signal Flow Graph Masson's Rules System Reduction,	Lectures,	
8	**4**				
9	**4**				
10	**4**				
11	**4**				
12	**4**	Stability	Root Locus, Steps to draw the Locus, Root Locus method for control system design . Routh- Hurwitz Criteria	Lectures,	
13	**4**				
14	**4**				
15	**4**				

143. Course Evaluation

31. Quizzes (5 x 2)=10 Marks
32. Exam 2*10=20
33. Final Exam =60 Marks

144. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Modern Control Engineering Fifth Edition
Main references (sources)	Modern Control Engineering Fifth Edition

Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

145. Course Name:					
Optical communication					
146. Course Code:					
ECE425					
147. Semester / Year:					
second/ Fourth					
148. Description Preparation Date:					
22/9/2025					
149. Available Attendance Forms:					
150. Number of Credit Hours (Total) / Number of Units (Total)					
4 hours/4 units					
151. Course administrator's name (mention all, if more than one name)					
Name: haider.raheem@mu.edu.iq Email: haider raheem					
152. Course Objectives					
Course Objectives	• **1. To develop an understanding of the functionality of each of the components that comprise a fiber-optic communication system: transmitter, fiber, amplifier, and receiver.** • **2. To provide knowledge of the properties of optical fiber that affect the performance of a communication link.** • **3. To differentiate between direct modulation and external electro-optic modulation.** • **4. To understand the basic optical amplifier operation and its effect on signal power and noise in the system..**				
153. Teaching and Learning Strategies					
Strategy					
154. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1 2		31- Communicative Approach:			• Homework • Critical

3 4 5 6 7 8 9 10 11 12 13 14 15		Emphasize interactive and meaningful communication. Encourage students to engage in pair work and group discussions. 32- Scaffolded Instruction: Provide structured support and gradually increase the difficulty level as students get progress. 33- Contextual Learning: Present the concepts of fiber optics communications in meaningful contexts to enhance understanding and retention. Use real-life situations, visual aids, authentic materials, and multimedia resources to make the learning experience more relevant and engaging. 34- Active Learning: Encourage students to participate in the learning process actively. Incorporate seminars and interactive exercises to promote engagement and develop design skills. 35- Multi-Sensory Approach: Utilize various senses to			evaluating • Attendances • Quizzes • Assessment • Presentation

		enhance learning. Incorporate visual aids, audio recordings, gestures, and kinesthetic activities to cater to different learning styles and reinforce understanding of the fundamentals of fiber communications design learning. 36- Formative Assessment: Regularly assess students' progress and provide constructive feedback. Use various assessment methods, such as quizzes, speaking tasks, listening exercises, and short written assignments, to gauge their understanding and identify areas for improvement.15 - Exam			

155. Course Evaluation

156. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

157. Course Name:
Control -II
158. Course Code:
ECE427
159. Semester / Year:
First semester / four year

160. Description Preparation Date:
22/9/2025
161. Available Attendance Forms:
Face-to-face class attendance
162. Number of Credit Hours (Total) / Number of Units (Total)
4
163. Course administrator's name (mention all, if more than one name)
Name: . Ahmed Qabel Fahem Email: Ahmed.qabel@mu.edu.iq
164. Course Objectives

Course Objectives	This course studies fundamentals of Frequency Response. These fundamentals are supported by many practical problems that clarify the concept. The aims of the course include understanding the classification, modeling, and analyzing of linear control systems in both time domainand frequency domain. Additionally, this course also focuses on the stability of the linear control system.

