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 of Electrical Engineering Department

College of Engineering

Al-Iraqia University

Academic Year: 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: Al-Iraqia University

Faculty/Institute: Faculty of Engineering

Scientific Department: Electrical Engineering Department

Academic or Professional Program Name: Bachelor in Electrical Engineering

Final Certificate Name: Bachelor in Electrical Engineering

Academic System: Semester-Based (Bologna Process)

Location: 2nd floor, College of Engineering Building, Saba' Abkar Complex, Al-Iraqia University, Baghdad, Iraq

Department Site: https://eng.aliraqia.edu.iq/electricity-eng/

Department E-mail: electrical.dep.eng@aliraqia.edu.iq

Description Preparation Date: 15/ 2/ 2026

File Completion Date: 15/ 2/ 2026

Signature:

Head of Department Name: Prof. Dr. Baraa Munqith Albaker
Head of Electrical Engineering Department
College of Engineering, Al-Iraqia University

Date: 15/2/2026

Signature:

Scientific Associate Name: Dr. Omar Hassan Hameed
Deputy Dean for Scientific Affairs
College of Engineering

Date: 15/2/2026

The file is checked by: Dr. Ruaq Muthana Ali

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 15/2/2026

Signature:

Approval of the Dean

مالك عبد الرزاق جبار
عميد كلية الهندسة

1. Program Vision

The department becomes distinct and pioneer at the local and regional levels in the field of electrical engineering by offering a modern and advanced academic program in accordance with local, regional and international standards, empowering qualified nationals to work and providing scientific, technical and applied advice in the labor market.

2. Program Mission

Developing competent and highly qualified engineers who are able to meet the needs of the labor market in the public and private sectors in the field of electrical engineering, by updating the curricula according to the rapid developments of modern technology and dynamic requirements changes of the market. Also, providing students of the department with the latest knowledge and advanced theoretical and practical skills, and encouraging students to be creative and innovative. In addition to the department's endeavor to develop new study programs for postgraduate studies to keep pace with the advanced and recent developments in the specialization.

3. Program Objectives (Strategic Objectives)

1- To graduate well-educated engineers who possess a wide range of knowledge in the field of electrical engineering and able to develop themselves as well as to work in the public and private sectors.

2- To obtain national and international accreditations and continuously update the curricula using appropriate and up-to-date theoretical and practical teaching methods and techniques according to the international standards to enable students to meet the needs of the labor market.

3- To foster cooperation with the corresponding engineering departments and research centers to enhance the scientific level of the students and the teaching staff.

4- To enable the student to conduct scientific researches, organizing seminars, participating in scientific conferences and workshops inside the country and abroad.

5- To enrich the students with the required knowledge to work on solving practical and applied issues.

6- To focus on postgraduate studies to raise the level of scientific research to provide universities, institutes, research centers and organizations with well qualified higher degrees holders.

7- To integrate with other related engineering disciplines in order to bridge the gaps of scientific and applied researches.

8- To provide academic and engineering consultancy services in the field of electrical engineering and its applications, including systems design, supervision and engineering management, in accordance with the market's needs and requirements.

4. Program Educational Objectives (PEOs)

1. To prepare graduates to establish successful professional careers as practicing engineers or consultants in electrical engineering and related fields within the private and public sectors.
2. To prepare graduates with the academic and research skills necessary to pursue self-development and advanced studies in electrical engineering.
3. To serve the community by fostering innovation, promoting ethics and professional responsibility, addressing societal challenges, and providing technical solutions.
4. To cultivate a lifelong learning mindset, enabling graduates to adapt to technological advancements and develop their professional competencies.

5. Program Accreditation

In line with the Electrical Engineering Department's ongoing commitment to continuous improvement, academic quality and excellence in education, the department at the College of Engineering, Al-Iraqia University, has successfully satisfied all the requirements set for program accreditation. Accordingly, the

department has been officially awarded program accreditation by the Iraqi Council for Engineering Education Accreditation effectively starting from the academic year 2025/2026 for a period of six years accreditation cycles.

6. Other external influences

Labor market, practical and field visits to government departments and relevant companies, the Industrial Advisory Council at the College of Engineering.

7. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	7	15	7.8%	
College Requirements	11	38	20%	
Department Requirements	46	137	72.2%	
Summer Training				
Other				

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

8. Program Description

Year/Level	Course Code	Course Name	Credit Hours		
			Theor.	Tuto.	Prac.
First/ 1st Semester	ENLA102	English Language	1		
First/ 1st Semester	PHY102	Physical Electronics	5	1	
First/ 1st Semester	MAT103	Mathematics I	5		
First/ 1st Semester	DCC104	DC Electrical Circuits	4	1	1
First/ 1st Semester	COMP105	Computer	4		1

First/ 1st Semester	WSP106	Workshop			1
First/ 1st Semester	HRAD103	Human Rights and Democracy	1		
First/ 2nd Semester	MAT121	Mathematics II	5	1	
First/ 2nd Semester	EDR122	Engineering Drawing			1
First/ 2nd Semester	ACC123	AC Electrical Circuits	3	1	1
First/ 2nd Semester	MEC124	Principles of Mechanical Engineering	4		
First/ 2nd Semester	DTC125	Digital Techniques	4		1
First/ 2nd Semester	ARLA101	Arabic Language I	1		
Second/ 1st Semester	MAT201	Mathematics III	4		
Second/ 1st Semester	ELE202	Electronics I	2	1	1
Second/ 1st Semester	NAS203	Networks and Systems	2	1	1
Second/ 1st Semester	DCM204	DC Machines and Transformers	4	1	1
Second/ 1st Semester	EEC205	Engineering Economics	2		
Second/ 1st Semester	CBRI104	Crimes of the Baath Regime in Iraq	1		
Second/ 2nd Semester	PNS221	Probability and Statistics	3		
Second/ 2nd Semester	INC222	Induction Machines	2		1
Second/ 2nd Semester	CPR223	Computer Programming	4		1
Second/ 2nd Semester	APH224	Applied Physics	4		
Second/ 2nd Semester	ELE225	Electronics II	3		1
Second/ 2nd Semester	ARLA201	Arabic Language II	1		
Second/ 2nd Semester	ENLA202	English Language II	1		
Third/ 1st Semester	EAN301	Engineering Analysis	3	1	—
Third/ 1st Semester	AEL302	Advanced Electronics	3	1	1
Third/ 1st Semester	SYC303	Synchronous Machines	2	—	2
Third/ 1st Semester	COM304	Communications I	2	1	2
Third/ 1st Semester	ENG305	Academic English II	2	—	2
Third/ 1st Semester	ETH226	Engineering Ethics	2	—	2
Third/ 1st Semester	PRM306	Project Management	2	—	—
Third/ 2nd Semester	APR321	Antenna and Propagation	4	—	2
Third/ 2nd Semester	MPR322	Microprocessors	4	—	2
Third/ 2nd Semester	COM323	Communications II	2	1	2
Third/ 2nd Semester	NAN324	Numerical Analysis	2	1	—
Third/ 2nd Semester	POW325	Fundamentals of Electrical Power	4	—	2

Third/ 2nd Semester	RMW326	Research Methodology and Academic Writing	2	—	—
Fourth/1st Semester	EE4101	Information Theory and Coding	2		1
Fourth/1st Semester	EE4102	Electrical power system I	3		
Fourth/1st Semester	EE4103	Control Engineering I	3		1
Fourth/1st Semester	EE4104	Power Electronic and Machines I	3		
Fourth/1st Semester	EE4105	Engineering Project (full year)	1	2	
Fourth/1st Semester	EE4106	Digital Electronics I	2		
Fourth/1st Semester	EE4107	Embedded Systems	2		
Fourth/1st Semester	EE4108	English Language IV	1		
Fourth/1st Semester	EE4109	Power Electronic and Machine I LAB			2
		Control Engineering I LAB			2
Fourth/2nd Semester	EE4201	Digital Signal Processing (DSP)	3		
Fourth/2nd Semester	EE4102	Electrical power system II	3		
Fourth/2nd Semester	EE4203	Control Engineering II	3		1
Fourth/2nd Semester	EE4204	Power Electronic and Machines II	3		
Fourth/2nd Semester	EE4205	Engineering Project (full year)	1	2	
Fourth/2nd Semester	EE4206	Digital Electronics II	2		
Fourth/2nd Semester	EE4207	Computer Networks	2		
Fourth/2nd Semester	EE4208	Power Electronic and Machine I LAB			2
		Control Engineering I LAB			2

9. Expected learning outcomes of the program

Knowledge

A1- An ability to understand, identify, formulate, and solve basic and complex electrical engineering problems by applying principles of engineering, science, and mathematics.

A2- An ability to apply the engineering design process to produce solutions that meet the specified needs with consideration of public health, safety, and welfare, as well as global, cultural, environmental, socio-economic factors, and other factors as appropriate to the discipline.

A3- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

Skills

B1- An ability to communicate and networking effectively with a wide range of audiences from different levels and sectors.

B2- An ability to employ critical thinking and recognize the ongoing needs to acquire new knowledge, to choose appropriate learning strategies, and to apply this knowledge.

B3- An ability to function effectively with their peers and counterparts in a collaborative and inclusive environment, as a member or leader of a team that establishes goals and plan tasks to meet the required objectives.

Ethics

C- An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, with considering the impact of engineering solutions on global, economic, environmental, and societal contexts.

10. Teaching and Learning Strategies

1. Explanation and clarification through lectures, both in-person and online.
2. Presenting scientific materials using various presentation devices.
3. Self-learning through homework assignments and small projects.
4. Using laboratories for learning and practical application.
5. Completing graduation projects as part of the learning experience.
6. Benefiting from scientific visits to relevant sites.
7. Attending scientific seminars held in the department.
8. Providing opportunities for summer training to develop practical skills.

11. Evaluation methods

1. Short comprehension tests (quick quizzes).
2. Homework assignments.
3. Final and midterm exams for theoretical and practical subjects.
4. Small projects integrated into the lessons.
5. Active participation during class sessions.
6. Preparation of scientific and investigative reports.

12. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Prof. Dr. Baraa Munqith Abdul-Jabbar Jassim	Electrical Engineering	Control and Computers			On the college staff	
Prof. Dr. Khamis Awad Zidan Farhan	Electrical Engineering	Communications and Computers Engineering			On the college staff	
Prof. Dr. Malik Abdul-Razzaq Jabbar	Electrical Engineering	Power and Communications			On the college staff	
Prof. Dr. Mohammed Nasser Hussein Abdul-Ali	Electrical Engineering	Control and Computers			On the college staff	
Assistant Professor Farqad Talib Najm Al-Ani	Chemical Engineering	Heat Transfer and Two-Phase Flow			On the college staff	
Assistant Professor Bashar Sakin Farhan	Electrical Engineering	Power			On the college staff	
Assistant Professor Jassim Mohammed Jassim	Electrical Engineering	Electrical Power			On the college staff	
Assistant Professor Rasha Subhi Ali Hussein	Computer Science	Data Security and Artificial Intelligence			On the college staff	

Lecturer Wassan Saad Abdul-Jabbar	Electrical and Computer Engineering	Artificial Intelligence			On the college staff	
Lecturer Iyad Mahmoud Kawad	Mechatronics Engineering	Mechatronics Engineering			On the college staff	
Lecturer Firas Ali Jawad Issa	Electrical Engineering	Electrical and Electronic Engineering			On the college staff	
Lecturer Mustafa Subhi Kamal Hassoun Al-Bayati	Electrical Engineering	Communications			On the college staff	
Assistant Professor Qasim Hadi Karim Arabi	Electrical Engineering	Electronics and Communications Engineering			On the college staff	
Assistant Professor Ruaa Muthana Ali	Physics	Philosophy of Physics			On the college staff	
Professor Anas Fouad Ahmed Abdul-Rahman	Electrical Engineering	Electronics			On the college staff	
Assistant Professor Mohammed Khaled Ibrahim	Electrical Engineering	Communications Engineering			On the college staff	
Lecturer Ali Kazim Hantoush Alwan	Physics	Semiconductors / Nanotechnology / Solar Cells			On the college staff	
Lecturer Suhail Najm Abdullah	Electrical Engineering	Industrial Microwave Engineering			On the college staff	
Lecturer Mohammed Hussein Ali	Communications and Computer Engineering	Computer Networks			On the college staff	

Lecturer Alaa Majeed Ali Mohammed	Electrical Engineering	Electronics			On the college staff	
Assistant Lecturer Ayad Tahseen Abdul Hafeez	Electrical Engineering	Power			On the college staff	
Assistant Lecturer Heba Hadi Kurdi	Electromechanical Engineering	Energy			On the college staff	
Assistant Lecturer Raghda Abdul Rab Abdul Hassan	Computer Science	Information Security			On the college staff	
Assistant Lecturer Ahmed Naji Zidane	Electrical Engineering	Power			On the college staff	
Assistant Lecturer Ali Jassim Mohammed	Electrical Engineering	Electronics and Communications Engineering			On the college staff	
Lecturer Alaa Hussein Abdul Aal	Electrical Engineering	Electrical			On the college staff	
Lecturer Marwa Malik Hassouni	Electrical Engineering	Electronics and Communications			On the college staff	
Assistant Lecturer Shahad Taleb Armout	Electrical Engineering	Electronics and Communications			On the college staff	
Lecturer Hala Kamal Abdul Jalil	Electrical Engineering	Electronics and Communications			On the college staff	
Assistant Lecturer Asmaa Faleh Jassim Jawad	Fundamentals of Religion	Aqeedah			On the college staff	

Total number of faculty members: 30

Number of PhD holders: 21

Number of Master's degree holders: 9

Number of holders of the academic title (Professor): 5

Number of holders of the academic title (Assistant Professor): 7

Number of holders of the academic title (Lecturer): 12

Number of holders of the academic title (Assistant Lecturer): 6

Professional Development
Mentoring new faculty members
1. Providing comprehensive guidance on the nature of work, objectives, and the faith-based values of the institution and department. 2. Offering specialized training courses covering innovative teaching methods and best academic practices. 3. Guiding the faculty on institutional and departmental policies and procedures, including research ethics and quality standards. 4. Providing opportunities for networking with colleagues and participating in research and professional development activities. 5. Monitoring the performance of new faculty members and providing additional support and guidance as needed.
Professional development of faculty members
1. Providing specialized training courses in effective teaching strategies and modern educational technology. 2. Offering workshops to share experiences and best practices in teaching and applying them in the classroom. 3. Conducting regular evaluations of faculty performance and learning outcomes to improve the educational process. 4. Promoting participation in ongoing professional development programs, such as seminars, workshops, and academic conferences. 5. Supporting research and scholarly publishing to enhance the academic competence of faculty members.

6. Providing opportunities for networking and collaboration with faculty in areas of mutual interest.
7. Offering preparatory programs to develop academic management and leadership skills.

13. Acceptance Criterion

Admission to the college for morning study is through central admission:

- **GPA: Not less than 87%**
- **Age: Not more than 25 years**
- **Number of seats: 50**

For evening study, admission is through direct application:

- **GPA: Not less than 77%**
- **Age: Not specified**
- **Number of seats: 50**

14. The most important sources of information about the program

1. Local and international university websites.
2. Workshops organized by the Ministry of Higher Education and its quality standards.
3. Iraqi Council for Accreditation of Engineering Education Guide.
4. Institute of Electrical and Electronics Engineers (IEEE).

15. Program Development Plan

1. Needs Analysis: Conduct surveys and assessments to identify labor market needs and industry directions, and gather feedback from students and faculty regarding the strengths and weaknesses of the current program.

2. Curriculum Update: Develop modern curricula aligned with technological advancements and labor market needs, including adding new courses and updating existing ones.

3. Enhancing Interactivity: Integrate interactive learning tools such as virtual labs, practical projects, and workshops to enrich the learning experience and apply theoretical concepts in hands-on projects.

4. Focus on Practical Skills: Develop training programs that emphasize practical skills for students, such as programming, system design, and project management, in addition to enhancing communication and teamwork skills.

5. Enhancing the Learning Environment: Improve technical infrastructure, provide necessary resources, and promote interaction between students and faculty through virtual forums, seminars, and group lectures.

6. Monitoring and Evaluation: Establish mechanisms to monitor and evaluate program performance, analyze student data, and assess the achievement of learning objectives, enabling necessary measures to improve the program.

7. Industry Collaboration: Build partnerships with companies and industrial institutions to guide and develop the curriculum and provide training and employment opportunities for students.

8. Continuous Update: Conduct periodic reviews and updates of the curriculum based on market, technology, and industry needs to ensure the provision of high-quality, distinguished education.

