

Republic of Iraq
Ministry of Higher Education
and Scientific Research
Scientific supervision and
evaluation device



Academic program and course

2025

Introduction:

The educational program is a coordinated and organized package of courses that include procedures and experiences organized in the form of study vocabulary, the main purpose of which is to build and refine the skills of graduates, making them qualified to meet the requirements of the labor market. It is reviewed and evaluated annually through internal or external audit procedures and programs, such as the external examiner program

Academic Program Description: A brief summary of the main features of the program and its courses, indicating the skills that students are working to acquire based on the objectives of the academic program. The importance of this description is evident because it represents the cornerstone in obtaining program accreditation, and the teaching staff participates in writing it under the supervision of the scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the vocabulary and paragraphs of the previous guide in light of the developments and changes in the educational system in Iraq, which included a description of the academic program in its traditional form (annual, semester) system, in addition to adopting the description of the academic program circulated pursuant to the letter of the Department of Studies TM3/2906 dated 5/3/2023 regarding programs that adopt the Bologna process as the basis for their work.

In this regard, we cannot but emphasize the importance of writing a description of academic programs and courses to ensure the smooth running of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a concise 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 concise summary of the most important characteristics of the course and the learning outcomes expected from the student, demonstrating whether he has made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture of the future of the academic program to be an advanced, inspiring, motivating, realistic and applicable program.

Program Mission: It briefly explains the goals and activities required to achieve them, and it also identifies the paths and directions of the program's development.

Program Objectives: These 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 (semester, yearly, Bologna track) whether required (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by the student after successfully completing the academic program. The learning outcomes for each course must be determined in a way that achieves the program objectives.

Teaching and Learning Strategies: The strategies used by the faculty member to develop the student's teaching and learning. They are plans that are followed to achieve the learning objectives. That is, they describe all classroom and extracurricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: Northern Technical University

College/Institute: Al- Hawija Technical Institute

Scientific Department: Electrical Technology Department

Academic or Professional Program Name: Technical Diploma in Electrical Technology

Final Certificate Name: Technical Diploma in Electrical Technology

Study System: Courses

Description Preparation Date: 4/9/2024

File Filling Date: 4/9/2024

Signature:



Department Head:

Parween Raheem Kareem

4/9/2024

Signature:



Scientific Assistant Dean

Dr. Mohammed Jiad Ligy

4/9/2024

Check the file before

Quality Assurance and University Performance Division:

Hamza Omar siddeeq

Signature: Ahmed Abed Khalaf



Dean's approval

Professor: Omar Khalil Ahmed

1. Program Vision
To equip students with both theoretical and practical knowledge in the field of electrical technologies, meeting the demands of the job market and expanding the horizons of technical education by developing the curriculum
2. Program Mission
–Prepare technical electrical personnel capable of managing the operation of electrical machinery, power generation methods, electrical networks, and transmission and distribution lines while being equipped with academic knowledge and practical skills. –Train students both theoretically and practically to meet job market requirements through a modern curriculum and advanced laboratory equipment. –Stay abreast of scientific advancements in global institutes and universities. –Adhere to the ethics of the profession, ensuring compliance with applicable standards and regulations. – Strive for excellence in service delivery that meets quality standards.
3. Program objectives
–Prepare intermediate-level personnel with advanced technical skills in the field by manufacturing and maintaining electrical equipment. –Train students in scientific research through graduation project studies. –Offer practical courses in the specialization for all segments of society. –Manufacture laboratory equipment and electrical devices that support the educational process. –Operate and maintain electrical units for power generation stations.
4. Program accreditation
Under study
5. 1. Other external influences
nothing

6. .Program structure for the first and second levels
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Program Structure	Number of courses	Study unit	Percentage	Notes *
University Requirements	11	22	26.8%	9 Basic, 2 Optional
Institute Requirements	4	9	9.8%	3 Basic, 1 Optional
Department Requirements	26	72	63.4%	88 Basic, 4 Optional
Summer Training	Completed	-----	-----	
Other	nothing			

*Notes may include whether the course is basic or optional.

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			Theoretical	Practical
2024-2025 First	NTU100	Human Rights and Democracy	2	0
	NTU101	English Language	2	0
	NTU102	Computer principles1	1	2
	NTU103	Computer principles2	1	2
	NTU104	Arabic Language	2	0
	NTU105	Sport	1	1
	NTU106	Franch Language	2	0
	TIHA100	Mathematic 1	2	0
	TIHA101	Mathematic 2	2	0
	TIHA102	Mechanical Workshop	0	3
	TIHA103	Vocational Safety	2	0
	ELTP100	Electrical Cicuit1	2	2
	ELTP101	Electrical Cicuit2	2	2
	ELTP102	Electronic 1	2	2
	ELTP103	Electronic 2	2	2
	ELTP104	Electrical Installation	2	2
	ELTP105	Digital Electronic	2	2
	ELTP106	Engineering Drawing	0	3
	ELTP107	Electrical Workshop	0	3
	ELTP108	Renewable Energy	2	0
	ELTP109	Electric Circuits Simulation	1	2
2024-2025	NTU200	English Language	2	0

Second	NTU201	Professional Ethics	2	0
	ELTP204	D.C Machines	2	3
	ELTP205	Electrical networks 1	2	2
	ELTP206	Power electronics 1	2	3
	ELTP207	Maintenance Workshop 1	0	3
	ELTP208	Industrial Installation1	2	2
	ELTP209	Electrical Drawing	0	3
	ELTP210	Project1	0	2
	ELTP211	A.C Machines	2	3
	ELTP212	Electrical networks 2	2	2
	ELTP213	Power electronics 2	2	3
	ELTP214	Maintenance Workshop 2	0	3
	ELTP215	Electrical Installation 2	2	2
	ELTP216	Programmable Logic Controller (PLC)	1	2
	ETP217	Project 2	0	2
	ETP218	Protection system	1	1
	ETP219	Microcontroller	1	2

8. Expected learning outcomes of the program
Knowledge(A)
1–Learn the principles and foundations of electrical circuits. 2–Knowledge of the work of electrical installations of all kinds. 3–Knowledge of winding of various electrical motors and machines. 4–Knowledge of examining and measuring electrical systems.
Skills(B)
1 –Teamwork skills. 2–Computer and Internet skills. 3–Communication skills such as English. 4–Leadership skills and taking responsibility.
Values(C)
1–The student acquires the concepts and basics of electrical circuits. 2–Analyze the problems facing workers in it and how to develop the necessary solutions. 3–Evaluate the proposed solutions and choose the best of them. 4– Integrity, loyalty and dedication to work.

9. Teaching and learning methods

Theoretical explanation of the subject, the use of a data viewer to illustrate the practical aspect, and playing the educational video for students, as well as the weekly reports assigned to the student for each experiment, along with scientific trips to electrical power stations and various state laboratories

10. Evaluation methods

Daily, semester and final tests, weekly reports

11. Faculty

Faculty members

Academic Rank	Specialization		Special requirements/skills (if any)		Faculty preparation	
	Year	Special			permanent	lecturer
Assistant Professor	Electrical Engineering	Electric Power			permanent	
Assistant Lecturer	Electrical Engineering	Power & Machinery			permanent	
Assistant Lecturer	Electrical Engineering	Power & Machinery			permanent	
Assistant Lecturer	Civil Engineering	Roads & Transport			permanent	

12. Acceptance Criteria

The student's acceptance criteria are determined according to the central acceptance within the ministry's plan, the student's branch in the preparatory school, his average

Evaluation methods
Daily, semester and final tests, weekly reports
and his desire, and this is after the student has been interviewed in a special interview at the institute.