165. Teaching and Learning Strategies	
Strategy	• Lecture presentation • Experimental learning.

166. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**4**	Introduction to Frequency Response	Review of Mathematical	Lectures, Tutorials laboratory	**Quiz exams. Homework, Reports Oral questions Attending Mid-term Exam Final - exam**
2	**4**				
3	**4**				
4	**4**	Stability	Bode , Nyquist Plots Method for Control system Design.	Lectures, Tutorials laboratory	
5	**4**				
6	**4**				
7	**4**	Application	Led and Lag Compensators. PID P PI Controller. Analysis of Discrete-Time Systems.	Lectures, Tutorials, laboratory	
8	**4**				
9	**4**				
10	**4**				
11	**4**				
12	**4**	Application	Design of Digital Control Systems	Lectures, Tutorials, laboratory	
13	**4**				
14	**4**				

15	**4**		Using State-Space Methods		

167. Course Evaluation

34. Quizzes (5 x 1)=5 Marks
35. Exam 2*10=20
36. Lab =15 Marks.
37. Mid-term Exam = 10 Marks
38. Final Exam =60 Marks

168. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Fundamentals of Electric Circuits
Main references (sources)	Fundamentals of Electric Circuits
Recommended books and references (scientific journals, reports...)	Electrical technology theraja book
Electronic References, Websites	

145. Course Name:

DSP II

146. Course Code:

ECE426

147. Semester / Year:

second / 2026

148. Description Preparation Date:

22/9/2025

149. Available Attendance Forms:

150. Number of Credit Hours (Total) / Number of Units (Total)

3 hours/3 units

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

Name: Yaqdhan Mahmood Hussein
Email: yaqdhan.mahmood@mu.edu.iq

152. Course Objectives

Course Objectives	1. **Master the Z-Transform and Its Applications** o Understand the definition, properties, and region of convergence (ROC) of the Z-transform. o Apply Z-transform techniques to solve difference equations and analyze LTI systems. 2. **Analyze Discrete-Time Frequency Representations**

	○ Compute and interpret the **Discrete-Time Fourier Series (DTFS)** and **Discrete-Time Fourier Transform (DTFT)** for periodic and aperiodic signals. ○ Relate DTFT to the Z-transform and exploit symmetry properties for efficient analysis. 3. **Evaluate LTI Systems in Frequency Domain** ○ Determine the frequency response of LTI systems and analyze their stability using pole-zero plots. ○ Distinguish between transient and steady-state responses to sinusoidal/exponential inputs. 4. **Understand the Discrete Fourier Transform (DFT)** ○ Derive the DFT and explain its relationship to other transforms (DTFS, Z-transform, CTFS). ○ Apply DFT properties (e.g., circular convolution) to practical signal processing problems. 5. **Implement DFT-Based Filtering** ○ Use the DFT for linear filtering, spectral analysis, and reconstruction of discrete-time signals. ○ Demonstrate the role of DFT in reducing computational complexity (e.g., via FFT algorithms). 6. **Solve Real-World DSP Problems** ○ Design and analyze systems using frequency-domain tools (e.g., noise removal, spectral estimation). ○ Interpret power/energy density spectra for periodic and finite-duration signals.
153. Teaching and Learning Strategies	
Strategy	**1. Teaching Strategies (Instructor-Led)** **A. Interactive Lectures** • **Conceptual Explanations**: Clear breakdowns of complex topics (e.g., Z-transform, DFT, pole-zero analysis) using visual aids (graphs, animations).

	• **Real-World Examples**: Relate theory to applications (e.g., audio processing, biomedical signal analysis, telecommunications). • **Problem-Solving Demonstrations**: Step-by-step solutions to difference equations, DFT computations, and filter design. **B. Self-Paced Practice** • **Algorithm Implementation**: Code DFT, FIR filters, and autocorrelation from scratch in Python/MATLAB. • **Textbook Problems**: Solve exercises from standard texts (e.g., Oppenheim's *Discrete-Time Signal Processing*). **C. Conceptual Reinforcement** • **Flashcards**: Memorize key properties (e.g., DFT symmetry, Z-transform pairs). • **Concept Maps**: Link topics (e.g., relate DTFT, DFT, and Z-transform) to visualize connections.

154. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 3 5 6		The Z-Transform Inversion Method of Z-Transform Solution of Difference Equations, Analysis of LTI system in Z-Transform. The Fourier Series of Discrete -Time Periodic Signals (DTFS), Power Density Spectrum of Periodic Signals The Discrete -Time Fourier Transform (DTFT) for Periodic Signals and its Convergence, Energy Density Spectrum of Periodic Signals. Relationship of DTFT to Z-Transform, Theorems and			• Homework • Critical evaluating • Attendances • Quizzes • Assessment • Presentation

		Properties of DTFT, Symmetry Properties.			
7		Frequency Domain Analysis of LTI Systems, Response to Complex exponential and Sinusoidal Signals, Steady-State and Transient Response.			
8		Response to a periodic Input Signals.			
9		Frequency Response of LTI Systems, Computation of the Frequency Response Functions & Geometric Interpretation of Poles and Zeros.			
10		Exam I			
11		The Discrete Fourier Transform (DFT), Frequency Domain and Sampling and Reconstruction of Discrete -Time Signals.			
11		The DFT as a Linear Transformation, Relationship of DFT to other Transforms(DFS, Z-Transform, and CTFS)			
12		Properties of DFT, Circular Convolution			
13		Multiplication of Two DFTs and Circular Convolution Use of the DFT in Linear Filtering.			

14		Exam II			

155. 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	
156. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	PRENTICE HALL SIGNAL PROCESSING SERIES Alan V. Oppenheim, Series Editor
Main references (sources)	PRENTICE HALL SIGNAL PROCESSING SERIES Alan V. Oppenheim, Series Editor
Recommended books and references (scientific journals, reports...)	Digital Signal Processing Fundamentals and Applications Book • Third Edition • 2019
Electronic References, Websites	

25. **Educational Institution**
Muthanna University / College of Engineering
26. **Scientific Department / Center**
Department of Electronics and Communication Engineering
27. **Course Name/Code**
Satellite Communication / ECE423
28. **Available Forms of Attendance**
Presence
29. **Semester/Year**
Second 2025-2026
30. **Number of Hours (Total)**
175 hours
31. **Date this description was prepared**
15/9/2025
32. Course administrator name (if more than one name mentioned)
● Dr. HATEM ODAY HATEM
33.

34. **Course Structure for the Second Course**					
		Credit Hours	**Course or course name**	**Course or course code**	**Stage of study**

		3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	Week 1 Overview of satellite systems Week 2 Satellite orbital parameters Week 3 The geostationary orbit Week 4 Atmospheric attenuation Week 5 Rain attenuation Week 6 Atmospheric depolarization Week 7 Midcourse exam Week 8 The space segment Week 9 The space link I Week 10 The space link II Week 11 Interference Week 12 Satellite access I Week 13 Satellite access II Week 14 Specialized satellite services Week 15 Review	ECE423	Fourth
.35					
.36					

1. Course Name:	
Digital System Design	
2. Course Code:	
ECE 414	
3. Semester / Year:	
Fourth year, first semester	
4. Description Preparation Date:	
22/9/2025	
5. Available Attendance Forms:	
Face-to-face class attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3.00	
7. Course administrator's name (mention all, if more than one name)	
Name: Auda Raheemah Odhaib Email: auda@mu.edu.iq	
8. Course Objectives	
Course Objectives	The Digital System Design course aims to enable students to understand the internal and external design of computers and how to

	connect internal computer components with input/output (I/O) devices. The objectives of teaching Computer Architecture are: • To prepare students to become engineers capable of designing and implementing complex digital systems. • To implement using various existing integrated circuits. • To design and analyze combinatorial logic circuits. • To design and analyze sequential logic circuits. • To understand the basic software tools for designing and implementing digital circuits and systems. • To reinforce the theories and techniques taught in class through projects.

