

**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 Energy and Renewable Energies Engineering Department

2026

Introduction:

The academic program is a carefully structured and student-centered curriculum designed in accordance with the principles of the Bologna Process and the European Credit Transfer and Accumulation System (ECTS). It comprises a coherent set of courses, learning activities, practical experiences, and assessment methods that collectively enable students to achieve the intended learning outcomes. The program aims to equip graduates with the knowledge, technical competencies, professional skills, and ethical values required to meet the demands of the labor market and contribute effectively to sustainable development.

The Academic Program Specification provides a comprehensive description of the program, including its educational objectives, learning outcomes, curriculum structure, teaching and learning strategies, assessment methods, and quality assurance mechanisms. It serves as a key reference for students, academic staff, and external stakeholders, ensuring transparency, accountability, and continuous improvement of the educational process. The specification also plays a fundamental role in supporting academic accreditation and quality assurance.

This guide has been prepared in accordance with the regulations and guidelines of the Ministry of Higher Education and Scientific Research of Iraq for academic programs adopting the Bologna Process, as circulated

by the Department of Studies, Planning and Follow-up. It reflects the latest developments in higher education by adopting a student-centered approach, outcome-based education, continuous assessment, and the ECTS framework, thereby enhancing academic mobility, international recognition, and compatibility with global higher education standards.

The academic program is subject to periodic review and evaluation through internal and external quality assurance procedures to ensure that it remains aligned with national requirements, international best practices, and the evolving needs of society and the labor market. Therefore, maintaining an accurate and regularly updated Program Specification is essential for enhancing the quality of education and ensuring the successful implementation of the Bologna 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 (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-Iraqi University .

Faculty/Institute: College of Engineering.

Scientific Department: Energy and Renewable Energies Engineering
Department .

Academic or Professional Program Name: Bachelor of Science in
Energy and Renewable Energies Engineering.

Final Certificate Name: Bachelor of Science in Energy and
Renewable Energies Engineering.

Academic System: Bologna Process (ECTS) .

Description Preparation Date:

File Completion Date:

Signature:

Head of Department Name:

Hussein Juma Jabir

Date:

Signature:

Scientific Associate Name:
Dr. Omar Hassan Hameed

Deputy Dean for Scientific Affairs
College of Engineering

Date:

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance

Department:

Ass. Prof. Dr. Riag Muthana Ali

Date: 27/07/2020

Signature:

Approval of the Dean

Prof. Dr. Malik Abdulrazzaq

1. Program Vision

Building and developing Iraq's national capabilities in the field of renewable energy through education, innovation, scientific research, and the systematic application of clean energy technologies. The vision aims to protect the environment, promote the optimal utilization of energy and natural resources, and support sustainable development in Iraq by graduating highly qualified engineers with the knowledge, expertise, and professional skills required in renewable energy. It also seeks to establish a specialized research center in Energy and Renewable Energy Engineering to advance research, innovation, and technological development in this vital field.

2. Program Mission

The program is committed to providing a high-quality educational environment for preparing engineers in various fields of renewable energy, enabling them to contribute effectively to research, development, and innovation in the energy sector. It also seeks to provide scientific expertise and professional consultancy in renewable energy and to develop practical and sustainable solutions for the effective utilization of renewable energy resources in Iraq. The academic curriculum offered by the department is recognized as one of the leading programs at both the national and regional levels, as it adopts modern teaching and learning methodologies while actively engaging faculty members and students in the design, development, implementation, and continuous improvement of integrated sustainable energy systems.

3. Program Objectives

- 1- **To establish a national database** for research, development, and applications in the fields of Renewable Energy Engineering and Technology.
- 2- **To apply engineering and technological principles** based on the outcomes of relevant scientific research in order to enhance engineering performance, technical capabilities, and professional skills related to renewable

energy.

- 3- **To provide the public and private sectors** with qualified young engineering graduates capable of improving energy production and consumption patterns, protecting the environment, and addressing environmental challenges in Iraq.
- 4- **To create a modern socio-economic environment** through the adoption and advancement of renewable energy technologies, thereby supporting sustainable development in Iraq.

4. Program Accreditation

Does the program have program accreditation? And from which agency?

The program is currently not accredited by any national or international accreditation body.

5. Other external influences

Is there a sponsor for the program?

No sponsor.

6. 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.

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours		
			theoretical	practical	Tutorial
1 st year \ 1 st Semester					
1 st year \ 1 st Semester	MAT101	Mathematics I	3		1
1 st year \ 1 st Semester	PME101	Principles of Mechanical Engineering I	4		2
1 st year \ 1 st Semester	END101	Engineering drawing		2	
1 st year \ 1 st Semester	FEC101	Fundamentals of Electrical Circuits	4	2	
1 st year \ 1 st Semester	WORK110	Technical Workshop		2	
1 st year \ 1 st Semester	EPH101	Electronic Physics	4		
1 st year \ 1 st Semester	HARD103	Human Rights and Democracy	2		
1 st year \ 2 nd Semester	MAT102	Mathematics II	3		1
1 st year \ 2 nd Semester	PME102	Principles of Mechanical Engineering II	4		2
1 st year \ 2 nd Semester	ENLA102	English language I	2	2	
1 st year \ 2 nd Semester	GCH101	General Chemistry	4	2	
1 st year \ 2 nd Semester	COMP105	Computer I	2	2	
1 st year \ 2 nd Semester	ARLA101	Arabic language I	2		
2 nd year \ 1 st Semester	MAT201	Mathematics III	3		1
2 nd year \ 1 st Semester	ELE202	Electronics I	2	2	1
2 nd year \ 1 st Semester	COMP205	Computer II	2	2	
2 nd year \ 1 st Semester	DCM203	DC Machines and Transformers	4	2	
2 nd year \ 1 st Semester	THE205	Thermodynamics	2	1	1
2 nd year \ 1 st Semester	CBRI204	Crimes of the Baath Regime in Iraq	2		
2 nd year \ 1 st Semester	ARLA202	Arabic language II	2		
2 nd year \ 2 nd Semester	PNS206	Probability and Statistics	2		1
2 nd year \ 2 nd Semester	ACEM207	AC Electrical Machines	3	2	
2 nd year \ 2 nd Semester	STM208	Strength of Materials	2	1	2
2 nd year \ 2 nd Semester	FLM209	Fluid Mechanics	2	2	
2 nd year \ 2 nd Semester	ELE210	Electronics II	2	2	
2 nd year \ 2 nd Semester	ENLA202	English language II	2		

8. Expected learning outcomes of the program

Knowledge

A1. The ability to understand, define, formulate, and solve basic and complex energy engineering and renewable energy problems by applying principles of engineering, science, and mathematics.

A2. The ability to apply the engineering design process to produce solutions that meet specific needs while considering public health, safety, and welfare, as well as global, cultural, environmental, social, economic, and other factors relevant to the discipline.

A3. The ability to develop and conduct appropriate experiments, analyze and interpret data, and use engineering judgment to draw conclusions.

Skills

B1. The ability to communicate and interact effectively with a wide range of audiences from diverse backgrounds and sectors.

B2. The ability to employ critical thinking, recognize the ongoing need for new knowledge, select appropriate learning strategies, and apply that knowledge.

B3. The ability to work effectively with peers in a collaborative and inclusive environment, as a member or leader of a team that sets goals and plans tasks to achieve them.

Ethics

C. The ability to recognize ethical and professional responsibilities in engineering situations and to make informed judgments, taking into account the impact of engineering solutions on global, economic, environmental and societal contexts.

9. Teaching and Learning Strategies

1. Explanation and demonstration through lectures, both in person and online.
2. Presentation of scientific materials using various presentation devices.
3. Self-directed learning through homework assignments and small projects.
4. Use of laboratories for learning and practical application.
5. Completion of graduation projects as part of the learning experience.
6. Participation in scientific visits to sites of interest.
7. Attendance at scientific seminars held within the department.
8. Provision of summer internship opportunities to develop practical skills.

10. Evaluation methods

1. Short comprehension tests (quizzes).

2. Homework assignments.
3. Final and midterm exams for theoretical and practical subjects.
4. Small projects integrated into lessons.
5. Active participation during study sessions.
6. Preparation of scientific and investigative reports.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/ Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Hussain J. Jabir – Assistant Prof.	Electrical Engineer	Electrical power system			Permanent	
Rami Raad Saadi Lecturer	Mathematics	Mathematics			Permanent	
Muafaq Shyaa Alwan – Prof.	Mechanical Engineering	Heat Transfer			Permanent	
Omar Hassan Hameed – Assistant Prof.	Mechanical Engineering	Thermal Engineering			Permanent	
Farqad Talib Najem – Assistant Prof.	Chemical Engineering	Heat Transfer			Permanent	
Mazin Nabih Ali Lecturer	Materials Engineering	Materials Engineering			Permanent	
Natiq A. Fadhill – Lecturer	Mechanical Engineering	Thermal Engineering			Permanent	
Ali Mahmood Jasim Assistant Prof.	Electrical Engineering	Power electronics			Permanent	
Mustafa Ibrahim Salim–	Mechanical	Thermal			Permanent	

Lecturer	Engineering	Engineering				
Bilal A. Wasmi – Lecturer	Chemical Engineering	Industrial Process Engineering			Permanent	
Zainab Q. Abdullrazaq – Assistant Prof.	Chemical Engineering	Chemical Engineering			Permanent	
Mahmood M. Hamzah – Lecturer	Mechanical Engineering	Applied Mechanics – Welding Techniques Engineer			Permanent	
Hiba Hadi Kurdi – Assistant Lecturer	Electromechanical Engineering				Permanent	

Professional Development

Mentoring new faculty members

1. Provide comprehensive guidance on the nature of the work, the goals, and the core values of the institution and department.
2. Offer customized training courses that include innovative teaching methods and best academic practices.
3. Guide faculty members on the policies and procedures of the institution and department, including research ethics and quality standards.
4. Provide opportunities to network with colleagues and participate in research and professional development activities.
5. Monitor the performance of new faculty members and provide additional support and guidance as needed.

Professional development of faculty members

1. Offering specialized training courses in effective teaching strategies and modern educational technology.
2. Providing workshops to exchange experiences and best practices in teaching and their application in the classroom.
3. Conducting periodic evaluations of faculty performance and learning outcomes to improve the educational process.
4. Encouraging participation in ongoing professional development programs, such as seminars, workshops, and academic conferences.

5. Supporting research and scholarly publication to enhance the academic competence of faculty members.
6. Providing opportunities for networking and collaboration with faculty members in areas of mutual interest.
7. Offering professional development programs to enhance academic management and leadership skills.

12. Acceptance Criterion

Admission to the college is through central admission for morning studies.

GPA: Minimum 87%

Age: Not exceeding 25 years

Number of seats: 50

For evening studies, admission is through direct application.

GPA: Minimum 77%

Age: Not specified

Number of seats: 50)

13. 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. The Iraqi Council for Engineering Education Accreditation guide.
4. The Association of Energy Engineers (AEE).

14. Program Development Plan

1. Needs Analysis: Conduct surveys and polls to identify labor market needs and industry trends, and gather feedback from students and faculty regarding the strengths and weaknesses of the current program.
2. Curriculum Update: Develop modern curricula that align with current

technological advancements and labor market needs, including adding new courses and updating existing ones.

3. Enhanced Interactivity: Integrate interactive learning tools such as virtual labs, practical projects, and workshops to enhance the learning experience and apply theoretical concepts to real-world projects.

4. Focus on Practical Skills: Develop training programs that focus on developing students' practical skills, such as programming, systems design, and project management, as well as enhancing communication and teamwork skills.

5. Enhanced Learning Environment: Improve the technological 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 extent to which learning objectives are achieved, enabling the implementation of necessary measures to improve the program.

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

8. Continuous Updating: Conducting periodic reviews and updates to the curriculum based on market and technological changes and industry needs to ensure the continued provision of high-quality and distinctive education.

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
1 st year \ 1 st Semester	MAT101	Mathematics I	B / basic	●											
	PME101	Principles of Mechanical Engineering I	c / basic	●	●	●		●	●			●			
	END101	Engineering drawing	s / basic						●						
	FEC101	Fundamental s of Electrical Circuits	c \ basic	●											
	WORK110	Technical Workshop	B \ basic						●						
	EPH101	Electronic Physics	B \ basic	●				●							
	HARD103	Human Rights and Democracy	s \ basic					●							
1 st year \ 2 nd Semester	MAT102	Mathematics II	B\ basic	●											
	PME102	Principles of Mechanical	C \ basic	●	●	●		●	●			●			

2 nd year \ 1 st Semester		Engineering II													
	ENLA102	English language I	s / basic					●							
	GCH101	General Chemistry	B \ basic	●				●							
	COMP105	Computer I	B \ basic	●											
	ARLA101	Arabic language I	s\ basic					●							
	MAT201	Mathematics III	B/ basic	●											
	ELE202	Electronics I	C\ basic	●											
	COMP205	Computer II	c/ basic					●							
	DCM203	DC Machines and Transformers	c/ basic	●											
	THE205	Thermodynamics	c / basic	●	●	●		●	●			●			
	CBRI204	Crimes of the Baath Regime in Iraq	s/ basic	●											
	ARLA202	Arabic language II	s/ basic					●							

	PNS206	Probability and Statistics	B/ basic									●			
2nd year \ 2nd Semester	ACEM207	AC Electrical Machines	c/ basic	●											
	STM208	Strength of Materials	B\ basic	●	●	●		●							
	FLM209	Fluid Mechanics	C\ basic	●	●	●		●	●			●			
	ELE210	Electronics II	C\ basic	●											
	ENLA202	English language II	S\ basic					●							