Program Skills Outline											
				Required program Learning outcomes							
Year/Level	Course Code	Course Name	Basic or optional	Knowledge			Skills			Ethics	
				A1	A2	A3	B1	B2	B3	C	
First/ 1st Semester	ENLA102	English Language	Basic				●				
	PHY102	Physical Electronics	Basic	●			●				
	MAT103	Mathematics I	Basic	●							
	DCC104	DC Electrical Circuits	Basic	●							
	COMP105	Computer	Basic	●							
	WSP106	Workshop	Basic					●			
	HRAD103	Human Rights and Democracy	Basic				●				
First/ 2nd Semester	MAT121	Mathematics II	Basic	●							
	EDR122	Engineering Drawing	Basic					●			
	ACC123	AC Electrical Circuits	Basic	●							

	MEC124	Principles of Mechanical Engineering	Basic	●						
	DTC125	Digital Techniques	Basic	●						
	ARLA101	Arabic Language I	Basic				●			
Second/ 1st Semester	MAT201	Mathematics III	Basic	●						
	ELE202	Electronics I	Basic	●						
	NAS203	Networks and Systems	Basic	●		●				
	DCM204	DC Machines and Transformers	Basic	●			●			
	EEC205	Engineering Economics	Basic							●
	CBRI104	Crimes of the Baath Regime in Iraq	Basic							●
Second/ 2nd Semester	PNS221	Probability and Statistics	Basic							●
	INC222	Induction Machines	Basic	●		●				
	CPR223	Computer Programming	Basic	●				●		

	APH224	Applied Physics	Basic	●			●			
	ELE225	Electronics II	Basic	●					●	
	ARLA201	Arabic Language II	Basic				●			
	ENLA202	English Language II	Basic				●			
Third/ 1st Semester	EAN301	Engineering Analysis	Basic	●						
	AEL302	Advanced Electronics	Basic	●						
	SYC303	Synchronous Machines	Basic	●						
	COM304	Communications I	Basic	●	●	●				
	ETH226	Engineering Ethics	Basic							●
	ENG305	Academic English II	Basic	●						
	PRM306	Project Management	Basic	●						
Third/ 2nd Semester	APR321	Antenna and Propagation	Basic	●	●					
	MPR322	Microprocessors	Basic	●						

	COM323	Communications II	Basic	●	●					
	NAN324	Numerical Analysis	Basic	●			●			
	POW325	Fundamentals of Electrical Power	Basic		●					
	RMW326	Research Methodology and Academic Writing	Basic	●						
Fourth/1st Semester	EE4101	Information Theory and Coding	Basic	●						
	EE4102	Electrical power system I	Basic				●		●	
	EE4103	Control Engineering I	Basic		●					
	EE4104	Power Electronic and Machines I	Basic		●					
	EE4105	Engineering Project (full year)	Basic				●	●	●	
	EE4106	Digital Electronics I	Basic	●						
	EE4107	Embedded Systems	Optional	●	●				●	
	EE4108	English Language IV	Basic				●			

	EE4109	Power Electronic and Machine I LAB				●		●		
		Control Engineering I LAB				●		●		
Fourth/2nd Semester	EE4201	Digital Signal Processing (DSP)	Basic	●						
	EE4102	Electrical power system II	Basic				●		●	
	EE4203	Control Engineering II	Basic		●					
	EE4204	Power Electronic and Machines II	Basic		●					
	EE4205	Engineering Project (full year)	Basic				●	●	●	
	EE4206	Digital Electronics II	Basic		●					
	EE4207	Computer Networks	Optional	●						
	EE4208	Power Electronic and Machine II LAB				●		●		
		Control Engineering II LAB				●		●		

Course Description Form

1. Course Name:
Physical Electronics
2. Course Code:
PHY102
3. Semester / Year:
First Semster/ First year
4. Description Preparation Date:
1-6-2026
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total)
6hrs/6Units
7. Course administrator's name (mention all, if more than one name)
Name: Ass. Prof. Ruaa Muthana Ali Email: ruaamuthanaali@aliraqia.edu.iq
8. Course Objectives

Course Objectives	1. To understand the concepts of atomic structure, the dual nature of matter, energy levels, quantum numbers, and crystal structure. 2. To understand The ability to analyze electronic ballistics. 3. To develop problem solving skills and understanding electron mobility, explain conduction in metals, semiconductor types, and the Fermi energy level. 4. Introducing the basic principles of the diode, its types, structure and properties, analyzing its circuits, and studying its most important applications in electronic circuits. 5. Introducing the basic principles of the BJT transistor, its structure and characteristics, analyzing its basic circuits, and studying its most important applications in electronic circuits.

9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	6	Understand and be able to apply physical electronic concepts.	Introduction to atomic structure, The atom, wave nature of light, Bohr's model	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	6	Understand and be able to apply physical electronic concepts.	collision of electron with atom, dual nature of matter, Quantum numbers, energy-band theory of metals	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	6	Understand and be able to apply physical electronic concepts.	insulator and semiconductors, crystal structure Covalent bonding	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	6	Understand and be able to apply physical electronic concepts.	energy band of crystals and energy levels, Electron ballistics	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	6	Understand and be able to apply physical electronic concepts.	Electrical conduction in metals, The mobility, The conductivity	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	6	Understand and be able to apply physical electronic concepts.	Energy distribution of electrons, Fermi level, Semiconductor materials	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	6	Understand and be able to apply physical electronic concepts.	Silicon, germanium, extrinsic semiconductor	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	6	2. Describe the characteristics of a diode,	Semiconductor Doping, PN junction, diode depletion width, LED, Resistance level of the diode, diode equivalent circuits	Lectures	Quizzes Assignments Projects Report

		and its use in electronic circuits.			Final Exam
Week 9	6	3. Describe the characteristics of a BJT, and its use in electronic circuits.	Full-wave rectifier, Diode clipper circuits	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	6	1. Understand and be able to apply physical electronic concepts.	Diode clippers summary circuits with different AC inputs waveform, Zener Region	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	6	2. Describe the characteristics of a diode, and its use in electronic circuits.	Zener diode voltage regulator circuits, Special types of diodes and review questions	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	6	3. Describe the characteristics of a BJT, and its use in electronic circuits.	Introduction to the BJT transistor structure, BJT common base, common emitter, common collectors	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13 &14	6	3. Describe the characteristics of a BJT, and its use in electronic circuits.	BJT DC biasing Circuits	Lectures	Quizzes Assignments Projects Report Final Exam

11. Course Evaluation

Quizzes 10% (10)
Assignments 10% (10)
Projects 10% (10)
Report 10% (10)
Midterm Exam
10% (10)
Final Exam
50% (50)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	B.L. Theraja, "Basic Electronics: Solid State," S. Chand & Company Ltd, 2005. Floyd, Thomas L. Electronic devices (electron flow version).

	Prentice-Hall, Inc., 2007
Main references (sources)	Donald A. Neamen, “Semiconductor Physics and Devices: Basic Principles,” McGraw-Hill International Edition, Fourth Edition, 2012
Recommended books and references (scientific journals, reports…)	Boylestad, Robert L., and Louis Nashelsky. "Electro Devices and Circuit Theory 11th ed." (2018).
Electronic References, Websites	https://site.unibo.it/semiconductor-physics/en

Course Description Form

1. Course Name:
Computer
2. Course Code:
COMP105
3. Semester / Year:
First Semester/ First year
4. Description Preparation Date:
24-6-2026
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total)
6hrs/6Units
7. Course administrator's name (mention all, if more than one name)
Name: Ass. Prof. Dr Rasha Subhi Ali Email: rasha.s.ali@aliraqia.edu.iq
8. Course Objectives

Course Objectives	1. Introduce students to the basic concepts of computer science and information technology. 2. Familiarize students with computer hardware components and system architecture. 3. Develop algorithmic thinking and problem-solving skills using flowcharts and algorithms. 4. Train students in Microsoft Word and Excel applications for academic and technical tasks. 5. Introduce C++ programming language fundamentals and syntax. 6. Enable students to write, test, and debug simple C++ programs. 7. Develop skills in using operators, control structures, functions, arrays, and mathematical functions. 8. Build a strong programming foundation applicable to future engineering courses and professional practice.

9. Teaching and Learning Strategies

Strategy	The main strategy adopted in delivering this course is to encourage active student participation through lectures, laboratory sessions, practical programming exercises, assignments, and discussions. Students are guided to develop logical thinking and problem-solving skills through algorithm design, flowcharts, and C++ programming applications. Learning is reinforced through continuous assessment, laboratory activities, homework assignments, and practical examples solved collaboratively during class sessions.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	6	Identify computer components and IT concepts Understand computer classifications	Introduction to Computer, Hardware and IT Types of Computers	Lectures & Lab	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	6	Explain CPU, memory and input/output devices and networking concepts	CPU, Memory and I/O Networks	Lectures & Lab	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	6	Understand system buses and storage devices And Understand Microsoft office Develop	Buses, BIOS and Storage Introduction to Microsoft office programs	Lectures & Lab	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	6	Explain the basic concepts of algorithms and flow charts	Computer Languages, Flowcharts and Algorithms	Lectures & Lab	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	6	Explain the basic concepts of C++ programming language and its data types	Introduction to C++, Data Types	Lectures & Lab	Quizzes Assignments Projects Report Midterm Exam Final Exam

Week 6	6	Apply a simple program in C++. Apply C++ operators	Simple program in C++ C++ Operators	Lectures & Lab	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	6	Mid exam	Midterm Exam	Lectures & Lab	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	6	Apply logical operators in programming	Logical Operators	Lectures & Lab	Quizzes Assignments Projects Report Final Exam
Week 9	6	Program control in C++ (if statement and Switch-Case Statement)	If Statement and Switch-Case Statement	Lectures & Lab	Quizzes Assignments Projects Report Final Exam
Week 10	6	Implement looping structures (For loops and do - while Loop statements)	For Loops and Do-While Loops	Lectures & Lab	Quizzes Assignments Projects Report Final Exam
Week 11	6	Apply advanced loop control mechanism	Jump Statements, Goto and Infinite Loops	Lectures & Lab	Quizzes Assignments Projects Report Final Exam
Week 12	6	Utilize built-in functions in programming	Mathematical and String Functions in C++	Lectures & Lab	Quizzes Assignments Projects Report Final Exam
Week 13	6	Create and manipulate arrays	One-Dimensional and Two-Dimensional Arrays	Lectures & Lab	Quizzes Assignments Projects Report Final Exam
Week 14	6	Design modular programs using functions	Functions in C++	Lectures & Lab	Quizzes Assignments Projects Report Final Exam
Week 15	6	Solve integrated	Advanced Programming Problems	Lectures & Lab	Quizzes Assignments

		programming problems			Projects Report Final Exam

11. Course Evaluation

Quizzes 10% (10)
Assignments 5% (5)
Homework 5% (5)
Projects 10% (10)
Report 10% (10)
Midterm Exam 10% (10)
Final Exam 50% (50)
Total 100% (100)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Required Textbooks** 1. Gordon B. Davis, *Introduction to Computers*. 2. Herbert Schildt, *Borland C++ Builder: The Complete Reference*. 3. Herbert Schildt, *C/C++ Programmer's Reference*.
Main references (sources)	1. Paul Deitel & Harvey Deitel, *C++ How to Program*, 10th Edition. 2. Walter Savitch, *Problem Solving with C++*, 10th Edition. 3. Stanley B. Lippman & Josée Lajoie, *C++ Primer*.
Recommended books and references (scientific journals, reports…)	1. Slobodan Dmitrović, *Modern C++ for Absolute Beginners*. 2. Ira Pohl, *C++ by Dissection*. 3. Additional programming references and scientific resources related to C++ and computer fundamentals.
Electronic References, Websites	1. https://link.springer.com/book/10.1007/978-1-4842-6047-0 2. C++ Primer Online Resources. Additional online learning materials related to computer fundamentals and C++ programming.

Course Description Form

1. Course Name:
DC Electrical Circuits
2. Course Code:
DCC104
3. Semester / Year:
First Semester/ First year
4. Description Preparation Date:
1-6-2026
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total)
175 hrs./175Units
7. Course administrator's name (mention all, if more than one name)
Lecturer Dr. OMAR MUNAF TAWFEEQ Email: omar.m.tawfeeq@aliraqia.edu.iq
8. Course Objectives

Course Objectives	1. To develop problem solving skills and understanding of circuit theory through the application of techniques. 2. To understand voltage, current and power from a given circuit. 3. This course deals with the basic concept of electrical circuits. 4. To understand Ohm's Law 5. To understand Kirchhoff's current and voltage Laws problems. 6. To perform mesh and Nodal analysis. 7. To perform Thévenin theorem Norton theorem and maximum power transfer theorem 8. To develop problem solving skills and understanding Superposition theorem , Millman's theorem, substitution theorem, reciprocity theorem , Source Transformation

9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
Week 1	6	Understand basic electrical concepts and units used in DC circuits.	Basic concepts, systems of units, charge, current, current density, voltage, power, efficiency.	Lectures	Quizzes, Assignments, Projects, Report, Midterm Exam, Final Exam
Week 2	6	Identify circuit elements and different types of electrical sources.	Circuit elements, independent and dependent sources, source transformation, renewable energy sources.	Lectures	Quizzes, Assignments, Projects, Report Midterm Exam, Final Exam
Week 3	6	Apply Ohm's Law and analyze simple DC circuits.	Ohm's Law, temperature effects on resistance, nodes, branches, loops.	Lectures	Quizzes, Assignments, Projects, Report Midterm Exam, Final Exam
Week 4	6	Analyze equivalent resistance networks.	Series circuits, parallel circuits, series-parallel combinations.	Lectures	Quizzes, Assignments, Projects, Report Midterm Exam, Final Exam
Week 5	6	Simplify complex resistor networks.	Delta (Δ) and Star (Y) transformations, equivalent resistance applications.	Lectures	Quizzes, Assignments, Projects, Report Midterm Exam, Final Exam
Week 6	6	Apply Kirchhoff's Laws to solve electrical circuits.	Kirchhoff's Current Law (KCL), Kirchhoff's Voltage Law (KVL), circuit analysis.	Lectures	Quizzes, Assignments, Projects, Report Midterm Exam, Final Exam
Week 7	6	Solve DC circuits using node-voltage methods.	Nodal Analysis techniques and applications.	Lectures	Quizzes, Assignments, Projects, Report Midterm Exam, Final Exam
Week 8	6	Solve DC circuits using loop-current methods.	Mesh Analysis techniques and applications.	Lectures	Quizzes, Assignments, Projects, Report Midterm Exam, Final Exam
Week 9	6	Demonstrate understanding of material covered in Weeks 1–8.	Mid-Term Examination.	Examination	Midterm Exam
Week 10	6	Apply network theorems in	Thévenin Theorem and Norton Theorem.	Lectures	Quizzes, Assignments,

		circuit simplification.			Projects, Report Final Exam
Week 11	6	Determine optimum power conditions in DC circuits.	Maximum Power Transfer Theorem and applications.	Lectures	Quizzes, Assignments, Projects, Report Final Exam
Week 12	6	Analyze circuits using advanced network theorems.	Superposition Theorem, Source Transformation.	Lectures	Quizzes, Assignments, Projects, Report Final Exam
Week 13	6	Apply additional circuit simplification methods.	Millman's Theorem, Substitution Theorem, Reciprocity Theorem.	Lectures	Quizzes, Assignments, Projects, Report Final Exam
Week 14	6	Analyze transient behavior in DC circuits.	Capacitors and Inductors in DC Circuits.	Lectures	Quizzes, Assignments, Projects, Report Final Exam
Week 15	6	Review and integrate all course concepts.	Preparatory Week and Comprehensive Review for Final Examination.	Lectures / Review Sessions	Final Exam

11. Course Evaluation

Quizzes (2) 10% (10)
Assignments (2) 10% (10)
Projects (1) 10% (10)
Report (1) 10% (10)
Midterm Exam (1) 10% (10)
Final Exam 50% (50)

12. Learning and Teaching Resources

Required textbooks (curricular books)	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education
Recommended Texts	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.
Electronic References, Websites	https://www.coursera.org/browse/physical-science-and-engineering/electricalengineeringhttps://site.unibo.it/semiconductor-physics/en

Course Description Form

1. Course Name:	
Mathematics I	
2. Course Code:	
MAT103	
3. Semester / Year:	
First Semester/ First year	
4. Description Preparation Date:	
1−6−2026	
5. Available Attendance Forms:	
Physically	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5hrs/5Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Asst. Prof. Dr. Qasim Hadi Kareem Email: qasim.h.kareem@aliraqia.edu.iq	
8. Course Objectives	
Course Objectives	1- Define and analyze different types of functions, determine their domain and range, and explore their graphical representations. 2- Evaluate limits of functions, understand the concept of continuity, and apply these principles in mathematical problem-solving. 3- Compute derivatives of algebraic and transcendental functions, understand their geometric and physical interpretations, and apply them to real-world problems. 4- Perform definite and indefinite integration, understand the Fundamental Theorem of Calculus, and apply integration techniques in various applications. 5- Understand matrix operations, including addition, multiplication, and inversion, and apply matrices in solving systems of linear equations.
9. Teaching and Learning Strategies	
Strategy	The course adopts an active and student-centered learning approach that emphasizes conceptual understanding, problem-solving, and practical engineering applications of calculus. Teaching methods include interactive discussions, collaborative activities, problem-based learning, and the use of technology tools to enhance visualization and analysis. Student performance is evaluated through exams, assignments, projects, and quizzes, while office hours and tutorials provide additional academic support and guidance.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
Week 1	5	Understand and apply fundamental calculus concepts, to solve mathematical and engineering problems	Matrices and Determinants, Complex numbers	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 2	5	Apply critical thinking and appropriate mathematical techniques to analyze and solve problems.	Polar Coordinates	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 3	5	Understand and apply fundamental calculus concepts, to solve mathematical and engineering problems	Inequalities, absolute value, function, domain, and range	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 4	5	Understand and apply fundamental calculus concepts, to solve mathematical and engineering problems	Even and odd function, symmetry, Combining functions, composition functions	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 5	5	Understand and apply fundamental calculus concepts, to solve mathematical and engineering problems	Shifting graphs, trigonometric functions	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 6	5	Apply critical thinking and appropriate mathematical techniques to analyze and solve problems.	Trigonometric graphs and identities	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 7	5	Understand and apply fundamental calculus concepts, to solve	Limits, limit at infinity	Lectures	Quizzes Assignments Report Midterm Exam

		mathematical and engineering problems			Final Exam
Week 8	5	Apply critical thinking and appropriate mathematical techniques to analyze and solve problems.	Differentiation, Application of Differentiation, Max. and Min. of Function	Lectures	Quizzes Assignments Report Final Exam
Week 9	5	Demonstrate academic integrity, accuracy, and responsibility in mathematical problem-solving and engineering applications.	Integration, Application of definite integral, Area between two curves	Lectures	Quizzes Assignments Report Final Exam
Week 10	5	Work collaboratively to solve mathematical and engineering-related tasks.	Inverse functions, Logarithms, The exponential function	Lectures	Quizzes Assignments Report Final Exam
Week 11	5	Apply critical thinking and appropriate mathematical techniques to analyze and solve problems.	Integration Techniques: Trigonometric substitutions and Integration involving ax^2+bx+c	Lectures	Quizzes Assignments Report Final Exam
Week 12	5	Apply critical thinking and appropriate mathematical techniques to analyze and solve problems.	Integration Techniques: integration by parts, power of sine and cosine	Lectures	Quizzes Assignments Report Final Exam
Week 13 &14	5	Understand and apply fundamental calculus concepts, to solve mathematical and engineering problems	L'Hôpital's rule	Lectures	Quizzes Assignments Report Final Exam

11. Course Evaluation

Quizzes 20% (20)
Assignments 10% (10)
Report 10% (10)
Midterm Exam
10% (10)
Final Exam

50% (50)	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	"Thomas Calculus" G. Thomas, M. Weir, et al., 14th edition, 2017.
Main references (sources)	"Thomas Calculus" G. Thomas, M. Weir, et al., 14th edition, 2017.
Recommended books and references (scientific journals, reports…)	"Engineering Mathematics", by Jo Bird, 8th edition, Elsevier Ltd., 2017.
Electronic References, Websites	http://www.electronics-tutorials.ws/combination

Course Description Form

1. Course Name:
Digital techniques
2. Course Code:
DCT125
3. Semester / Year:
Second Semster/ First year
4. Description Preparation Date:
25-6-2026
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total)
8hrs/8Units
7. Course administrator's name (mention all, if more than one name)
Name: Asst. lec. Shahad Talib Armoot Email: shahadtalibarmoot@aliraqia.edu.iq
8. Course Objectives

Course Objectives	1. To understand the concepts of different number systems (Binary, Octal, Hexadecimal, BCD), mathematical conversions between them, and performing binary arithmetic operations. 2. To understand the fundamental laws of Boolean Algebra and De Morgan's theorems to analyze digital logic circuits. 3.To develop problem-solving skills and the ability to simplify complex logic functions using Karnaugh Maps(K-Maps) to minimize the number of electronic gates required . 4. Introducing the basic principles and design of Combinational Circuits, including full adders, multiplexers, decoders, and encoders. 5. Introducing the basic principles of Sequential Circuits, studying the structure and characteristics of Flip-Flops as the core building blocks of digital memory.