9. Teaching and Learning Strategies

Strategy	The following strategies can be used in teaching computer architecture to third-year students: 1. Communicative Approach: Focus on interactive and purposeful communication. Encourage students to work in pairs and participate in group discussions. 2. Progressive Instruction: Provide structured support and gradually increase the level of difficulty as students progress. Begin with the concepts of digital systems, both synchronous and sequential. 3. Contextual Learning: Demonstrate the concepts of connecting internal computer components with input/output devices using real-life scenarios, visual aids, original materials, and multimedia resources to make the learning experience more relevant and engaging. 4. Active Learning: Encourage students to actively participate in the learning process. Integrate practical activities and interactive exercises to enhance participation and develop design skills. 5. Multisensory Approach: Use different senses to enhance learning. Utilize visual aids, audio recordings, gestures, and movement activities to cater to different learning styles and reinforce understanding of the fundamentals of computer design and architecture. 6. Formative Assessment: Regularly assess student progress and provide constructive feedback. Use a variety of assessment methods, such as short quizzes, speaking tasks, listening exercises, and short writing assignments, to measure their understanding and identify areas that need improvement.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3		Types of Input/output (I/O), Isolated I/O Interface, I/O data transfer and Instructions	Lectures	**Quiz exams. Homework, Reports Oral questions project Attending Mid-term Exam Final – exam**
2	3		Byte-wide output ports using Isolated I/O and Byte-wide input ports using Isolated I/O	Lectures	
3	3		Input/output Handshaking and Parallel Interfacing	Lectures	
4	3		82C55A Programmable Peripheral interface.	Lectures	
5	3		82C55A Implementation of Parallel I/O Ports, Memory Mapped I/O Ports.	Lectures	
6	3		82C54 Programmable Interval timer.	Lectures	
7	3		Exam I	Lectures	
8	3		82C37 Programmable Direct Memory Access controller.	Lectures	
9	3		Serial Communications Interface and Programmable Communication interface Controller	Lectures	
10	3		Keyboard and Display Interface.	Lectures	
11	3		Interrupt Mechanism, Types and Priority. Interrupt Vector table and instructions	Lectures	
12	3		External hardware Interrupt interface and Interrupt Sequence	Lectures	
13	3		82C59A Programmable Interrupt controller	Lectures	
14	3		Interrupt Interface Circuits Using the 82C59A, software ,	Lectures	

			non -maskable, and Reset Interrupt		

11. Course Evaluation

1. Quizzes (2 x 14) =28Marks
2. Online assignments (1 x 4) = 4 Marks
3. Onsite Assignments (1 x 4) 4 Marks
4. Homework Assignment = (1 x 4)=4 Marks
4. Mid-term Exam = 10 Marks
6. Final Exam =50 Marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Digital Design: with an introduction to Verilog HDL by M. Mo Mano and Mechael D. Ciletti, 5th Edition, Pearson Educat 2013.
Main references (sources)	Advanced Digital Design with the Verilog HDL by Michae Ciletti, 2nd edition, Pearson education, 2017
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	https://library.oapen.org/handle/20.500.12657/59717

1. Course Name:

Networks and communication protocols

2. Course Code:

ECE415

3. Semester / Year:

Fourth year, first semester

4. Description Preparation Date:

22/9/2025

5. Available Attendance Forms:

Face-to-face class attendance

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

7.00

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

Name: Tabarek Alwan Tuiab
Email: tabarik.alwan@mu.edu.iq

8. Course Objectives

Course Objectives	The course objectives include learning about computer network organization and implementation, obtaining a theoretical understanding of data communication and

	computer networks, and gaining practical experience in the installation, monitoring, and troubleshooting of current LAN systems. Students are introduced to computer communication network design and its operations and discuss the following topics: Open Systems Interconnection (OSI) communication model; error detection and recovery; local area networks; bridges, routers, and gateways; network naming and addressing; and local and remote procedures. On completion of the course, students should be able, in part, to design, implement and maintain a typical computer networks.