Course Description Form

1. Course Name:	
Strength of Material	
2. Course Code:	
STM208	
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/5Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Lecturer Mahmood Mohammed Hamzah Email: mahmood.m.hamzah@aliraqia.edu.iq	
8. Course Objectives	
Course Objectives	1. Review some of the important principles of statics and show how they are used to determine the internal resultant loadings in a body. 2. Introduce the concept of normal and shear stress. 3. Analysis and design a member subjected to axial load or direct shear 4. Define the quantities of deformation of a body using the concept of normal and shear strain. 5. Show how stress can be related to strain by using experimental methods. 6. Discuss the mechanical properties, and other tests that are related to the development of mechanics of materials. 7. Discuss how to determine the deformation of the axially loaded members. 8. An analysis of the effects of thermal stress. 9. Determine the stress in beams and shafts caused by bending. And calculate the maximum bending stress. Develop a method for finding the shear stress in a beam having a prismatic cross section and made from homogeneous material that behaves in a linear-elastic manner.
9. Teaching and Learning Strategies	
Strategy	The main strategy adopted in delivering this module is to actively engage students through lectures, problem-solving tutorials, and application-based discussions. Emphasis will be placed on developing analytical thinking by solving practical engineering problems related to energy systems. Interactive sessions and selected simulation-based examples will support deeper understanding of the subject.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	4	Review some of the important principles of statics and show how they are used to determine the internal resultant loadings in a body.	Introduction to Mechanics of Materials and Review of Statics	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 2	4	Introduce the concept of normal and shear stress. Show how stress can be related to strain by using experimental methods.	Concepts of Stress and Strain (Normal and Shear)	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 3	4	Analysis and design a member subjected to axial load or direct shear Define the quantities of deformation of a body using the concept of normal and shear strain.	Mechanical Properties of Materials; Stress-Strain Diagrams	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 4	4	An analysis of the effects of thermal stress. Analysis and design a member subjected to axial load or direct shear	Axial Deformation and Thermal Effects	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 5	4	Analysis and design a member subjected to axial load or direct shear	Torsion in Circular Shafts + Quiz	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 6	6	Discuss how to determine the deformation of the axially loaded members.	Shear Force and Bending Moment Diagrams	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 7	4	Determine the stress in beams and shafts caused by bending. And calculate the maximum bending stress.	Pure Bending and Normal Stress in Beams	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 8	4	Develop a method for finding the shear stress in a beam having a prismatic cross section and made from homogeneous	Shear Stress in Beams	Lectures	Quizzes Assignments Projects Report Final Exam

		material that behaves in a linear-elastic manner.			
Week 9	6	Develop a method for finding the shear stress in a beam having a prismatic cross section and made from homogeneous material that behaves in a linear-elastic manner.	Beam Deflection: Double Integration and Superposition Methods	Lectures	Quizzes Assignments Report Final Exam
Week 10	6	Develop a method for finding the shear stress in a beam having a prismatic cross section and made from homogeneous material that behaves in a linear-elastic manner.	Combined Stresses and Mohr's Circle + Quiz	Lectures	Quizzes Assignments Report Final Exam
Week 11	6	Develop a method for finding the shear stress in a beam having a prismatic cross section and made from homogeneous material that behaves in a linear-elastic manner.	Thin-Walled Pressure Vessels	Lectures	Quizzes Assignments Report Final Exam
Week 12	6	Determine the stress in beams and shafts caused by bending. And calculate the maximum bending stress.	Introduction to Failure Theories (von Mises, Tresca) + Mid	Lectures	Quizzes Assignments Report Final Exam
Week 13	6	Discuss the mechanical properties, and other tests that are related to the development of mechanics of materials.	Column Buckling and Euler's Formula	Lectures	Quizzes Assignments Report Final Exam
Week 14		Develop a method for finding the shear stress in a beam having a prismatic cross section and made from homogeneous material that behaves in a linear-elastic manner. Discuss how to determine the deformation of the axially loaded members.	Applications in Energy Systems (e.g., turbine shafts, pressure tanks)		Quizzes Assignments Report Final Exam

Week15		Develop a method for finding the shear stress in a beam having a prismatic cross section and made from homogeneous material that behaves in a linear-elastic manner.	Review and Problem Solving		Quizzes Assignments Report Final Exam
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11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	- Singer, F. L. and Pytel, A. Strength of Materials, Harper & Row Publishers. - Hibbeler, R. C. Mechanics of Materials, Pearson.
Main references (sources)	- Singer, F. L. and Pytel, A. Strength of Materials, Harper & Row Publishers.
Recommended books and references (scientific journals, reports...)	- Beer, F. P., Johnston Jr., E. R. et al. Mechanics Materials, McGraw-Hill.
Electronic References, Websites	

Course Description Form

13.Course Name:	
	Fluid Mechanics
14.Course Code:	

FLM 209					
15.Semester / Year:					
4 th /2 nd					
16.Description Preparation Date:					
19/1/2026					
17.Available Attendance Forms:					
In class attendance					
18.Number of Credit Hours (Total) / Number of Units (Total):					
2 / 50					
19.Course administrator's name (mention all, if more than one name)					
Name: Dr. Natiq Abbas Fadhil Email: natiq.a.fadhil@aliraqia.edu.iq In laboratory: Assi.Lecture. Jasmine Aziz Hussein Email : yasmeen.a.hussein@aliraqia.edu.iq					
20. Course Objectives					
Course Objectives		- Introducing the student to how to use conversion tables (Pressure, mass, momentum...) And use it in designs, analyses, and flow sciences - Increasing the student's knowledge of how pressure occurs and knowing the types and measuring devices - Study losses in pipes and curves and develop correct designs for drainage in pipes			
21. Teaching and Learning Strategies					
Strategy		- Teacher-based learning: teacher explains lectures pre-class (lecture notes and videos) and in-class (traditional lecture) - Student-based learning: Students will be asked to prepare a presentation OR poster and react to the interaction among students. - The instructor could give realistic cases or exercises in class and post-class and ask students to solve these cases to enhance their critical thinking skills and improve the ability of students to do calculations. - Invite a guest lecturer to update the students on the modern steel structure industry. - Site visit to enhance the knowledge of students.			
22. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2	Satisfy the fluid mechanics	Introduction about fluid mechanics	-	Nil
2	2	knows the meaning of fluid, fluid properties, fluid mechanics	Definition of fluid and its relationship to fluid mechanics and fluid properties	Interactive lecture brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
3	2	standard units used to study fluids viscosity properties and surface tension	Definition of fluid and its relationship to fluid mechanics and fluid properties	Interactive lecture brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
4	2	learns about the meaning of pressure, pressure units, and atmospheric pressure, as well as the basic equations of fluid balance	Hydrostatics (the science of fluid balance)	Interactive lecture brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
5	2	numerates the types of pressure gauges and knows how each type works	Pressure measuring devices	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
6	2	the student distinguishes the laws and equations related to the forces acting on flat and inclined curved surfaces liquids	Forces acting on surfaces due to static fluid pressure	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
7	2	the student learns about the equilibrium conditions for a body completely or partially immersed in a liquid	Equilibrium of submerged and floating bodies in a liquid (conditions of equilibrium)	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
8	2	Mid Exam	-	-	-
9	2	the student conducts experiments a3 and solves mathematical problems about types of flow and the continuity equation for flow	Fluid flow, flow classification, and continuity equation	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
10	2	the student knows the derivation of bernoulli's equation and its practical applications	Fluid flow and Bernoulli's equation	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test

11	2	the student benefits from machines and devices that work on applications of the momentum equation	Principles of momentum	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
12	2	the student learns how to find the Reynolds number and how to use the Darcy equation	The flow of liquid in pipes, Reynolds' experiment, and Darcy's equation	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
13	2	the student explains how to find the marginal roughness coefficient for pipes and the coefficient of friction for types of flow	Fluid flow and study of losses through pipes due to friction	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
14	2	the student enumerates the laws and equations related to the various losses resulting from flow in pipes	Fluid flow and study of losses through pipes	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
15	2	Dissection Report	-	-	-

11. Course Evaluation

Evaluating style	Time / Number	Weight (Marks)	Week Due
Quiz	Every week	10 (10%)	1 hr
Semester test	8	20 (20%)	3 hr
Home reports	15	10(10%)	2 hr
Lab.	Every week	10(10%)	2 hr
Final theoretical test	15	50 (50%)	3 hr

13. Learning and Teaching Resources

Required textbooks (curricular books, if any)	- Streeter V.L. and Wiley E.B., (1985); " Fluid Mechanics", McGraw- Hill, Inc, New York (Eight edition) - Rajput R.K. (2008), " A textbook of fluid mechanics", Chand & company LTD,
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	New Delhi, India
Main references (sources)	1. Fluid Mechanics by Yuns A.Cengle and John M.Cimbala,Mc Graw Hill,Third edition,2014. 2. Fluid mechanics and hydraulic machines, Dr.R.K.Bansal, Ninth Education, 2010.
Recommended books and references (scientific journals, reports...)	-
Electronic References, Websites	• www.EasyEngineering.net • www.studocu.com/row/document/arba-ministry-university/pipe-flow-lecture-notes-

Course Description Form

23.	Course Name:
	Electrical Machines
24.	Course Code:
	ACEM207
25.	Semester / Year:

2 nd Semster / 2 nd year	
26. Description Preparation Date:	
1-6-2026	
27. Available Attendance Forms:	
Physically	
28. Number of Credit Hours (Total) / Number of Units (Total)	
6hrs/7Units	
29. Course administrator's name (mention all, if more than one name)	
Name: Ass. Prof. Hussein Jumma Jabir Email: Hussein.j.jabir@aliraqia.edu.iq	
30. Course Objectives	
Course Objectives	1. To make the students have knowledge about the Electromagnetic field that passes through the Induction machines (Generators and motors). 2. How to use the learned skills to understand and analyzed the equivalent circuits of three phase or single phase induction motors or generators. 3. Learn the important things about the induction machine (the operation, the input power, output power, the torque speed characteristics for rotational part, the efficiency of machines) whether it is single phase or three phase. speed control for induction machine (motor or generator). 4. To analyze representation of an interaction of electric Induction machines with the matter. 5. To explain construction of AC synchronous machines and equivalent circuit and phasor diagram. 6. To explain Power and torque, Synchronous generators operating alone , parallel operation of synchronous generators , performance of generator connected to infinite-bus. 7. To explain Synchronous motor: principle of operation and equivalent circuit and phasor diagram. 8. To explain Power-factor control. 9. To explain torque-speed characteristics, effect of load changes, effect of field current changes, the synchronous capacitor, starting of synchronous motor. Hunting of synchronous machines, stepper and servo motors, BLDC Motor.
31. 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.
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32. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	6	Understand and be able to apply	Production of rotating field. Reversal of magnetic field rotation. Basic principle and construction of three phase induction motor: cage and wound rotor types.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	6	Understand and be able to apply circuit elements	Equivalent circuit of three phase induction motor. Determination circuit model parameters of three phase induction motor. Determining circuit model parameters	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	6	Understand and be able to apply circuit elements	Power and torque of three phase induction motor. Torque speed characteristics of three phase induction motor.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	6	Understand and be able to apply circuit elements	Starting of three phase induction motor. Speed control of three phase induction motor	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	6	Understand and be able to apply circuit elements	Single phase induction motor (IM), revolving field theory and cross field	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	6	Understand and be able to apply circuit elements	Universal and single-phase AC series motor. Single phase repulsion motors. Stepper , servo and BLDC motors	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	6	Understand and be able to apply	Construction of AC synchronous machines. Salient and non-salient pole	Lectures	Quizzes Assignments Projects

		circuit elements	types, EMF equation.		Report Midterm Exam Final Exam
Week 8	6	Describe the characteristics of AC machines	Synchronous generator equivalent circuit and phasor diagram.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	6	Describe the characteristics of AC machines	Power and torque. Measuring model parameters	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	6	Describe the characteristics of AC machines	Parallel operation of synchronous generators. Effect of salient poles.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	6	Describe the characteristics of AC machines	Mid term Exam	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	6	Describe the characteristics of AC machines	Performance of generator connected to infinite-bus, Operation of Generators in Parallel with Other Generators of the Same Size.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13	6	Describe the characteristics of AC machines	Synchronous motor: principle of operation and equivalent circuit and phasor diagram		
Week 14	6	Describe the characteristics of AC machines	Review		
Week 15	6		Preparatory week before the Final Exam		

33. Course Evaluation

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

34. Learning and Teaching Resources

Required textbooks (curricular books, if any)	BL Theraja. Electrical technology. Vol- II: S Chand & co
Main references (sources)	J.B. Gupta. Theory & Performance of Electrical Machines: S. K. Kataria & Sons

Recommended books and references (scientific journals, reports...)	.B. Gupta. Theory & Performance of Electr Machines: S. K. Kataria & Sons
Electronic References, Websites	https://www.electrical4u.com/

Course Description Form

35.	Course Name:
Arabic	
36.	Course Code:
ARLA101	
37.	Semester / Year:
2 Semester 1/ First year	
38.	Description Preparation Date:
24-6-2026	
39.Available Attendance Forms:	

Physically					
40.Number of Credit Hours (Total) / Number of Units (Total)					
2hrs./2Units					
41. Course administrator's name (mention all, if more than one name)					
Name: Ass. Prof. ANWAR QUTAIBA YAHYA Email: anwar.q.yahya@aliraqia.edu.iq					
42. 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.		
43. 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.			
44. 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.	<i>Surat Al-Hajj</i> ; Punctuation Marks	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	2	Understand and apply Arabic grammar rules and appreciate literary texts	<i>Surat Al-Baqarah</i> ; Morphological Pattern (Word Scale)	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	2	Understand and apply Arabic grammar rules and appreciate literary texts	Types of Hamza; A Noble Prophetic Hadith	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	2	Understand and apply Arabic grammar rules and appreciate literary texts	Parts of Speech; Solar and Lunar "Lam"	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	2	Understand and apply Arabic grammar rules and appreciate literary texts	Inflection (I'rab) and Structure (Bina'); "My School Methodology: Vision and Foundation"	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	2	Understand and apply Arabic grammar rules and appreciate literary texts	Types of Plurals; The Poet Ibn Al-Rumi	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	2	Understand and apply Arabic grammar rules and appreciate literary texts	Assigning Verbs to Pronouns; The Poet Antarah ibn Shaddad	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	2	Understand and apply Arabic grammar rules and appreciate literary texts	Verb Conjugation	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	2	Understand and apply Arabic grammar rules and appreciate literary texts	Inflection (I'rab) and Structure (Bina'); Lexicographical Schools	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	2	Understand and apply Arabic	Subject and Predicate (Al-Mubtada' and Al-Khabar);	Lectures	Quizzes Assignments

		grammar rules and appreciate literary texts	Human Values in Pre-Islamic Poetry		Projects Report Final Exam
Week 11	2	Understand and apply Arabic grammar rules and appreciate literary texts	<i>Kana</i> and Its Sisters; Islam and Poetry	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	2	Understand and apply Arabic grammar rules and appreciate literary texts	<i>Inna</i> and Its Sisters; Cases of Opening and Breaking the Hamza of <i>Inna</i>	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13	2	Understand and apply Arabic grammar rules and appreciate literary texts	Deputy Subject (Passive Agent); Poetic Selections	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.	Poets of the Mu‘allaqat Common Linguistic Errors	Lectures	Quizzes Assignments Projects Report Final Exam