Professional development
Orientation of new faculty members through seminars, symposia and conference attendance.
Professional development for faculty members
Through conferences, seminars, discussion groups and the attendance of faculty members at postgraduate discussions

13. The most important sources of information about the program
1 .Methodological books prescribed by the Northern Technical University. 2 .Resources available in the Technical Institute's library. 3. Resources available on the Internet

14. Program Development Plan

- 1- Adding information on all topics related to the principles and foundations of electricity.
- 2- Identifying modern scientific developments.
- 3- Participating in international and local conferences.
- 4- Participating in scientific workshops inside and outside Iraq.
- 5- Hosting scientific competencies in the field of specialization

Program Skills Outline

Year/Level	Course Code	Course Name	Mandatory or Elective	Required Learning Outcomes of The Program												
				Knowledge				Skills				Values				
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	
2024-2025 First	NTU100	Human Rights and Democracy	University mandatory					✓			✓				✓	
	NTU101	English Language								✓						
	NTU102	Computer principles1							✓							
	NTU103	Computer principles2							✓							
	NTU104	Arabic Language								✓						
	NTU105	Sport	University Elective								✓					
	NTU106	Language Franch								✓						
	TIHA100	Mathematic 1	Institute mandatory			✓										
	TIHA101	Mathematic 2				✓										
	TIHA102	Mechanical Workshop		✓	✓	✓	✓	✓				✓	✓	✓		
	TIHA103	Safety Vocational	Institute Elective	✓	✓		✓	✓				✓		✓	✓	
	ELTP100	Electrical Cicuit1	Department mandatory	✓	✓	✓	✓	✓					✓	✓	✓	
	ELTP101	Electrical Cicuit2		✓	✓	✓	✓	✓					✓	✓	✓	
	ELTP102	Electronic 1		✓	✓	✓	✓	✓					✓	✓	✓	
	ELTP103	Electronic 2		✓	✓	✓	✓	✓					✓	✓	✓	
	ELTP104	Electrical Installation		✓	✓	✓	✓	✓					✓	✓	✓	
	ELTP105	Digital Electronic		✓	✓			✓	✓					✓	✓	✓
	ELTP106	Engineering Drawing		✓		✓			✓					✓	✓	✓
	ELTP107	Electrical Workshop		✓	✓	✓	✓	✓						✓	✓	✓
	ELTP108	Renewable Energy	Department Elective	✓	✓		✓	✓						✓	✓	✓
ELTP109	Electric Circuits Simulation	✓		✓				✓					✓	✓	✓	
2024-2025 Second	NTU200	English Language	University mandatory					✓			✓					
	NTU201	Professional Ethics									✓				✓	
	ELTP204	D.C Machines	Department mandatory					✓							✓	
	ELTP205	Electrical networks 1						✓		✓						
	ELTP206	Power electronics 1							✓							
	ELTP207	Maintenance Workshop 1		✓	✓	✓	✓	✓					✓	✓	✓	
	ELTP208	Industrial Installation1		✓	✓	✓	✓	✓					✓	✓	✓	
	ELTP209	Electrical Drawing		✓	✓	✓	✓	✓						✓	✓	✓
	ELTP210	Project1		✓	✓	✓	✓	✓						✓	✓	✓
	ELTP211	A.C Machines		✓	✓	✓	✓	✓							✓	✓

	ELTP212	Electrical networks 2		✓	✓				✓			✓	✓	✓	
	ELTP213	Power electronics 2		✓	✓	✓	✓	✓			✓	✓	✓	✓	
	ELTP214	Maintenance Workshop 2		✓	✓	✓	✓	✓				✓	✓	✓	
	ELTP215	Electrical Installation 2		✓	✓	✓	✓	✓				✓	✓	✓	
	ELTP216	Programmable Logic Controller (PLC)		✓	✓	✓	✓	✓				✓	✓	✓	
	ETP217	Project 2		✓	✓	✓	✓	✓				✓	✓	✓	
	ETP218	Protection system	Department Elective	✓	✓	✓	✓	✓				✓	✓	✓	
	ETP219	Microcontroller	5 units	✓	✓				✓			✓	✓	✓	

Course description form

1- Course name		
Electrical Circuits 1		
2- Course code		
ELTP100		
3- Available forms of attendance		
- Weekly lesson schedule (theoretical + practical). - Scientific discussions, seminars and other extracurricular activities		
4- Semester/year		
The first / first		
5- Number of study hours (total)		
60		
6- Date this description was prepared		
2025/6/10		
7- Name of the rapporteur		
Name: Ahmed Adnan Jawamer e-mail : ahmedadnan85@ntu.edu.iq		
8- Course objectives (general objectives of the course)		
- Introduce students to DC circuits and their components. - Understand the various calculations in DC circuits and familiarize themselves with various theories. - Learn about various measuring devices. - Solve basic technical problems in electrical circuits. - Improve personal productivity.		
9- Course outcomes, teaching, learning and assessment methods		
Outcomes	Teaching and learning methods	Evaluation methods

A- Knowledge A1- The ability to design circuits and analyze data. A2 - The ability to identify, formulate, and solve problems. A3 - Proficiency in the necessary mathematical and engineering sciences. A4 - The ability to use the technologies required in the work.	(Theoretical lectures / discussion groups / debates between students)	(Traditional tests, assignments, formative assessment)
B – Skills B1 - Learn to work collaboratively with colleagues to complete group projects. B2 - Be able to respond to technical challenges with initiative and independence. B3 - Be able to use all types of measuring devices. B4 - Have the ability to simplify complex electrical circuits.	(Presentation, explanation, questions and answers, discussion)	(Oral exams / Written exams / Weekly reports / Daily attendance / Participation and interaction in lectures / Midterm and final exams)
C- Values C1- Identify all types of electrical components and	(Reports on scientific developments in the field of specialization, asking analytical and deductive questions)	(Self-assessment and peer assessment, participation and contribution)

the properties of each component in an electrical circuit. C2- Understand how to select the appropriate components for an electrical circuit and how to calculate these components both practically and theoretically. C3- Understand how to perform calculations for electrical circuits using multiple methods and choose the easiest calculation method. C4- Handle electrical devices and circuits safely and correctly.		
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11- Course structure

(Theoretical Vocabulary)

Week	Hours	Required learning outcomes	Unit name/subject	Teaching method	Evaluation method
First	2	Understands the units used and how to convert between them.	The system of units used in electricity and units of measurement for each substance (its	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.

			parts and multiples). Mathematical applications for converting values using units.		
Second	2	Identify the factors affecting resistance value.	Factors affecting resistance value 1-Specific resistance 2-Temperature coefficient	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
Third	2	Learn to connect resistors in series in DC circuits.	DC circuits include: Connecting resistors in series with examples	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
Fourth	2	Learn how to connect resistors in parallel in DC circuits.	Connecting resistors in parallel with examples	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
Fifth	2	Learn to connect the resistors in DC circuits.	Mixed connection of resistors with examples	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
Sixth	2	Performs the required calculations when linking the stellar and triangular	Applications on series, parallel, mixed, star and triangular circuits	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.

Seventh	2	Analysis of electrical circuits according to Kirchhoff's theory of current and voltage in DC circuits.	Kirchhoff's Laws - Kirchhoff's Laws Definition of Current and Voltage with solved examples	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
Eighth	2	Analysis of electrical circuits according to Maxwell's theory in DC circuits.	Maxwell's theory with solved examples	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
Ninth	2	Analysis of electrical circuits according to Thevenin's theorem in DC circuits.	Thevenin's Theorem - Definition of the Theorem - How to Apply It in DC Circuits	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
tenth	2	Analysis of electrical circuits according to Norton's theory in DC circuits.	Norton's Theorem - Definition of the Theorem - How to Apply It in DC Circuits	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
eleventh	2	Optimal solution based on Thevenin and Norton theorem.	Applications of Thevenin and Norton's Theorem	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
twelfth	2	Define the theory and derive its relationships.	Maximum power transfer theory.	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final

					exams, homework.
thirteenth	2	Analysis of electrical circuits with two or more sources according to the superposition theory.	Superposition Theorem - Definition of the Theorem - How to Apply It in DC Circuits.	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
fourteenth	2	Optimal solution based on superposition theory.	Applications of Superposition Theory with Solutions and Examples	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
fifteenth	2	Definition of current source and voltage source (DC power supply) and how to convert from one to the other.	Congruence Theorem - Definition of the Theorem - Steps for applying it to solve DC circuits that contain more than one source - Solving examples	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
(Practical Vocabulary)					
Week	Hours	Required learning outcomes	Unit name/subject	Teaching method	Evaluation method
First	2	Learn about laboratory equipment	Training on laboratory work methods, reporting	Practical lectures, educational	Daily practical tests, daily posts, midterm and final

		and how to write reports.	methods, and equipment use.	videos and discussions.	exams, weekly reports
Second	2	Calculates resistor values by colors and how to use an ohmmeter.	Calculating resistances by color - the resistance measuring device (ohmmeter) in measuring resistances by color - and calculating the error percentage.	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
Third	2	Use of laboratory voltage measuring devices	Use of DC voltage measuring devices.	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
Fourth	2	Use of laboratory voltage and power meter	Use of DC measuring devices (such as ohmmeters) – Use of DC power supplies.	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
Fifth	2	Measure the electromotive force and internal resistance of the battery.	Measurement of electromotive force and internal resistance of a battery - Study of the thermal coefficient of resistance.	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
Sixth	2	Learn to check the resistance of	Determine the specific resistance of	Practical lectures, educational	Daily practical tests, daily posts, midterm

		conductors available in the laboratory.	some conductors.	videos and discussions.	and final exams, weekly reports
Seventh	2	Understanding Ohm's Law in the Lab	Check Ohm's law in practice.	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
Eighth	2	Learn how to connect resistors in series, parallel and compound in a practical way.	Connecting resistors in series - parallel - mixed (multiple exercises).	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
Ninth	2	Converting star to triangular and vice versa in DC circuits.	Equation of star and triangular DC circuits (multiple exercises).	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
tenth	2	Connecting electrical circuits and verifying Kirchhoff's first and second theories in the laboratory.	- Practical verification of Kirchhoff's first law - Practical verification of Kirchhoff's second law	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
eleventh	2	Connect electrical circuits and verify Thevenin's theorem in the laboratory.	Verification of Thevenin's theorem	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports

twelfth	2	Connect electrical circuits and verify Norton's theory in the laboratory.	Verification of Norton's theorem	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
thirteenth	2	Definition of current source and voltage source (DC power supply) and how to convert from one to the other in the laboratory.	Verification of the correspondence theory	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
fourteenth	2	To practically implement the theory of exchange between different sources.	Verification of exchange theory	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
fifteenth	2	Verifying the theory with its three possibilities	Power distributor - the theory of maximum possible power transfer in direct current	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports

12- Curriculum development plan

Include a lecture titled "Solar Energy and Smart Batteries," which will include the following topics:

1- Introduction to Solar Energy

- Definition of solar energy as a renewable resource.
- Comparison between solar energy and conventional energy sources.
- Types of solar cells: monocrystalline, polycrystalline, thin-film

2- Solar Cell Operating Principle

- Photoelectric Effect
- Connection in Electrical Circuits Using Solar Panels
- Voltage and Current Curve (IV Curve)

3- Smart Batteries

- Definition and Function
- Types (Lithium-ion, Lead-acid, etc.)
- The Relationship Between Smart Batteries and Solar System Efficiency

4- Integrating systems into practical applications

- Assembling a miniature solar power circuit using a small solar panel and battery
- Measuring voltage and current differences as lighting changes
- Practical experiment calculating the power output of a solar panel

13- Infrastructure

Classrooms, laboratories and workshops	Available
1- Required textbooks	Available
2- Main references (sources)	Electrical Technology (Theraja A.K. Theraja).
a) Recommended books and references (scientific journals, reports, etc.)	1- Electrical Technology (Edward Hughes). 2- Basic Circuits (A-M-F Brooks) pregame press 3- Introduction to Electric circuits (M Romanize) John Willy.
b) Electronic references, websites, etc.	https://www.youtube.com/@user-ld6bv4po3e

1- Course name		
Electrical Circuits 2		
2- Course code		
ELTP101		
3- Available forms of attendance		
- Weekly lesson schedule (theoretical + practical). - Scientific discussions, seminars and other extracurricular activities		
4- Semester/year		
The Second / first		
5- Number of study hours (total)		
60		
6- Date this description was prepared		
2025/6/10		
7- Name of the rapporteur		
Name: Ahmed Adnan Jawamer e-mail : ahmedadnan85@ntu.edu.iq		
8- Course objectives (general objectives of the course)		
- Introduce students to AC circuits and their components. - Understand the various calculations in AC circuits and familiarize themselves with various theories. - Learn about various measuring devices. - Solve basic technical problems in electrical circuits. - Improve personal productivity.		
9- Course outcomes, teaching, learning and assessment methods		
Outcomes	Teaching and learning methods	Evaluation methods
A- Knowledge A1- The ability to design circuits and analyze data. A2 - The ability to identify, formulate, and solve problems. A3 - Proficiency in the necessary mathematical and engineering sciences. A4 - The ability to use the technologies required in the work.	(Theoretical lectures / discussion groups / debates between students)	(Traditional tests, assignments, formative assessment)

B – Skills B1 - Learn to work collaboratively with colleagues to complete group projects. B2 - Be able to respond to technical challenges with initiative and independence. B3 - Be able to use all types of measuring devices. B4 - Have the ability to simplify complex electrical circuits.	(Presentation, explanation, questions and answers, discussion)	(Oral exams / Written exams / Weekly reports / Daily attendance / Participation and interaction in lectures / Midterm and final exams)
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C- Values C1- Identify all types of electrical components and the properties of each component in an electrical circuit. C2- Understand how to select the appropriate components for an electrical circuit and how to calculate these components both practically and theoretically. C3- Understand how to perform calculations for electrical circuits using multiple methods and choose the easiest calculation method. C4- Handle electrical devices and circuits safely and correctly.	(Reports on scientific developments in the field of specialization, asking analytical and deductive questions)	(Self-assessment and peer assessment, participation and contribution)
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11- Course structure

(Theoretical Vocabulary)

Week	Hours	Required learning outcomes	Unit name/subject	Teaching method	Evaluation method
First	2	Learn about alternating current, its properties and waveform.	Alternating quantities, including their definition, characteristics of alternating	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.

			current, how alternating current is generated, its waveform, and its special relationships.		
Second	2	Identify the direction of alternating current and its phase angle.	Alternating vector quantities - definition - phase and direction representation - phase angle and how to find it.	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
Third	2	Learn how to find the phase angle between voltage and current for each circuit with examples.	Study the effect of alternating current on a circuit containing only resistance, a circuit containing only pure inductance, and a circuit containing only pure capacitance.	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
Fourth	2	Finding the relationship between current and voltage in the three cases - phase angle - total impedance of the circuit	Effect of alternating current on a circuit containing a resistance and an inductance in series - A	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.

		with applied examples.	circuit containing a resistance and a capacitor in series.		
Fifth	2	Analysis of circuits containing resistance, inductance, and capacitance in parallel	Effect of alternating current on a circuit containing a resistance and an inductance in parallel - A circuit containing a resistance and a capacitor in parallel.	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
Sixth	2	Find the total impedance, total permittivity, current, voltage and phase angle for series and parallel impedance circuits with examples.	Use description 1-7 (J-Operator) or compound operator	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
Seventh	2	Find the bandwidth, find the quality factor, and draw the relationship between inductive and capacitive reactance with frequency.	Resonant circuits, including: series resonant circuit, definition of resonance and how to reach it, calculation of current, voltage, impedance	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.

			and frequency angle at resonance.		
Eighth	2	Find bandwidth - plot graphs with frequency - find quality factor and solve examples.	Parallel resonant circuit - definition - calculation of current, voltage, impedance, impedance angle, phase angle and resonant frequency.	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
Ninth	2	Analysis of electrical circuits according to Norton and Thevenin's theorems in AC circuits.	Applying theories such as Norton's theorem, Thevenin's theorem, and matching to AC circuits with solving examples.	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
tenth	2	Definition of active power and how to calculate it - Reactive power and how to calculate it. Theoretically.	Power in AC circuits, including power calculations in: circuits containing only resistance, circuits containing only inductance, and circuits containing	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.

			only capacitors.		
eleventh	2	Definition and effect on AC circuits - How to improve power factor - with practical examples.	Total apparent power (definition) - How to draw the power triangle - Power factor.	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
twelfth	2	Derivation of its relations - with practical examples.	Maximum power transfer theory in current circuits.	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
thirteenth	2	Using the ohmmeter in series and parallel - the ammeter and voltmeter method - the compensation method - using the Wheatstone bridge.	Practical methods for measuring high, medium and small value resistors.	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
fourteenth	2	Calculating line and phase current and voltage, total power, line power - phase power - advantages of each connection when used in balanced and unbalanced loads.	Three-phase AC circuits - single phase - two phases - three phases.	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.

fifteenth	2	How to find the total power in this way and in the case of star and triangular connections - using two watt meters - using three watt meters.	Methods for measuring power for three-phase loads - Wattmeter and how to connect it to the circuit to measure active power.	Theoretical lectures, educational videos and discussions.	Daily written tests, daily posts, midterm and final exams, homework.
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(Practical Vocabulary)

Week	Hours	Required learning outcomes	Unit name/subject	Teaching method	Evaluation method
First	2	How to connect inductive and capacitive resistance in an electrical circuit.	(RL) series, (RC) series, (RL) parallel, (RC) parallel.	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
Second	2	Practical application of measuring the phase angle of a series circuit and extracting the results in the laboratory.	Phase Angle Measurement – (RLC) Series (Multiple Exercises).	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
Third	2	Practical application of measuring the phase angle of a parallel circuit.	Phase Angle Measurement – (RLC) Parallelism (Multiple Exercises).	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports

Fourth	2	Apply the resonant circuit in series and parallel and extract the results in the laboratory	- Series resonance - Parallel resonance	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
Fifth	2	Connecting an electrical circuit, analyzing it, and extracting results according to Thevenin and Norton's theories of alternating current.	-Verification of Thevenin's theorem for alternating current - Verification of Norton's theorem for alternating current	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
Sixth	2	Measurement with different types of regular and electronic voltmeters and comparison between them according to the extracted results.	Comparison between conventional and electronic voltmeters in measuring DC and AC voltages.	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
Seventh	2	Be able to measure power using multiple voltmeters and multimeters.	Measuring power using three voltmeters and three ammeters (multiple exercises).	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
Eighth	2	Using a wattmeter to measure power and a power	Measuring power and power factor using a wattmeter	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and

		laboratory practically	(multiple exercises).		final exams, weekly reports
Ninth	2	Professionalism in power factor improvement processes and measuring them with high accuracy in the laboratory.	Power Factor Improvement (Multiple Exercises).	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
tenth	2	Performing calculations and extracting practical results for three-phase current circuits connected in star and triangular configurations	Voltage and current in three-phase current circuits, star and triangle connections.	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
eleventh	2	Learn about the Wheatstone bridge, how it works, and how the bridge is balanced.	Resistance using a Wheatstone bridge (multiple exercises).	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
twelfth	2	Use the voltage divider method in the load and no-load states.	Loaded voltage divider – Unloaded voltage divider.	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
thirteenth	2	Professionalism in measuring different types of voltages and different values	Measuring resistance using an ammeter and voltmeter	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and

		using a voltmeter.	(multiple exercises).		final exams, weekly reports
fourteenth	2	Methods of using operational amplifiers when connecting them to an electrical circuit.	Using a magnifier to measure high value resistors (insulators) (multiple exercises).	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports
fifteenth	2	Absolute control of the ammeter, increasing its effectiveness and calibrating it to adjust the reading of laboratory results.	-Increase the measuring range of the ammeter - Calibrate the ammeter using another device.	Practical lectures, educational videos and discussions.	Daily practical tests, daily posts, midterm and final exams, weekly reports

12- Curriculum development plan

Include a lecture entitled “Inverter” that includes the following topics:

1- Introduction to Inverters:

- Definition of inverters.
- Simplified inverter circuit diagram.
- Types of inverters.

2- Inverter Operating Principle

- DC input from a battery or solar panels
- Switching stage to convert current into MOSFETs
- Filtering stage
- Output

3- Basic Inverter Components

- Battery: The DC power source
- Electronic switches for switching current, such as MOSFET or IGBT
- Protection circuit: To protect against overload or overheating

4- Integrating systems into practical applications

- Solar energy systems

- Powering home appliances from batteries
- Practical experiment in calculating the energy output of a solar panel

13- Infrastructure

Classrooms, laboratories and workshops	Available
1- Required textbooks	Available
2- Main references (sources)	Electrical Technology (Theraja A.K. Theraja).
a) Recommended books and references (scientific journals, reports, etc.)	1- Electrical Technology (Edward Hughes). 2- Basic Circuits (A-M-F Brooks) pregame press 3- Introduction to Electric circuits (M Romanize) John Willy.
b) Electronic references, websites, etc.	https://www.youtube.com/@user-ld6bv4po3e

1. Course Name
Electrical installations
2. Course Code
ELTP104
3. Available attendance forms
in presence
4. semester/year
Decisions
5. Number of study hours(kidney)
4*15=60
6. Date this description was prepared
11-6-2024
7. Name of the rapporteur
Name: Wissam Ibrahim Hussein e-mail : Wisamibrahim_hwj@ntu.edu.iq
8. Course objectives (general objectives of the course)
1- Training the student on electrical installation methods and comparing different types of installations 2 - Understand the main concepts and know the rules and laws used in calculating electrical loads and cable size. The capacity of the circuit breaker to be connected 3- Introducing the student to the types of cables and the load capacity of each cable. To the maximum A current that can pass through it 4 -Preparing the student to study the various calculations required in electrical installations and to become familiar with the various theories for studying those calculations. .
9. Outputs The decision Teaching, learning and assessment methods
Course outcomes
1. Understanding the basics of electricity(voltage, current, resistance). 2. Installation of foundations(Lighting, control circuits, motors). 3. Use of protective devices (breakers, fuses, grounding). 4. Reading electrical diagrams And implement it practically. 5. Implementing safety procedures And risk prevention. 6. Breakdown maintenance(Detect and repair common faults).

identification It is a theoretical-practical course that aims to teach students the basics of designing, installing, and maintaining electrical systems in facilities (such as homes, laboratories, and workshops), which the course seeks to achieve for students.

Its importance:

- 1- Providing safe electricity For homes and factories.**
- 2- Prevent fires and electric shocks.**
- 3- Operate machinery and equipment efficiently.**
- 4- Meet the requirements of regulations and standard specifications.**
- 5- Facilitate maintenance and reduce breakdowns**

How is it determined?:

- 1. Study of labor market needs**
- 2. Review of professional standards**
- 3. Evaluate students' capabilities and the workshop**
- 4. Formulate clear and measurable goals**
- 5. Linking with other courses**
- 6. Periodic update according to developments**

Outputs	Teaching and learning methods	Evaluation methods
A-knowledge A1-During the academic year, the student learns the basics of electrical installations. A2-The student learns about electrical installations, how to read them, and the factors affecting them.. A3-The student learns the types of connections used in home installations.. A4-knowledgeSafety standards and the risk of electric shock	1- Theoretical lectures using presentations. 2- Real-life case studies of foundation failures. 3- Short research on modern distribution systems	1- Written tests (essay and objective questions). 2- Analytical reports on protection systems. 1-Theoretical tests 2- Practical tests 3- Reports
B - Skills B1-Ability to design and conduct experiments, analyze and interpret data.	1- Practical experiments (workshops on electrical installations).	1- Practical performance tests (such as installing a lighting circuit).

B2-Ability to identify, formulate and solve problems. B3 -Mastery of the necessary mathematical, basic and engineering sciences. B4-Ability to use the techniques and skills required in the work.	2- Simulation using programs such as: AutoCAD Electrical. 3- Field visits to electrical construction sites	2- Project evaluation (design and implementation of a control circuit)
C- Values A1-Commitmentwith safety standards at work A2-to bear Professional responsibility In implementing the foundations A3-the job With a team To implement electrical projects A4-respectStandards and regulations(such as delivery terms)	1- Group discussions on professional ethics. 2- Role playing For situations that require ethical decisions. 3- Observe and imitate models of distinguished professionals.	1- Peer evaluation For team performance. 2- Observing behavior during practical training (commitment to safety). 3- Self-reports on practical experiences

10. Course structure A- (Theoretical vocabulary)

week	watches	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
the first	2	1-Explaining the curriculum vocabulary to the student 2- Learn about the classification of materials (conductive, semiconductor, and insulator) and the properties of each type.	Overview of the curriculum vocabulary for the subject and classification of the subjects into: • electrical conductors • semiconductors • Insulators	An introductory lecture about the method + classification of materials (conductor, semiconductor, insulator)	Short test (theoretical) on material classification
the second	2	1-The student's understanding of the basics of electricity, including potential difference, current intensity, resistance, and the influencing factors. 2-Identify the components of electrical circuits 3-Knowing electrical switches and lamps, their types and uses	Basics of Electrical Principles Factors affecting the intensity of electric current, resistance. Factors affecting resistance. Components of an electrical circuit	Theoretical explanation of the principles of electricity (potential difference, current, resistance) + presentation of the components of an electrical circuit	Electrical circuit components identification test.
the third	2	1-Introducing the student to electrical conductive materials 2-Understanding the characteristics and uses of materials in the electrical field	electrical conductors Their advantages and uses in the field of electricity	Study of the properties of copper and aluminum (electrical, mechanical) + their applications	Practical Evaluation (Comparison between Copper and Aluminum)

		3-Knowing the properties that make materials good conductors of electricity			
Fourth	2	1-Introducing students to insulating materials 2-Understanding and studying the properties of insulating materials and their temperature tolerance 3-Introducing students to solid insulating materials	Insulating materials Examples of insulating materials Properties of insulating materials in relation to their temperature tolerance solid insulating materials	Explanation of insulating materials (air, oil, solids) + permittivity laws	Short test on the properties of insulators
Fifth	2	1-Study of the properties of magnetic materials 2-Knowing the types of magnetic materials and their associated terms 3-Study of the laws related to magnetism	Magnetic properties of materials Solved examples	Lecture on Magnetism (Force, Magnetic Materials, Laws)	Students are assessed individually by giving them the opportunity to participate in the class by answering questions.
Sixth	2	1-Understanding Magnetic Circuits 2-Study and application of laws and solved examples of magnetism	magnetic circuits Apply Kirchhoff's laws to it. Solved examples on magnetism	Application of Kirchhoff's laws to magnetic circuits	Short tests and Evaluate participation in discussions
Seventh	2	1-Introducing the student to the mechanical properties of electrical materials 2-Study and apply laws and solve examples on the topic	Mechanical properties of electrical materials - Tension, stress, elongation, elasticity, other - Solved exam	Study of mechanical properties (tensile, stress, elasticity)	Theoretical test on mechanical properties
The eighth	2	1-Study the stages of electrical energy 2-Knowing how electrical energy is generated, transmitted and distributed	The stages of electrical energy Generation, transmission and distribution	Explanation of the stages of energy transmission (generation, transmission, distribution) + distribution panels	Power transmission diagram + distribution panels explanation
Ninth	2	1-Knowing how to supply the consumer with electricity from a secondary station 2-Introducing students to home and industrial distribution panels 3-Teaching a student how to supply electricity to a building In addition To know the capacity of the electrical transformers used	Basic principles on how to prepare a consumer from a secondary station, the materials required for this, and the type of consumer	Theoretical explanation of generation, transmission and distribution systems. +Visual presentation of building power supply diagrams + practical examples. +Workshop on installing distribution panels	Short test on types of stations and transformer capacities