9. Teaching and Learning Strategies

Strategy	Here are the strategies that can be employed in teaching Computer Communications & Networks to fourth-year students: 1. Develop into competent and engaged engineering professionals and apply their technical and managerial qualifications in the planning, designing, constructing, operating, and/or maintaining of the infrastructure concerning the field of electronic and communications engineering. 2. Using their skills to analyze and design systems, identify project execution means and materials, carry out cost estimation and analyses, and participate in directing technical activities for electronic and communications engineering projects or projects related to other fields. 3. Be able to actively participate in their communities and their profession by developing their oral, written, visual and graphic modes communication abilities when working as team members or leaders. 4. Initiate a program of continuous learning which may include studies leading to proficient licensure or a higher degree in engineering that provides continued development of their technical abilities and management skills, and attainment of professional expertise. 5. Improve their understanding of sustainability, professionalism, ethics, quality performance, and safety that allows them to be professional influential to society when solving engineering problems and creating solutions in the field of electronic and communications engineering.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Network Model and Network Architecture		Lectures	**Quiz exams. Homework, Reports Oral questions project**
2	2	Protocols design Issues, Transmission and multiplexing		Lectures	
3	2	Design and Analysis of Link Level Protocol		Lectures	
4	2	Protocol Functionality, Layering and Framework (SP3)		Lectures	
5	2	LAN Design, Architecture and Protocols (802.xx).		Lectures	

6	2	Internet Protocol (IP) Design, Internet Addressing		Lectures	**Attending Mid–term Exam Final – exam**
7	2	Mid-term Exam		Lectures	
8	2	WAN Protocols and Network Architecture		Lectures	
9	2	Transport Layer Protocol Design.		Lectures	
10	2	Application Protocols: Email, FTP, Telnet and HTTP		Lectures	
11	2	Introduction and history about Wireless Networks		Lectures	
12	2	IP Telephony and Internet Video		Lectures	
13	2	Network Management Functions and Protocols		Lectures	
14	2	Network Quality of Service (NQS)		Lectures	

11. Course Evaluation

1. Quizzes (2 x 5) =10Marks
2. Online assignments (1 x 5) = 5 Marks
3. Onsite Assignments (1 x 5) = 5 Marks
4. Mid-term Exam = 10 Marks
6. Final Exam =70 Marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	J. Kurose and K. Ross, "Computer Networking: A Top-D Approach", 6th edition, Pearson Education, 2012
Main references (sources)	- L. Peterson and B. Davie, "Computer Networks: A Syst Approach", 5th edition, Morgan Kaufmann, 2011 - A. Tanenbaum and D. Wetherall, "Computer Networks", Edition, Pearson, 2013
Recommended books and references (scientific journals, reports…)	Introduction to Computer Networks and Cybersecurity
Electronic References, Websites	https://link.springer.com/book/10.1007/978-3-030-50405-2

1. Course Name:

Wireless & Mobile Communications

2. Course Code:

ECE424

3. Semester / Year:

Fourth year, second semester

4. Description Preparation Date:

22/9/2025

5. Available Attendance Forms:

Face-to-face class attendance

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

7.00

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

Name: Tabarek Alwan Tuiab
Email: tabarik.alwan@mu.edu.iq

8. Course Objectives

Course Objectives	. To give insight into the history of cellular communications and the first, second, third and fourth generation standards 2. To introduce methods of traffic modeling for typical mobile applications including the specification of important quality of service requirements 3. To review wireless propagation mechanisms and understand a range of large-scale channel models and their use in dimensioning mobile communication systems 4. To describe methods for cellular network planning and introduce constraints and issues surrounding practical deployments 5. To introduce multiple access techniques and interference mitigation techniques 6. To introduce methods for dimensioning and evaluating the capacity of mobile communication networks 7. To develop skills in the selection and application of appropriate numeric and algebraic techniques 8. To develop skills in system level design based on operational parameters and constraints.