45. Course Evaluation

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

46. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	• <i>Alfiyyah Ibn Malik</i> and its Commentaries. • <i>Sharh Ibn Aqil</i> (Ibn Aqil’s Commentary on the <i>Alfiyyah</i>). • <i>Jami‘ al-Durus al-‘Arabiyyah</i> (The Comprehensive Arabic Lessons). • <i>Dala’il al-I’jaz</i> (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...)	• <i>Arabic Grammar: Rules and Meanings.</i> • <i>A Concise Guide to the Arabic Language for Non-Specialists.</i> • <i>Jawahir al-Balaghah</i> (The Jewels of Rhetoric). • <i>A Study of Spelling Rules.</i> • <i>A Concise Guide to Spelling and Composition Rules.</i>
Electronic References, Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering

Course Description Form

47.	Course Name:
Arabic	
48.	Course Code:
ARLA201	
49.	Semester / Year:
2 Semester 1/ Second year	
50.	Description Preparation Date:
24-6-2026	
51.	Available Attendance Forms:
Physically	
52.	Number of Credit Hours (Total) / Number of Units (Total)
2hrs./2Units	
53.	Course administrator's name (mention all, if more than one)

name)
Name: Ass. Prof. ANWAR QUTAIBA YAHYA Email: anwar.q.yahya@aliraqia.edu.iq

54. 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.
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55. 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.
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56. 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.	<i>Surat Yusuf</i> ; A Noble Prophetic Hadith; Parsing the Present Tense Verb (<i>I'rab al-Fi'l al-Mudari</i>).	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam

Week 2	2	Understand and apply Arabic grammar rules and appreciate literary texts	<i>Surat Al-Isra</i> ; A Noble Prophetic Hadith; Genitive Constructions (<i>Al-Majrurat</i>).	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	2	Understand and apply Arabic grammar rules and appreciate literary texts	Dependent Elements (<i>Al-Tawabi</i>); 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 (<i>Al-'Adad</i>); 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 apply Arabic grammar rules and appreciate literary texts	Solar and Lunar "Lam"; Introduction to the Science of <i>Badi'</i> (Rhetorical Embellishment).	Lectures	Quizzes 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; <i>Alif Layyinah</i> (Soft Alif).	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	2	Understand and apply Arabic grammar rules and appreciate literary texts	<i>My School Curriculum</i> ; <i>Maqayis al-Lughah</i> and <i>Al-Sihah</i> .	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	Common Linguistic Errors.	Lectures	Quizzes Assignments Projects

		and appreciate literary texts			Report Final Exam
Week 12	2	Understand and apply Arabic grammar rules and appreciate literary texts	The Letters <i>Dad</i> and <i>Za</i> ; 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 (<i>Al-Mansubat</i>).	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 <i>Alif</i> (Extended <i>Alif</i> and Maqsurah <i>Alif</i>).	Lectures	Quizzes Assignments Projects Report Final Exam

57. Course Evaluation

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

58. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	• <i>Alfiyyah Ibn Malik</i> and its Commentaries. • <i>Sharh Ibn Aqil</i> (Ibn Aqil's Commentary on the <i>Alfiyyah</i>). • <i>Jami' al-Durus al-'Arabiyyah</i> (The Comprehensive Arabic Lessons). • <i>Dala'il al-I'jaz</i> (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...)	• <i>Arabic Grammar: Rules and Meanings</i>. • <i>A Concise Guide to the Arabic Language for Non-Specialists</i>. • <i>Jawahir al-Balaghah</i> (The Jewels of

	Rhetoric). • <i>A Study of Spelling Rules.</i> • <i>A Concise Guide to Spelling and Composition Rules.</i>
Electronic References, Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering

Course Description Form

Course Name:	
Computer I	
Course Code:	
COMP105	
Semester / Year:	
Second Semester / First Year	
Description Preparation Date:	
28-6-2026	
Available Attendance Forms:	
In-person	
Number of Credit Hours (Total) / Number of Units (Total)	
4 hrs/week / 2 ECTS Credits / 75 SWL hrs	
Course administrator's name (mention all, if more than one name)	
Name: Asst. Lec. Humam Kalaman Email: humam-k-m@aliraqia.edu.iq	
Course Objectives	
Course Objectives	1. Introduce students to fundamental computing concepts, including computer hardware, software, operating systems, graphical user interfaces, data, information, algorithms, data structures, networking, email, and cloud computing. 2. Develop practical skills in operating system navigation, file and folder management, and everyday computer use.

	3. Enable students to create, format, edit, print, and manage documents using word processing software. 4. Enable students to create and format spreadsheets, use formulas and functions, sort/filter data, and create charts. 5. Build logical and computational thinking through basic data structure concepts and algorithm development. 6. Prepare students to use networks, email, cloud storage, and online collaboration tools for academic and professional communication.
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Teaching and Learning Strategies

Strategy	The teaching strategy for this course combines interactive lectures, live demonstrations, laboratory practice, quizzes, and project-based activities. Students practice the concepts directly through operating-system tasks, Microsoft Office applications, networking examples, email exercises, cloud file sharing, and collaborative document work. This approach strengthens digital literacy, problem solving, teamwork, and applied computing skills.
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Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	4	Identify the role of the operating system and basic GUI elements.	Operating systems and GUI: OS meaning, common operating systems, user interface, GUI elements, and mouse techniques.	Lectures + hands-on practice	Class discussion, oral questions, and participation
Week 2	4	Manage files, folders, windows, shortcuts, and everyday OS tasks.	File and folder basics, paths, windows, icons, menus, pointer, shortcuts, and everyday OS scenarios.	Lectures + lab practice	Practical lab, short assignment, and observation of student performance
Week 3	4	Create, save, edit, and format documents using MS Word.	Word processing basics: creating/saving files, editing text, fonts, paragraph formatting, headers, footers, and page numbers.	Lecture + demonstration	Practical Word assignment, examples, and discussion
Week 4	4	Prepare academic documents using advanced Word tools.	Word tables, spelling and grammar, symbols, pictures, page setup, bullets and numbering, borders, find/replace, print preview and printing.	Lectures + lab practice	Quiz, lab application, and assignment review
Week 5	4	Create and format basic worksheets	Spreadsheet concepts: workbook, worksheet, rows, columns, cells, cell	Lecture + demonstration	Excel lab exercise, class questions, and

		using MS Excel.	references, launching Excel, and Excel file formats.		participation
Week 6	4	Apply formulas, functions, sorting, and charts for simple analysis.	Excel formulas and functions, ranges, absolute references, sorting, text wrap, charts, and chart components.	Lectures + lab practice	Practical assignment, quiz, and applying formulas and functions
Week 7	4	Explain data, information, data structures, and common structure types.	Data and information, data structures, arrays, linked lists, stack, queue, tree, graph, and the need for data structures.	Lectures + examples	Class discussion, applied examples, and quiz
Week 8	4	Use algorithmic thinking and basic data structure operations.	Traversing, searching, insertion, deletion, sorting, merging; algorithm definition, good algorithm properties, and max-of-three example.	Lectures + problem solving	Problem solving, short assignment, and midterm review
Week 9	4	Review and assess progress across the first half of the course.	Midterm exam and feedback; applied review of OS/GUI, Word, Excel, data, data structures, and algorithms.	Exam + feedback	Midterm exam, discussion of answers, and feedback
Week 10	4	Explain computer network concepts, uses, benefits, and limitations.	Networking basics: definition, applications, client/server idea, advantages, and disadvantages of computer networks.	Lectures + examples	Quiz, class examples, and discussion
Week 11	4	Distinguish network types by geographical coverage and purpose.	PAN, LAN, WAN, MAN, CAN, and comparison of LAN, WAN, and MAN with resource-sharing examples.	Lectures + activity	Assignment, group activity, and discussion of network types
Week 12	4	Use electronic mail professionally and safely.	Email basics, address structure, message fields, sending and receiving, sent folder, professional etiquette, spam, phishing, and safe links.	Lecture + email practice	Email application, class participation, and practical assessment
Week 13	4	Explain cloud computing and manage cloud-based storage/sharing.	Cloud computing concept, benefits and limitations, Google Workspace, Microsoft 365, Google Drive/OneDrive, sharing permissions.	Lecture + demonstration	Cloud lab, file-sharing assignment, and oral questions
Week 14	4	Collaborate online using	Google Docs collaboration, Google	Lectures + collaborative	Group activity, short

		documents, spreadsheets, and meetings.	Sheets basics, Google Meet behavior, comments, versioning, and group document activity.	lab	report, and collaboration assessment
Week 15	4	Integrate productivity, networking, and communication skills.	Integrated project: prepare a document/report, spreadsheet table or chart, share through cloud, and send a professional email.	Project-based learning	Practical project, short presentation, and lab assessment
Week 16	4	Review all course learning outcomes and prepare for final assessment.	Final review: OS/GUI, Word, Excel, data structures, algorithms, networking, email, cloud computing, and online collaboration.	Review + discussion	Final review, class questions, and final exam

Course Evaluation

Quizzes 15% (15)
 Assignments 10% (10)
 Participation 5% (5)
 Projects / Lab. 10% (10)
 Midterm Exam 10% (10)
 Final Exam 50% (50)
 Total 100% (100)

Learning and Teaching Resources

Required textbooks (curricular books, if any)	Computer Science: An Overview by J. Glenn Brookshear and Dennis Brylow; Microsoft Office Step by Step (Office 2021 and Microsoft 365) by Joan Lambert and Curtis Frye; PCs For Dummies by Dan Gookin.
Main references (sources)	Computer I curriculum (COMP105); lecture slides and handouts for OS/GUI, Word, Excel, Data Structures, Networking, Email and Cloud Computing.
Recommended books and references (scientific journals, reports...)	Structure and Interpretation of Computer Programs (SICP); Microsoft Office and Google Workspace user guides.
Electronic References, Websites	https://support.microsoft.com/office https://support.google.com/docs https://www.cplusplus.com/doc/

Course Description Form

Course Name:	
Computer II	
Course Code:	
COMP100	
Semester / Year:	
Second Semester / Second Year	
Description Preparation Date:	
08-7-2025	
Available Attendance Forms:	
In-person	
Number of Credit Hours (Total) / Number of Units (Total)	
4 hrs/week / 2 ECTS Credits / 75 SWL hrs	
Course administrator's name (mention all, if more than one name)	
Name: Asst. Lec. Rehab kareem Email: rehab.k.kadhim@aliraqia.edu.iq	
Course Objectives	
Course Objectives	1. Introduce students to the fundamental concepts of programming, networking, and AI. 2. Develop problem-solving and algorithmic thinking skills using programming tools. 3. Familiarize students with e-commerce principles, network troubleshooting, and AI applications in real-world contexts. 4. Provide hands-on experience in implementing practical solutions to basic computing challenges.

	5. Explore the ethical implications and societal impacts of AI technologies.
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Teaching and Learning Strategies

Strategy	Interactive Lectures: Deliver engaging sessions using real-world examples to explain core concepts. Hands-On Labs: Reinforce theoretical knowledge with practical exercises focused on programming, networking, and AI. Case Studies: Discuss real-world scenarios to analyze the applications and implications of e-commerce and AI. Project-Based Learning: Guide students to apply their knowledge in a comprehensive final project. Supplementary Resources: Encourage the use of recommended resources for extended learning.
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Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	4	Identify the role of the security system and basic network.	-Security and Networking: What is a network - Types of networks. Basic network components.	Lectures + hands-on practice	Class discussion, oral questions, and participation
Week 2	4	Manage files, folders, windows, shortcuts, and everyday OS tasks.	Security and Networking (Cont.): Network Security Basics. Understanding network threats	Lectures + lab practice	Practical lab, short assignment, and observation of student performance
Week 3	4	identify, determine the concept of electronic banking service.	E-Commerce: Concepts of Electronic Banking services. This includes online banking: ATM and debit card services, Phone banking, SMS banking, electronic alert, Mobile banking	Lecture + demonstration	Practical Word assignment, examples, and discussion
Week 4	4	Determine the common software and problem the computers	Computer Troubleshooting: Identifying and solving common hardware and software problems that computer users encounter	Lectures + lab practice	Quiz, lab application, and assignment review
Week 5	4	Create and format basic worksheets using MS Excel.	Computer Troubleshooting (Cont.): Basic troubleshooting techniques and tools for diagnosing and resolving issues.	Lecture + demonstration	Network lab exercise, class questions, and participation
Week 6	4	simple analysis.	introduction to AI: Definition of AI, History of AI, AI Techniques and Approaches.	Lectures + lab practice	Practical assignment, quiz

Week 7	4	Explain data, information, AI, and python common structure types.	Introduction to AI (Cont.): Key Characteristics of AI, Benefits of AI, Challenges and Ethical Considerations.	Lectures + examples	Class discussion, applied examples, and quiz
Week 8	4	Mid exam	Mid exam	Mid exam	Mid exam
Week 9	4	Review and assess progress across the first half of the course.	The Role of AI in Modern Smartphones: AI-Driven Mobile Technologies, Virtual Assistants (Siri, Google Assistant, Alexa).	Exam + feedback	Midterm exam, discussion of answers, and feedback
Week 10	4	Explain computer network concepts, uses, benefits, and limitations.	. The Role of AI in Modern Smartphones (Cont.): Adaptive Learning, Real-Time Translation Services	Lectures + examples	Quiz, class examples, and discussion
Week 11	4	Distinguish network types by geographical coverage and purpose.	Applications and Tools of AI: Overview of AI Applications in Various Industries, Education and Healthcare.	Lectures + activity	Assignment, group activity, and discussion of network types
Week 12	4	Use electronic mail professionally and safely.	Applications and Tools of AI (Cont.): Transportation, Marketing and Advertising.	Lecture + python practice	participation, and practical assessment
Week 13	4	Explain cloud computing and AI manage cloud-based storage/sharing.	Applications and Tools of AI (Cont.): Finance, Robotics and Automation Technologies	Lecture + demonstration	Python lab, file-sharing assignment, and oral questions
Week 14	4	Collaborate online using documents, spreadsheets, and meetings.	AI and Society: How affects social. AI and international relations, AI and the future of humanity	Lectures + collaborative lab	Group activity, short report, and collaboration assessment
Week 15	4	Integrate productivity, networking, and communication skills.	Ethical challenges in AI: AI ethics ,privacy and surveillance. the impact of AI on the job market	Project-based learning	Practical project, short presentation, and lab assessment
Week 16	4	Review all course learning outcomes and prepare for final assessment.	the future of AI: Future trends in AI, recent research and emerging technologies	Review + discussion	Final review, class questions, and final exam