tenth	2	1-Knowing and studying electrical switches and their types 2-Teaching students to draw electrical circuits and diagrams	Types of switches used in electrical installations and their importance	Explanation of electrical switch types + drawing of application circuits	Circle drawing test using keys.
eleventh	2	1-Introducing the student to the protection devices used in Foundation electrical 2-Learn about fuses, their types, advantages and disadvantages 3-Teaching the student how to select a fuse and coordinate the fuses in the same electrical circuit.	Protection devices used in installations Electrical (Fuses)	Study of fuses (types, specifications, how to choose them)	Evaluating the selection of suitable fuses for different circuits
twelfth	2	1-Study of circuit breakers, their types, composition and working principle 2-Knowing how to distribute loads inside the building and calculating the circuit breaker capacity	Circuit Breakers	Electrical breakers explained(MCCB, MCB, ELCB) + Installation	Short tests and Evaluate participation in discussions
thirteenth	2	1-Study of electrical wiring systems 2-Knowing how to number wires and cables at work and taking into account the colors of the wires when installing them	Electrical wiring systems Electrical Wiring Systems	View wiring systems(BB, TRS, PVC) + Wire numbering	Wiring systems knowledge assessment.
fourteenth	2	1-Teaching students about the types of home electrical installations 2-Knowing the advantages and disadvantages of each type, safety requirements, the general form of the foundation, and the tools used in it.	Home electrical installations	Home Foundation Study (Safety Requirements, Tools, Cost)	Evaluate participation in discussions
fifteenth	2	1-Study grounding and know its components and connection and connection equipment 2-Know the different methods of reducing grounding resistance and the	Grounding	Lecture on grounding (components, measurement methods, importance)	Short tests and Evaluate participation in discussions

		devices and equipment that must be grounded. 3-Teaching the student the importance of good grounding, the difference between grounded and ungrounded systems, and measurement methods.			
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11- Course structure B-(Practical vocabulary)					
week	watches	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
the first	2	1-Implementing safety procedures in workshops and factories. 2-First aid for electric shock. 3-Take fire prevention measures.	Warnings and precautions to be taken while working in workshops and factories, as well as training on how to provide first aid for electric shock and how to warn of fires.	Lecture and practical application of safety and first aid	Short theoretical test + practical application for first aid and safety
the second	2	Recognizing symbols for electrical tools and components.	Knowing the symbols for devices, tools, and all necessary pendants used in electrical installations	Display electrical symbols and classify tools	Symbol and Tool Classification Test
the third	2	to implement Twist and T-connector for VIR wire	Make a connection of type (Twist) and also a link of type (T Wire of type (VIR)	Practical training on Wasalti work Twist and T	Practical evaluation Implementation of Twist and T joints
Fourth	2	Implement a link Married Joint and T-joint with welding.	Marriage bond Married Joint) Type connector (T) Then do the welding for it.	Practical application of my connection Married Joint and T with Weld	Evaluation of the quality of joints and welding(Married Joint and T)
Fifth	2	to implement connection Straight And a link T For wire CTS With welding.	Make a straight connection (Straight) and also a link of type (T) Wire type (CTS) Then weld the joint.	Practical application of to implement connection Straight and T for CTS wires with solder	Check straight connections and T with welding
Sixth	2	Connecting German conductors and paper-insulated cables with soldering	Connecting aluminum conductors and paper insulated cables and then how to do their welding	Practical training for Connecting and welding aluminum and paper cables	Aluminum joint and welding evaluation

Seventh	2	1- Installation of a lighting circuit with a switch and one lamp (Clead). 2- Installing a circuit of two lamps in series with a switch. (Clead)	Making a circuit containing a switch and one lamp with a wiring system of type (Clead) Making a circuit containing two lamps in series with a switch with a wiring system of type (Clead)	Practical application of Installing a simple lighting circuit (switch + lamp) with a system Clead	Circuit installation test (switch + lamp)
The eighth	2	Installing a circuit of two lamps in parallel with a switch(Clead)	Make a simple circuit on two lamps in parallel with a switch (Clead)	Implementation and practical application of Installing two lamps in parallel in a system Clead	Parallel Circuit Installation Evaluation
Ninth	2	Installing a light point, fan, and socket with separate control(Clead)	Wiring a lighting point, a ceiling fan point, and a socket, with separate control for each point, using a wiring system of the type (Clead)	Practical training for Installation of lighting circuit, fan and socket with separate control	Evaluation of lighting, fan and socket circuit installation
tenth	2	Two-way lamp control circuit installation (ladder system).	Wiring to control one lamp from two places (wiring used in ladder)	Training on Two-way lamp control circuit installation (ladder system)	Ladder circuit installation test
eleventh	2	Installing a 3-way lamp control circuit using Two Pole Relay or Intermediate Switch.	Make a circuit to control a lamp from three places using a two-pole relay (Two Pole Relay) and also by using the middle key (Intermediate Switch)	Practical application of Installing a 3-way control circuit using Two Pole Relay	3-Place Control Circuit Installation Evaluation
twelfth	2	Installing a control circuit for multiple lamps using Two-way switch.	Establish a circuit to control multiple lamps using a two-way switch (Two-way switch)	Practical training for Installing a control circuit for multiple lamps using Two-way switch.	Multi-lamp circuit installation evaluation
thirteenth	2	Installation and operation of a fluorescent lamp with Thermal Relay	Testing and setting up an AC fluorescent lamp using a thermal starter (Thermal Relay) with his examination	Practical application of Installation and operation of a fluorescent lamp with Thermal Relay	Test and Fluorescent lamp operation check
fourteenth	2	Installing two fluorescent lamps in series with Chook 40W and check it.	Set up two 20W fluorescent lamps in series with (Chook)	Implementation and practical application of	Evaluation of installing two fluorescent lamps in series

			Its capacity is 40 watts, then check it.	Installing two fluorescent lamps in series with Chook.	
fifteenth	2	Installation of a high-pressure mercury lamp and a sodium lamp	Establishment of the mercury lamp (High pressure mercury vapor lamp) And also a lamp of the type (Sodiuin vapor lamp)	Practical training for Installation of a mercury lamp and a sodium lamp	Mercury and sodium lamp installation test

12- Curriculum Development Plan

Continuously developing educational content to keep pace with modern requirements, such as:

1–IncludeQualitative specializations in line with digital transformation

2–OrganizationDiscussion sessions with industry leaders

3– Follow–upGlobal technical developments in the electrical field

4– ResidenceApplied exhibitions to showcase modern innovations

5–DevelopmentField training programs in leading companies

13- infrastructure

Classrooms, laboratories and workshops	Well-equipped and equipped halls and laboratories are available to provide a suitable environment for teaching and learning.
1- Required textbooks	Home and industrial electrical installations •Basics of Electricity and Electrical Circuits •International Electrical Code (IEC) - Latest Editi
2- Main References (Sources)	"Electrical Engineering: Principles and Applications" "Electrical Engineering: An Introduction" "Fundamentals of Electrical Engineering" "Electricity and Electronics for HVAC"
A)Recommended books and references (scientific journals, reports, etc.)	Electrical Systems Design Electric Power Systems: A Conceptual Introduction "Electrical Engineering: Know It All"
B)Electronic references, websites,.....	https://www.qrcodechimp.com/page/srcyif3uvk4a4

1- Course Name
Occupational safety
2- Course Code
TIHA103
3- Available attendance forms
in presence
4- semester/year
Decisions
5- Number of study hours(kidney)
2*15= 30
6- Date this description was prepared
11-6-2024
8- Name of the rapporteur
Name: Wissam Ibrahim Hussein e-mail : Wisamibrahim_hwj@ntu.edu.iq
9- Course objectives (general objectives of the course)
1. Educating the student about the dangers of electric current: Understand ingReasons Which leads to Injuries Electrical and types Injuries Different, which enhances their ability to prevent and deal with them properly. 2. Teaching proceduresFirst aid PrimaryAcquiring skillsnecessaryTo presentReliefImmediate assistance to those injured by electric current, Including breathing appartificialAnd treat burns effectively. 3. Understanding systemsWarningFrom Fire: Learn How Systems WorkWarningVarious fire extinguishers, including detectors Fire, smoke and heat detectors, learn how to install and maintain them. 4. Applying occupational health and safety guidelines: Understanding and following general safety guidelines in work environments, and the ability to Reducing unhealthy behaviors and practicesSafe. 5. Familiarity with Personal Protective Equipment: Knowing how to use personal protective equipment correctly, including: This is a means of protecting eyesight and hearing.and clothesProtective, to ensure safetyindividualsDuring work.