9. Teaching and Learning Strategies

Strategy	Strategies Here are the strategies that can be employed in teaching numerical analysis to third - year students:

	1. Reducing the time for tedious work. The activities in classrooms include some frequent and tedious tasks. 2. Engaging students in learning activities. Because of the limited resources in ordinary classrooms, students often merely accept the ready-prepared materials during learning activities. 3. Facilitating group collaborative learning. To implement collaborative learning activities in classrooms, teachers often confront two problems. 4. Empowering the teacher to monitor students' learning statuses. Generally, a wireless learning environment can facilitate students' individual or collaborative learning and expand their activity space, but it might be difficult for teachers to monitor each student's current learning status 5. Recording teaching and learning processes as portfolios. Before class, teachers need to systematically construct teaching materials in RCMS for themselves and learners to use during learning and teaching. 6. Implementing technology-supported activities smoothly. To allow teachers and students benefit from technology easily

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction to Wireless Communication Systems.		Lectures	**Quiz exams. Homework, Reports Oral questions project Attending Mid–term Exam Final – exam**
2	2	The Cellular Concepts Syster Design		Lectures	
3	2	The Cellular Concepts Syster Design		Lectures	
4	2	Traffic Engineering		Lectures	
5	2	Traffic Engineering		Lectures	
6	2	Large Scale Path Loss		Lectures	
7	2	Large Scale Path Loss		Lectures	
8	2	Exam I		Lectures	
9	2	Small Scale Multipath Propagation.		Lectures	
10	2	Multiple Access Techniques.		Lectures	
11	2	Multiple Access Techniques.		Lectures	
12	2	Wireless Systems.		Lectures	
13	2	Wi-Fi, Bluetooth and ZigBee.		Lectures	
14	2	Course Review.		Lectures	

11. Course Evaluation

1. Quizzes (2 x 5) =10 Marks
2. Online assignments (1 x 5) = 5 Marks
3. Onsite Assignments (1 x 5) = 5 Marks
4. Mid-term Exam = 10 Marks
5. Final Exam =70 Marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Mobile Wireless Communications "Mischa Schwartz"
Main references (sources)	Principles of Mobile Communication "Gordon L. Stüber"

Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	https://dafedil.com/wp-content/uploads/2020/05/2017_Book_PrinciplesOfMobileCommunicatio.pdf

37. Course Name:					
VLSI					
38. Course Code:					
ECE422					
39. Semester / Year:					
Second semester / Fourth year					
40. Description Preparation Date:					
22/9/2025					
41. Available Attendance Forms:					
Face-to-face class attendance					
42. Number of Credit Hours (Total) / Number of Units (Total)					
3					
43. Course administrator's name (mention all, if more than one name)					
Name: Dr. Durgham Al-Shebanee Email: durgham.alshebanee@mu.edu.iq					
44. Course Objectives					
Course Objectives	The objective of the VLSI (Very Large-Scale Integration) course is to provide a comprehensive understanding of CMOS device physics and advanced semiconductor fabrication technologies. It aims to develop proficiency in digital and analog integrated circuit design methodologies. The course focuses on transistor-level design, layout techniques, and design rule verification using industry-standard CAD tools. Students learn to analyze performance parameters such as power dissipation, propagation delay, noise margins, and scaling effects. Ultimately, the course prepares students to design, simulate, and optimize reliable and efficient integrated circuits for modern electronic systems.				
45. Teaching and Learning Strategies					
Strategy	• Lecture presentation • Tutorials				
46. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	**3**		nMOS operation, pMOS Transistor, Transistors as Switches. CMOS Invertor, CMOS NAND Gate, CMOS NOR Gate, 3- Input	Lectures,	**Quiz exams. Attending** **Final - exam**
2	**3**				

3	**3**		NAND Gate, CMOS Fabrication nderstanding nMOS operation and pMOS transistors clarifies MOSFET behavior in cutoff, triode, and saturation regions, forming the foundation of switching theory in digital CMOS circuits. Studying CMOS inverters, NAND/NOR gates (including multi-input NAND), and CMOS fabrication processes provides practical insight into logic design, layout realization, and performance optimization in VLSI systems		
4	**3**		CMOS Latches and Flip-Flops, CMOS Capacitor, CMOS latches and flip-flops are fundamental sequential circuits used for data storage, synchronization, and timing control in digital systems. CMOS capacitors play a key role in charge storage, timing elements, and analog/digital circuit performance, influencing delay and signal integrity.	Lectures,	
5	**3**				
6	**3**				
7	**3**		Nonideeal Transistor behavior Nonideal transistor behavior refers to real-world deviations from ideal MOSFET models, including short-channel effects, leakage currents, threshold voltage variation, and channel-length modulation. Understanding these effects is essential for accurate circuit analysis, timing prediction, and reliable CMOS VLSI design.	Lectures,	
8	**3**				
9	**3**				
10	**3**		Pass Transistors, DC Response, Transient Response, RC Delay Models	Lectures,	
11	**3**				