Course Evaluation

Quizzes 15% (15)
 Assignments 10% (10)
 Participation 5% (5)
 Projects / Lab. 10% (10)
 Midterm Exam 10% (10)
 Final Exam 50% (50)
 Total 100% (100)

Learning and Teaching Resources	
Required textbooks (curricular books, if any)	1. Graham Brown, David Watson, "Cambridge IGCSE Information and Communication Technology", 3rd Edition (2020) 2. Alan Evans, Kendall Martin, Mary Anne Poatsy, "Technology In Action Complete" 16th Edition (2020). 3. Ahmed Banafa, "Introduction to Artificial Intelligence (AI)", 1st Edition (2024).
Main references (sources)	Computer I curriculum (COMP100); lecture slides and handouts for OS/GUI, Word, Excel, Data Structures, Networking, Email and Cloud Computing.
Recommended books and references (scientific journals, reports...)	1. <i>Microsoft Office 2019 Step by Step</i> by Curtis Frye & Joan Lambert. 2. أساسيات الحاسوب 2016 3. مدخل إلى علم الذكاء الاصطناعي 2005.
Electronic References, Websites	www.python.org/about/gettingstarted/ https://www.cplusplus.com/doc/

Course Description Form

59. Course Name:	
Crimes of the Defunct Ba'ath Party	
60. Course Code:	
CBRI294	
61. Semester / Year:	
Third Semester / Second Year	
62. Description Preparation Date:	
1-6-2026	
63. Available Attendance Forms:	
Physically	
64. Number of Credit Hours (Total) / Number of Units (Total)	
2hrs/2Units	
65. Course administrator's name (mention all, if more than one name)	
Name: Ass. Prof. Anmar Abdul wahhab Hamdan Email: anmar.a.hamdan@aliraqia.edu.iq	
66. Course Objectives	
Course Objectives	1. Examine the political regimes that have governed Iraq and compare the conduct of the Ba'athist regime with the principles of human rights and public freedoms. 2. Comprehend the impact of the Ba'athist regime's repressive policies on the civil, political, social, and cultural rights of Iraqi citizens. 3. Analyze the psychological, social, religious, and cultural ramifications of authoritarianism and the militarization of society. 4. Investigate the environmental and humanitarian consequences of wars and the policies of the

	former regime (e.g., prohibited weapons, scorched-earth tactics, the draining of the marshes, and mass graves). 5. Promote awareness of transitional justice principles and the significance of documenting violations and preserving national memory to prevent their recurrence.
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67. Teaching and Learning Strategies

Strategy	The primary strategy relies on delivering theoretical lectures supported by historical documents and primary sources. It also emphasizes encouraging student participation in discussions and debates, alongside the preparation of short reports and research papers to foster students' critical thinking skills and their capacity for historical and legal analysis.
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68. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understanding the rise of the Iraqi state and its political regimes (1921–2003) as historical context for the Ba'athist era.	Descriptive overview of Iraqi political regimes (1921–2003): The Monarchy, the First Republic, and the Ba'athist Republic.	Theoretical lecture, discussion, analysis of historical documents/sources.	Quizzes, Assignments, Report, Midterm, Final Exam.
2	2	Identifying the Ba'athist regime's mechanisms for violating intellectual property and public freedoms.	Violations of human rights and public freedoms: Intellectual property rights and public liberties.	Theoretical lecture, discussion, analysis of historical documents/sources.	Quizzes, Assignments, Report, Midterm, Final Exam.
3	2	Analyzing the status of political pluralism and the revocation of citizenship as tools of political repression.	Violations of the right to political pluralism, citizenship revocation, and socio-economic/cultural rights.	Theoretical lecture, discussion, analysis of historical documents/sources.	Quizzes, Assignments, Report, Midterm, Final Exam.
4	2	Examining the methods of systematic repression (arbitrary detention, torture, executions) practiced by the former regime.	Impact of Ba'athist conduct on society: Arbitrary arrests, torture of detainees, and execution of military and civilian personnel.	Theoretical lecture, discussion, analysis of historical documents/sources.	Quizzes, Assignments, Report, Midterm, Final Exam.
5	2	Analyzing the concentration of the three branches of government (legislative, executive, judicial) under the Ba'athist regime and the absence of separation of powers.	Consolidation of power, partisan control, authoritarianism, moral corruption, and the suppression of intellectuals.	Theoretical lecture, discussion, analysis of historical documents/sources.	Quizzes, Assignments, Report, Midterm, Final Exam.
6	2	Understanding the concept, mechanisms, objectives, and institutions of transitional justice in post-2003 Iraq.	Transitional justice: Combatting authoritarian policies, its benefits, objectives, and implementing institutions.	Theoretical lecture, discussion, analysis of historical documents/sources.	Quizzes, Assignments, Report, Midterm, Final Exam.
7	2	Analyzing the psychological and social mechanisms employed by the former regime for social control.	Psychological sphere: Mechanisms of control (scarcity, starvation, intimidation, sectarian/ethnic cleansing, and intellectual impoverishment).	Theoretical lecture, discussion, analysis of historical documents/sources.	Quizzes, Assignments, Report, Midterm, Final Exam.
8	2	Understanding the impact of family rule and militarization on the Iraqi personality and the culture	Social sphere: Family-based rule, equating the nation with the ruler, the dialectic of praise and hypocrisy, and	Theoretical lecture, discussion, analysis of historical documents/sources.	Quizzes, Assignments, Report, Final Exam.

		of violence.	the militarization of society.		
9	2	Examining the former regime's policy toward religion, religious authorities, and political organizations.	Church and State: Suppression of religious teachings, confiscation of knowledge, persecution of scholars/youth, and prohibition of religious parties.	Theoretical lecture, discussion, analysis of historical documents/sources.	Quizzes, Assignments, Report, Final Exam.
10	2	Analyzing the role of culture and media in serving the Ba'athist regime and the militarization of the educational system.	Culture, media, and societal militarization: Militarization of the educational institution and media, literary, and artistic discourse.	Theoretical lecture, discussion, analysis of historical documents/sources.	Quizzes, Assignments, Report, Final Exam.
11	2	Examining the effects of using internationally prohibited weapons on the Iraqi environment and human population.	Impact of repression and war: Use of internationally prohibited weapons and environmental contamination (Halabja, Basra).	Theoretical lecture, discussion, analysis of historical documents/sources.	Quizzes, Assignments, Report, Final Exam.
12	2	Understanding the concept of "scorched earth" policies and their environmental and humanitarian consequences.	Scorched earth policy: The Battle of Nahr Jasim, oil well fires, minefields, and war remnants.	Theoretical lecture, discussion, analysis of historical documents/sources.	Quizzes, Assignments, Report, Final Exam.
13	2	Analyzing the causes and consequences of draining the marshes and the forced displacement of their inhabitants.	Draining of the marshes and forced displacement: The regime's role and subsequent socio-environmental impacts.	Theoretical lecture, discussion, analysis of historical documents/sources.	Quizzes, Assignments, Report, Final Exam.
14	2	Examining the destruction of agricultural and animal environments and the impact of radiation on affected regions.	Environmental destruction: Dujail, clearing of palm orchards, and radiation pollution in Basra.	Theoretical lecture, discussion, analysis of historical documents/sources.	Quizzes, Assignments, Report, Final Exam.
15	2	Identifying the crimes of mass graves and the bombing of religious sites, summarizing major violations of international law.	Mass graves, destruction of places of worship, and a comprehensive summary of Ba'athist regime violations.	Theoretical lecture, discussion, analysis of historical documents/sources.	Quizzes, Assignments, Report, Final Exam.

69. Course Evaluation

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

70. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Republic of Iraq, Ministry of Higher Education and Scientific Research, Department of Studies, Planning, and Follow-up. (2023). Curriculum of the Crimes of the Former Ba'ath Party. Baghdad, Iraq.
Main references (sources)	• Republic of Iraq, The Interim Constitution of the Republic of Iraq of 1970. • Republic of Iraq, The Constitution of the Republic of Iraq of 2005. • Republic of Iraq, Iraqi Penal Code No. 111 of 1969 and its amendments. • Republic of Iraq, Law of the Iraqi Higher Criminal Court No. 10 of 2005.

Recommended books and references (scientific journals, reports...)	- Center for Strategic and International Studies. (2008). <i>Iraqi Strategic Report 2008: Media File</i>. Baghdad, Iraq. - Amnesty International. (n.d.). <i>Reports on Human Rights Violations in Iraq</i>. - Human Rights Watch. (n.d.). <i>Reports on Human Rights Violations in Iraq</i>.
Electronic References, Websites	https://www.icrc.org/ar https://annabaa.org https://ar.wikipedia.org

Course Description Form

71.	Course Name:
Electrical Circuits	
72.	Course Code:
FEC101	
73.	Semester / Year:
First Semster/ First year	
74.	Description Preparation Date:
1-6-2026	
75.	Available Attendance Forms:
Physically	
76.	Number of Credit Hours (Total) / Number of Units (Total)
6hrs/7Units	
77.	Course administrator's name (mention all, if more than one name)
Name: Ass. Prof. Hussein Jumma Jabir Email: Hussein.j.jabir@aliraqia.edu.iq	
78.	Course Objectives
Course Objectives	- Understand the fundamental concepts of electric circuits, including voltage, current, resistance, and power, and their relationships as defined by Ohm's law. - Analyze and solve basic DC circuits using techniques such as series and parallel circuit analysis, voltage division, and current division. - Apply Kirchhoff's laws (Kirchhoff's current law and Kirchhoff's voltage law) to analyze and solve complex DC circuits. - Calculate the equivalent resistance of resistors in series and parallel configurations and apply this knowledge to simplify complex resistor networks. - Analyze circuits using various circuit analysis techniques, such as nodal analysis and mesh analysis, to determine voltage, current, and power relationships. - Apply important circuit theorems, such as the superposition theorem, Thevenin's theorem, and Norton's theorem, to simplify complex DC circuits and calculate unknown quantities.

79. 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.			
80. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	6	Understand and be able to apply circuit elements	Basic concepts, systems of units, Electric charge, current, voltage, and power Ohm's law	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	6	Understand and be able to apply circuit elements	Kirchhoff's Laws, Kirchhoff's Voltage Law, Kirchhoff's Current Law. Series dc Circuits, Parallel dc Circuits, Series-Parallel dc Circuits Conversion of delta - connected resistance into an equivalent Wye connection & Vic versa	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	6	Understand and be able to apply circuit elements	Thevenin's and Norton's theorems. maximum power transfer theorem	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	6	Understand and be able to apply circuit elements	Nodal Analysis and Mesh Analysis Superposition theorem and its application.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	6	Understand and be able to apply circuit elements	Definition and characteristics of alternating current. Generation and waveform representation of AC. Relationships and definitions of RMS value, average value, and their significance.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	6	Understand and be able to apply circuit elements	Mid-Exam	Lectures	Quizzes Assignments Projects Report Midterm Exam

					Final Exam
Week 7	6	Understand and be able to apply circuit elements	Analyses of Alternating Current Circuits	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	6	Describe the characteristic s of network and circuits analysis	Phasor Relationships for AC Circuit Elements, voltage and current relations in pure resistive inductive and capacitive circuits.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	6	Describe the characteristic s of network and circuits analysis	Series Configuration in AC Circuit Parallel Configuration in AC Circuit Network Theorems in AC circuits, Superposition, Thevenin's Theorem, Norton's Theorem	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	6	Describe the characteristic s of network and circuits analysis	Power in AC circuits, Average power and power factor, Power Factor, Apparent power, Reactive Power	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	6	Describe the characteristic s of network and circuits analysis	complex power and power triangle:	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	6	Describe the characteristic s of network and circuits analysis	Review and revision	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13 & 14	6	Preparatory week before the Final Exam	Preparatory week before the Final Exam		

81. Course Evaluation

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

82. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Introductory circuit Analysis; by Robert L. Boylestad
Main references (sources)	Sadiku, Matthew NO, and Charles K. Alexander. Fundamentals of electric circuits. New York: McGraw-Hill, 2009.