9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials, and by considering types of practical engineering laboratory

	experiments involving digital logic implementation activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	8	Understand and be able to apply digital logic concepts.	introduction to digital systems, Number systems (Binary, Decimal), and conversions.	Lectures & Lab	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	8	Understand and be able to apply digital logic concepts.	Number systems (Octal, Hexadecimal) and direct/indirect conversion methods	Lectures & Lab	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	8	Understand and be able to apply digital logic concepts.	Binary Arithmetic: Basic arithmetic operations, and complements (1's&2's Complement).	Lectures & Lab	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	8	Understand and be able to apply digital logic concepts.	Digital Codes: BCD, Gray Code, and conversions between different codes	Lectures & Lab	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	8	Understand and be able to apply digital logic concepts.	Basic and derived logic gates (AND, OR, NOT, NAND, NOR) and their Truth Tables.	Lectures & Lab	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	8	Understand and be able to apply physical electronic concepts.	Energy distribution of electrons, Fermi level, Semiconductor materials	Lectures & Lab	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	8	Understand and be able to apply digital logic concepts.	Comparator logic gates (XOR, XNOR) and implementation using Universal Gates.	Lectures & Lab	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	8	Understand and be able	Boolean Algebra: Basic theorems, postulates, and De Morgan's laws.	Lectures & Lab	Quizzes Assignments

		to apply digital logic concepts.			Projects Report Final Exam
Week 9	8	Analyze and simplify complex logic functions.	four-variable Karnaugh Maps (4-Variables, K-Map) and Don't Care Conditions.	Lectures & Lab	Quizzes Assignments Projects Report Final Exam
Week 10	8	Design and analyze combinational digital circuits.	Combinational Circuits: Half Adder and Full Adder design and implementation.	Lectures & Lab	Quizzes Assignments Projects Report Final Exam
Week 11	8	Design and analyze combinational digital circuits.	Subtractor circuits (Half/Full Subtractor) and Digital Comparators.	Lectures & Lab	Quizzes Assignments Projects Report Final Exam
Week 12	8	Design and analyze combinational digital circuits.	Decoders, Encoders, and applications with 7-Segment Displays.	Lectures & Lab	Quizzes Assignments Projects Report Final Exam
Week 13 &14	8	Understand and design sequential digital circuits and memory systems..	Multiplexers and Demultiplexers. Introduction to Sequential Circuits and Latches/Flip-Flops (SR, JK, D, T).	Lectures & Lab	Quizzes Assignments Projects Report Final Exam

11. Course Evaluation

Quizzes 10% (10)
Assignments 10% (10)
Projects 10% (10)
Report 10% (10)(Weekly engineering laboratory reports)
Midterm Exam
10% (10)
Final Exam
50% (50)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Thomas L F Floyd digital fundamental
Main references (sources)	M. morris mano . "digital logic and computer design M. morris mano "digital design ,Pearson education Asia.

Course Description Form

1. Course Name:	
Mathematics II	
2. Course Code:	
MAT121	
3. Semester / Year:	
Second Semester/ First year	
4. Description Preparation Date:	
1-6-2026	
5. Available Attendance Forms:	
Physically	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5hrs/5Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Asst. Prof. Dr. Qasim Hadi Kareem Email: qasim.h.kareem@aliraqia.edu.iq	
8. Course Objectives	
Course Objectives	1- Analyze and perform operations with vectors in 2D and 3D space, including dot and cross products. 2- Determine areas of various geometric objects using calculus and vector techniques. 3- Apply formulas to find distances between points and lines/planes in space. 4- Formulate and interpret equations of lines and planes in space. 5- Evaluate convergence and divergence of sequences and series. 6- Apply partial derivatives, chain rule, and gradient vectors to solve optimization and modeling problems. 7- Interpret gradient vectors geometrically and in applications.
9. Teaching and Learning Strategies	
Strategy	The course adopts an active and student-centered learning approach that emphasizes conceptual understanding, problem-solving, and practical engineering applications of calculus II. Teaching methods include interactive discussions, collaborative activities, problem-based learning, and the use of technology tools to enhance visualization and analysis. Student performance is evaluated through

	exams, assignments, projects, and quizzes, while office hours and tutorials provide additional academic support and guidance.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	5	Understand and apply vector calculus and multivariable calculus concepts to solve mathematical and engineering problems	Introduction to vectors, vector representation, vector operation, dot product, cross product, triple product,	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 2	5	Understand and apply vector calculus and multivariable calculus concepts to solve mathematical and engineering problems	Equation of line and planes in space, intersection planes,	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 3	5	Understand and apply vector calculus and multivariable calculus concepts to solve mathematical and engineering problems	Vector functions and their derivatives, curvature	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 4	5	Understand and apply vector calculus and multivariable calculus concepts to solve mathematical and engineering problems	unit normal vector, binomial vector, torsion,	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 5	5	Understand and apply vector calculus and multivariable calculus concepts to solve mathematical and engineering problems	Tangent and normal component	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 6	5	Employing critical thinking and problem-solving skills	Partial derivatives: first order partial derivatives, Higher order partial derivatives	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 7	5	Analyzing results and applying mathematical reasoning	Chain rule, wave equation, Laplace equation, total differential+ Midterm Exam	Lectures	Quizzes Assignments Report Midterm Exam Final Exam

Week 8	5	Analyzing results and applying mathematical reasoning	Maxima, minima, and saddle points: case 1, case 2, max and min with constrains	Lectures	Quizzes Assignments Report Final Exam
Week 9	5	Analyzing results and applying mathematical reasoning	Maxima, minima, and saddle points: case 1, case 2, max and min with constrains	Lectures	Quizzes Assignments Report Final Exam
Week 10	5	Analyzing results and applying mathematical reasoning	Gradients, directional derivative and tangent planes	Lectures	Quizzes Assignments Report Final Exam
Week 11	5	Analyzing results and applying mathematical reasoning	Gradients, directional derivative and tangent planes	Lectures	Quizzes Assignments Report Final Exam
Week 12	5	Demonstrate accuracy, academic integrity, and professional responsibility in mathematical analysis and problem-solving, recognizing their importance in engineering practice	Sequence and infinite series: power series	Lectures	Quizzes Assignments Report Final Exam
Week 13 &14	5	Demonstrate accuracy, academic integrity, and professional responsibility in mathematical analysis and problem-solving, recognizing their importance in engineering practice	Sequence and infinite series: power series	Lectures	Quizzes Assignments Report Final Exam

11. Course Evaluation

Quizzes 20% (20)
Assignments 10% (10)
Report 10% (10)
Midterm Exam
10% (10)
Final Exam
50% (50)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	"Thomas Calculus" G. Thomas, M. Weir, et al., 14th edition, 2017.
Main references (sources)	"Thomas Calculus" G. Thomas, M. Weir, et al., 14th edition, 2017.
Recommended books and references (scientific journals, reports…)	"Engineering Mathematics", by Jo Bird, 8th edition, Elsevier Ltd., 2017.
Electronic References, Websites	http://www.electronics-tutorials.ws/combination

Course Description Form

1. Course Name:
Engineering drawing
2. Course Code:
EDR122
3. Semester / Year:
Second Semster/ First year
4. Description Preparation Date:
1-6-2026
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total)
42hrs/2Units
7. Course administrator's name (mention all, if more than one name)
Name: Dr waleed Salman Email: waleed.alzanganawee@aliraqia.edu.iq
8. Course Objectives

Course Objectives	1. The aim of this module is to provide students with a comprehensive understanding of engineering drawing principles and techniques. It aims to develop their skills in creating and interpreting technical drawings, which are essential in the field of engineering. The module also aims to enhance students' spatial visualization abilities and their understanding of the relationship between 2D representations and 3D objects. 2. Describing the AutoCAD program and its icons, knowing what's new in AutoCAD version. 3. The students will have skills to use that's program and drawing any things (2D). 4. Reading plans of projects. 5. How to make show for them projects. 6. Auto desk AutoCAD software provide powerful, integrated 2D modeling, drawing, and layers tools that enable designers to focus more energy on creative, rather than technical challenges

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module, a combination of project-based learning, lectures, and group discussions will be utilized to create an engaging learning environment. Students will apply engineering drawing principles and techniques to real-world scenarios,

	participate in interactive lectures using visual aids and examples, collaborate in group discussions to analyze and problem-solve, engage in practical exercises and workshops to develop technical drawing skills with traditional tools and CAD software, and conduct independent study.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	3	Demonstrate an understanding of the principles and conventions of engineering drawing.	Principle of engineering drawing	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	3	Interpret and analyze technical drawings, including dimensions and annotations.	Sketching techniques and line types & Scaling, dimensioning, and labeling	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	3	Interpret and analyze technical drawings, including dimensions and annotations.	Principles of orthographic projection	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	3	Apply appropriate techniques to create accurate and precise engineering drawings.	Principles of orthographic projection	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	3	Demonstrate an understanding of the principles and conventions of engineering drawing.	Multi-view drawings in orthographic pro	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	3	Interpret and analyze technical drawings, including dimensions and	Multi-view drawings in orthographic pro	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam

		annotations.			
Week 7	3	Demonstrate an understanding of the principles and conventions of engineering drawing.	Sectional views and conventions	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	3	Apply appropriate techniques to create accurate and precise engineering drawings.	Sectional views and conventions	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	3	Demonstrate an understanding of the principles and conventions of engineering drawing.	Introduction to isometric projections	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	3	Apply appropriate techniques to create accurate and precise engineering drawings.	Isometric drawing techniques and isometric scales	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	3	Interpret and analyze technical drawings, including dimensions and annotations.	Isometric views of objects and assemblies Extracting 2D Drawings form Isometric drawing	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	3	Learn drawing skills by AutoCAD, Increase the student's imagination by AutoCAD.	AutoCAD program	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13 &14	3	Learn to read construction plans by AutoCAD.	AutoCAD program	Lectures	Quizzes Assignments Projects Report Final Exam

11. Course Evaluation

Quizzes 15% (15)
Assignmnts 20% (20)
Report 5% (5)
Midterm Exam

10% (10) **Final Exam** 50% (50)	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Manual of engineering drawing - Simmons C.H., Maguire D. E.
Main references (sources)	Autodesk AutoCAD 2021: Learn CAD With Ease (For
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	https://www.autodesk.com/ Grading

Course Description Form

1. Course Name:
Principles of Mechanical Engineering
2. Course Code:
MEC124
3. Semester / Year:
Second Semster/ First year
4. Description Preparation Date:
1-6-2026
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total)
14hrs/2Units
7. Course administrator's name (mention all, if more than one name)
Name: Dr waleed Salman Email: waleed.alzanganawee@aliraqia.edu.iq
8. Course Objectives

Course Objectives	1. Understand the fundamental principles of mechanical engineering. 2. Learn basic concepts of forces, motion, and energy. 3. Develop knowledge of engineering materials and their properties. 4. Understand mechanical systems and machine components. 5. Apply engineering principles to solve practical problems. 6. Develop analytical and technical problem-solving skills. 7. Gain awareness of engineering design and manufacturing processes. 8. Use engineering calculations and technical drawings effectively. Prepare for further study and applications in mechanical engineering.
9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encourage

	students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	2	Apply principles of mathematics, science, and engineering to solve mechanical engineering problems.	Units and Measurement Systems (1): The SI (Metric) System, the British/Imperial System. Understanding common units of length, mass, force.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	2	Identify, formulate, and solve mechanical engineering problems by applying principles of engineering, science, and mathematics	Resultant of Forces (2): Force Systems, Principle of Physical Independence of Forces, Resultant of Forces	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	2	Apply principles of mathematics, science, and engineering to solve mechanical engineering problems.	Equilibrium (3): Moment of a force.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	2	Identify, formulate, and solve mechanical engineering problems by applying principles of engineering, science, and mathematics	Equilibrium (3): Moment of a force.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	2	Apply principles of mathematics, science, and engineering to solve mechanical engineering problems.	Equilibrium (4): Equilibrium and the Free-Body Diagram and Analysis of trusses, Equilibrium	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam

Week 6	2	An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics	Equilibrium (4): Equilibrium and the Free-Body Diagram and Analysis of trusses, Equilibrium	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	2	An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics	Friction (5): Static Friction, Kinetic Friction	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	2	Identify, formulate, and solve mechanical engineering problems by applying principles of engineering, science, and mathematics	Friction (5): Static Friction,	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	2	Identify, formulate, and solve mechanical engineering problems by applying principles of engineering, science, and mathematics	Friction (5): Kinetic Friction	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	2	Identify, formulate, and solve mechanical engineering problems by applying principles of engineering, science, and mathematics	Centroid of mass (6): Moment of Inertia	Lectures	Quizzes Assignments Projects Report Final Exam

Week 11	2	An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics	Centroid of mass (6): Moment of Inertia	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	2	Identify, formulate, and solve mechanical engineering problems by applying principles of engineering, science, and mathematics	Force, mass and acceleration, Newton's 2'nd law.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13 &14	2	Identify, formulate, and solve mechanical engineering problems by applying principles of engineering, science, and mathematics	Force, mass and acceleration, Newton's 2'nd law.	Lectures	Quizzes Assignments Projects Report Final Exam

11. Course Evaluation

Quizzes 15% (15)
aAssignments 15% (15)
Report 10% (10)
Midterm Exam
10% (10)
Final Exam
50% (50)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	R. C. Hibbeler, Engineering Mechanics: STATICS (SI Edition), Prentice Hall 2004.
Main references (sources)	J. L. Meriam and L. G. Kraige, 'Engineering Mechanics: Statics (V.1), 7th edition, Wiley 2012.
Recommended books and references (scientific journals, reports…)	Daniel W. Baker, William Haynes Engineering Statics Open and Interactive
Electronic References, Websites	https://engineeringstatics.org/Chapter_01.html

Course Description Form

1. Course Name:
Engineering Economics
2. Course Code:
EEC205
3. Semester / Year:
First Semester/ Second Year
4. Description Preparation Date:
1-6-2026
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total)
75 hrs. / 75 Units
7. Course administrator's name (mention all, if more than one name)
Lecturer Dr. OMAR MUNAF TAWFEEQ Email: omar.m.tawfeeq@aliraqia.edu.iq
8. Course Objectives

Course Objectives	1. To introduce students to the principles and applications of engineering economics. 2. To develop the ability to evaluate engineering alternatives based on economic criteria. 3. To understand the concepts of interest, equivalence, and the time value of money. 4. To perform present worth, annual worth, and future worth analyses. 5. To analyse cash flow diagrams and economic decision-making problems. 6. To evaluate investment projects using economic methods. 7. To understand depreciation, taxation, inflation, and replacement analysis. 8. To develop decision-making skills for engineering and industrial projects.