6. Risk assessment and application of prevention strategies: The ability to identify risks in the work environment and apply prevention strategies.

Effective prevention and risk reduction to ensure a safe and healthy working environment.

10- OutputsThe decisionTeaching, learning and assessment methods

Course outcomes

- 1- Understanding the causes and effects of electrical injuries.**
- 2- The ability to provide first aid to the injured.**
- 3- Knowledge of fire alarm systems and how to deal with them.**
- 4- Applying occupational health and safety guidelines in work environments.**
- 5- Use personal protective equipment correctly.**

Identification The Occupational Safety course is a core course that aims to provide students with the concepts and skills necessary to deal with occupational hazards, particularly those related to electrical current and fire-fighting systems, as well as personal protective measures. The course focuses on the theoretical aspect by examining the causes of electrical injuries, first aid methods, fire alarm systems, and the use of personal protective equipment.

Its importance:

- 1. Protecting lives– Prevention of injuries and deaths resulting from electric shock, fires, and occupational hazards.**
- 2. Legal Compliance- Applying global safety standards and avoiding penalties.**
- 3. Promoting preventive awareness- Training employees on dealing with emergencies and first aid.**
- 4. Improve productivity– Reducing accidents ensures a safe and efficient work environment.**

How is it determined?:

- 1. Compliance with laws and application of safety standards**
- 2. Accident preventionAvoid work-related injuries and deaths**
- 3. Cost savingsReducing accident losses and compensation**
- 4. Qualifying cadresFilling the labor market's need for safety experts**
- 5. Reputation protectionAvoid legal and media problems**

Outputs

Teaching and
learning
methods

Evaluation
methods

A- knowledge A1 - Understanding occupational hazards and prevention methods A2 - Knowledge of international safety standards A3 - Understanding Emergency Procedures A4- Identify personal protective equipment	1. Theoretical lectures 2. Group discussions 3. Case studies	1. Theoretical tests 2. My work performance evaluation 3. Safiya's participation 4. Research reports
B - Skills B1- Ability to implement safety procedures in the work environment B2 - Skill in using personal protective equipment correctly B3 - Ability to analyze and evaluate risks B4- Basic first aid skill	1. Interactive lectures 2. Real-life case studies 3. Field visits to facilities	1. Short and final tests 2. Performance evaluation during practical training 3. Applied projects 4. Field visit reports
C- Values A1- Commitment to a culture of safety as a priority in the work environment A2- Take individual and collective responsibility for implementing safety standards. A3- Respect the regulations and preventive instructions without compromise A4- Promoting the spirit of initiative in spreading awareness of occupational safety	1. Interaction and application 2. modern technologies 3. group learning	1. Continuous assessment 2. Performance evaluation during practical training 3. Final evaluation 4. Field visit reports

12- Course structure (Theoretical Vocabulary)					
week	watch es	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
the first	2	1- Understanding the main causes of electric shock 2- Identifying the conditions and factors causing	Causes of electric shock	1.Show videos of electrical accidents with analysis of the causes.	Short test (objective questions) on the main causes of injury

		electrical accidents.		2.Discussing real-life cases of common errors that cause electrical injuries.	
the second	2	1- Classification of types of electrical injuries (burns, electrocution, organic effects) 2- Analysis of the severity of injuries according to the circumstances of the accident.	Types of electrical injury	1.Explaining the types of injuries (burns, electrocution, organ damage) through pictures and medical explanation. 2.Workshop on identifying injuries based on current intensity	Practical evaluation of classification of fictitious injuries by type
the third	2	1- Applying the steps to rescue the injured personBy electric current 2- Practice safety procedures during the rescue operation.	Relief The injured By current electrician - clearance The injured	1.Practical training on isolating the injured person from the electrical source using isolation tools.. 2.Simulate rescue scenarios with safety rules in place.	Evaluate students' performance during the simulation (application accuracy + response time).
Fourth	2	1- Mastering basic artificial respiration techniques 2Treating different types of	Artificial respiration - burn treatment	Workshops, simulations	evaluation , Tests Skills

		burns according to their degree			
Fifth	2	Assessing the cumulative understanding of previous concepts	exam monthly	Written test, performance assessment	a test written, evaluation comprehensive For skills The student
Sixth	2	1- Analysis of the effects of electrical leakage to the ground 2- Understanding the risks of ground voltage	Effects of electric current passing through the ground	Lecture, case study	Editorial, case study analysis
Seventh	2	1- Explanation of the components of a fire alarm system 2 - Understanding how the central control unit works	Fire Alarm Systems - Control Unit	Presentations, workshops	Test, performance evaluation
The eighth	2	1- Distinguishing between types of fire detectors (heat, smoke, flame) 2- Determine the optimal use of each type of reagent.	Fire Detectors - Heat Detectors - Smoke Detectors	Training, interactive lectures	evaluation, a test Editorial
Ninth	2	1 - Classification of buildings according to alarm system requirements 2- Applying equipment standards for alarm systems.	buildings that He should Provide it System warning from fire	Case studies, lectures	Written test, case analysis
tenth	2	Assessing understanding of fire protection concepts	monthly exam	Written test, performance assessment	Written test, comprehensive assessment of student skills

eleventh	2	1- Comparison of different audible alarm methods 2- Choosing the appropriate system according to the work environment	Alarm means audible And bells and trumpets	Lectures, training	Test, performance evaluation
twelfth	2	1- Application of occupational health and safety guidelines 2 - Analysis of the impact of the work environment on safety	Occupational Health and Safety Guidelines	Interactive lectures, discussions	Written test, discussion questions
thirteenth	2	1 - Identify common unsafe practices 2- Proposing solutions to reduce risky behaviors	limit from Actions and practices Other Amana	Case studies, workshops	a test Editorial, analysis studies the condition
fourteenth	2	1- Selection and use of personal protective equipment 2- Applying vision and hearing protection standards	Personal Protective Equipment - Eye Protection - Hearing Protection	Training, presentations	Test, performance evaluation
fifteen	2	1- Evaluation of the effectiveness of different protective clothing 2- Applying criteria for selecting protective clothing according to risks.	Personal protective clothing	Lectures, training	evaluation, a test Editorial

13- Curriculum Development Plan

Continuously updating the curriculum to keep pace with developments in the labor market (Curriculum Update Committee, Scientific Committee) such as:

- 1- Updating the curriculum to keep pace with developments in the field of occupational safety.**

2– Holding scientific seminars with specialists in the field. 3– Keeping up with scientific developments in electrical safety systems.	
14– infrastructure	
Classrooms, laboratories and workshops	There are classrooms equipped to accommodate students and prepared to provide a suitable learning environment.
3- Required textbooks	Occupational Safety Lectures Booklet “Principles of Occupational Safety and Health” by Philip J. Landrigan and William J. Rosenstock
4- Main References (Sources)	“Fundamentals of Occupational Safety and Health” by Mark A. Friend and James P. Kohn "Introduction to Safety Management" by David L. Goetsch
A-Recommended books and references (scientific journals, reports, etc.)	"Safety and Health at Work: A Practical Guide" by Michael R. McGarry "Occupational Health and Safety Management: A Practical Approach" by Charles D. Reese
B- Electronic references, websites,.....	https://www.qrcodechimp.com/page/srcyif3uvk4a4

1- Course Name
Electronics1
2- Course Code
Electronics1
3- Available attendance forms
presence
4- semester/year
Decisions
5- Number of study hours(kidney)
21 theoretical and 2 practical lessons every week 2*15=60
6- Date this description was prepared
11-6-2024
7- Name of the rapporteur
Name: Mahdi Qahraman Fakhr al-Din e-mail : MahdiQ.F-haw@ntu.edu.iq
8- Course objectives (general objectives of the course)
1- Introducing the student to the different electronic components. 2 - The student will be able to understand: electronic components made from different types of semiconductors. -Its composition-Its properties-Its uses in electronic circuits-Its Applications-Analysis of electronic circuits using optoelectronic components and their applications.
9- OutputsThe decisionTeaching, learning and assessment methods Course outcomes By the end of the course, the student will be able to: 7. a descriptionBasic principles of operation of electronic components (e.g., diodes, transistors, amplifiers) 8. to explainProperties of analog and digital electronic circuits and their theoretical analysis 9. Understand the role of electronic components in the design of modern systems (e.g., power supplies, digital logic). identificationThis course description provides a concise summary of the main course features and the learning outcomes expected of the student,

demonstrating whether the student has made the most of the available learning opportunities. It must be linked to the program description.

Its importance:

- 1- Ensure that the skills acquiredKeep up with industry needs (e.g., circuit design, use of measuring instruments)**
- 2- All modern devices rely on electronics, from smartphones to artificial intelligence systems and robots.**
- 3- Students can develop innovative electronic projects (e.g., alarm systems, home automation, small medical devices).**
- 4- Contributes to the knowledge economy by manufacturing local electronic products instead of relying on imports.**

How is it determined?