Recommended books and references (scientific journals, reports...)	Boylestad, Robert L., and Louis Nashelsky. "Electronic Devices and Circuit Theory 11th ed. (2018).
Electronic References, Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering

Course Description Form

1. Course Name:	
Electronic I	
2. Course Code:	
ELE 202	
3. Semester / Year:	
First Semester/ First year	
4. Description Preparation Date:	
25-6-2026	
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. Ali Mahmood Jasim Email: alimahmoodjasim@aliraqia.edu.iq	
8. Course Objectives	
Course Objectives	1. 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. 2. To identify and differentiate the regions of operation and configurations (CB, CE, and CC) of BJTs relevant to electronic applications. 3. To analyze DC biasing techniques and their impact on the stability and performance of transistors in low-power and electronic circuit - sensitive systems. 4. To evaluate and design biasing circuits (fixed bias, voltage divider, emitter resistor, etc.) using both NPN and PNP BJTs with electronic circuits. 5. To introduce the analysis of multiple BJT networks in electronic circuit management systems. 6. To explore BJTs as switches in electronic circuits, including understanding the stability factor and compensation methods. 7. To apply AC analysis and small-signal modeling of BJTs in amplifying

	low-energy signals from sensors and transducers used in electronic circuits. 8. To analyze various transistor configurations in the AC domain, focusing on their relevance to signal processing in electronic circuits. 9. To evaluate collector feedback and emitter follower designs with consideration to energy efficiency and signal integrity. 10. To understand cascaded systems, including the Darlington configuration, in the context of increasing gain and sensitivity in electronic circuits.
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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 simple experiments involving some sampling activities that are interesting to the students.
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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 electronic concepts.	Introduction to BJTs, Basic Operation, Volt-Ampere Characteristics, Energy-efficient switching basics	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	6	Understand and be able to apply electronic concepts.	Regions of Operation (Active, Cutoff, Saturation), BJT Configurations (CB, CE, CC) for electronic circuits	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	6	Understand and be able to apply electronic concepts.	DC Biasing of BJTs: Fixed Bias and Voltage Feedback Circuits in electronic circuits.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	6	Understand and be able to apply electronic concepts.	Voltage Divider Biasing, Circuits with Emitter Resistor, Energy-stable biasing techniques.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	6	Understand and be able to apply electronic concepts.	Collector Feedback and Emitter-Follower Configuration in electronic circuits.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam

Week 6	6	Understand and be able to apply electronic concepts.	Common-Base Configuration, Multiple BJT Networks in sensor and monitoring systems	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	6	Understand and be able to apply electronic concepts.	BJT as a Switch in Smart Controllers, Stability Factor, and Compensation Techniques	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	6	2. Describe the AC characteristics of a BJT and its use in electronic circuits.	Introduction to AC Analysis of BJTs, Amplification in electronic circuits.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	6	3. Describe the characteristics of a BJT and its use in electronic circuits.	BJT Small-Signal Models the re Model and its use in sensor amplifiers.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	6	1. Understand and be able to apply electronic concepts.	Common-Emitter and Voltage-Divider Bias Configurations in electronic circuit for signal amplification.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	6	1. Understand and be able to apply electronic concepts.	Emitter-Follower and Common-Base Amplifiers: Applications in Electronic Circuits.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	6	1. Understand and be able to apply electronic concepts.	Collector DC Feedback Configuration, Effect of Load (RL) and Source (RS) Resistance	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13 & 14	6	1. Understand and be able to apply electronic concepts.	Cascaded Systems and Darlington Connection in Electronic 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. "Electronic Devices and Circuit Theory 11th ed." (2018).
Electronic References, Websites	https://site.unibo.it/semiconductor-physics/en

Course Description Form

1. Course Name:	
Electronic II	
2. Course Code:	
ELE210	
3. Semester / Year:	
Second Semester/Second year	
4. Description Preparation Date:	
25-6-2026	
5. Available Attendance Forms:	
Electronic I	
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. Ali Mahmood Jasim Email: alimahmoodjasim@aliraqia.edu.iq	
8. Course Objectives	
Course Objectives	1. To understand the structure, operation, and characteristics of Field Effect Transistors (FETs), with emphasis on energy-efficient and low-power applications. 2. To identify the behavior and use of Junction Field Effect Transistors (JFETs) and Metal-Oxide Semiconductor FETs (MOSFETs) in electronic circuits. 3. To differentiate between depletion-mode and enhancement-mode MOSFETs. 4. To analyze key parameters of FET operation and DC characteristics across different types of FETs used in electronic circuits. 5. To demonstrate biasing techniques for FETs (self-bias, voltage-divider, common-gate), focusing on circuit stability and minimal power loss. 6. To understand FETs as amplifiers in the context of sensing, monitoring, and control applications within electronic circuits. 7. To evaluate small-signal FET models and analyze common amplifier configurations (Common Source, Common Drain, and Common Gate) in

	electronic circuits 8. To explore multistage amplifier design and signal conditioning circuits used in environmental monitoring. 8. To analyze the frequency response of FET and BJT amplifiers, including low-frequency behavior, with applications in data acquisition systems and electronic circuits.
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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 simple experiments involving some sampling activities that are interesting to the students.
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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 electronic circuits concepts.	Introduction to Field Effect Transistors (FETs): Structure, operation, and characteristics of FETs.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	6	Understand and be able to apply electronic circuits concepts.	JFETs and MOSFETs: Introduction to Junction Field-Effect Transistors (JFETs) and Metal-Oxide-Semiconductor FETs (MOSFETs), including types (N-channel, P-channel).	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	6	Understand and be able to apply electronic circuits concepts.	MOSFET Types: Depletion-mode and enhancement-mode MOSFETs.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	6	2. Describe the characteristics of various FETs and their use in electronic circuits.	FET DC Characteristics: Analysis of key operational parameters, including I-V characteristics for various FETs used in electronic circuits.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	6	Understand and be able to apply electronic circuits concepts.	FET Biasing Techniques: Self-bias, voltage-divider bias, common-gate bias configurations. Emphasizing stability and minimal power loss for energy applications.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	6	Understand and be able to apply electronic circuits concepts.	AC Analysis of FETs: How FETs function as amplifiers in electronic circuits.	Lectures	Quizzes Assignments Projects Report Midterm Exam

					Final Exam
Week 7	6	Understand and be able to apply electronic circuits concepts.	Small-Signal FET Models: Understanding small-signal models for FETs; analyzing Common Source, Common Drain, and Common Gate configurations.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	6	Understand and be able to apply electronic circuits concepts.	Multistage Amplifiers: Introduction to multistage amplifier designs. Analysis of voltage and current gain for electronic circuit applications.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	6	3. Describe the Frequency Response of FETs and their use in electronic circuits.	Frequency Response of FETs: Analyzing frequency response, including decibels and Bode plot analysis	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	6	1. Understand and be able to apply electronic circuits concepts.	BJT and FET Frequency Response: Analyzing low-frequency behavior and using Bode plots for understanding amplifier responses in electronic circuits.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	6	2. Describe the characteristics of a diode and its use in electronic circuits.	Advanced Amplifier Designs: Exploring advanced amplifier types used in electronic circuits.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	6	3. Describe the characteristics of a BJT and its use in electronic circuits.	Energy System Integration: How FETs and BJTs are integrated into electronic circuits.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13 & 14	6	Understand and be able to apply electronic circuits concepts.	Applications of Amplifiers in Energy Systems: Case studies on using amplifiers in solar power systems, energy storage management.	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
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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. "Electronic Devices and Circuit Theory 11th ed (2018).
Electronic References, Websites	https://site.unibo.it/semiconductor-physics/en

Course Description Form

83.	Course Name:
	Engineering drawing
84.	Course Code:
	END101
85.	Semester / Year:
	First Semester/ First year
86.	Description Preparation Date:
	1-6-2026
87.	Available Attendance Forms:
	Physically
88.	Number of Credit Hours (Total) / Number of Units (Total)
	3hrs/3Units
89.	Course administrator's name (mention all, if more than one name)
	Name: Dr Mustafa Ibrahim Salim Email: musrafa.i.salim@aliraqia.edu.iq
90.	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
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91. Teaching and Learning Strategies

Strategy	In 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.
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92. 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	Lab	Class work, Homework and Exam
Week 2	3	Demonstrate an understanding of the principles and conventions of engineering drawing.	Sketching techniques and line types & Scaling, dimensioning, and labeling	Lab	Class work, Homework and Exam
Week 3	3	Demonstrate an understanding of the principles and conventions of engineering drawing.	Principles of orthographic projection	Lab	Class work, Homework and Exam
Week 4	3	Demonstrate an understanding of the principles and conventions of engineering drawing.	Multiview drawings in orthographic projection	Lab	Class work, Homework and Exam
Week 5	3	Demonstrate an understanding of the principles and conventions of engineering	Sectional views and conventions	Lab	Class work, Homework and Exam

		drawing.			
Week 6	3	Demonstrate an understanding of the principles and conventions of engineering drawing.	Introduction to isometric projections	Lab	Class work, Homework and Exam
Week 7	3	Demonstrate an understanding of the principles and conventions of engineering drawing.	Isometric drawing techniques and isometric scales	Lab	Class work, Homework and Exam
Week 8	3	Demonstrate an understanding of the principles and conventions of engineering drawing.	Isometric views of objects and assemblies Extracting 2D Drawings from Isometric drawing	Lab	Class work, Homework and Exam
Week 9	3		Mid exam	Lab	Exam
Week 10	3	Learn drawing skills by AutoCAD.	Introduction - Theory lectures on history of AutoCAD program, what's new versions, how to install program.Explanation the main window for program, how to arrange it before start work.	Lab	Class work, Homework and Exam
Week 11	3	Learn drawing skills by AutoCAD.	how to use file icon from the window(open, new, save ,save as, export, merge ,drawing properties .draw orders(line and construction line with types of lines (hidden and center lines)) and modify (erase, move, copy) Orthogonally ,snaps, grid, scale and explode .	Lab	Class work, Homework and Exam
Week 12	3	Learn drawing skills by AutoCAD.	Draw Arcs, polyline, circles and rectangle Draw Ellipses ,trim and extend orders , rotate and mirror.	Lab	Class work, Homework and Exam
Week 13 &14	3	Apply appropriate techniques to create accurate and precise engineering drawings.	term Exam + tutorial. And Application of previous orders. Layer order (how to change color, name, type and thickness of line by layer)	Lab	Class work, Homework and Exam

93. Course Evaluation

Class work 20% (20)

Homework 20% (20) Midterm Exam 10% (10) Final Exam 50% (50)	
94. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	1-Manual of engineering drawing - Simmons C.H., Maguire D. E. 2-Autodesk AutoCAD 2021: Learn CAD With Ease (For Beginners) Hardcover – February 20, 2021 by Madhumita Kshirsagar.
Main references (sources)	1-Manual of engineering drawing - Simmons C.H., Maguire D. E.
Recommended books and references (scientific journals, reports...)	1-Giesecke, Frederick Ernest, et al. Technical drawing with engineering graphics. Vol. 15. Prentice Hall, 2016. 2-French, Thomas Ewing, and Charles J. Vierck. fundamentals of engineering drawing and graphics technology. McGraw-Hill Companies, 1978.
Electronic References, Websites	https://www.autodesk.com/

Course Description Form

95.	Course Name:
General Chemistry	
96.	Course Code:
GCH101	
97.	Semester / Year:
Second Semester/ First year	
98.	Description Preparation Date:
1-6-2026	
99.	Available Attendance Forms:
Physically	
100.	Number of Credit Hours (Total) / Number of Units (Total)
6hrs/6Units	
101.	Course administrator's name (mention all, if more than one name)
Name: Dr. Bilal Ayed Wasmi Email: bilal.ayed@aliraqia.edu.iq	
102.	Course Objectives
Course Objectives	1. Explain the fundamental concepts of chemistry relevant to engineering applications, and describe their

	significance in various engineering fields. - Analyze how chemical principles support the selection, and using of materials used in energy systems and renewable energy applications, and explain how material properties influence performance and efficiency. - Apply chemical principles to solve practical engineering problems and propose sustainable solutions based on the principles of green chemistry while considering environmental and economic aspects.
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103. Teaching and Learning Strategies

Strategy	➤ Utilize Visual teaching methods: Use presentation, diagrams, charts, pictures and tables to visualize complex concepts. This can assist in better understanding structures, reactions, and processes. ➤ Practice Problem-Solving: Engineering chemistry involves a lot of problem-solving. Work through problems practice different types of chemical calculations. ➤ Study Regularly and engage in group study: Create a study schedule that allows reviewing material consistently. Study with classmates to discuss concepts and work through problems together. ➤ Utilize Online Resources: Take advantage of online lectures, tutorials, and educational videos. ➤ Read the Textbook Thoroughly: Focus on the textbook during study sessions. Highlight important points, and summarize chapters to reinforce your understanding. ➤ Connect Chemistry to Engineering Applications: Understand how chemistry principles apply to engineering problems. ➤ Ask Questions: Don't hesitate to seek help from lecturer or peers when you have questions or struggle with a topic. Engaging in class discussions can also clarify concepts. ➤ Stay Organized: Keep track of assignments, deadlines, and exam dates. ➤ Seek Feedback: After assignments and exams, review feedback carefully to understand what you did well and where you can improve.
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104. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	6	To understand the importance of chemistry in engineering and the basic concepts of chemistry. Additionally, gaining knowledge on how chemistry plays a role in energy.	Introduction to Engineering Chemistry	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	6	To understand how to read the periodic table, type of elements, and their physical and chemical properties	Periodic table of elements.	Lectures and Lab.	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	6	To understand the chemical	Chemical Bonds	Lectures	Quizzes

		bonds, to be able to differentiate between the different types of chemical bonds, and the properties of each bond		and Lab.	Assignments Projects Report Midterm Exam Final Exam
Week 4	6	To understand what is the difference between pure substance and mixture, types of mixtures, their properties and separation methods	Pure Substance and Mixtures	Lectures and Lab.	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	6	Understanding the types of chemical reactions, reactions behaviors and what are reaction indications.	Chemical Reactions and Reaction Stoichiometry	Lectures and Lab.	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	6	Understanding chemical reaction stoichiometry, including mole concept, limiting reactants, and yield percent	Chemical Reactions and Reaction Stoichiometry	Lectures and Lab.	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	6	Exploring the main types of materials, their properties, their advantages and disadvantages as well as their applications	Materials Chemistry	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	6	Midterm Exam			
Week 9	6	Understanding the concepts of smart materials, functional types and their properties.	Smart materials	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	6	Exploring the main types of smart materials, their properties, as well as their applications	Smart materials	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	6	Understanding the basics of electrochemistry, its terminologies, types of electrochemical cells, types of batteries.	Electrochemistry	Lectures and Lab.	Quizzes Assignments Projects Report Final Exam
Week 12	6	Understanding the theory of corrosion, the main factors influencing corrosion.	Corrosion	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13	6	Exploring the types of corrosion and the prevention methods	Corrosion	Lectures	Quizzes Assignments Projects Report Final Exam
Week 14	6	Understanding the basic concepts of green chemistry, its twelve principles, and exploring the application of green chemistry.	Green Chemistry	Lectures	Quizzes Assignments Projects Report Final Exam