9. Teaching and Learning Strategies

Strategy	The main strategy adopted in delivering this module is to encourage students to participate actively in solving engineering economic problems and case studies. This will be achieved through lectures, classroom discussions, practical examples, assignments, and project-based learning activities that connect economic principles with real engineering applications.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	4	Understand the role of economics in engineering decisions.	Introduction to Engineering Economics and Economic Decision Making	Lectures	Quizzes, Assignments, Midterm, Final Exam
Week 2	4	Explain the principles of cost estimation and economic analysis.	Cost Concepts and Cost Estimation	Lectures	Quizzes, Assignments
Week 3	4	Understand the time value of money.	Interest, Equivalence, and Economic Equivalence	Lectures	Quizzes, Assignments
Week 4	4	Calculate simple and compound interest.	Simple Interest and Compound Interest	Lectures	Quizzes, Assignments
Week 5	4	Analyze cash flow diagrams.	Cash Flow Analysis and Economic Modeling	Lectures	Quizzes, Assignments
Week 6	4	Apply present worth techniques.	Present Worth Analysis	Lectures	Quizzes, Assignments
Week 7	4	Apply annual worth methods.	Annual Worth Analysis	Lectures	Quizzes, Assignments
Week 8	4	Apply future worth methods.	Future Worth Analysis	Lectures	Quizzes, Assignments
Week 9	4	Demonstrate understanding of previous topics.	Mid-Term Examination	Examination	Midterm Exan
Week 10	4	Compare engineering alternatives.	Rate of Return Analysis	Lectures	Quizzes, Assignments

Week 11	4	Evaluate project feasibility.	Benefit-Cost Analysis	Lectures	Quizzes, Assignments
Week 12	4	Understand depreciation methods.	Depreciation and Asset Valuation	Lectures	Quizzes, Assignments
Week 13	4	Analyze inflation effects.	Inflation and Economic Decision Making	Lectures	Quizzes, Assignments
Week 14	4	Evaluate equipment replacement decisions.	Replacement and Retention Analysis	Lectures	Quizzes, Assignments
Week 15	4	Integrate course concepts and prepare for final assessment.	Comprehensive Review and Final Exam Preparation	Review Sessions	Final Exam

11. Course Evaluation

Quizzes (2) 10% (10)
Assignments (2) 20% (20)
Projects (1) 10% (10)
Midterm Exam (1) 10% (10)
Final Exam 50% (50)

12. Learning and Teaching Resources

Required textbooks (curricular books)	Leland Blank & Anthony Tarquin, McGraw-Hill Education.
Recommended Texts	Chan S. Park, Pearson Education.
Electronic References, Websites	• MIT OpenCourseWare – Engineering Economics • Coursera – Engineering and Economics Courses • Khan Academy – Finance and Capital Markets

Course Description Form

1. Course Name:
DC Machines and Transformers
2. Course Code:
DCM204
3. Semester / Year:
First Semester / Second Year
4. Description Preparation Date:
24-6-2026
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total)
8 hrs / 8 Units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Ali Kadim Email: ali.k.hintosh@aliraqia.edu.iq
8. Course Objectives

Course Objectives	1. To introduce the fundamental concepts of electro-mechanical energy conversion and magnetic circuits. 2. To analyze magnetic flux, flux density, magnetizing force, permeability, reluctance, and their analogy with electrical circuits. 3. To explain the construction, working principle, emf equation, characteristics, losses, and efficiency of DC generators. 4. To explain the construction, working principle, back emf, torque, speed control, starting, losses, and applications of DC motors. 5. To analyze the operation, equivalent circuit, voltage regulation, losses, efficiency, and tests of single-phase transformers. 6. To understand three-phase transformer construction, connections, parallel operation, load sharing, tap changing, and cooling methods.

9. Teaching and Learning Strategies	
Strategy	The main strategy adopted in delivering this module is to combine theoretical lectures with problem-solving tutorials and practical demonstrations. Students are encouraged to participate in class discussions, solve numerical examples related to magnetic circuits, DC machines, and transformers, analyze phasor diagrams and equivalent circuits, and prepare assignments or reports that strengthen engineering judgment and critical thinking skills.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	8	Explain electro-mechanical energy conversion and	Introduction to electrical machines and transformers; magnetic field, magnetic flux,	Lectures	Quizzes Assignments Projects Report

		basic magnetic circuit quantities.	flux density, permeability, mmf, and reluctance.		Midterm Exam Final Exam
Week 2	8	Analyze magnetic circuits using Ohm's law for magnetic circuits.	Magnetic circuit analysis; series magnetic paths; air gap effects; B-H curve; comparison between electric and magnetic circuits; numerical problems.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	8	Describe DC machine construction and the principle of induced emf.	DC machine construction: yoke, poles, field winding, armature core, armature winding, commutator, brushes, bearings, and generated emf.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	8	Calculate generated emf and identify DC generator types and characteristics.	DC generator working principle, emf equation, separately excited, shunt, series, and compound generators; voltage buildup and characteristics.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	8	Evaluate DC generator performance and commutation problems.	Armature reaction, commutation, interpoles, losses, efficiency, voltage regulation, and applications of DC generators.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	8	Explain DC motor action, back emf, and electromagnetic torque.	DC motor working principle; role of commutator; back emf; armature current; torque equation; shaft torque and power conversion.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	8	Analyze characteristics of different DC motor types.	DC shunt, series, and compound motors; speed-torque characteristics; comparison of generator and motor action; applications.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	8	Apply DC motor starting, speed control, and performance calculations.	DC motor starters, speed control methods, losses, efficiency, testing, braking, and review problems on DC machines.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	8	Explain transformer necessity, construction, and ideal transformer relations.	Single-phase transformer introduction, applications, core and winding construction, working principle, turns ratio, transformation ratio, and emf equation.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	8	Analyze transformer operation under no-load and load conditions.	No-load current, magnetizing current, inrush current, loaded transformer, phasor diagrams, leakage flux, winding resistance, and equivalent circuit.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	8	Determine transformer regulation, efficiency, and test parameters.	Voltage regulation, losses, efficiency, maximum efficiency condition, polarity test, voltage ratio test, open-circuit test, short-circuit test, and back-to-back test.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	8	Describe construction and connections of	Three-phase transformer construction, advantages over a bank of single-phase transformers, core type and shell	Lectures	Quizzes Assignments Projects Report

		three-phase transformers.	type construction, star and delta connections.		Final Exam
Week 13 & 14	8	Analyze three-phase transformer operation in practical power systems.	Parallel operation and load sharing of transformers; zig-zag connection; open-delta and Scott connections; three-winding transformers; tap changers; cooling methods and course review.	Lectures	Quizzes Assignments Projects Report Final Exam

11. Course Evaluation

Quizzes 10% (10)
Lab. 10% (10)
Projects 10% (10)
Report 10% (10)
Midterm Exam 10% (10)
Final Exam 50% (50)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	B.L. Theraja and A.K. Theraja, "A Textbook of Electrical Technology, Vol. II: AC and DC Machines," S. Chand. Stephen J. Chapman, "Electric Machinery Fundamentals," McGraw-Hill.
Main references (sources)	P.S. Bimbhra, "Electrical Machinery," Khanna Publishers. A.E. Fitzgerald, Charles Kingsley, and Stephen D. Umans, "Electric Machinery," McGraw-Hill.
Recommended books and references (scientific journals, reports...)	Lecture notes of DC Machines and Transformers, Electrical Engineering Department, Al-Iraqia University. Scientific articles, technical reports, and manufacturer application notes related to DC machines and transformers.
Electronic References, Websites	https://www.electrical4u.com/ https://www.allaboutcircuits.com/ https://www.nptel.ac.in/

Course Description Form

1. Course Name:
English Language II
2. Course Code:
AEL302
3. Semester / Year:
Second Semster/ Second year
4. Description Preparation Date:
1-9-2025
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total)
2hrs/6Units
7. Course administrator's name (mention all, if more than one name)
Name: Ass. Inst. Sarah Mahmoud Ali Email: sarahmahmoudali@aliraqia.edu.iq
8. Course Objectives

Course Objectives	This course aims to: 1. enable the learner to communicate effectively and appropriately in real-life situations. 2. use English effectively for study purposes across the curriculum. 3.develop and integrate the use of the four language skills, i.e., listening, speaking, writing and reading. 4. develop interest in and appreciation of literature. 5.revise and reinforce structures already learnt. 6.basically, translate from English to Arabic and vice versa.
9. Teaching and Learning Strategies	
Strategies	**1. Lectures**: In-class lectures delivered by the instructor provide the foundational knowledge and theoretical concepts of English language. Lectures can include explanations, demonstrations, and the presentation of examples to illustrate key concepts. **2. Interactive Discussions:** Encourage active participation and engagement through interactive discussions. This can involve asking questions, facilitating group discussions, and encouraging students to share their insights and perspectives on grammar and English activities .

	3. Group team work: Assign groups that require students to apply their knowledge of English language. 4. Online Resources and Multimedia: Provide access to online resources, textbooks, lecture recordings, and interactive multimedia materials that support the learning of English language. These resources can serve as supplementary materials for self-study and reinforce understanding. 5. Formative and Summative Assessments: Incorporate a variety of assessment methods, including quizzes, assignments, lab reports, and examinations, to evaluate students' understanding and progress. Provide constructive feedback to help students improve their knowledge and skills in English language.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	2	**8.** Understand and interpret messages conveyed in person or by telephone.	Introduction & Course Overview Basic Greetings, Self-introduction	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	2	**5.** Present an argument, supporting it with appropriate examples.	Present tense (simple, continuous, perfect)	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	2	2. Deduce the meaning of unfamiliar lexical items in a given context. 3. Consult a dictionary to obtain information on the meaning and use of lexical items.	Electrical terminology	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	2	**8.** Understand and interpret messages conveyed in person or by telephone. **9.** Participate in spontaneous spoken discourse in familiar social situations.	Listening and oral quiz	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam

Week 5	2	**5.** Present an argument, supporting it with appropriate examples. **6.** Use an appropriate style and format to write an essay.	Past tense (simple, continuous, perfect)	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	2	**1.** Anticipate and predict what will come next in a text.. **4.** Compare and contrast ideas and arrive at conclusions. **7.** Distinguish main points from supporting details, and relevant from irrelevant information.	Reading passage (wonders of modern world)	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	2	Midterm Exam			
Week 8	2	**1.** Anticipate and predict what will come next in a text. **2.** Deduce the meaning of unfamiliar lexical items in a given context. **7.** Distinguish main points from supporting details, and relevant from irrelevant information.	Reading about job interviews Electrical terminology	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	2	**2.** Deduce the meaning of unfamiliar lexical items in a given context. **3.** Consult a dictionary to obtain information on the meaning and use of lexical items.	Future tense (simple, continuous, perfect)	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	2	**6.** Use an appropriate style and format to write	Giving opinions	Lectures	Quizzes Assignments Projects

		an essay. **9.** Participate in spontaneous spoken discourse in familiar social situations.			Report Final Exam
Week 11	2	8. Understand and interpret messages conveyed in person or by telephone.	Numbers Modal Verbs	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	2	**8.** Understand and interpret messages conveyed in person or by telephone. **9.** Participate in spontaneous spoken discourse in familiar social situations.	Social Expressions	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13 &14	2	Assignment			Quizzes Assignments Projects Report Final Exam

11. Course Evaluation

Quizzes 10% (10)
Assignment 20% (20)
attendance 10% (10)
Midterm Exam
10% (10)
Final Exam
50% (50)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Soars, L., & Soars, J. (2006). *New Headway Plus: Intermediate Student's Book*. Oxford University Press. Soars, L., & Soars, J. (2006). *New Headway Plus: Intermediate Workbook*. Oxford University Press.
Main references (sources)	Donald A. Neamen, "Semiconductor Physics and Devices: Basic Principles," McGraw-Hill International Edition, Fourth Edition, 2012
Recommended books and references (scientific journals, reports…)	Basic Electrical Engineering Handbooks, IEEE Glossary
Electronic References, Websites	Electrical Engineering Glossary,

Course Description Form

1. Course Name:	
Applied Physics	
2. Course Code:	
APH224	
3. Semester / Year:	
Second Semster/ Second year	
4. Description Preparation Date:	
1-6-2026	
5. Available Attendance Forms:	
Physically	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4hrs/4Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Ass. Prof. Ruaa Muthana Ali Email: ruaamuthanaali@aliraqia.edu.iq	
8. Course Objectives	
Course Objectives	1. To learn the students the basic components in Electric field , Electric flux, Electric displacement. 2. To learn, develop and analyze new forms of solid state physics 3. How to relate the skills and concepts learned from vector analysis to solve Electric. 4. How to use the learned skills to understand, and analyzed the Maxwell's equations. 5. Representation of an interaction of electric field with the matter. 6. Completing static and moving electrical and introducing the student to electrical capacitors and some of their types and the effect of the electric field on them. 7. Studying magnetism and types of magnets. We start with the second part with electromagnetic fields, which is the magnetic field, which is complementary to the electric field in terms of influence. 8. Identifying the magnetic field and how to generate it from the magnet or from the passage of a current with a wire according to the laws of Piot-Savart, as well as Ampere law. 9. Study of the magnetic flux formed by the influence of a magnetic field. 10. Studying the application of magnetic potential, as well as magnetic forces and moments generated as a result of the movement of a positive charge in circular paths.
9. Teaching and Learning Strategies	
Strategy	1-Lectures: Conduct interactive lectures to introduce and explain the fundamental concepts, theories, and principles of each topic. Use visual aids, examples, and demonstrations to enhance understanding and engagement.

	2-Problem-solving Sessions: Organize problem-solving sessions where students can practice solving circuit analysis and design problems related to the module topics. Encourage discussions and collaboration to enhance critical thinking and problem solving skills. 3-Group Projects: Assign group projects that require students to design and build practical systems. 4-Case Studies: Present real-world case studies where students can analyze and evaluate existing systems, circuits, or devices. Discuss the challenges faced, design considerations, and performance trade-offs. 5-Online Resources: Provide access to online resources, such as textbooks, research papers, video tutorials, and interactive learning platforms, to supplement classroom learning and facilitate self-study. 6-Assessments: Conduct regular quizzes, assignments, and exams to assess students' understanding and progress. Include both theoretical and practical components to evaluate their knowledge and application skills. 7-Feedback and Discussions: Provide timely feedback on assignments and assessments, and encourage students to engage in discussions, asking questions, and seeking clarification on concepts that may be challenging.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	4	1. An ability to read and comprehend the effects of Electric field.	Introduction to (EMF)and Vector Analysis and Dot product. Cross product and Cartesian coordinates system,cylindrical coordinates system	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	4	2. An ability both to follow and correctly to analyze the electromagnetic field interaction with the help of boundary condition.	Complete the cylindrical coordinates system, Spherical coordinates system Electrical force and Coulomb's Law , Introduction to Electric field.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	4	2. An ability both to follow and correctly to analyze the electromagnetic field interaction with the help of boundary condition.	The electric field for (point charge, line charge density The electric field for surface charge density and volume charge density)	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	4	3. An understanding of physical behavior of electric and magnetic and the matter.	Electric Flux , Gauss's Law and electric flux density for point charge Application of Gauss's Law	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam

Week 5	4	3. An understanding of physical behavior of electric and magnetic and the matter.	First Maxwell equation, Electric flux density for different distribution charges. The Line Integral and The Potential Field of a(Point Charge,line charge density,surface charge density,volume charge density)	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	4	4. Providing the student with knowledge of the electric field and its effect on the electric charges in a vacuum or on the surface of a conductor.	Potential Gradient and the Electric Dipole, Energy Expended in Moving a Point Charge in an Electric Field. Current and current density in materials and boundary condition for material.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	4	4. Providing the student with knowledge of the electric field and its effect on the electric charges in a vacuum or on the surface of a conductor.	Mid-term Exam + Properties of conductors and the electric field for conductor.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	4	5. Through the course, the student will be able to identify complex issues in the subject and find appropriate solutions to them.	The Dielectric material and boundary condition of dielectric. Poisson's and Laplace's Equations, Examples of the Solution of Laplace's Equation	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	4	5. Through the course, the student will be able to identify complex issues in the subject and find appropriate solutions to them.	The capacitances, the kinds of capacitors, parallel plate capacitors, cylindrical plates capacitors, spherical plates capacitors. The resistance of different plates capacitors, The relaxation time	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	4	6. Developing the student's thinking and feeling and expanding his perception.	The electric field of parallel plate capacitors, cylindrical plate capacitor Introduction for Magnetism, magnetic field intensity and Biot-Savart law for magnetic field	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	4	7. Through understanding the material	Ampere's Circuital Law and the applications.	Lectures	Quizzes Assignments Projects

		and establishing the importance of the material to him and what is its importance in our lives and in all areas of electricity and magnetism.	The magnetic flux density, the Maxwell equation for magnetic flux density		Report Final Exam
Week 12	4	7. Through understanding the material and establishing the importance of the material to him and what is its importance in our lives and in all areas of electricity and magnetism.	Introduction for the magnetic potential and scalar potential. The vector magnetic potential and relationship with current density.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13	4	8. Conducting discussions for students by asking students questions to make students more interactive and allowing for dialogue about what they have learned from the lecture.	The magnetizing force for (moving charge) The magnetic force for another application (line charge (wire conductor), the sheet of charge)	Lectures	Quizzes Assignments Projects Report Final Exam
Week 14	4	8. Conducting discussions for students by asking students questions to make students more interactive and allowing for dialogue about what they have learned from the lecture.	Inductors and Inductances, Magnetic Energy , Magnetic Circuits , Force on Magnetic Materials	Lectures	Quizzes Assignments Projects Report Final Exam

11. Course Evaluation

Quizzes 20% (20)
Assignments 10% (10)
Report 10% (10)
Midterm Exam
10% (10)
Final Exam
50% (50)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Engineering Electromagnetics 8th Edition William H. Hayt
Main referen (sources)	Matthew_N_O_Sadiku_Elements_of_Electromagnetic.
Recommended books and references (scientific journals, reports…)	-
Electronic Referenc Websites	Youtube , google and any link that takes The field of magnetic fields and the electric fields