- 7. Study of labor market needs**
- 8. Review of professional standards**
- 9. Evaluate students' capabilities and the workshop**
- 10. Formulate clear and measurable goals**
- 11. Linking with other courses**
- 12. Periodic update according to developments**

Evaluation methods	Teaching and learning methods	Outputs
1- Written tests (essay and objective questions). 2- Analytical reports on protection systems. 1-Theoretical tests 2- Practical tests 3- Reports	1- Theoretical lectures using presentations. 2- Real-life case studies of foundation failures. 3- Short research on modern distribution systems	i- knowledge Describe the basic principles of operation of electronic components (e.g., diodes, transistors, amplifiers). Explain and analyze the properties of analog and digital electronic circuits theoretically. Understand the role of electronic components in the design of modern systems (e.g., power supplies, digital logic)

1- Practical performance tests. 2- Project evaluation (design and implementation of a control circuit)	1- Practical experiments. 2- Simulation using programs such as: AutoCAD Electrical. 3- Field visits to electrical construction sites	B - Skills Analyze the behavior of electronic circuits using laws and theories (e.g., Ohm's Law, current and voltage analysis). Comparison of types of electronic circuits (analogvs.digital) and identify its practical applications. Evaluating the performance of electronic circuits based on criteria of energy efficiency, cost, and stability
1- Peer evaluationFor team performance. 2- Observing behavior during practical training (commitment to safety). 3- Self-reports on practical experiences	1- Group discussions on professional ethics. 2- Role playingFor situations that require ethical decisions. 3- Observe and imitate models of distinguished professionals.	C- Values Commitmentwith safety standards at work to bearProfessional responsibilityIn implementing the foundations the jobWith a teamTo implement electrical projects respectStandards and regulations

10- Course structure A- (Theoretical vocabulary)					
week	watches	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
the first	2	3-Explaining the curriculum vocabulary to the student 4- Learn about the classification of materials (conductive, semiconductor, and insulator) and the properties of each type.	Semiconductor theory - Atomic structure - Energy levels - Crystals - Conduction in crystals - Gap current - How gaps move	An introductory lecture about the method + classification of materials (conductor, semiconductor, insulator)	Short test (theoretical) on the classification of materials
the second	2	4-Student understanding of the basicselectronics 5-Identify components Mosul sub-continent disaster	Doping - positive crystal type (PNegative crystal of type (NElectron current and hole current - total resistance	Theoretical explanation of the principles of theTronic	Component identification testCrystal of the Mosul sub-continent.

the third And the fourth	4	4-Introducing the student to electrical materials semiconductor 5-Understanding the features and uses of materials in the field of Electronic	Semiconductor diodes - junction (PN) Formation of the evacuation zone - barrier potential - energy hill - thermal effects - biased diode - forward bias - reverse bias - characteristic curves in the forward and reverse directions - evanescent crossing current - minority carrier current - surface leakage current - breakdown potential - breakdown potential (PIV) Maximum forward current - Maximum reverse voltage - (PIV _{max}) – Equivalent circuit of a diode	Study of the properties of Silicon and germanium (Electrical, Mechanical) + their applications	Practical evaluation (comparison of the Silicon and germanium)
Fifth	2	4-Study of a binary current integrator 5-Understanding its types and applications	Diode as a rectifier – Half-wave rectifier – DC current value and its calculation Effective value – Output frequency	a lecture Diodes as a current integrator	Students are assessed individually by giving them the opportunity to participate in the class by answering questions.
Sixth	2	3-Understand the topic Full wave unification 4-Calculating effective current values 5-Understanding the difference between a half-wave and full-wave rectifier	Full-wave rectifier – using a center-phase transformer – bridge rectifier – calculating continuous and effective current values – extracting the output frequency – comparison between half-wave rectifier and full-wave rectifier – comparison between full-wave rectifiers	Extract output frequency	Short tests and Evaluate participation in discussions
Seventh The eighth	2	3-Introducing the student to Filters and their types	Filters - Capacitor filtration - Filter (RC) – DC ripple output voltage	study Filters, their types and comparison between them	Theoretical test about Filters
Ninth and tenth	2	3-Explaining the feeding circuits and their types 4-Knowing the difference between negative, positive and compound pruning	Ripple Factor Voltage Multiplier Trimmer Circuits - Positive Trimmer - Negative Trimmer - Compound Trimmer	Explanation of the mechanism of pruning circuits	Surprise test for evaluation departments

eleventh and twelfth	4	4-Introducing the student to the Zener diode 5-Knowing the difference between a Zener diode and a normal diode 6-Explaining the types of refraction	Zener diode - structure - symbol - properties - breakdown refraction Zener refraction - breakdown voltage - power tolerance - Zener impedance - temperature effects - Zener approximation Continuous voltage regulation	Theoretical explanation of Zener diode and refraction + refraction potential	Short test about Zener diode
13th and 14th	4	4-Introducing the student to transistor 5-Explanation of its composition and types 6-Explaining the areas of the zener	bipolar junction transistor-Its composition-Its regions-Its symbol-bias efforts-(α DC)-(β DCThe relationship between (α DC)-(β DCTypes of bias-Approximate connection formulas in transistor and equivalent circuit	study transistor (Types, specifications, how to choose them)	Selection Evaluation transistors Suitable for different circles
Fifteenth	2	3-study Transistor characteristics curves 4-Explanation of work areas	Transistor characteristics curves-Work areas definition (ICBO) and (ICEO)-Current gain curve-The relationship between (IC) and (ICEO)	Explain the properties of the transistor, its working areas, and clarify the gain curve.	Knowledge assessment Work areas

11- Course structure B-(Practical vocabulary)

week	watches	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
the first		-Familiarization with laboratory equipment - your Report card For Afires.	Training on how to use laboratory equipment, prepare reports, and occupational safety	- Demo - Group practical application	Short theoretical test + practical application for first aid and safety
the second		- Drawing a voltage-current curve - Comparison between silicon and germanium	Forward bias diode properties and plotting of the diode characteristics of	- Individual laboratory experiments - Analysis of results	Symbol and Tool Classification Test

			silicon and germanium		
the third		- Draw a reverse bias curve. - Breakdown voltage measurement	Properties of diode in reverse bias and plotting of the characteristics curve of silicon and germanium type	- Group work - Discuss the results	Practical evaluation
Fourth		- Installation of the calendar circuit - Measure the output voltage	half-wave rectifier	- Practical application - Using the oscilloscope	Lab Report + Performance Test
Fifth		- Comparison of evaluation efficiency - Output signal analysis	Full wave rectifier (bridge)	- Comparative experiments - Data analysis	Practical assessment + short test
Sixth		- Circuit design using transformer - Measure the ripple ratio	Full wave rectifier using center-phase transformer	- Teamwork - Discussion of results	Technical report + presentation of results
Seventh		- Filter effect analysis - Time constant calculation	Half wave rectifier with filter (RC) and candidate (RL)	- Laboratory experiments - Signal analysis	Practical test + report
The eighth		- Comparison of filter performance - Improve output quality	Full wave rectifier with filter (RC) and candidate (RL)	- Compare results - Edit circles	Performance Evaluation + Theory Test
Ninth		- Apply trimming types - Modify waveforms	Trimming circuits (positive, negative, and compound)	- Practical experiments - drawing waveforms	Lab Report + Classification Test
tenth		- Building a multiplier circuit - Measure the output voltage	DC voltage multiplier circuits (triple to quadruple)	- Practical application - Performance measurement	Practical assessment + math test
eleventh		- Output signal analysis - Understanding voltage stabilization	Obligor (positive, negative and compound)	- Laboratory experiments - Data analysis	Technical Report + Short Test
twelfth		- Breakdown voltage measurement - Characteristics analysis	Properties of Zener diode in forward bias and reverse bias	- Group work - Discuss the results	Practical assessment + theoretical test
thirteenth		- Design of an organizing circle	Properties of Zener Diode in	- Practical application - modifying values	Lab Report + Performance Test

		- Voltage stability measurement	Voltage Regulation with a Fixed Resistive Load		
fourteenth		- Circuit response analysis - Adjusting load values	Properties of Zener Diode in Voltage Regulation with Variable Resistive Load	- Stepwise experiments - Analysis of results	Practical assessment + analytical test
fifteenth		-Measuring transistor coefficients -Understanding the properties of conduction	Common base transistor properties	- Laboratory experiments - Drawing curves	Technical Report + Classification Test

12– Curriculum Development Plan

Continuously developing educational content to keep pace with modern requirements, such as:

- 1–IncludeQualitative specializations in line with digital transformation**
- 2–OrganizationDiscussion sessions with industry leaders**
- 3– Follow–upGlobal technical developments in the fieldElectronics**
- 4– ResidenceApplied exhibitions to showcase modern innovations**
- 5–DevelopmentField training programs in leading companies**

13– infrastructure

Well-equipped and equipped halls and laboratories are available to provide a suitable environment for teaching and learning.