105. Course Evaluation	
Quizzes 10% (10) Assignments 10% (10) Lab. 10% (10) Report 10% (10) Midterm Exam 10% (10) Final Exam 50% (50)	
106. Learning and Teaching Resources	
Required textbooks (curricular books any)	• General Chemistry: Principles and Modern Applications" (11th Ed.) – <i>Petrucci, Herring, Madura, Bissonnette</i>, 2012. • Chemistry: The Central Science" (14th Ed.) – <i>Brown, LeMay, Bursten, Murphy, Woodward, Stoltzfu.</i> 2023
Main references (sources)	• Chemistry: The Central Science" (14th Ed.) – <i>Brown, LeMay, Bursten, Murphy, Woodward, Stoltzfu.</i> 2023
Recommended books and references (scientific journals, reports...)	• Essentials of General Chemistry by D.D. Ebbing, S.D. Gammon, and R.O. Ragsdale, 2003, Houghton Mifflin Company, New York. • Raymond Chang, General Chemistry, McGraw Hill 9th ed., 2007 • Green Chemistry: An Introductory Text, By Mike Lancaster, 2020.
Electronic References, Websites	https://chem.libretexts.org/ https://openstax.org/details/books/chemistry-2e?Student%20resources https://www.khanacademy.org/science/chemistry/chemical-bonds https://open.umn.edu/opentextbooks/textbooks/22

Course Description Form

107.	Course Name:
Mathematics 1	
108.	Course Code:
MAT101	
109.	Semester / Year:
First Semester/ First year	
110.	Description Preparation Date:

1-6-2026					
111. Available Attendance Forms:					
Physically					
112. Number of Credit Hours (Total) / Number of Units (Total)					
6hrs/6Units					
113. Course administrator's name (mention all, if more than one name)					
Name: Dr Mustafa Ibrahim Salim Email: musrafa.i.salim@aliraqia.edu.iq					
114. Course Objectives					
Course Objectives			1. Make students able to analyze engineering problems and formulate mathematical models to solve them. 2. Understand mathematical concepts in engineering as apply matrix techniques to problems in engineering 3. Expressing linear transforms in other forms, such as matrix equations and vector equations. 4. Apply systems of linear equations to problems in networking 5. Use the characteristic polynomial to find all eigenvalues and eigenvectors 6. In engineering, by domain and range one can use to design and optimize systems. 7. Build a mathematical toolkit: The course introduces various mathematical tools and techniques necessary for engineering analysis. This includes algebraic manipulation, trigonometric functions, calculus operations (such as differentiation and integration)		
115. Teaching and Learning Strategies					
Strategy		1- Giving theoretical lectures 2- Solve many problems 3- Using illustration methods such as drawing 4- Direct discussion by asking questions and opening dialogue and interaction with students.			
116. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

Week 1	6	Understand and perform operations on matrices.	Matrices: introduction, operation	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	6	Understand and perform operations on matrices.	Matrix determination	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	6	Understand and perform operations on matrices.	Inverse Matrices	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	6	Understand and perform operations on matrices.	Solving a system of linear equations by Cramer's rule	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	6	Understand and perform operations on matrices.	Solving a system of linear equations by inverse method	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	6	Understand and perform operations on matrices.	Eigen value and Eigen vector	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	6		(Mid-term Exam)	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	6	Analyze and graph functions	Real Numbers, Intervals, Functions:graphs , domain and range	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	6	3. Describe the characteristics of a BJT, and its use in electronic circuits.	Limit and continuity	Lectures	Quizzes Assignments Projects Report Final Exam

Week 10	6	Apply differentiation rules, including the chain rule and implicit differentiation, to find derivatives.	Differentiation	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	6	Apply differentiation rules,	Chain rule, implicit Differentiation	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	6	Apply differentiation rules,	Rules of integration, Definite and indefinite integrals	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13 & 14	6	Apply differentiation rules,	trigonometric functions: derivations, integrations	Lectures	Quizzes Assignments Projects Report Final Exam
Week 15	6	Apply differentiation rules,	natural logarithm , exponential e^x : properties, derivations, integrations	Lectures	Quizzes Assignments Projects Report Final Exam

117. Course Evaluation

Class work 20% (20)
Homework 20% (20)
Midterm Exam 10% (10)
Final Exam 50% (50)

118. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Calculus By Thomas
Main references (sources)	CALCULUS EARLY TRANSCENDENTALS, By HOWARD ANTON, IRL BIVENS ,STEPHEN DAVIS
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Mathematics 2

2. Course Code:					
MAT102					
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)					
6hrs/6Units					
7. Course administrator's name (mention all, if more than one name)					
Name: Dr Mustafa Ibrahim Salim Email: musrafa.i.salim@aliraqia.edu.iq					
8. Course Objectives					
Course Objectives			The objective of this course is to develop an understanding of the basic ideas of mathematics encountered in engineering. Focus will be on the methods for understanding complex numbers and fundamentals of the derivative and integration of inverse trigonometric functions. Students will learn some special integration techniques (Integration by part, partial fraction, and substitution) that are useful for the understanding of different engineering subjects. Another objective is to teach the Engineering student about integration applications such as Area under curve and volume. Finally, the student will learn the concept of polar coordinates and its application.		
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 simple reports 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 perform mathematical operations	Fundamental Concepts of complex numbers.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	6	Understand and perform mathematical	Complex numbers properties- power and roots	Lectures	Quizzes Assignments Projects

		operations			Report Midterm Exam Final Exam
Week 3	6	Understand and perform mathematical operations	Introduction to Inverse Trigonometric function and their differentiation	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	6	Understand and perform mathematical operations	Inverse Trigonometric function Integration	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	6	Understand and perform mathematical operations	Introduction to Hyperbolic Trigonometric functions and their differentiation	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	6	Understand and perform mathematical operations	Hyperbolic Trigonometric functions integration	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	6		Mid-term Exam	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	6	Understand and perform mathematical operations	Methods of integration – Integration by Part and integration using Partial fraction method	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	6	Understand and perform mathematical operations	Methods of integration – Integration using substitution	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	6	Understand and perform mathematical operations	Integration applications – Area under curve and Area between two curves	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	6	Understand and perform mathematical operations	Integration applications – Area between two curves	Lectures	Quizzes Assignments Projects Report Final Exam

Week 12	6	Understand and perform mathematical operations	Integration applications – Volume of solid using Disk and Washer methods	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13	6	Understand and perform mathematical operations	Introduction to polar coordinates and its properties	Lectures	Quizzes Assignments Projects Report Final Exam
Week 14	6	Understand and perform mathematical operations	Integral applications using polar coordinates – Area and length of curve	Lectures	Quizzes Assignments Projects Report Final Exam
Week 15	6	Understand and perform mathematical operations	Preparatory week before the final Exam	Lectures	Quizzes Assignments Projects Report Final Exam

11. Course Evaluation

Class work 20% (20)
Homework 20% (20)
Midterm Exam 10% (10)
Final Exam 50% (50)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Calculus By Thomas
Main references (sources)	CALCULUS EARLY TRANSCENDENTALS, By HOWARD ANTON, IRL BIVENS ,STEPHEN DAVIS
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

119.	Course Name:
Mathematics III	
120.	Course Code:
MAT201	
121.	Semester / Year:
Third Semester/ Second year	
122.	Description Preparation Date:
1-6-2026	

123. Available Attendance Forms:					
Physically					
124. Number of Credit Hours (Total) / Number of Units (Total)					
4hrs/5Units					
125. Course administrator's name (mention all, if more than one name)					
Name: Lect. Dr. Rami Raad Saadi Email: rami.raad@aliraqia.edu.iq					
126. Course Objectives					
Course Objectives		8. Partial derivatives are useful in analyzing surfaces for maximum and minimum points and give rise to partial differential equations in next stage. 9. Learn basics of vectors for many engineering quantities, such as forces, displacements, velocities, and accelerations, will need to be represented as vectors for analysis. 10. The major applications of multiple integrals in engineering is the determination of properties of plane, and whenever an area or a volume under a 2D curve (a surface) needs to be measured 11. Build a mathematical toolkit: The course introduces various mathematical tools and techniques necessary for engineering analysis. This includes • impart the knowledge of sequences and summation of series • Represent functions as Taylor and Maclaurin series. 12. Understand their engineering application			
127. Teaching and Learning Strategies					
Strategy	1- Giving theoretical lectures 2- Solve many problems 3- Using illustration methods such as drawing 4- Direct discussion by asking questions and opening dialogue and interaction with students. 5- Giving video lecture if need				
128. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	4	Understand and be able to apply fundamental mathematical concepts and problem-solving techniques.	Fourier series - introduction.	Lectures	Quizzes Assignments Report Midterm Exam Final Exam

Week 2	4	Understand and be able to apply fundamental mathematical concepts and problem-solving techniques.	Half range Fourier series	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 3	4	Understand and be able to apply fundamental mathematical concepts and problem-solving techniques.	Partial derivatives	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 4	4	Understand and be able to apply fundamental mathematical concepts and problem-solving techniques.	Chain rule	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 5	4	Understand and be able to apply fundamental mathematical concepts and problem-solving techniques.	Maxima, minima, and saddle points	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 6	4	Understand and be able to apply fundamental mathematical concepts and problem-solving techniques.	Vectors: Introduction	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 7	4	Understand and be able to apply fundamental mathematical concepts and problem-solving techniques.	Vectors: properties, dot product	Lectures	Quizzes Assignments Report Midterm Exam Final Exam
Week 8	4	Understand and be able to apply fundamental mathematical concepts and problem-solving techniques.	Vectors: cross product	Lectures	Quizzes Assignments Report Final Exam
Week 9	4	Understand and be able to apply fundamental mathematical concepts and problem-	(Mid-term Exam)	Lectures	Quizzes Assignments Report Final Exam

		solving techniques.			
Week 10	4	Understand and be able to apply fundamental mathematical concepts and problem-solving techniques.	Equations of lines and planes in space	Lectures	Quizzes Assignments Report Final Exam
Week 11	4	Understand and be able to apply fundamental mathematical concepts and problem-solving techniques.	Vector function	Lectures	Quizzes Assignments Report Final Exam
Week 12	4	Understand and be able to apply fundamental mathematical concepts and problem-solving techniques.	Multiple Integrals: Double Integrals	Lectures	Quizzes Assignments Report Final Exam
Week 13	4	Understand and be able to apply fundamental mathematical concepts and problem-solving techniques.	Double Integrals using polar coordinate	Lectures	Quizzes Assignments Report Final Exam
Week 14	4	Understand and be able to apply fundamental mathematical concepts and problem-solving techniques.	Triple integrals	Lectures	Quizzes Assignments Report Final Exam
Week 15	4	Understand and be able to apply fundamental mathematical concepts and problem-solving techniques.	Taylor and Maclaurin series	Lectures	Quizzes Assignments Report Final Exam

129. Course Evaluation

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

130. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Calculus By Thomas
Main references (sources)	CALCULUS EARLY TRANSCENDENTALS, By HOWARD ANTON, IRL BIVENS , STEPHEN DAVIS
Recommended books and references (scientific journals, reports...)	Erwin Kreyszig, Advanced Engineering Mathematics.
Electronic References, Websites	https://www.khanacademy.org/math

Course Description Form

1. Course Name:	
Electronic Physics	
2. Course Code:	
EPH 101	
3. Semester / Year:	
First Semester/ First year	
4. Description Preparation Date:	
25-6-2026	
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. Ali Mahmood Jasim Email: alimahmoodjasim@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 of 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.
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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 simple experiments involving some sampling activities that are interesting to the students.
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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 electronic physics 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 electronic physics concepts.	collision of an electron with an 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 electronic physics 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 electronic physics 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 electronic physics 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 electronic physics 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 electronic physics concepts.	Silicon, germanium, an extrinsic semiconductor	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	6	2. Describe the characteristics of a diode and its use in electronic circuits.	Semiconductor Doping, PN junction, diode depletion width, LED, Resistance level of the diode, diode equivalent circuits	Lectures	Quizzes Assignments Projects Report 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 electronic physics concepts.	Diode clippers summary circuits with different AC input waveforms, 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, and 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. "Electronic Devices and Circuit Theory 11th ed." (2018).
Electronic References, Websites	https://site.unibo.it/semiconductor-physics/en

Course Description Form

1. Course Name:	
Principles of Mechanical Engineering II	
2. Course Code:	
PME102	
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)	
6hrs/6Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Ass. Prof. Dr. Omar Hassan Email: omar.hassan@aliraqia.edu.iq	
8. Course Objectives	
Course Objectives	1. Explain centroid and moment of inertia a for various shapes. 2. Describe the motion of a particle in terms of its position. 3. Demonstrate velocity and acceleration in different frames. 4. Analyze the forces causing the motion of a particle. 5. Use the equation of motion to describe the accelerated motion of a particle.