Course Description Form

1. Course Name:
Electronics 1
2. Course Code:
ELE202
3. Semester / Year:
First Semester/ First year
4. Description Preparation Date:
21-6-2026
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total)
5hrs/5Units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Marwah Malik Hassooni Email: marwah.m.hassooni@aliraqia.edu.iq
8. Course Objectives
Master the DC biasing techniques of BJT amplifiers, including Fixed-Bias, Voltage-Divider, Emitter-Bias, and Collector-Feedback configurations. Analyze the DC load line and determine the Q-point (quiescent point) to ensure proper operation within the active region for both single-stage and multistage circuits. Apply the hybrid-π and re-transistor small-signal models to perform AC analysis of BJT amplifier circuits. Calculate key AC parameters: voltage gain (Av), current gain (Ai), input impedance (Zi), and output impedance (Zo) for various amplifier configurations. Compare the performance characteristics of Common-Emitter, Common-Collector (Emitter Follower), and Common-Base amplifiers in terms of gain, impedance, and phase relationships. Analyze the Darlington pair configuration, understanding its high current gain, high input impedance, and practical applications in signal amplification. Design and simulate multistage BJT amplifier circuits, employing RC coupling, direct coupling, and transformer coupling techniques to achieve overall gain and impedance matching. Examine the loading effects between stages and the overall frequency response of cascaded amplifier systems. Construct and test single-stage, Darlington, and multistage BJT amplifier circuits in the laboratory, verifying DC biasing, AC parameters, and overall gain using oscilloscopes and function generators. Diagnose and troubleshoot common BJT circuit faults, relating practical observations to theoretical models across multiple cascaded stages.
9. Teaching and Learning Strategies
Strategy The course integrates interactive lectures, problem-solving workshops, and hands-on laboratory sessions to develop both analytical and practical competencies in BJT amplifier design. Theoretical concepts are reinforced through simulation exercises and guided lab experiments, emphasizing active learning and immediate feedback. Collaborative tutorials and design challenges foster critical thinking, enabling students to bridge theory with real-world circuit implementation independently.
10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	5	Understand the basic structure and operation of BJT.	Introduction to BJT: NPN/PNP structure, active/cutoff/saturation modes	Lecture	Quiz 1, Assignments
Week 2	5	Analyze DC biasing using Fixed-Bias configuration.	Fixed-Bias circuit: DC analysis, Q-point determination, load line	Lecture + Lab	Lab Work, Report
Week 3	5	Analyze DC biasing using Emitter-Bias and Voltage-Divider Bias.	Emitter-Bias, Voltage-Divider Bias: stability and design considerations	Lecture + Lab	Lab Work, Report
Week 4	5	Analyze DC biasing using Collector-Feedback and other biasing circuits.	Collector-Feedback Bias, miscellaneous biasing configurations	Lecture	Assignments, Report
Week 5	5	Perform DC load line analysis and stability concepts.	DC load line, Q-point stability, bias stabilization techniques	Lecture + Lab	Quiz 2, Lab Work
Week 6	5	Introduce AC small-signal models for BJT.	AC analysis: re-model, hybrid-π model, parameter extraction	Lecture	Assignments
Week 7	5	Analyze Common-Emitter (CE) amplifier AC performance.	CE amplifier: voltage gain, input/output impedance, phase reversal	Lecture + Lab	Lab Work, Report
Week 8	5	Midterm Exam Week	Revision and Midterm Exam	Self-study	Midterm Exam (10%)
Week 9	5	Analyze Common-Collector (CC) amplifier AC performance.	CC (Emitter Follower): characteristics, gain, impedance matching	Lecture + Lab	Quiz 3, Lab Work
Week 10	5	Analyze Common-Base (CB) amplifier AC performance.	CB amplifier: characteristics, gain, impedance, high-frequency response	Lecture	Assignments, Report
Week 11	5	Compare CE, CC, and CB configurations.	Performance comparison: gain, impedance, phase, applications	Lecture + Lab	Lab Work, Report
Week 12	5	Introduce Darlington pair and its AC/DC analysis.	Darlington pair: structure, high current gain, input impedance, applications	Lecture	Assignments
Week 13	5	Analyze multistage BJT amplifiers (RC coupling).	Multistage amplifiers: RC coupling, overall gain, loading effects, cascaded stages	Lecture + Lab	Project (10%), Lab Wor

11. Course Evaluation

Quizzes 10% (10)
Projects 10% (10)
Report 10% (10)
Midterm Exam 10% (10)
Laboratory 10% (10)
Final Exam 50% (50)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Boylestad, Robert L., and Louis Nashelsky. "Electronic Devices and Circuit Theory 11th ed." (2018). Floyd, Thomas L. Electronic devices (electron flow version). Prentice-Hall, Inc., 2007

Recommended books and references (scientific journals, reports...)	Boylestad, Robert L., and Louis Nashels "Electronic Devices and Circuit Theory 11th (2018).
Electronic References, Websites	https://site.unibo.it/semiconductor-physics/en

Course Description Form

1. Course Name:
Probability and Statistics
2. Course Code:
PNS221
3. Semester / Year:
Second Semester/ Second Year
4. Description Preparation Date:
8-6-2026
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total)
100 Hours / 100 Units
7. Course administrator's name (mention all, if more than one name)
Lecturer Dr. OMAR MUNAF TAWFEEQ Email: omar.m.tawfeeq@aliraqia.edu.iq
8. Course Objectives

Course Objectives	1. To introduce students to the fundamental concepts of probability and statistics. 2. To develop the ability to collect, organize, summarize, and interpret data. 3. To understand probability theory and its applications in engineering problems. 4. To analyze random variables and probability distributions. 5. To calculate measures of central tendency and dispersion. 6. To apply statistical methods in engineering decision-making. 7. To perform hypothesis testing and confidence interval estimation. 8. To develop skills in statistical analysis using practical engineering examples. 9. To prepare students for advanced engineering and research courses requiring statistical techniques.

9. Teaching and Learning Strategies

Strategy	The primary strategy adopted in delivering this module is to encourage students to actively participate in solving statistical and probability problems while strengthening their analytical and quantitative reasoning skills. This will be achieved through lectures, tutorials, practical exercises, classroom discussions, assignments, and real-world engineering applications involving statistical analysis and decision-making.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	3	Understand the role of probability and statistics in engineering.	Introduction to Probability and Statistics	Lectures	Quizzes, Assignments, Midterm Exam, Final Exam
Week 2	3	Organize and summarize data effectively.	Data Collection and Descriptive Statistics	Lectures and Tutorials	Quizzes, Assignments
Week 3	3	Calculate measures of central tendency.	Mean, Median, and Mode	Lectures and Tutorials	Quizzes, Assignments
Week 4	3	Calculate measures of variability.	Range, Variance, and Standard Deviation	Lectures and Tutorials	Quizzes, Assignments
Week 5	3	Understand basic probability concepts.	Probability Theory and Sample Space	Lectures	Quizzes, Assignments
Week 6	3	Analyze relationships between events.	Conditional Probability and Independent Events	Lectures and Tutorials	Quizzes, Assignments
Week 7	3	Apply probability rules.	Bayes' Theorem and Probability Applications	Lectures and Tutorials	Quizzes, Assignments
Week 8	3	Understand discrete probability distributions.	Binomial and Poisson Distributions	Lectures	Quizzes, Assignments
Week 9	3	Demonstrate understanding of material covered in Weeks 1–8.	Mid-Term Examination	Examination	Midterm Exam
Week 10	3	Understand continuous probability distributions.	Normal Distribution and Standard Scores	Lectures and Tutorials	Quizzes, Assignments
Week 11	3	Apply sampling techniques.	Sampling Methods and Sampling Distributions	Lectures	Quizzes, Assignments
Week 12	3	Estimate population parameters.	Confidence Intervals	Lectures and Tutorials	Quizzes, Assignments

Week 13	3	Conduct statistical inference.	Hypothesis Testing	Lectures and Tutorials	Quizzes, Assignments
Week 14	3	Analyze relationships between variables.	Correlation and Regression Analysis	Lectures and Tutorials	Quizzes, Assignments
Week 15	3	Integrate and review all course concepts.	Comprehensive Review and Final Examination Preparation	Review Sessions	Final Exam

11. Course Evaluation

Quizzes (2) – 10% (10 Marks)
Assignments (2) – 20 % (20 Marks)
Statistical Project / Report – 10% (10 Marks)
Midterm Examination – 10% (10 Marks)
Final Examination – 50% (50 Marks)

12. Learning and Teaching Resources

Required textbooks (curricular books)	Probability and Statistics for Engineers and Scientists Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, and Keying Ye.
Recommended Texts	• Engineering Statistics Douglas C. Montgomery & George C. Runger. • Introduction to Probability and Statistics for Engineers and Scientists Sheldon M. Ross. • Applied Statistics and Probability for Engineers Douglas C. Montgomery & George C. Runger.
Electronic References, Websites	MIT OpenCourseWare – Probability and Statistics

Course Description Form

1. Course Name:
Arabic
2. Course Code:
ARLA201
3. Semester / Year:
2 Semester 1/ Second year
4. Description Preparation Date:
24-6-2026
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total)
2hrs./2Units
7. Course administrator's name (mention all, if more than one name)
Name: **Ass. Prof. ANWAR QUTAIBA YAHYA** Email: **anwar.q.yahya@aliraqia.edu.iq**
8. Course Objectives

Course Objectives	**1. – Arabic is a means of communication; it carries a message between speakers. For this message to be clear and understandable, its vocabulary must be arranged according to the grammatical structure of the language. Hence, the necessity of teaching grammar in all languages becomes evident.** **2- Students learn writing and expression skills and identify errors to correct pronunciation.** **3- They master correct writing skills by learning spelling rules, especially common mistakes.** **4- They preserve the Arabic language as the language of the Holy Quran.** **5- They learn the fundamental principles of the Arabic language by developing writing, expression, and conversation skills.**

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	2	Understand and apply Arabic grammar rules and appreciate literary texts.	*Surat Yusuf*; A Noble Prophetic Hadith; Parsing the Present Tense Verb (*I'rab al-Fi'l al-Mudari'*).	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	2	Understand and apply Arabic grammar rules and appreciate literary texts	*Surat Al-Isra*; A Noble Prophetic Hadith; Genitive Constructions (*Al-Majrurat*).	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	2	Understand and apply Arabic grammar rules and appreciate literary texts	Dependent Elements (*Al-Tawabi'*); The Poet Al-Mutanabbi.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	2	Understand and apply Arabic grammar rules and appreciate literary texts	Numerals (*Al-'Adad*); The Poet Badr Shakir Al-Sayyab.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	2	Understand and apply Arabic grammar rules and appreciate literary texts	Open Taa and Closed Taa (Taa Marbuta); The Poet Ibn Al-Farid.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	2	Understand and apply Arabic grammar rules and appreciate literary texts	Noun Inflection and Derivation; Mustafa Jamal Al-Din.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	2	Understand and	Solar and Lunar "Lam";	Lectures	Quizzes

		apply Arabic grammar rules and appreciate literary texts	Introduction to the Science of *Badi'* (Rhetorical Embellishment).		Assignments Projects Report Midterm Exam Final Exam
Week 8	2	Understand and apply Arabic grammar rules and appreciate literary texts	Stages in the Compilation of the Arabic Language; *Alif Layyinah* (Soft Alif).	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	2	Understand and apply Arabic grammar rules and appreciate literary texts	*My School Curriculum*; *Maqayis al-Lughah* and *Al-Sihah*.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	2	Understand and apply Arabic grammar rules and appreciate literary texts	Prose and Its Literary Forms; The Poet Abu Al-Ala Al-Ma'arri.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	2	Understand and apply Arabic grammar rules and appreciate literary texts	Common Linguistic Errors.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	2	Understand and apply Arabic grammar rules and appreciate literary texts	The Letters *Dad* and *Za*; The Poet Muhammad Mahdi Al-Jawahiri.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13	2	Understand and apply Arabic grammar rules and appreciate literary texts	Objects and Other Accusative Constructions (*Al-Mansubat*).	Lectures	Quizzes Assignments Projects Report Final Exam
Week 14 &15	2	Understand and apply Arabic grammar rules, appreciate literary texts, and correctly use punctuation and oral expression in Standard Arabic.	• Lexical and Semantic Dictionaries; The Poet Al-Sharif Al-Radi. • Rules for Writing the *Alif* (Extended *Alif* and Maqsurah *Alif*).	Lectures	Quizzes Assignments Projects Report Final Exam

11. Course Evaluation

Quizzes 10% (10)
Assignments 10% (10)
Projects 10% (10)
Report 10% (10)
Midterm Exam

10% (10) **Final Exam** 50% (50)	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	• *Alfiyyah Ibn Malik* and its Commentaries. • *Sharh Ibn Aqil* (Ibn Aqil's Commentary on the Alfiyyah). • *Jami' al-Durus al-'Arabiyyah* (The Comprehensive Arabic Lessons). • *Dala'il al-I'jaz* (The Proofs of Eloquence). • Poetry collections (Diwans) of Al-Mutanabbi, Muhammad Mahdi Al-Jawahiri, Ibn al-Farid, Badr Shakir al-Sayyab, and Abu al-Ala al-Ma'arri.
Recommended books and references (scientific journals, reports…)	• *Arabic Grammar: Rules and Meanings*. • *A Concise Guide to the Arabic Language for Non-Specialists*. • *Jawahir al-Balaghah* (The Jewels of Rhetoric). • *A Study of Spelling Rules*. • *A Concise Guide to Spelling and Composition Rules*.
Electronic References, Websites	Https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering

Course Description Form

1. Course Name:
Computer Programming
2. Course Code:
CPR223
3. Semester / Year:
Second Semester/ Second year
4. Description Preparation Date:
24-6-2026
5. Available Attendance Forms:
Physically (Offline, In Class)
6. Number of Credit Hours (Total) / Number of Units (Total)
6hrs/6Units
7. Course administrator's name (mention all, if more than one name)
Name: Ass. Prof. Dr Rasha Subhi Ali Email: rasha.s.ali@aliraqia.edu.iq
8. Course Objectives

Course Objectives	1. Understanding the MATLAB environment and its major attributes. 2. Performing basic arithmetic and numerical computations in MATLAB. 3. Learning how to solve problems using algorithms design and implementation. 4. Learning the efficient use of MATLAB GUI. 5. Writing, testing and debugging basic MATLAB programs. 6. Using MATLAB functions and libraries in engineering applications. 7. Data analysis and visualization using MATLAB plotting capabilities. 8. Introduction to Simulink and its application in modeling and simulation. 9. Using MATLAB methods to solve real world problems of electrical engineering. 10. Preparing the students for advanced computational and engineering courses.

11. Teaching and Learning Strategies	
Strategy	This is achieved through the following teaching approach that has been developed for this course, which is the use of active learning on the part of the learners through lectures, discussions, assignments, case studies, and testing. Students will

	learn the skills of computational thinking and engineering problem solving through the application of programming using MATLAB to engineering problems.

12. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	6	Understand MATLAB environment and M-files	MATLAB Introduction and M-File	Lectures & Lab	Classroom Activities
Week 2	6	Variables, Numbers and Functions	Variables, Numbers and Functions	Lectures & Lab	Quizzes, Assignments, Homework
Week 3	6	Arithmetic and Logic Operations	Arithmetic and Logic Operations	Lectures & Lab	Classroom Activities
Week 4	6	Vectors	Vectors	Lectures & Lab	Classroom Activities
Week 5	6	Matrix Understanding matrices and matrix operations in MATLAB	Matrix Operations	Lectures & Lab	Assignments, Homework
Week 6	6	If – Statement	If Statement	Lectures & Lab	Assignments, Homework
Week 7	6	Mid-term Exam Switch-Case Statement	Midterm Exam and Switch-Case Statement	Lectures & Lab	Midterm Exam
Week 8	6	For Loop Statement	For Loop Statement	Lectures & Lab	Quiz and Classroom Activities
Week 9	6	While Loop Statement	While Loop Statement	Lectures & Lab	Questions During Lecture
Week 10	6	Continue and Brake Statement	Continue and Break Statements	Lectures & Lab	Homework and Questions
Week 11	6	Plot Graphics 2D Introduction to 2D	Plot Graphics 2D	Lectures & Lab	Classroom Activities

		plotting and visualization in MATLAB			
Week 12	6	Plot Graphics 3D Extending plotting capabilities to 3D visualizations in	Plot Graphics 3D	Lectures & Lab	Classroom Activities
Week 13	6	Simulink introduction to Simulink for system modeling and simulation in MATLAB	Simulink	Lectures & Lab	Classroom Activities
Week 14	6	Understanding Image Processing in MATLAB	Image Processing	Lectures & Lab	Classroom Activities
Week 15	6	Solving advanced problems	Solving Advanced Problems	Lectures & Lab	Classroom Activities and Final Evaluation

13. Course Evaluation

Quizzes 10% (10)
Assignments 5% (5)
Homework 5% (5)
Projects 10% (10)
Report 10% (10)
Midterm Exam 10% (10)
Final Exam 50% (50)
Total 100% (100)

14. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Required Textbooks** 1. MATLAB for Electrical and Computer Engineering Students and Professionals with Simulink – Roland Priemer. 2. MATLAB Numerical Computing – Tutorials Point.
Main references (sources)	1. BASICS OF AND BEYOND MATLAB – Andrew Knight, 2000.

	2. MATLAB Documentation and User Guides. 3. MATLAB Programming and Numerical Analysis References.
Recommended books and references (scientific journals, reports…)	1. Engineering Applications of MATLAB and Simulink. 2. Scientific papers and technical reports related to numerical computing, simulation, and engineering analysis. 3. MATLAB applications in Electrical Engineering and Signal Processing.
Electronic References, Websites	https://www.mathworks.com/ Self-Paced Online Courses - MATLAB & Simulink http://tutorialspoint.com/matlab/

Course Description Form

1. Course Name:
(Human Rights)
2. Course Code:
3. Semester / Year
Annual System / First Phase
4. Description Preparation Date:
14/7 /2024
5. Available Attendance Forms:
Weekly attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
(60Hr. / 4 Unit)
7. Course administrator's name (mention all, if more than one name)
Name: Assistant Mohammed .Abdulsada Ali **Email: mohammed.bd.ali@aliragia.edu.iq**
8. Course Objectives

Course Objectives	As illustrated below .

General goal //

The importance of human rights revolves around guaranteeing their rights in society, preserving their dignity and ensuring their living at a high standard away from injustice and greed from those of high status.

Special (Behavioral) goals //

1- Every person in life deserves to live in safety and peace.

2- The abolition of slavery to any person who exists in society, whether that person is of high status or an ordinary person.

3- Human rights have made all persons subject to the principle of equality before the law.

4- This equality has brought all persons to the law because of the justice provided by human rights that exist throughout the world.

5- Justice can be used if a person is subjected to any kind of injustice in society.