			Pass transistors are used to efficiently transmit logic levels between nodes, reducing transistor count in circuits. DC and transient response analysis, along with RC delay models, help evaluate voltage behavior, signal propagation, and timing performance in CMOS networks.		
B	**3**		Multistage Logic Networks Multistage logic networks consist of cascaded logic gates arranged in multiple levels to implement complex Boolean functions. Their analysis involves propagation delay accumulation, fan-out effects, logical effort, and power-performance trade-offs in CMOS VLSI design.	Lectures,	
13	**3**				
14	**3**				
15	**3**				

47. Course Evaluation	
39. Quizzes 40. Final Exam	
48. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	. Design of Analog CMOS Integrated Circuits Behzad Razavi Professor of Electrical Engineering University of California, Los Angeles
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

157. Course Name:

Information theory

158. Course Code:

ECE418

159. Semester / Year:

First Semester / Fourth Year

160. Description Preparation Date:

22/9/2025

161. Available Attendance Forms:

Face-to-face class attendance

162. Number of Credit Hours (Total) / Number of Units (Total)

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

Name: Dr. Ahmed Hasan Saaudi
Email: Ahmed.saaudi@mu.edu.iq

164. Course Objectives

Course Objectives	20. Introduce principles of information theory. 21. Understand probabilistic models of information sources. 22. Analyze entropy and information measures. 23. Study data compression and channel coding concepts. 24. Apply Shannon theory to communication systems

165. Teaching and Learning Strategies

Strategy	13. Interactive lectures 14. Problem-solving sessions 15. Laboratory simulations 16. Assignments and quizzes 17. Student presentations

166. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3			Lecture	

2	3	1. Explain probability concepts used in information systems. 2. Calculate entropy and information measures. 3. Analyze communication channels using mutual information. 4. Design basic coding strategies for reliable transmission. 5. Apply mathematical models to real communication problems.	1. Introduce principles of information theory. 2. Understand probabilistic models of information sources. 3. Analyze entropy and information measures. 4. Study data compression and channel coding concepts. Apply Shannon theory to communication systems Explain probability concepts used in information systems. Calculate entropy and information measures. Analyze communication channels using mutual information. Design basic coding strategies for reliable transmission. Apply mathematical models to real communication problems.	Lecture	1. Quizzes and homework assignments. 2. Midterm and final written examinations. 3. Class participation and problem-solving activities. 4. Continuous (formative) assessment throughout the semester 5. Report and Presentation
3	3			Lecture	
4	3			Lecture	
5	3			Lecture	
6	3			Lecture	
7	3			Lecture	
8	3				
9	3			Lecture	
10	3			Lecture	
				Lecture	
				Lecture	
				Lecture	
				Lecture	
15	3			Lecture	

167. Course Evaluation

1. Exam (2 x 14) =28 Marks

2. Homework (1 x 4) = 4 Marks 3. Quiz (1 x 4) = 4 Marks 4. Report & Presentation (1 x 4)=4 marks 5. Mid-term Exam = 10 Marks 6. Final Exam =50 Marks	
168. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	- Cover, T. M., & Thomas, J. A. (2006). Elements of Information Theory. Wiley-Interscience. - Proakis, J. G., & Salehi, M. (2007). Digital Communications. McGraw-Hill.
Main references (sources)	- Sklar, B. (2001). Digital Communications: Fundamentals and Applications. Prentice Hall. - MacKay, D. J. C. (2003). Information Theory, Inference, and Learning Algorithms. Cambridge University Press.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	