	6. To apply work, energy, impulse and momentum relationships for a particle in motion. 7. Describe the motion of a rigid body in different frames of reference
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9. Teaching and Learning Strategies

Strategy	Understand mechanical engineering principles and applications by developing a schedule that specifies when you will study each part of the mechanics course. Identify how you will practically interact with the course material, such as solving problems, conducting practical experiments where possible, and participating in discussions with peers or teachers. Establish periods for review and self-evaluation to understand progress and understanding of the material. Based on previous experiences, these reviews can be used to improve the strategic plan.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	6	Solving Rectilinear Motion of a particle.	Rectilinear Motion of a particle.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	6	Solving Angular Motion of a Line and motion of projectile	Angular Motion of a Line	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	6	Solving problem Curvilinear Motion of Particle using normal and tangential component, and using radial and transverse components.	Curvilinear Motion of particle using rectangular components	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	6	Solving Angular Motion of a line and motion of projectile	Motion of Projectile.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	6	Solving problem Curvilinear Motion of Particle using normal and tangential component, and using radial and transverse	Curvilinear Motion of Particle using normal and tangential components	Lectures	Quizzes Assignments Projects Report Midterm Exam

		components.	and Quiz		Final Exam
Week 6	6	Solving problem Curvilinear Motion of Particle using normal and tangential component, and using radial and transverse components.	Curvilinear Motion of particle using radial and transverse components	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	6	Find Motion of rigid bodies.	Motion of rigid bodies	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	6	Find Kinematics relative motion and kinetics-force	Kinematics relative motion	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	6	Find Kinematics relative motion and kinetics-force	Kinetics- Force	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	6		Mid.	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	6	To find Mass, acceleration, centroids and center of gravity	Mass and acceleration	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	6	To find Mass, acceleration, centroids and center of gravity	Centroids and Center of Gravity	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13	6	To find Mass, acceleration, centroids and center of gravity	Second Moment or moment of inertia	Lectures	Quizzes Assignments Projects Report Final Exam
Week 14	6	Apply the mode superposition method to determine the vibration response of mechanical systems.	Kinetics-Work and Energy	Lectures	Quizzes Assignments Projects Report Final Exam
Week 15		Understand dynamics, definitions and basic	Dynamics, definitions and		

		principles	basic principles		
Week 16			Final		
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)		1. Meriam, J. L. & Kraige, L. G. (2013). Engineering Mechanics Statics, 7th Edition, Wiley. 2. Hibbeler, R. C. (2017). Engineering Mechanics Statics, 14th Edition in SI units, Pearson.			
Recommended books and references (scientific journals, reports...)		1. I. H. Shames, Engineering Mechanics: Statics and dynamics, 4th Ed, PHI, 2002. 2. F. P. Beer and E. R. Johnston, Vector Mechanics for Engineers, Vol I - Statics, Vol II – Dynamics, 9th Ed, Tata McGraw Hill, 2011.			
Websites		https://highered.mheducation.com/sites/00733803/information_center_view0/			

Course Description Form

131. Course Name:	
Principles of Mechanical Engineering I	
132. Course Code:	
PME101	
133. Semester / Year:	
First Semester/ First year	
134. Description Preparation Date:	
1-6-2026	
135. Available Attendance Forms:	
Physically	
136. Number of Credit Hours (Total) / Number of Units (Total)	
6hrs/6Units	
137. Course administrator's name (mention all, if more than one name)	
Name: Ass. Prof. Dr. Omar Hassan Email: omar.hassan@aliraqia.edu.iq	
138. Course Objectives	
Course Objectives	1. Explain the principles basic definitions and introductory concepts of engineering mechanics/statics. 2. Analyze forces and find out the resultant forces in plane and space. 3. Differentiate between various type of supports and draw free-body

		diagram, compute the reaction force in simple structure (beam, frame, truss). 4. Explain the principles of static equilibrium and solve problems relating to dry friction. 5. Use free body diagrams to solve static problems involving components and pulley systems 6. Solve problems relating to the forces in truss members using the method of joints and the method of sections. 7. Providing the basic concepts and skills that form the foundation for mechanical design.			
139. Teaching and Learning Strategies					
Strategy	Understand mechanical engineering principles and applications by developing a schedule that specifies when you will study each part of the mechanics course. Identify how you will practically interact with the course material, such as solving problems, conducting practical experiments where possible, and participating in discussions with peers or teachers. Establish periods for review and self-evaluation to understand progress and understanding of the material. Based on previous experiences, these reviews can be used to improve the strategic plan.				
140. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	6	- Analyze units, and basic principles. - Define Newton's laws of motion.	Introduction, course orientation, units, definitions and basic principles	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	6	Recall trigonometric laws and apply to the addition and decomposition of vector quantities	Forces, forces resolution and combination in plane and in space	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	6	Identify the moment of a force and calculate its value about a specified axis..	Rigid Body Force Systems, moment of a force about a point, moment of a force about an axis.	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	6	Define the moment of a couple	Rigid Body Force Systems, couples, reduction of force and couple systems	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam

Week 5	6	Recall trigonometric laws and apply to the addition and decomposition of vectors quantities.	Resultant of concurrent coplanar force system and Quiz	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	6	Recall trigonometric laws and apply to the addition and decomposition of vectors quantities.	Resultant of non-concurrent non parallel coplanar force system	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	6	Construct "Free Body Diagrams" of real-world problems and apply Newton's Laws of motion and vector operations to evaluate equilibrium of particles and bodies.	Equilibrium of a Particles, free body and force diagrams; equilibrium of a particle	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	6	Construct "Free Body Diagrams" of real-world problems and apply Newton's Laws of motion and vector operations to evaluate equilibrium of particles and bodies.	Equations of equilibrium, Equilibrium of a rigid body plane	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	6	Solving problem of equilibrium plane and space.	Solving equation of equilibrium plane	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	6		Mid-Term	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	6	Solving problem of equilibrium plane and space.	Equations of equilibrium, Equilibrium of a rigid body space	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	6	Solving problem of equilibrium plane and space.	Solving problem of equilibrium space	Lectures	Quizzes Assignments Projects Report Final Exam
Week 13	6	Apply the principles of equilibrium of particles and bodies to analysis the forces	Trusses: method of	Lectures	Quizzes Assignments

		in planar truss members.	joints		Projects Report Final Exam
Week 14	6	Apply the principles of equilibrium of particles and bodies to analysis the forces in planar truss members.	Trusses: method of sections		
Week 15		Solving Truss problems.	Solving Truss problems		
Week 16			Final Exam		
141. Course Evaluation					
Quizzes 20% (20) Assignments 10% (10) Report 10% (10) Midterm Exam 10% (10) Final Exam 50% (50)					
142. Learning and Teaching Resources					
Required textbooks (curricular books, if any)			1. Meriam, J. L. & Kraige, L. G. (2013). Engineering Mechanics Statics, 7th Edition, Wiley. 2. Hibbeler, R. C. (2017). Engineering Mechanics Statics, 14th Edition in SI units, Pearson.		
Recommended books and references (scientific journals, reports...)			Beer, Ferdinand Pierre, et al. Vector mechanics for engineers. Vol. 4. New York: McGraw-Hill,		
Websites			http://www.adelaide.edu.au/mathlearning/resources/sts/		

Course Description Form

143. Course Name:
Probability and Statistics
144. Course Code:
PNS206
145. Semester / Year:
second Semster/ second year
146. Description Preparation Date:
1-6-2026
147. Available Attendance Forms:
Physically
148. Number of Credit Hours (Total) / Number of Units (Total)
3hrs/5Units
149. Course administrator's name (mention all, if more than one name)
Name: Dr Mustafa Ibrahim Salim

150. Course Objectives

Course Objectives

1. To provide students with a thorough grounding in statistical methodology, an awareness of the scope, achievements and possibilities of using statistics.
2. To give students a theoretical and mathematically formal framework for conditional distributions of random variables and for studying the asymptotic behavior of sequences of random variables.
3. To discuss the statistical inference technique of parameter (point) estimation.
4. To extend the knowledge about statistical inference concepts and techniques to (confidence) interval estimation and hypothesis testing of variety of standard statistical tests.
5. Introduce simple analysis-of-variance models.
6. To introduce the students to more complex statistical models like the simple and multiple linear regression models.

151. 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.

152. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	3	Understand and perform probability and statistical rules	Probability Models	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	3	and perform probability and statistical rules	Discrete Random Variables and Probability Distributions	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	3	and perform probability	Continuous Random Variables and Probability	Lectures	Quizzes Assignments

		and statistical rules	Distributions		Projects Report Midterm Exam Final Exam
Week 4	3	and perform probability and statistical rules	Joint Probability Distributions and Random Samples	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 5	3	and perform probability and statistical rules	Point Estimation	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	3	and perform probability and statistical rules	Statistical Intervals Based on a Single Sample	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	3	and perform probability and statistical rules	Tests of Hypotheses Based on a Single Sample + Mid-term Exam	Lectures	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	3	and perform probability and statistical rules	Inferences Based on Two Samples	Lectures	Quizzes Assignments Projects Report Final Exam
Week 9	3	and perform probability and statistical rules	The Analysis of Variance and Multifactor Analysis of Variance	Lectures	Quizzes Assignments Projects Report Final Exam
Week 10	3	and perform probability and statistical rules	frequency distribution	Lectures	Quizzes Assignments Projects Report Final Exam
Week 11	3	and perform probability and statistical rules	ANOVA test	Lectures	Quizzes Assignments Projects Report Final Exam
Week 12	3	and perform probability and statistical rules	Simple Linear Regression and Correlation	Lectures	Quizzes Assignments Projects Report Final Exam

Week 13	3	and perform probability and statistical rules	Nonlinear and Multiple Regression	Lectures	Quizzes Assignments Projects Report Final Exam
Week 14	3	and perform probability and statistical rules	Goodness-of-Fit Tests and Categorical Data Analysis	Lectures	Quizzes Assignments Projects Report Final Exam
Week 15	3		Preparatory week before the final Exam	Lectures	Quizzes Assignments Projects Report Final Exam

153. Course Evaluation

Class work 20% (20)
Homework 20% (20)
Midterm Exam 10% (10)
Final Exam 50% (50)

154. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Probability and Statistics for Engineering and the Sciences, JAY DEVORE, 8 th edition
Main references (sources)	Probability and Statistics the Science of Uncertainty, Michael J. Evans and Jeffrey S. Rosenthal, Second Edition
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Technical workshop
2. Course Code:
WSP106
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)

2hrs/2Units

7. Course administrator's name (mention all, if more than one name)					
Name: Ass. lec. Aws Abdulillah Hussein Email aws.a.hussein@aliraqia.iq					
8. Course Objectives					
Course Objectives			1. Identify all the pieces used in the computer and network industries 2. Check and test electronic parts used in computers and electronic devices. 3. Learn the Soldering and DE soldering processes and how to deal with destroyed parts.		
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	Understanding and applying concepts for the technical workshop	Identifying the measuring devices available in the workshop and how they work	Lecture with practical application	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 2	2	Understanding and applying concepts for the technical workshop	Understanding the process of soldering electronic components in series	Lecture with practical application	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 3	2	Understanding and applying concepts for the technical workshop	Learn how to solder electronic components in parallel.	Lecture with practical application	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 4	2	Understanding and applying concepts for the technical workshop	Resistance: Types of resistors and how to calculate their values using several methods.	Lecture with practical application	Quizzes Assignments Projects Report Midterm Exam Final Exam

Week 5	2	Understanding and applying concepts for the technical workshop	Capacitor identification: Understanding capacitor types and charging/discharging methods	Lecture with practical application	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 6	2	Understanding and applying concepts for the technical workshop	Silicon and germanium semiconductors	Lecture with practical application	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 7	2	Understanding and applying concepts for the technical workshop	Diode: How a diode works and how to incorporate it in electrical circuits	Lecture with practical application	Quizzes Assignments Projects Report Midterm Exam Final Exam
Week 8	2	Understanding and applying concepts for the technical workshop	Applications of diode operation and rectifier circuits	Lecture with practical application	Quizzes Assignments Projects Report Final Exam
Week 9	2	Understanding and applying concepts for the technical workshop	Zener diode: how it works and how it's connected in electrical circuits	Lecture with practical application	Quizzes Assignments Projects Report Final Exam
Week 10	2	Understanding and applying concepts for the technical workshop	Applications of Zener diode operation	Lecture with practical application	Quizzes Assignments Projects Report Final Exam
Week 11	2	Understanding and applying concepts for the technical workshop	LED types and applications	Lecture with practical application	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)	Technical workshop (Materials & Devices) authored by Assist. Lecturer Mazin N. Ali supervised by Prof. Mohammed H. Hafiz Dean of college of engineering.
Main references (sources)	Electrical & Electronics Engineering, Amrita School of Engineering, 2014
Recommended books and references (scientific journals, reports...)	Electronics Workshop Lab Man Polytechnic, Bilaspur, 2010

Course Description Form

1. Course Name:	
DC Machines and Transformers	
2. Course Code:	
DCM203	
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)	
6 hrs / Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Hiba H.Kurdi Email: hiba.h.kurdi@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.
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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:
(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 learning Story strategy. Combining different strategies
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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 development of human rights	Human rights in regional conventions	Interactive Lecture	Oral and written Examination
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	Economic freedoms	Interactive Lecture	Oral and

		human rights			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
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5	5	5	5	20	60	100
12. Learning and Teaching Resources						
Required textbooks (curricular books 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.		

COURSE DESCRIPTION FORM

1. Course Name:
English Language I
2. Course Code:
ENLA101
3. Semester / Year:
second Semester / First Year
4. Description Preparation Date:
01/06/2026
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total):
2 Hours / 2 Units
7. Course Administrator's Name (mention all, if more than one name)
Name: Furqan Khairi Mohammed
Email: furqan.khairi@gmail.com
8. Course Objectives
The course aims to enable first-year engineering students to: 1. Develop the four basic English language skills: listening, speaking, reading, and writing. 2. Build a strong foundation in English grammar and sentence structure. 3. Acquire basic engineering and renewable energy vocabulary.

4. Improve communication skills for academic and engineering purposes.
5. Read and understand simple engineering texts and technical instructions.
6. Prepare students for studying engineering courses taught in English.
7. Develop self-learning skills and encourage lifelong learning.

Enhance students' confidence in using English in academic and professional environments.

9. Teaching and Learning Strategies

The teaching strategy focuses on active learning through lectures, classroom discussions, pair work, group activities, presentations, vocabulary exercises, reading comprehension, writing assignments, listening practice, and interactive speaking activities. Modern teaching methods will be employed to improve students' communication skills and encourage continuous learning.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject	Learning Method	Evaluation Method
Week 1	2	Understand the course requirements and introduce oneself in English.	Introduction, Alphabet, Greetings, Classroom Expressions	Lecture	Quiz
Week 2	2	Use the verb "To Be" correctly.	Verb To Be, Personal Pronouns	Lecture + Exercises	Assignment
Week 3	2	Construct simple affirmative, negative and interrogative sentences.	Present Simple Tense	Lecture	Quiz
Week 4	2	Use articles correctly.	Articles (A, An, The)	Lecture + Exercises	Homework
Week 5	2	Ask and answer questions correctly.	Question Forms, WH-Questions	Lecture	Quiz
Week 6	2	Use numbers, dates and time expressions correctly.	Numbers, Time, Dates	Lecture	Assignment
Week 7	2	Describe daily activities using simple English.	Daily Routine Vocabulary	Lecture + Discussion	Quiz
Week 8	2	Demonstrate understanding of the first seven weeks.	Midterm Examination	Examination	Midterm Exam

Week 9	2	Read and understand simple engineering texts.	Reading Comprehension	Lecture	Assignment
Week 10	2	Use renewable energy terminology appropriately.	Renewable Energy Vocabulary (Solar, Wind, Biomass, Hydropower, Energy Storage)	Lecture	Quiz
Week 11	2	Write short academic paragraphs.	Paragraph Writing	Lecture + Practice	Assignment
Week 12	2	Improve listening comprehension skills.	Listening Activities	Audio Practice	Quiz
Week 13	2	Communicate effectively using spoken English.	Speaking Practice and Short Presentations	Classroom Activities	Presentation
Week 14	2	Translate simple engineering texts.	Translation (English–Arabic & Arabic–English)	Lecture	Assignment
Week 15	2	Review and reinforce all course topics.	General Revision	Discussion	Quiz
Week 16	2	Demonstrate overall achievement of learning outcomes.	Final Examination	Examination	Final Exam

11. Course Evaluation

Assessment	Percentage
Quizzes	10%
Assignments	10%
Projects	10%
Report	10%
Midterm Examination	10%
Final Examination	50%

12. Learning and Teaching Resources

Required Textbooks

1. New Headway Beginner (5th Edition), Oxford University Press.
2. Oxford English for Careers: Engineering 1.

Main References

1. Murphy, R. *Essential Grammar in Use* (5th Edition). Cambridge University Press.
2. Glendinning, E. H. *Oxford English for Careers: Engineering 1*. Oxford University Press.
3. Technical English for Engineering Students.