9. Teaching and Learning Strategies

Strategy	Brainstorming strategy Modeling learning strategy Group work or cooperative learning strategy Discussion strategy Project strategy A strategy for problem solving or problem-based learnin Story strategy. Combining different strategies

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-	2	Knowledge of the law	Definition of the law	Interactive Lecture	Oral and written Examination
2-	2	Know what the right to protection is	The concept of right	Interactive Lecture	Oral and written Examination
3-	2	Knowing the sacred right of man that cannot be violated	The concept of human right	Interactive Lecture	Oral and written Examination
4-	2	Stages of human rights development	The historical development of the idea of human rights	Interactive Lecture	Oral and written Examination
5-	2	Knowledge of human rights in the Renaissance and modern times	The idea of human rights in the Renaissance and the modern era	Interactive Lecture	Oral and written Examination
6-	2	Replay of the month's lectures	Review	Interactive Lecture	Oral and written Examination

7-	2	Knowing the protection provided by Islamic laws	The idea of human rights in Islamic laws	Interactive Lecture	Oral and written Examination
8-	2	The development of thought and its impact on the development of human rights	Intellectual contribution to the development of human rights	Interactive Lecture	Oral and written Examination
9-	2	Knowing the role of philosophical thought in the development of human rights	Intellectual and philosophical contribution to the Renaissance and the early modern era	Interactive Lecture	Oral and written Examination
10-	2	Quick replay of the month's lectures	Review	Interactive Lecture	Oral and written Examination
11-	2	Knowing the position of the international world on freedoms	Types of public rights and freedoms and the position of some international conventions	Interactive Lecture	Oral and written Examination
12-	2	Find out how constitutions dealt with rights and freedoms	Some comparative and Arabic constitutions	Interactive Lecture	Oral and written Examination
13-	2	Knowledge of economic and social rights and freedoms	Economic freedoms and social rights	Interactive Lecture	Oral and written Examination
14-	2	A quick review of the entire curriculum	Comprehensive review	Interactive Lecture	Oral and written Examination
15-	2	A test to know the student's level of understanding of the curriculum	Oral selection	Interactive Lecture	Oral and written Examination
16	2	Knowledge of the content of the Universal Declaration	Human rights in regional rights declarations	Interactive Lecture	Oral and written Examination
17	2	Find out how regional conventions have contributed to the	Human rights in regional conventions	Interactive Lecture	Oral and written Examination

		development of human rights			
18	2	Find out how the constitution dealt with the issue of human rights	Human rights in the Iraqi constitution	Interactive Lecture	Oral and written Examination
19	2	Knowledge of rights and fundamental freedoms of man	Traditional public rights and freedoms	Interactive Lecture	Oral and written Examination
20	2	Comprehensive review	Review	Interactive Lecture	Oral and written Examination
21	2	Knowledge of economic human rights	Economic freedoms	Interactive Lecture	Oral and written Examination
22	2	Knowledge of social human rights	Social rights	Interactive Lecture	Oral and written Examination
23	2	Knowledge of the mechanism and ways to protect human rights	Means of protecting human rights	Interactive Lecture	Oral and written Examination
24	2	Knowing ways to address human rights violations through legislation	Legal means in protecting human rights	Interactive Lecture	Oral and written Examination
25	2	The role of domestic legislation in protecting human rights	Ordinary legislation and its role in protecting human rights	Interactive Lecture	Oral and written Examination
26	2	The role of the judiciary in protecting human rights	Judicial means to protect human rights	Interactive Lecture	Oral and written Examination
27	2	Know the role of the political factor in protecting human rights	Political means to protect human rights	Interactive Lecture	Oral and written Examination
28	2	Replay of class lectures	Comprehensive review	Interactive Lecture	Oral and written Examination

29	2	Quick replay of the curriculum	Comprehensive review	Interactive Lecture	Oral and written Examination
30	2	Knowing the extent to which the student benefited from the course	Oral tests	Interactive Lecture	Oral and written Examination

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.

Daily Preparation	Daily Exam	Oral Exam	Report	Monthly Exam	Written Exam	Total
5	5	5	5	20	60	100

12. Learning and Teaching Resources

Required textbooks (curricular bool if any)	1- Islamic Perspectives on Human Rights 2- The Book of Sectarianism in Islam Sayyid Muhammad Sadiq Al-Sadr 3- College Library 4. Internet
Main references (sources)	
Recommended books and references (scientific journals, reports…)	Virtual court
Electronic References, Websites	Browse the Google network using the desired subject key.

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Course Description Form

1. Course Name:	
Engineering Analysis	
2. Course Code:	
EAN301	
3. Semester / Year:	
First Semster/ First year	
4. Description Preparation Date:	
1-6-2026	
5. Available Attendance Forms:	
Physically	
6. Number of Credit Hours (Total) / Number of Units (Total)	
14hrs/4Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr waleed Salman Email: waleed.alzanganawee@aliraqia.edu.iq	
8. Course Objectives	
Course Objectives	1. Fourier Transform Properties, Convolution Theorem, Power Spectral Density, and Correlation: Students learn signal analysis in the frequency domain, enabling manipulation and analysis of signals based on their frequency components. 2. Signal and Linear Systems: Students understand how signals behave in linear systems, applicable in fields such as telecommunications, control systems, and audio processing. 3. Applications of Fourier Transform: Students explore signal processing applications like image processing, audio compression, and spectral analysis. 4. Laplace Transform: Students gain a powerful tool for analyzing linear time-invariant systems, transforming differential equations into algebraic equations. 5. Laplace Transform Properties and Inversion Techniques: Students learn the properties and techniques for

	inverting Laplace transforms, aiding in complex system analysis and solution of differential equations. 6. Applications of Laplace Transform: Students apply Laplace Transform in circuit analysis, control systems, and signal processing. 7. Z-Transform: Students analyze and process discrete-time signals and systems, studying stability, frequency response, and filtering. 8. Properties of Z-Transform and Inverse Z-Transform: Students understand the properties and inverse transform techniques, enabling accurate manipulation and analysis of discrete-time signals. 9. Analysis of Discrete-Time Systems: Students analyze the behavior of discrete-time systems, applicable in digital signal processing, communications, and control systems. 10. Matrix Analysis: Students explore linear transformations, eigenvalues, eigenvectors, and Laplace transforms of matrices, relevant in electrical circuit analysis and system modeling

9. Teaching and Learning Strategies

Strategy	Interactive learning through discussions, questions, and active student participation. Problem-based learning to develop analytical and problem-solving skills. Practical application of concepts in real-world engineering and scientific problems. Case studies and worked examples to reinforce theoretical understanding. Group work and collaborative activities to promote teamwork, communication, and knowledge sharing.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	2	Develop proficiency in signal analysis using Fourier, Laplace,	Fourier Transform Properties, convolution theorem, power spectral density and correlation	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	2	Apply mathematical and transform	Signal and linear systems.	Lectures	Quizzes Assignments

		techniques to solve real-world engineering problems.			Projects Report Midterm Exam Final Exam
Week 3	2	Enhance advanced problem-solving skills for differential equations and linear systems.	Applications on Fourier Transform.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	2	Enhance advanced problem-solving skills for differential equations and linear systems.	Laplace Transform.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	2	Analyze and model engineering systems, including stability and frequency response.	Laplace transform (existence, convergence, properties, and inversion techniques).	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	2	strengthen mathematical, computational, and programming skills using modern software tools.	Applications (including linear systems, circuit analysis, ordinary differential equations.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	2	Develop proficiency in signal analysis using Fourier, Laplace, and Z-Transforms, as well as matrix methods.	Z-Transform.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	2	Build a strong foundation for advanced studies in signal processing, control systems, communications, and related engineering fields.	Region of convergence, properties of Z-transform, Z-transform pairs.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	2	Develop proficiency in signal analysis using Fourier, Laplace, and Z-Transforms, as well as matrix methods.	The inverse of Z-transform, analysis and discrete-time system, application	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	2	Enhance advanced problem-solving skills for differential	Matrix Analysis.	Lectures	Quizzes Assignments Projects Report

		equations and linear systemsamplifiers, including different classes of operation and output stages			Final Exam
Week 11	2	Enhance advanced problem-solving skills for differential equations and linear systems	Review of matrix theory, linear transformation, Eigen values and Eigen vectors.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	2	Develop proficiency in signal analysis using Fourier, Laplace,	Laplace transform of matrices, application of matrices to electrical circuit.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13	2	Strengthen mathematical, computational.	Partial Differential Equation.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 14	2	Strengthen mathematical, computational.	Wave equation, Laplace's equation, solution of boundary condition problems. General solution by separation of variables.	Lectures	Quizzes Assignments Projects Report Final Exam

11. Course Evaluation

Quizzes 10% (10)
aAssignments 10% (10)
Report 10% (10)
Midterm Exam
10% (10)
Final Exam
50% (50)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	"Numerical methods for engineers" by steven c. chapra and raymond p. canale
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Project Management
2. Course Code:
PRM306
3. Semester / Year:
First Semster/ Third year
4. Description Preparation Date:
1-6-2026
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total)
3hrs / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: Asst. Prof. Dr. Ahmed Khalaf Email: dr.ahmedkhlf@gmail.com
8. Course Objectives

Course Objectives	1. **Understanding Project Management Fundamentals:** To understand the key concepts, principles, methodologies, and best practices of project management and how they apply specifically to electrical engineering projects. 2. **Developing Planning and Scheduling Skills:** To develop skills in project planning, scheduling, budgeting, and resource management within the electrical engineering context. 3. **Risk Management Proficiency:** To gain knowledge of risk management techniques and strategies to identify, assess, and mitigate risks associated with electrical engineering projects. 4. **Effective Communication and Collaboration:** To learn how to effectively communicate and collaborate with stakeholders, clients, and project team members.

	5. **Quality Control and Assurance:** To acquire an understanding of quality control and assurance processes specific to electrical engineering to ensure project deliverables meet specified standards. 6. **Legal and Regulatory Awareness:** To familiarize students with the legal, regulatory, and safety considerations involved in managing electrical engineering projects. 7. **Practical Application through Case Studies:** To provide students with practical insights and case studies to apply project management principles to real-world electrical engineering projects. 8. **Critical Thinking and Problem-Solving:** To develop critical thinking and problem-solving skills to address project challenges and make informed decisions. 9. **Ethical and Sustainable Practices:** To cultivate an awareness of ethical, social, and environmental implications and incorporate sustainable practices into project management. 10. **Leadership and Team Management:** To prepare students to effectively lead and manage electrical engineering projects by developing leadership and team management skills.

9. Teaching and Learning Strategies

Strategy	The main strategy adopted in delivering this module is to encourage students' participation in exercises while refining and expanding their critical thinking skills. This will be achieved through interactive lectures to introduce and explain fundamental concepts and theories; case studies and real-world applications to demonstrate the relevance and practical implications of project management; group projects that require students to apply their knowledge to real or simulated engineering scenarios; dedicated problem-solving sessions where students work on exercises related to project management; inviting industry professionals as guest speakers to share their experiences and insights; providing access to online resources and multimedia as supplementary materials for self-study; and formative and summative assessments to evaluate students'

	understanding and progress.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
Week 1–2	6	Understand the principles, methodologies, and phases of project management.	Introduction to Project Management — Overview of principles, life cycle, processes, and knowledge areas.	Lectures	Quizzes, Assignments, Projects, Report, Midterm Exam, Final Exam
Week 3–4	6	Explain the process of coordinating project elements to ensure successful execution.	Project Integration Management — Coordinating scope, schedule, budget, resources, and stakeholders.	Lectures	Quizzes, Assignments, Projects, Report, Midterm Exam, Final Exam
Week 5–6	6	Describe the specific phases and activities in electrical engineering projects.	Electrical Engineering Project Life Cycle — Understanding phases like design, procurement, construction, testing, and commissioning.	Lectures	Quizzes, Assignments, Projects, Report, Midterm Exam, Final Exam
Week 7	3	Define and manage project scope effectively.	Scope Management — Defining and managing project scope.	Lectures / Review	Quizzes, Assignments, Projects, Report, Midterm Exam, Final Exam
Week 8	3	Develop project schedules and identify critical paths.	Schedule Management — Developing schedules, identifying critical paths, and using scheduling techniques.	Lectures / Review	Quizzes, Assignments, Projects, Report, Final Exam
Week 9	3	Estimate and manage project costs.	Cost Management — Estimating and managing project costs.	Lectures	Quizzes, Assignments, Projects, Report, Final Exam

Week 10	3	Identify, assess, and manage project risks.	Risk Management — Identifying, assessing, and managing project risks specific to electrical engineering.	Lectures	Quizzes, Assignments, Projects, Report, Final Exam
Week 11	3	Ensure project deliverables meet specified quality standards.	Quality Management — Implementing quality control processes.	Lectures	Quizzes, Assignments, Projects, Report, Final Exam
Week 12	3	Manage human resources, equipment, and materials.	Resource Management — Managing resources to optimize project performance.	Lectures	Quizzes, Assignments, Projects, Report, Final Exam
Week 13	3	Establish effective communication channels among project team members.	Communication Management — Facilitating information exchange among team members, stakeholders, and clients.	Lectures	Quizzes, Assignments, Projects, Report, Final Exam
Week 14	3	Track project progress and implement corrective actions.	Project Monitoring and Control — Tracking progress, monitoring metrics, and conducting status reviews.	Lectures	Quizzes, Assignments, Projects, Report, Final Exam
Week 15	3	Review and prepare for the final examination.	Review / Preparatory week	Lectures / Review	Quizzes, Assignments, Projects, Report, Final Exam
Week 16	3	Demonstrate comprehensive understanding of all course topics.	Final Exam	—	Final Exam

11. Course Evaluation

Assessment Type	Components	Percentage	Marks
Formative	Quizzes (2)	10%	10
Formative	Assignments (2)	10%	10
Formative	Projects / Lab	10%	10

Formative	Report	10%	10
Summative	Midterm Exam (1 hr)	10%	10
Summative	Final Exam (3 hr)	50%	50
Total		**100%**	**100**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. John M. Nicholas and Herman Steyn, "Project Management for Engineering, Business and Technology", 5th Edition, Routledge, 2020.
Main references (sources)	1. Mohammad Shahidehpour, Hatim Yamin, and Zuyi Li, "Project Management in Electrical Power Systems", 1st edition, Wiley, 2016.
Recommended books and references (scientific journals, reports…)	**1. "Project Management: A Systems Approach** to Planning, Scheduling, and Controlling" – Harold Kerzner (12th Edition, 2017). 2. **"Project Management, Planning and Control"** – Albert Lester (8th Edition, 2021).
Electronic References, Websites	1. **ETAP Project Management Webinars** 2. **NECA Project Management Program** 3. **IEC Basecamp**

Course Description Form

Course Name:
Induction Machines

Course Code:
INC222

Semester / Year:
Second Semester / Second Year

Description Preparation Date:
24-6-2026

Available Attendance Forms:
Physically

Number of Credit Hours (Total) / Number of Units (Total)
5 hrs / 5 Units

Course administrator's name (mention all, if more than one name)
Name: Dr. Ali Kadim
Email: ali.k.hintosh@aliraqia.edu.iq

Course Objectives

Course Objectives	1. To introduce the constructional features and operating principles of three-phase induction machines. 2. To explain the production of rotating magnetic field, synchronous speed, slip, rotor frequency, and reversal of rotation. 3. To analyze rotor emf, resistance, reactance, impedance, current, power factor, and equivalent rotor circuits. 4. To develop the exact and simplified equivalent circuits and phasor diagrams of induction motors. 5. To evaluate power flow, losses, rotor efficiency, torque equations, maximum torque, and torque-slip characteristics. 6. To perform performance calculations using standard tests, circle diagram, and practical characteristics. 7. To identify harmonics, cogging, crawling, high-starting-torque cage motors, motor classes, applications, installation, and maintenance requirements.

Teaching and Learning Strategies

Strategy	The main strategy adopted in delivering this module is to combine theoretical lectures with problem-solving tutorials and practical demonstrations. Students are encouraged to participate in class discussions, solve numerical examples related to induction machines, analyze equivalent circuits, phasor diagrams, torque-slip curves and circle diagrams, and prepare assignments or reports that strengthen engineering judgment and critical thinking skills.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	5	Describe the construction and main types of three-phase induction motors.	Introduction to induction machines; constructional features; stator frame, core and winding; squirrel-cage and phase-wound rotors.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	5	Explain the production of rotating magnetic field and direction reversal.	Three-phase supply, revolving magnetic field, synchronous speed, phase sequence, and reversal of rotation by interchanging any two supply leads.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	5	Analyze the principle of operation and slip-related quantities.	Induction motor operating principle, asynchronous speed, slip, slip speed, rotor frequency, speed of rotor field, and numerical problems.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	5	Calculate rotor electrical quantities under starting and running conditions.	Rotor emf, rotor resistance and reactance, rotor impedance, rotor current, rotor power factor, and solved examples.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam

Week 5	5	Represent the rotor circuit by a simplified equivalent circuit.	Rotor equivalent circuit; slip-dependent resistance; electrical load representation; rotor phasor diagram and interpretation.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	5	Develop stator and complete induction motor equivalent circuits.	Stator parameters, no-load operation, loaded operation, exact equivalent circuit, phasor diagram, and comparison with transformer operation.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	5	Evaluate power flow, losses, efficiency, and power factor.	Reasons of low power factor, stator and rotor losses, power flow diagram, rotor copper loss, rotor input, rotor efficiency, and performance calculations.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	5	Derive and apply induction motor torque equations.	Torque developed, condition for maximum torque, maximum torque equation, starting torque, and ratios of starting/full-load torque to maximum torque.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	5	Interpret torque characteristics and voltage effects.	Effect of supply voltage on torque, torque-slip curve, torque-speed curve, operating regions, and effect of rotor resistance.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	5	Determine motor parameters and performance from standard tests.	Constant and variable losses, stator resistance test, voltage-ratio test, no-load test, blocked-rotor test, heat-run test, and equivalent circuit parameters.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	5	Apply simplified equivalent circuit and circle diagram methods.	Simplified equivalent circuit, maximum power output, circle diagram construction, approximate circle diagram, and quantities obtained from circle diagram.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	5	Explain harmonics and abnormal operating phenomena.	Space harmonics, cogging, crawling, performance curves, and factors governing induction motor performance.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13 & 14	5	Select and evaluate practical induction motor types and applications.	Deep-bar and double-cage rotors, motor enclosures, standard squirrel-cage motor classes, advantages and disadvantages, applications, comparison with synchronous motors, installation, preventive maintenance, and course review.	Lectures	Quizzes Assignments Projects Report Final Exam

Course Evaluation

Quizzes 10% (10)
Lab. 10% (10)
Projects 10% (10)
Report 10% (10)
Midterm Exam 10% (10)
Final Exam 50% (50)

Learning and Teaching Resources

Required textbooks (curricular books, if any)	B.L. Theraja and A.K. Theraja, “A Textbook of Electrical Technology, Vol. II: AC and DC Machines,” S. Chand. Stephen J. Chapman, “Electric Machinery Fundamentals,” McGraw-Hill.
Main references (sources)	P.S. Bimbhra, “Electrical Machinery,” Khanna Publishers. A.E. Fitzgerald, Charles Kingsley, and Stephen D. Umans, “Electric Machinery,” McGraw-Hill.
Recommended books and references (scientific journals, reports...)	Lecture notes of Induction Machines, Electrical Engineering Department, Al-Iraqia University. Scientific articles, technical reports, and manufacturer application notes related to induction motors and industrial drives.
Electronic References, Websites	https://www.electrical4u.com/ https://www.allaboutcircuits.com/ https://www.nptel.ac.in/

Course Description Form

1. Course Name:
Engineering Ethics
2. Course Code:
ETH226
3. Semester / Year:
2 Semester/ third year
4. Description Preparation Date:
20-6-2026
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total)
2hrs./3Units
7. Course administrator's name (mention all, if more than one name)
Name: **ASST.LEC. RAGDA ABD UL RAB** Email: raghda.a.abdulhasan@aliraqia.edu.iq
8. Course Objectives

Course Objectives	**1.An understanding of their duties and responsibilities as professionals through gaining knowledge of the philosophies of ethics, professional practice, and world culture.** **2. Basic knowledge to make informed ethical decisions when confronted with problems in the working environment.** **3. Improved awareness of potential ethical issues within an engineering context.** **4. Team skills through working in teams on assignments and in-class assignments.** **5. Subjective analytical skills through investigation and evaluation of ethical problems in engineering settings using accepted tests for moral problem solving.** **6. An understanding of how societal morals varies with culture and how this influences ethical thought and action.**

	7. **Improved communications skills with regard to ethical and professional issues in engineering.** 8. **Know some of the classic cases as well as contemporary issues in engineering ethics.**

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	2	4. Recognizing ethical and professional responsibilities in engineering situations and making informed decisions.	• Course introduction and overview • Morals and ethics • Comparison of ethics and engineering ethics • Ethics at personal and student level	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	2	4. Recognizing ethical and professional responsibilities in engineering situations and making informed decisions	• The concept of professions • The importance of ethics in science and engineering • The role of codes of ethics •Professional responsibilities of engineers	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	2	4. Recognizing ethical and professional responsibilities in engineering situations and making informed decisions	• The concept of morality • The importance of core values • Moral/ethical dilemmas and hierarchy of moral values • Factors affecting moral responsibility, and degrees of responsibility	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	2	4. Recognizing ethical and professional responsibilities in engineering situations and making informed decisions	Overview of ethical theories and applications	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	2	4. Recognizing ethical and professional	Basics of ethical analyses and decision-making	Lectures	Quizzes Assignments

		responsibilities in engineering situations and making informed decisions			Projects Report Midterm Exam Final Exam
Week 6	2	4. Recognizing ethical and professional responsibilities in engineering situations and making informed decisions	• The importance if intention • Truth (personal and social) • The concept of whistleblowing	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	2	4. Recognizing ethical and professional responsibilities in engineering situations and making informed decisions	• Ethical leadership in engineering and society • Conflicts of interests	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	2	4. Recognizing ethical and professional responsibilities in engineering situations and making informed decisions	• Engineers in organizations • Ethics in the workplace	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	2	4. Recognizing ethical and professional responsibilities in engineering situations and making informed decisions	Fairness (personal and social) +Mid-term Exam	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	2	4. Recognizing ethical and professional responsibilities in engineering situations and making informed decisions	Specific case example – Challenger Incident	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	2	4. Recognizing ethical and professional responsibilities in engineering situations and making informed decisions	• Reliability, risk and safety • Risk management • Resource allocations	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	2	4. Recognizing ethical and professional responsibilities in engineering situations and making informed	• Ethics in the electronic and digital age •Privacy and confidentiality issue	Lectures	Quizzes Assignments Projects Report Final Exam

		decisions			
Week 13	2	4. Recognizing ethical and professional responsibilities in engineering situations and making informed decisions	• Responsible conduct of research • Intellectual property and society • Ethics and the environment • Innovation and ethics	Lectures	Quizzes Assignments Projects Report Final Exam
Week 14 &15	2	4. Recognizing ethical and professional responsibilities in engineering situations and making informed decisions	• Sustainable engineering • Global and cultural considerations •Preparatory week before the final Exam	Lectures	Quizzes Assignments Projects Report Final Exam

11. Course Evaluation

Quizzes 10% (10)
Assignments 10% (10)
Projects 10% (10)
Report 10% (10)
Midterm Exam
10% (10)
Final Exam
50% (50)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Seebauer, E.G. and Barry, R.L. Fundamental of Ethics for Scientists and Engineers (New York: Oxford University Press, 2001). 2. Roland Scherzinger (Introduction To Engineering Ethics).
Main references (sources)	• Martin, M.W. and R. Schinzinger. Ethics in Engineering. 4th Edition. (McGraw- Hill, Inc., 2005). • Harris Jr., C.E., Pritchard, M.S., Rabins, M.J., Engineering Ethics, Concepts, and Cases: 4th edition (California: Wadsworth Learning, 2009). • Whitbeck, Caroline. Ethics in Engineering – Practice and Research: 2nd edition (Cambridge: Cambridge University Press, 2011).

Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	https://lss.at.ufl.edu/help.shtml.

Course Description Form

1. Course Name:
Communication I
2. Course Code:
COM304
3. Semester / Year:
First Semster/ Third year
4. Description Preparation Date:
1-6-2026
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
6hrs/7Units
7. Course administrator's name (mention all, if more than one name)
Name: Ass. Lec. Ali Jasim Mohammed Email: ali.j.mohammed@aliraqia.edu.iq
8. Course Objectives
• Understand the fundamentals of analog communication systems. • Analyze communication signals in time and frequency domains. • Study modulation and demodulation techniques. • Evaluate bandwidth and transmission efficiency. • Understand noise effects on communication performance. • Develop the ability to solve engineering communication problems.
9. Expected learning outcomes of the program
Knowledge
• Explain analog communication principles and components. • Identify characteristics of communication channels. • Distinguish between modulation techniques.
Skills
• Perform communication system calculations. • Analyze and design basic communication circuits. • Apply mathematical models in communication analysis.

Ethics

- Demonstrate professional responsibility.
- Work effectively in academic and engineering environments.
- Follow ethical standards in engineering practice.

10. Teaching and Learning Strategies

- Interactive lectures
- Problem-solving sessions
- Technical discussions
- Simulation-based learning (MATLAB / Simulink)
- Assignments and presentations

11. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	6	Explain communication model and system blocks	Introduction to Communication Systems	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	6	Analyze signals and Fourier spectrum	Signals and Fourier Analysis	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	6	Explain channel characteristics	Transmission of Signals	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	6	Calculate AM parameters and efficiency	Amplitude Modulation	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	6	Analyze demodulation techniques	AM Demodulation	Lectures	Quizzes Assignments Projects Report Midterm Exam

					Final Exam
Week 6	6	Compare DSB-SC and SSB	DSB-SC and SSB	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	6	Explain VSB applications	VSB	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	6	Evaluate achievement	Midterm Exam	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	6	Calculate FM bandwidth	Frequency Modulation	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	6	Distinguish PM and FM	Phase Modulation	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	6	Evaluate noise and SNR	Noise Analysis	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	6	Explain receiver operation	Analog Receivers	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13 &14	6	Apply concepts to case studies	Applications	Lectures	Quizzes Assignments Projects Report Final Exam

12. Course Evaluation

Quizzes 10% (10)
Assignments 10% (10)
Projects 10% (10)
Report 10% (10)
Midterm Exam
10% (10)
Final Exam
50% (50)

13. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	• Simon Haykin, *Communication Systems* • B.P. Lathi, *Modern Digital and Analog Communication System*
Main references (sources)	Wayne Tomasi, *Electronic Communications Systems*
Recommended books and references (scientific journals, reports…)	• Technical journals in communication engineering • IEEE publications
Electronic References, Websites	• IEEE Xplore • ScienceDirect • Educational communication simulation platforms

Course Description Form

1. Course Name:
Antenna and Propagation
2. Course Code:
APR321
3. Semester / Year:
Second Semster/ Third year
4. Description Preparation Date:
1-6-2026
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total)
6hrs/6Units
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Anas FOUAD AHMED Email: anas.ahmed@aliraqia.edu.iq
8. Course Objectives

Course Objectives	1. Understanding antennas: principles, types, characteristics, applications. 2. Radiation fundamentals: generation, propagation, reception, polarization, radiation patterns, antenna gain. 3. Antenna parameters and performance: impedance, bandwidth, efficiency, directivity. 4. Antenna design and analysis: design techniques, simulation tools, optimization methods. 5. Propagation of electromagnetic waves: path loss, multipath, fading, propagation through different media. **6.** Applications and emerging technologies: wireless communications, satellite systems, radar, sensor networks.

9. Teaching and Learning Strategies	
Strategy	Lectures with visual aids, examples, and demonstrations. Hands-on laboratory sessions (antenna measurements, design exercises). Assignments and projects (design antennas for specific applications). Group discussions and presentations. Computer simulations and modeling (e.g., CST). Guest lectures from industry. Online resources and multimedia.

	Formative and summative assessments.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
Week 1	6	Understand the basic concepts of electromagnetic waves and antenna types.	Introduction to Antenna and Propagation – basic concepts of EM waves, types of antennas.	Lectures	Quizzes, Assignments, Projects, Report, Midterm Exam, Final Exam
Week 2	6	Analyze and interpret radiation patterns, directivity, and gain of antennas.	Radiation patterns of thin wire antenna, radiation intensity, directivity, gain (2D and 3D).	Lectures	Quizzes, Assignments, Projects, Report, Midterm Exam, Final Exam
Week 3	6	Distinguish between omni-directional and directional pattern antennas.	Omni-directional and directional pattern antennas.	Lectures	Quizzes, Assignments, Projects, Report, Midterm Exam, Final Exam
Week 4	6	Describe key antenna parameters including efficiency, bandwidth, polarization, impedance, and field regions.	Antenna efficiency, bandwidth, polarization, input impedance, Fraunhofer/Fresnel regions, antenna temperature.	Lectures	Quizzes, Assignments, Projects, Report, Midterm Exam, Final Exam
Week 5	6	Apply the Friis transmission equation, radar range equation, and understand antenna arrays and beamforming.	Friis transmission equation, radar range equation, antenna arrays, beamforming.	Lectures	Quizzes, Assignments, Projects, Report, Midterm Exam, Final Exam
Week 6	6	Understand the design and applications of reflector antennas and microstrip antennas.	Reflector antenna, microstrip antenna.	Lectures	Quizzes, Assignments, Projects, Report, Midterm Exam, Final Exam
Weeks 7–8	6	Review and consolidate all previously covered antenna concepts.	Review / Continuation of antenna topics.	Lectures / Review	Quizzes, Assignments, Projects, Report, Final Exam (Midterm dropped)
Week 9	6	Understand EM wave propagation fundamentals in different media (lossless, conductor, dielectric).	EM wave propagation fundamentals – wave in lossless, conductor, dielectric media.	Lectures	Quizzes, Assignments, Projects, Report, Final Exam
Weeks 10–11	6	Analyze depth of penetration, surface impedance, reflection, refraction, wavelength, and phase velocity.	Depth of penetration, surface impedance, reflection, refraction, wavelength, phase velocity.	Lectures	Quizzes, Assignments, Projects, Report, Final Exam
Weeks 12–13	6	Describe different modes of propagation, ionospheric effects, fading, and Fresnel zones.	Modes of propagation (sky wave, tropospheric), ionospheric	Lectures	Quizzes, Assignments, Projects, Report, Final Exam

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
			propagation, fading, Fresnel zone.		
Weeks 14–15	6	Review and prepare for the final examination.	Review / Preparatory week.	Lectures / Review	Quizzes, Assignments, Projects, Report, Final Exam
Week 16	6	Demonstrate comprehensive understanding of all course topics.	Final Exam.	—	Final Exam

11. Course Evaluation

Assessment Type	Components	Percentage	Marks
Formative	Quizzes (2)	10%	10
Formative	Assignments (2)	10%	10
Formative	Projects / Lab	10%	10
Formative	Report	10%	10
Summative	Midterm Exam (2 hr)	10%	10
Summative	Final Exam (4 hr)	50%	50
Total		**100%**	**100**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Balanis, C. A., "Antenna Theory: Analysis and Design," 4th Edition, Wiley, 2016. 2. Kraus, J. D., & Marhefka, R. J., "Antennas for All Applications," 3rd Edition, McGraw-Hill, 2002.
Main references (sources)	1. Stutzman, W. L., & Thiele, G. A., "Antenna Theory and Design," 3rd Edition, Wiley, 2012. 2. Collin, R. E., "Antennas and Radiowave Propagation," McGraw-Hill, 1985.
Recommended books and references (scientific journals, reports…)	1. Rappaport, T. S., "Wireless Communicatic Principles and Practice," 2nd Edition, Prentice H 2002. 2. IEEE Transactions on Antennas and Propagat (Journal). 3. ITU-R Reports on Radiowave Propagation.
Electronic References, Websites	1. IEEE Antennas & Propagation Society Resource Page: https://ieeexplore.ieee.org/xpl/periodicals 2. Antenna Theory and Design Tutorials: https://www.antenna-theory.com 3. Recommended: The website you provided (https://site.unibo.it/semiconductor-physics/en) is useful for the physics background, but for antenna-specific topics, a dedicated resource is suggested above.

Course Description Form

1. Course Name:
Research Methodology and Academic Writing
2. Course Code:
RMW326
3. Semester / Year:
Second Semester/ Third Year
4. Description Preparation Date:
10-6-2026
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total)
75 hrs. / 75 Units
7. Course administrator's name (mention all, if more than one name)
Lecturer Dr. OMAR MUNAF TAWFEEQ Email: omar.m.tawfeeq@aliraqia.edu.iq
8. Course Objectives

Course Objectives	• To introduce students to the principles and importance of scientific research in engineering fields. • To develop scientific thinking and critical analysis skills for solving research problems. • To enable students to identify research topics and formulate research problems, objectives, and hypotheses. • To develop students' ability to conduct literature reviews using reliable academic sources. • To introduce quantitative and qualitative research methodologies and data collection techniques. • To develop skills in data analysis, interpretation, and presentation of research findings. • To train students in academic writing and technical report preparation according to international standards. • To promote awareness of research ethics and academic integrity. • To prepare students for graduation projects and future engineering research activities.

9. Teaching and Learning Strategies

Strategy	The primary strategy adopted in delivering this course is to engage students in research-oriented activities that enhance their scientific inquiry and academic writing skills. This is achieved through lectures, discussions, analysis of scientific papers, research assignments, presentations, and practical training on the use of academic databases and reference management tools.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	2	Understand the concept and importance of scientific research.	Introduction to Research Methodology	Lectures	Quizzes, Assignments, Report, Midterm Exam, Final Exam
Week 2	2	Identify the stages of conducting research.	Research Process and Research Design	Lectures	Quizzes, Assignments
Week 3	2	Formulate research problems and objectives.	Research Problem, Objectives, Questions, and Hypotheses	Lectures	Quizzes, Assignments
Week 4	2	Conduct an effective literature review.	Literature Review and Previous Studies	Lectures and Discussions	Quizzes, Assignments
Week 5	2	Utilize academic resources effectively.	Academic Databases and Information Sources	Lectures and Practical Activities	Quizzes, Assignments
Week 6	2	Distinguish between research methodologies.	Quantitative and Qualitative Research Methods	Lectures	Quizzes, Assignments
Week 7	2	Design suitable data collection instruments.	Questionnaires, Interviews, and Observation Techniques	Lectures and Practical Activities	Quizzes, Assignments
Week 8	2	Understand sampling procedures.	Population, Sampling Methods, and Sample Size Determination	Lectures	Quizzes, Assignments
Week 9	2	Demonstrate understanding of course materials covered in Weeks 1–8.	Mid-Term Examination	Examination	Midterm Exam
Week 10	2	Analyze research data appropriately.	Fundamentals of Data Analysis and Statistical Techniques	Lectures and Practical Activities	Quizzes, Assignments
Week 11	2	Interpret and discuss research findings.	Presentation and Discussion of Results	Lectures	Quizzes, Assignments
Week 12	2	Apply academic citation standards.	Referencing Styles and APA Guidelines	Lectures and Practical Activities	Quizzes, Assignments

Week 13	2	Recognize ethical responsibilities in research.	Research Ethics and Academic Integrity	Lectures and Discussions	Quizzes, Assignments
Week 14	2	Prepare a complete research report.	Academic Writing and Research Report Preparation	Lectures and Practical Activities	Quizzes, Assignments, Re
Week 15	2	Integrate and review all course concepts.	Comprehensive Review and Final Examination Preparation	Review Sessions	Final Exam

11. Course Evaluation

Quizzes (4) – 20 % (20 Marks)
Research Proposal – 20 % (20 Marks)
Midterm Examination – 10% (10 Marks)
Final Examination – 50% (50 Marks)

12. Learning and Teaching Resources

Required textbooks (curricular books)	Research Methodology: Methods and Techniques C. R. Kothari & Gaurav Garg
Recommended Texts	• Research Design: Qualitative, Quantitative, and Mixed Methods Approaches John W. Creswell & J. David Creswell. • The Craft of Research Wayne C. Booth, Gregory G. Colomb, and Joseph M. Williams. • Publication Manual of the American Psychological Association (APA).
Electronic References, Websites	• Google Scholar • ResearchGate • IEEE Xplore Digital Library • ScienceDirect

Course Description Form

1. Course Name:
Communication II
2. Course Code:
COM323
3. Semester / Year:
Second Semster/ Third year
4. Description Preparation Date:
1-6-2026
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
5hrs/5Units
7. Course administrator's name (mention all, if more than one name)
Name: Ass. Lec. Ali Jasim Mohammed Email: ali.j.mohammed@aliraqia.edu.iq
8. Course Objectives
• Introduce students to the fundamentals of digital communication systems. • Explain signal sampling, quantization, and digital encoding processes. • Study digital modulation and demodulation techniques. • Analyze channel effects and noise performance. • Evaluate communication efficiency and error performance. • Develop problem-solving skills in communication engineering.
9. Expected learning outcomes of the program
Knowledge
• Explain the principles of digital communication systems. • Describe digital signal processing and transmission methods. • Distinguish between different digital modulation techniques.
Skills
• Analyze transmitter and receiver performance. • Compare communication methods based on bandwidth and error rate. • Perform calculations related to bit rate and bandwidth. • Design and analyze basic digital communication systems.
Ethics
• Demonstrate professional responsibility.