Recommended Books and References

- Cambridge English Grammar.
- Oxford Learner's Dictionary.
- English Grammar in Use Workbook.

Electronic References, Websites

- <https://learnenglish.britishcouncil.org>
- <https://elt.oup.com>
- <https://dictionary.cambridge.org>
- <https://www.cambridgeenglish.org>

COURSE DESCRIPTION FORM

1. Course Name:
English Language II
2. Course Code:
ENLA202
3. Semester / Year:
second Semester / First Year
4. Description Preparation Date:
01/06/2026
5. Available Attendance Forms:
Physically
6. Number of Credit Hours (Total) / Number of Units (Total):
2 Hours / 2 Units
7. Course Administrator's Name (mention all, if more than one name)
Name: Furqan Khairi Mohammed
Email: furqan.khairi@gmail.com
8. Course Objectives
The course aims to enable first-year engineering students to:
8. Language Proficiency: English language materials aim to enhance learners' proficiency in the language by developing their skills in reading, writing, listening, and speaking. The materials provide opportunities for learners to practice and improve their grammar, vocabulary, pronunciation, and comprehension abilities. 9. Communication Skills: English language materials focus on developing learners' ability to communicate effectively in various contexts. This includes practicing conversation skills, giving presentations, writing

emails and reports, and engaging in discussions and debates.

10. **Cultural Understanding:** English language materials often incorporate cultural content to provide learners with insights into English-speaking countries' cultures, traditions, and societal norms. This helps learners understand and navigate cross-cultural interactions.
11. **Exam Preparation:** Many English language materials are designed to prepare learners for standardized tests like TOEFL, IELTS, or Cambridge English exams. These materials provide test-taking strategies, practice exercises, and sample questions to familiarize learners with the exam format and improve their performance.
12. **Professional and Academic Skills:** Some English language materials cater to learners who require English proficiency for specific professional or academic purposes. These materials focus on developing specialized vocabulary, writing research papers, delivering professional presentations, and enhancing critical thinking and analytical skills.
13. **Self-Study and Autonomy:** English language materials often aim to empower learners to become independent and autonomous language learners. They provide self-study resources, interactive exercises, and feedback mechanisms that allow learners to track their progress and take control of their learning journey.

9. Teaching and Learning Strategies

1. English language materials often follow a structured progression, starting with simpler concepts and gradually increasing the complexity. This scaffolding approach helps learners build upon their existing knowledge and skills, ensuring a smooth and gradual learning curve.
2. English language materials provide contextualized examples and practice exercises to help learners understand how language is used in real-life situations. By presenting language in meaningful contexts, learners can grasp its practical application and improve their comprehension and usage.
3. English language materials incorporate interactive activities like group discussions, role-plays, pair work, and language games to foster active participation and engagement. These activities promote communication, collaboration, and the application of language skills in authentic situations.
4. English language materials aim to integrate the four language skills (reading, writing, listening, and speaking) to promote holistic language development. By connecting these skills, learners can enhance their overall language proficiency and ability to communicate effectively.
5. English language materials provide a variety of practice exercises that gradually increase in difficulty. This progressive practice allows learners to reinforce their understanding, practice new language features, and build confidence in their language abilities.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject	Learning Method	Evaluation Method
Week 1	2	Understand the course requirements and introduce oneself in English. Grammar (1) (tenses : past, present , future) , Auxiliary Verbs , questions and negatives,	Introduction, Alphabet, Greetings, Classroom Expressions	Lecture	Quiz
Week 2	2	Use the verb "To Be" correctly. Grammar(3) Past tenses (simple, continuous), past perfect, and used to Vocabulary (spelling and pronunciation) , lost sounds	Verb To Be, Personal Pronouns	Lecture + Exercises	Assignment
Week 3	2	Construct simple affirmative, negative and interrogative sentences. Everyday English (Saying when)	Present Simple Tense	Lecture	Quiz
Week 4	2	Use articles correctly. Grammar (4): Advice, Obligation, and permission modal. Vocabulary : Phrasal verbs Everyday English (Polite request and offer).	Articles (A, An, The)	Lecture + Exercises	Homework
Week 5	2	Ask and answer questions correctly.	Question Forms, WH-Questions	Lecture	Quiz
Week 6	2	Use numbers, dates and time	Numbers, Time, Dates	Lecture	Assignment

		expressions correctly. Grammar (5): Future forms (Present continues and Future possibilities). Vocabulary: Word building (Suffixes and Prefixes). Everyday English (Arranging to meeting).			
Week 7	2	Describe daily activities using simple English. Grammar (6) : Information questions. Vocabulary: Describing people, places and things. Everyday English : In a department	Daily Routine Vocabulary	Lecture + Discussion	Quiz
Week 8	2	Demonstrate understanding of the first seven weeks.	Midterm Examination	Examination	Midterm Exam
Week 9	2	Read and understand simple engineering texts. Grammar (5): Verb patterns. Vocabulary: Body language. Everyday English (Travel and Numbers).	Reading Comprehension	Lecture	Assignment
Week 10	2	Use renewable energy terminology appropriately.	Renewable Energy Vocabulary (Solar, Wind, Biomass, Hydropower, Energy Storage)	Lecture	Quiz
Week 11	2	Write short academic	Paragraph Writing	Lecture + Practice	Assignment

		paragraphs. Team work activities (discussion and conversation) Seminar skills			
Week 12	2	Improve listening comprehension skills.	Listening Activities	Audio Practice	Quiz
Week 13	2	Communicate effectively using spoken English. Translation: a technical report from English to Arabic and from Arabic to English Energy and Renewable Energies engineering terms.	Speaking Practice and Short Presentations	Classroom Activities	Presentation
Week 14	2	Translate simple engineering texts. Preparatory week before the final Exam	Translation (English–Arabic & Arabic– English)	Lecture	Assignment
Week 15	2	Review and reinforce all course topics.	General Revision	Discussion	Quiz
Week 16	2	Demonstrate overall achievement of learning outcomes.	Final Examination	Examination	Final Exam

11. Course Evaluation

Assessment	Percentage
Quizzes	10%
Assignments	10%
Projects	10%
Report	10%
Midterm Examination	10%
Final Examination	50%

12. Learning and Teaching Resources

Required Textbooks

3. **New Headway Beginner (5th Edition), Oxford University Press.**
4. **Oxford English for Careers: Engineering 1.**

Main References

4. **Murphy, R. *Essential Grammar in Use* (5th Edition). Cambridge University Press.**
5. **Glendinning, E. H. *Oxford English for Careers: Engineering 1*. Oxford University Press.**
6. **Technical English for Engineering Students.**

Recommended Books and References

- **Cambridge English Grammar.**
- **Oxford Learner's Dictionary.**
- **English Grammar in Use Workbook.**

Electronic References, Websites

- <https://learnenglish.britishcouncil.org>
- <https://elt.oup.com>
- <https://dictionary.cambridge.org>
- <https://www.cambridgeenglish.org>

Thermodynamics Course Description

Course Description

The Thermodynamics course is offered in the Energy Engineering departments as a fundamental engineering course that focuses on energy and its transformations. The course aims to develop students' understanding of the relationship between heat and work and to apply the law of conservation of energy in the design and analysis of engineering systems, including heat engines and power generation plants.

Prepared by: Assist. Prof. Dr. Farqad Talib Najim

1. Educational Institution	Al-Iraqia University / College of Engineering
2. Department / Center	Department of Energy and Renewable Energy Engineering
3. Course Title / Code	Thermodynamics
4. Available Attendance Modes	On-campus, Blended, or Online
5. Semester / Academic Year	Third Semester / Second Academic Year
6. Total Study Hours	2 / week

7. Date of Preparing this Course Description	30 June 2026
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8. Course Objectives

The course aims to provide students with a comprehensive understanding of the fundamental principles of engineering thermodynamics. It focuses on the mechanisms of thermal energy transfer between different media, the properties of matter, various forms of energy and methods for their evaluation, as well as the application of the First and Second Laws of Thermodynamics. The course also introduces the thermodynamic properties of pure substances and their engineering applications in energy system

9. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Knowledge and Understanding

Upon successful completion of this course, students will be able to:

- Acquire the fundamental concepts and scientific principles of engineering thermodynamics and relate them to other engineering disciplines through both theoretical and practical approaches.
- Understand the fundamental principles and terminology of thermodynamics.
- Explain the mechanisms of heat transfer between different media and apply appropriate analytical methods to evaluate thermal energy transfer.
- Identify the various forms of energy and understand their theoretical principles and engineering applications.

1. Preparation of scientific and technical reports.
2. Solving numerical and engineering calculation assignments related to thermodynamics.
3. Solving numerical and engineering calculation assignments related to thermodynamics.

Teaching and Learning Methods

1. Face-to-face lectures, self-directed learning, and scientific discussion sessions
2. Face-to-face lectures, self-directed learning, and scientific discussion sessions.
3. Guiding students to utilize relevant electronic resources and online references.
4. Guiding students to utilize relevant electronic resources and online references.
5. Organizing online discussion sessions covering all course topics.
6. Organizing online discussion sessions covering all course topics.

7. Encouraging students to participate in scientific workshops, seminars, and training courses related to the field of study
8. Encouraging students to participate in scientific workshops, seminars, and training courses related to the field of study

Assessment Methods

1. Active participation in classroom activities.
2. Regular attendance and commitment to scheduled classes.
3. Daily assignments.
4. Weekly assignments.
5. Semester reports.
6. Midterm examinations

الأسبوع	الساعات	مخرجات التعلم المطلوبة	طريقة التعليم	طريقة التقييم
1	4	Introduction, Concept, Definitions, Dimensions & Units.	نظري + عملي	Quizzes Assignments Projects Report Midterm Exam Final Exam
1	4	Pressure, Temperature, and Problems		Quizzes Assignments Projects Report Midterm Exam Final Exam
2	4	Thermodynamic Systems, Perfect Gas Law, Equation of State		Quizzes Assignments Projects Report Midterm Exam
2	4	Equation of state (Boyl's Law, Charl's Law and Gay-Lusac Law) and Problems		Quizzes Assignments Projects Report Midterm Exam
3	4	Characteristic Gas Equation, specific volume, molecular weight, and Problems		Quizzes Assignments Projects Report Midterm Exam Final Exam
3	4	Mass and energy balance of open system, Forms of Energy		Quizzes Assignments Projects Report Midterm Exam Final Exam
4	4	Properties of a Pure Substance		Quizzes Assignments Projects Report Midterm Exam Final Exam

Quizzes Assignments Projects Report Final Exam		Exam	4	4
Quizzes Assignments Projects Report Final Exam		First Law Of Thermodynamic	4	5
Quizzes Assignments Projects Report Final Exam		Phases and Their Equilibrium	4	5
Quizzes Assignments Projects Report Final Exam		Second Law Of Thermodynamic	4	5
Quizzes Assignments Projects Report Final Exam		Structure of Thermodynamic Theories	4	6
Quizzes Assignments Projects Report Final Exam		Carnot cycle	4	6
Quizzes Assignments Projects Report Final Exam		Heat effects of industrial reaction	4	7
Quizzes Assignments Projects Report Midterm Exam Final Exam		Exam	4	7
Quizzes Assignments Projects Report Midterm Exam Final Exam	نظري + عملي	Heat Engines	4	8
Quizzes Assignments Projects Report Midterm Exam Final Exam		Entropy changes for ideal gas	4	8
Quizzes Assignments Projects Report Midterm Exam Final Exam		Entropy, mathematical statement of the second law	4	9
Quizzes Assignments Projects Report Midterm Exam Final Exam		The third law of thermodynamics	4	9
Quizzes Assignments Projects Report Midterm Exam Final Exam		Application of thermodynamics to flow process	4	10
Quizzes Assignments Projects Report		Duct flow of compressible fluid, turbines	4	10

Midterm Exam				
Final Exam				
Quizzes		The Steam Power Plant	4	11
Assignments				
Projects				
Report				
Final Exam				
Quizzes		Gas turbine engines	4	12
Assignments				
Projects				
Report				
Final Exam				
Quizzes		Heat pump	4	13
Assignments				
Projects				
Report				
Final Exam				
Quizzes		The choice of Refrigerator	4	14
Assignments				
Projects				
Report				
Final Exam				
Quizzes		Semester exam	4	15
Assignments				
Projects				
Report				
Final Exam				

11 . البنية التحتية

- Fundamentals of Engineering Thermodynamics; michael j. moran, el at.
- Fundamentals of classical Thermodynamics; Gordon John Van Wylen
- Engineering Thermodynamics: Work and Heat Transfer; G. F. C. Rogers and Y. R. Mayhew
- Applied Thermodynamics for Engineering Technologists (5th Edition); T.D. Eastop, A. Mcconkey
- The Principles of Thermodynamics, (N. D. Hari Dass)

القراءات المطلوبة :

- كتب ومراجع المقرر
- أخرى

Special Requirements	• Scientific workshops related to selected course topics. • Access to and utilization of relevant academic journals, engineering software, and online educational resources. • Use of specialized electronic databases and websites to support students' learning and research activities
Social Services -	• Guest lectures delivered by specialists and experts from academia and industry. • Professional training activities relevant to thermodynamics and energy engineering. • Field visits and educational trips, whenever applicable, to enhance students' practical understanding of engineering applications.