- Work effectively in academic and engineering environments.
- Follow ethical standards in engineering practice.

10. Teaching and Learning Strategies

- Theoretical lectures
- Numerical problem solving
- Classroom discussions
- MATLAB / Simulink simulation
- Assignments and reports

11. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	5	Explain communication model and system blocks	Introduction to digital Communication Systems	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	5	Converting Analog signal to digital	Sampling and Quantization	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	5	Converting Analog signal to digital	Pulse Code Modulation (PCM)	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	5	Converting Analog signal to digital	Delta Modulation (DM)	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	5	Understand & Analyze modulation techniques	Digital Modulation Concepts	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	5	Understand ASK and FSK	ASK and FSK Modulation	Lectures	Quizzes Assignments Projects Report

		Modulation concepts			Midterm Exam Final Exam
Week 7	5	Understand & compare PSK & QPSK concepts	PSK and QPSK Modulation	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	5	Evaluate achievement	Midterm Exam	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	5	Design & analyze digital receiver	Digital Receiver	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	5	Estimation & Evaluation Bit Error rate	Error Detection and Correction	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	5	Evaluate noise and SNR	Noise Performance Analysis	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	5	Case Studies and System Evaluation	Applications of Digital Communication	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13 &14	5	Review	Review and Final Preparation	Lectures	Quizzes Assignments Projects Report Final Exam

12. Course Evaluation

Quizzes 10% (10)
Assignments 10% (10)
Projects 10% (10)
Report 10% (10)
Midterm Exam
10% (10)
Final Exam
50% (50)

13. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Simon Haykin, *Communication Systems*

	• B.P. Lathi, *Modern Digital and Analog Communication System*
Main references (sources)	• Bernard Sklar — Digital Communications • John G. Proakis — Digital Communications
Recommended books and references (scientific journals, reports…)	• Technical journals in communication engineering • IEEE publications
Electronic References, Websites	• IEEE Xplore • ScienceDirect • Educational communication simulation platforms

Course Description Form

1. Course Name:
Fundamentals of Electrical power
2. Course Code:
POW325
3. Semester / Year:
Second Semester/ third year
4. Description Preparation Date:
1-6-2026
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total)
6hrs/6Units
7. Course administrator's name (mention all, if more than one name)
Name: Assistant. Prof. Dr. Jasim Mohmed Jasim Email: jasim.m.jasim@aliraqia.edu.iq
8. Course Objectives

Course Objectives	1. 1. To Introduce Fundamental Concepts: The module aims to provide students with a solid foundation in the principles of power systems engineering by introducing them to the fundamental concepts and principles of power systems. Students will develop an understanding of the basic terminology, classifications, and characteristics of power systems. 2. To Develop Mathematical Modeling Skills: Formulate and solve the mathematical models describing physical behavior of basics of generation, transmission and distribution systems. 3. The knowledge in the basic elements of electrical power transmission and distribution systems such as generators, transmission and distribution lines, and loads. To understand the analytical tools for analysis of basic operations of these systems. 4. To understand the behaviors of the basic components of power systems

9. Teaching and Learning Strategies

Strategy	❖ Lectures: In-class lectures delivered by the instructor provide the foundational knowledge and theoretical concepts of power systems. Lectures can include explanations, demonstrations, and the presentation of examples to illustrate key concepts. ❖ Interactive Discussions: Encourage active participation and engagement through interactive discussions. This can involve asking questions, facilitating group discussions, and encouraging students to share their insights and perspectives on power systems topics. ❖ Problem-Solving Sessions: Dedicated problem-solving sessions can be conducted where students work on exercises and examples related to power systems. The instructor can guide students through the problem-solving process, addressing any challenges or misconceptions that may arise. ❖ Case Studies and Real-World Applications: Use case studies and real-world applications to demonstrate the relevance and practical implications of power systems. This can involve analyzing power systems and discussing their design, performance, and challenges. ❖ Group Projects: Assign group projects that require students to apply their knowledge of power systems to real or simulated scenarios. This can involve designing and modelling a part of power systems for specific applications, analyzing system performance, and presenting findings to the class. ❖ Computer Simulations: Utilize computer simulations and software tools specifically designed for power systems analysis and design. This allows students to explore system behavior, simulate different power systems operation strategies, and observe the impact of parameter variations. ❖ Guest Speakers: Invite industry professionals or researchers in the field of power systems to share their experiences and insights. Guest speakers can provide real world perspectives, discuss emerging trends, and inspire students in their learning journey. ❖ Online Resources and Multimedia: Provide access to online resources, textbooks, lecture recordings, and interactive multimedia materials that support the learning of power systems. These resources can serve as supplementary materials for self-study and reinforce understanding. ❖ Formative and Summative Assessments: Incorporate a variety of assessment methods, including quizzes, assignments, lab reports, and examinations, to evaluate students' understanding and progress. Provide constructive feedback to help students improve their knowledge and skills in power systems.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	6	Understand & Formulate the mathematical models of	Source of electrical energy- structure of power system.	Lectures	Quizzes Assignments Projects Report

		generation side of electrical power Grid.			Midterm Exam Final Exam
Week 2	6	Describe and define basic concepts and principles of power systems engineering, including the plant types and structure of power systems.	Steam power station, hydroelectric power station, Diesel generating, nuclear and gas turbine power plants.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	6	Describe the power systems design, planning and operation.	Main components of overhead lines- conductor materials- line supports insulators - types of insulators - voltage distribution over suspension insulator string and string efficiency.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	6	Describe the power systems design, planning and operation.	Sag in overhead lines- Corona Phenomena - Factor affecting corona-critical disruptive voltage- visual critical voltage- corona losses- Advantages and disadvantages corona effect- Methods of reducing corona effect.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	6	Evaluate the ability of power systems to satisfy the operation requirements .	Overhead transmission lines- electrical design of overhead lines- skin effect - performance of transmission lines, classification of overhead lines (short , medium and long).	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	6	Evaluate the ability of power systems to	voltage regulation and transmission efficiency - generalized constants of transmission lines (A,B	Lectures	Quizzes Assignments Projects Report Midterm Exam

		satisfy the operation Requirements.	,C, D)- Power circle diagram.		Final Exam
Week 7	6	Formulate the mathematical models used in analyzing underground cables. AC and DC distributers in power systems.	Construction,- classification insulating materials - 3-phase service- laying of underground cables- R &C of single core cables - dielectric stress in a single core cables- grading cables.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	6	Formulate the mathematical models used in analyzing underground cables. AC and DC distributers in power systems.	capacitance grading - inters heath grading - capacitance of three core cables - Types of cable faults.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	6	Describe and define the operational concepts such as: Generation plants, load curve, demand pattern, active & reactive power, voltage profile, HVAC and HVDC transmission lines and	Power triangle- causes of low power factor- power factor improvement equipment (static capacitor, synchronous condenser, phase advancers, FACTs)- importance of power factor improvement- calculations of power factor correction..	Lectures	Quizzes Assignments Projects Report Final Exam

		distribution operation.			
Week 10	6	voltage profile, HVAC and HVDC transmission lines and distribution operation	Importance- methods - location of voltage control equipment - excitation - Tirril and brown Boveri regulators- tab changing transformer - auto transformer tab changing- booster transformer - induction regulator - voltage controller by synchronous condenser	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	6	evaluate power systems for a variety of applications.	Variable load on power station - load and duration curves, maximum demand - demand factor.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	6	evaluate power systems for a variety of applications.	average load - Diversity factor - Plant capacity factor	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13 &14	6+6	evaluate power systems for a variety of applications.	Economic dispatch problem- Thermal system dispatching with network losses consecration- lambda-iteration method- gradient method- Newton method	Lectures	Quizzes Assignments Projects Report Final Exam

11. Course Evaluation

Quizzes 10% (10)
Assignments 10% (10)
Projects 10% (10)
Report 10% (10)
Midterm Exam
10% (10)
Final Exam
50% (50)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	PRINCIPLES OF POWER SYSTEM , V.K. MEHTA .
Main references (sources)	POWER GENERATION, OPERATION, AND CONTROL Allen J. Wood and Bruce F, Wollenberg, PRINCIPLES OF POWER SYSTEM , V.K. MEHTA .

Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	https://books.google.iq/books?id=If_hxYcDnAUC&printsec=copyright&redir_esc=y#v=onepage&q&f=false

Course Description Form

1. Course Name:
Microprocessor
2. Course Code:
MPR322
3. Semester / Year:
Second Semster/ third year
4. Description Preparation Date:
20-6-2026
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total)
6hrs/6Units
7. Course administrator's name (mention all, if more than one name)
Name: **ASST.LEC. RAGDA ABD UL RAB** Email: raghda.a.abdulhasan@aliraqia.edu.iq
8. Course Objectives

Course Objectives	1. Understanding the basic components of a microprocessor, such as the Arithmetic Logic Unit (ALU), Control Unit, registers, and memory units. 2. Explaining the process of instruction execution and data processing inside the microprocessor. 3. Learning the instruction set and programming concepts of the **8086 Assembly Language**. 4. Developing students' skills in writing and executing assembly language programs. 5. Using the **emu8086 simulation environment** to design, test, and debug programs. 6. Understanding the communication between the microprocessor and input/output devices.

	7. Enhancing students' ability to analyze problems and implement solutions using microprocessor-based systems. 8. Applying microprocessor concepts in computer systems and embedded applications.

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	6	Understand the basic concepts of microprocessor systems and describe the architecture of the 8086 microprocessor.	Introduction to microprocessor systems and Microprocessor architecture	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	6	Explain the 8086 pin configuration, memory organization, and addressing modes.	Pin diagram and addressing mode	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	6	Apply data transfer instructions to move data between registers, memory, and I/O devices.	Data transfer group	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	6	Apply arithmetic and logical instructions to perform data processing operations.	Arithmetic instruction and Logical instruction	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	6	Analyze and apply control instructions and branch instructions to	Control instruction and Branch instruction	Lectures	Quizzes Assignments Projects Report

		control program execution.			Midterm Exam Final Exam
Week 6	6	Develop and execute simple and conditional assembly language programs using the 8086 instruction set.	Simple programs and Conditional programs	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	6	Evaluate and solve advanced programming problems related to microprocessor systems.	Mid Exam + Advance programs	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	6	Design modular assembly programs using procedures and subroutines.	Subroutine programs	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	6	Understand the basic concepts of microcontroller technology and its relationship with microprocessors.	Introduction to microcontroller technology	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	6	Apply microcontroller concepts in practical embedded system applications.	Microcontroller applications	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	6	Understand interrupt mechanisms and implement interfacing techniques with external devices.	Interrupt to MPU, Interfacing	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	6	Apply timing concepts, delay routines, and handshake communication techniques in MPU systems.	Handshake application in MPU, Delay programming and Timing	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13 &14	6	Understand the role of support IC chips and design memory interfacing circuits for MPU systems.	Support IC chips to MPU& Memory design with MP+ Solving advance problem	Lectures	Quizzes Assignments Projects Report Final Exam

11. Course Evaluation

Quizzes 10% (10)

Assignments 10% (10) **Projects** 10% (10) **Report** 10% (10) **Midterm Exam** 10% (10) **Final Exam** 50% (50)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	•Barry B. Brey, The Intel Microprocessors: Architecture, Programming & Interfacing, PHI, 6th Edition, 2003. •A.K.Ray and K.M. Bhurchandi, Advanced Microprocessor and Peripherals, Tata McGraw Hill
Main references (sources)	• Neamen, Microelectronics - Circuit Analysis and Design, McGraw-Hill, 2010. • Uffenback, The 8086 Family Design, PHI, 2nd Edition.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	Any other materials available on the web

Course Description Form

1. Course Name:	
Embedded Systems	
2. Course Code:	
EE4107	
3. Semester / Year:	
First Semester/ Forth year	
4. Description Preparation Date:	
1-6-2026	
5. Available Attendance Forms:	
Physically	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 Hrs./ 2Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Baraa Munqith Albaker Email: baraaalbaker@aliraqia.edu.iq	
8. Course Objectives	
Course Objectives	1. To introduce students to the fundamental concepts and principles of embedded systems and their applications. 2. To familiarize students with the hardware and architecture of Arduino boards, enabling them to understand microcontrollers and key components. 3. To develop students' programming skills using the Arduino programming language for controlling and interacting with Arduino based systems. 4. To enable students to interface Arduino with various sensors, actuators, and communication modules to acquire and process data. 5. To provide hands-on experience in developing small-scale projects integrating multiple components and functionalities using Arduino. 6. To enhance problem-solving and communication skills, enabling students to identify and resolve issues and effectively document their work.
9. Teaching and Learning Strategies	
Strategy	1-Lectures: Conduct interactive lectures to understand the concept, characteristics, and major application areas of embedded systems. 2-Problem-solving Sessions: Organize problem-solving sessions where students can apply the top-down and bottom-up design approaches to develop embedded systems. 3-Group Projects: Assign group projects that require students to design and build Embedded systems. 4-Case Studies: Present real-world case studies where students can analyze and evaluate existing embedded systems. Discuss the challenges faced, design considerations, and performance trade-offs. 5-Online Resources: Provide access to online resources, such as textbooks, research papers, video tutorials, and interactive learning platforms, to supplement classroom learning and facilitate self-study.

	6-Assessments: Conduct regular quizzes, assignments, and exams to assess students' understanding and progress. Include both theoretical and practical components to evaluate their knowledge and application skills. 7-Feedback and Discussions: Provide timely feedback on assignments and assessments, and encourage students to engage in discussions, asking questions, and seeking clarification on concepts that may be challenging.

10. Course Structure

Week	Hrs.	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1 and 2	4	A1- An ability to understand, identify, formulate, and solve basic and complex electrical engineering problems	Introduction to Embedded Systems: o Definition and characteristics of embedded systems o Overview of their major application areas	Lectures	Quizzes Assignments
Week 3	2	A2- An ability to apply the engineering design process to produce solutions that meet the specified needs	Embedded Systems Design Process: o Top-Down and Bottom-Up Design approaches o Requirement definition and system specification o Architecture design o Hardware and software components integration	Lectures	Quizzes Assignments
Week 4 to 7	6	A1- An ability to understand, identify, formulate, and solve basic and complex electrical engineering problems	Elements of Embedded Systems: o Processors and Controllers: 1. RISC and CISC architectures 2. Internal architecture and instruction pipelining 3. Types of processors: PLD, CPLDs, ASIC, COTS, DSPs, and FPGA o Memory: 1. Flash, PROM, Masked ROM, EPROM, EEPROM, NVRAM 2. Static and Dynamic RAM o Sensors & Actuators and Others: LED, display, optocouplers, stepper motor, relay, buzzer, switches, keyboard, Brown-out protection circuit, oscillator unit, real-time clock, watchdog timer	Lectures	Quizzes Assignments
Week 8 and 9	4	A1- An ability to understand, identify, formulate, and solve basic and complex electrical engineering problems	Midterm Exam and Introduction to Arduino: o Overview of the Arduino platform o Arduino board architecture o Setting up Arduino IDE	Lectures	Quizzes Assignments
Week 10	2	A1- An ability to understand, identify, formulate, and solve basic and complex electrical engineering problems	Arduino Programming Basics: o Introduction to Arduino programming language o Variables, data types, functions, and control structures	Lectures	Quizzes Assignments

Week 11	2	A2- An ability to apply the engineering design process to produce solutions that meet the specified needs	Digital Input/Output Interfacing: o Interfacing with digital devices using Arduino o Reading digital inputs and controlling digital outputs	Lectures	Quizzes Assignments
Week 12	2	A2- An ability to apply the engineering design process to produce solutions that meet the specified needs	Analog Input/Output Interfacing: o Interfacing with analog sensors and actuators o Reading analog inputs using ADC o Generating analog outputs using PWM	Lectures	Quizzes Assignments
Week 13	2	A2- An ability to apply the engineering design process to produce solutions that meet the specified needs	Advanced Sensor Interfacing and Motor Control: o Interfacing with advanced sensors o Controlling motors using Arduino	Lectures	Quizzes Assignments
Week 14 and 15	4	A2- An ability to apply the engineering design process to produce solutions that meet the specified needs B3- An ability to function effectively with their peers and counterparts in a collaborative and inclusive environment, as a member or leader of a team	Project Development: o Students work on small-scale projects integrating concepts learned so far	Teamwork Presentation	Teamwork project and Report submission

11. Course Evaluation

Quizzes: 10%
Assignments: 10%
Teamwork Project and Report: 8%
Midterm Exam: 12%
Final Exam: 60%

12. Learning and Teaching Resources

Required textbooks and recommended books	1. Henrik Tärnqvist, The complete Arduino maker's handbook: From first blink to wireless Real-Time, Multi-Module Systems, 2026. 2. Shibu Kizhakke Vallathai, Introduction to Embedded Systems, 2nd Edition, McGraw Hill Education, 2017. 3. John Nussey, Arduino for Dummies, 2nd Edition, John Wiley & Sons, Inc., New Jersey, 2018.
Electronic References, Websites	https://projecthub.arduino.cc/