Classrooms, laboratories and workshops

**1. Principles of Electronics 1984 - Written by Malvin
Translated by Badr Muhammad Ali Al-Watar - Dr. Riad
Kamal**

5- Required textbooks

**2. Industrial Electronics 1985 - Written by: Diaa
Mahdi Faris, Nabil Younis Abdullah, Helmy Amin**

**3. An Introduction to semiconductors (KI Gross & JY
Rwood)**

6- Main References (Sources)

**4. Power Electronics / Diaa Mahdi Faris, Youssef
Ibrahim Taha, Mosul University Press 1991**

**1)Recommended books and
references (scientific journals,
reports, etc.)**

<https://youtu.be/yEHKsiIyF8s?si=CbGnmTHRUx2tBg2N>

2)Electronic references,
websites,

1- Course Name
Electronics2
2- Course Code
Electronics2
3- Available attendance forms
My presence
4- semester/year
Decisions
5- Number of study hours(kidney)
21 theoretical and 2 practical lessons every week 2*15=60
6- Date this description was prepared
11-6-2024
7- Name of the rapporteur
Name: Mahdi Qahraman Fakhr al-Din e-mail : MahdiQ.F-haw@ntu.edu.iq
8- Course objectives (general objectives of the course)
1- Introducing the student to the different electronic components. 2 - The student will be able to understand: electronic components made from different types of semiconductors. -Its composition-Its properties-Its uses in electronic circuits-Its Applications-Analysis of electronic circuits using optoelectronic components and their applications.
9- OutputsThe decisionTeaching, learning and assessment methods Course outcomes By the end of the course, the student will be able to:

10. a descriptionBasic principles of operation of electronic components (e.g., diodes, transistors, amplifiers)
11. to explainProperties of analog and digital electronic circuits and their theoretical analysis
12. Understand the role of electronic components in the design of modern systems (e.g., power supplies, digital logic).

identificationThis course description provides a concise summary of the main course features and the learning outcomes expected of the student, demonstrating whether the student has made the most of the available learning opportunities. It must be linked to the program description.

Its importance:

- 5- Ensure that the skills acquiredKeep up with industry needs (e.g., circuit design, use of measuring instruments)
- 6- All modern devices rely on electronics, from smartphones to artificial intelligence systems and robots.
- 7- Students can develop innovative electronic projects (e.g., alarm systems, home automation, small medical devices).
- 8- Contributes to the knowledge economy by manufacturing local electronic products instead of relying on imports.

How is it determined?

13. Study of labor market needs
14. Review of professional standards
15. Evaluate students' capabilities and the workshop
16. Formulate clear and measurable goals
17. Linking with other courses
18. Periodic update according to developments

Evaluation methods	Teaching and learning methods	Outputs
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1- Written tests (essay and objective questions). 2- Analytical reports on protection systems. 1-Theoretical tests 2- Practical tests 3- Reports	1- Theoretical lectures using presentations. 2- Real-life case studies of foundation failures. 3- Short research on modern distribution systems	ا- knowledge Describe the basic principles of operation of electronic components (e.g., diodes, transistors, amplifiers). Explain and analyze the properties of analog and digital electronic circuits theoretically. Understand the role of electronic components in the design of modern systems (e.g., power supplies, digital logic)
1- Practical performance tests. 2- Project evaluation (design and implementation of a control circuit)	1- Practical experiments. 2- Simulation using programs such as: AutoCAD Electrical. 3- Field visits to electrical construction sites	ب - Skills Analyze the behavior of electronic circuits using laws and theories (e.g., Ohm's Law, current and voltage analysis). Comparison of types of electronic circuits (analogvs.digital) and identify its practical applications. Evaluating the performance of electronic circuits based on criteria of energy efficiency, cost, and stability
1- Peer evaluationFor team performance. 2- Observing behavior during practical training (commitment to safety). 3- Self-reports on practical experiences	1- Group discussions on professional ethics. 2- Role playingFor situations that require ethical decisions. 3- Observe and imitate models of distinguished professionals.	ج- Values Commitmentwith safety standards at work to bearProfessional responsibilityIn implementing the foundations the jobWith a teamTo implement electrical projects respectStandards and regulations

week	watches	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
First and Second	4	5-study Transistor characteristics curves 6-Explanation of work areas	Transistor characteristics curves-Work areas definition (ICBO) and (ICEO)-Current gain curve-The relationship between (IC) and (ICEO)	Explain the properties of the transistor, its working areas, and clarify the gain curve.	Knowledge assessment Work areas
Third and Fourth	4	3-Teaching the student the types Transistor bias circuits 4-Comparison between them	Transistor bias circuits-Al-Qaeda bias-emitter bias	study Bias circuits and explaining the difference between base and emitter bias	Evaluate participation in discussions
Fifth and Sixth	4	4-Explaining the application of the transistor in small signal amplification 5-Study of voltage gain, current gain and power	Transistor in small signal amplification-AC equivalent circuit-perfect approximation-Hybrid Constants-Equivalent circuit using coefficients (h)-Effort Gain-Gain the current-Gaining Power-Input and output resistors-small signal amplifiers-Al-Qaeda Market	Lecture on Equivalent circuit (Its components, measurement methods, importance)	Short tests and Evaluate participation in discussions
Seventh And Eighth	4	1- Explaining the use of transistors in voltage regulation.	Using transistors in voltage regulation - series regulator - parallel regulator DC voltage source circuit	A theoretical explanation of voltage regulation and the difference between series and parallel types	Evaluate participation in discussions
Ninth and Tenth	4	1-F They are a composition JFET and its characteristics - Characteristic curves analysis	Junction field effect transistor (JEFT) – Its structure – Its symbol – Theory of action – Characteristic curves – Interchangeable conductivity curve – Definition of the narrowing potential (VP),(IDSS),(VGSOFF) – Property curves (MOSFET) – (D-MOSFET) – (E-MOSFET)	1-theoretical lecture 2-Visual presentation 3-Group discussion	Short test + analytical assignment
Eleventh and Twelfth	4	1-Determine the action point 2-Bias circuit analysis	Bias circles (FET) – Constant current source bias – Self-	1-Solve numerical examples	Written assessment + problem solving

			biased working point – Equivalent circuit of (FETUseFET) In magnifying the small sign	2-Software simulation	
Thirteenth	2	1-Understanding Zoom Applications 2-Amplifier circuit analysis	Comparison between the types of (FET) (FET, MOSFET) and between (BJT	1-Case studies 2-Circuit analysis	Theoretical test + circuit analysis
Fourteenth	2	1-Comparison of properties 2-TIron suitable applications	Light-dependent resistor (LDR) – Light Emitting Diode – Photodiode Seven-Segment Board Its Structure and Applications	1-Comparison table 2-Group discussion	Comparative report + conceptual test
Fifteenth	2	1-Understanding the work of optical elements 2-Application Analysis	Phototransistor - Structure - Operation - Applications - Process	1-Showcase experiences 2-Data analysis	Short test + homework

10.Course structure B-(Practical vocabulary) electronic 2					
week	watch	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
the first		- Current and voltage gain analysis -Drawing characteristic curves	Common emitter transistor properties	- Teamwork - Data Analysis	Practical assessment + theoretical test
the second		- Calculate voltage and current gain Frequency response analysis	Common Base Amplifier (Finding Voltage Gain and Current Gain)	- Advanced experiments - Using a signal generator	Lab report + analytical test
the third		- Hybrid Transaction Measurement - Circuit Analysis	Common emitter amplifier (find voltage gain and current gain) and plot frequency response curve	- Practical application - Model analysis	Performance Evaluation + Short Test
Fourth		- Voltage regulator design - Performance analysis	Common collector amplifier (finding voltage gain and current gain) and plotting the frequency response curve	- Practical project - Stability test	Project Report + Presentation

Fifth		- Determine hybrid coefficients (h) - Analysis of common emitter circuits	Hybrid transaction measurement (h-paramet.) for the common emitter formula	- Laboratory experiments - Use of measuring devices	Lab Report + Arithmetic Test
Sixth		- Comparison of hybrid transactions - Analysis of differences	Hybrid transaction measurement (h-paramet.) for the common base formula	- Making comparisons - Drawing curves	Practical assessment + theoretical test
Seventh		- Application of coefficients in design - Power gain calculation	Hybrid transaction measurement (h-paramet.) for the common denominator formula	- Circuit design - Performance measurement	Technical Report + Design Test
The eighth		- Voltage regulator design - Stability testing	Use of transistor in voltage regulation circuits (series regulator)	- Practical project - Modify parameters	Performance Evaluation + Presentation
Ninth		- FET characteristics analysis - VI curves drawing	Properties of field effect transistor (FET)	- Laboratory experiments - Comparison with BJT	Practical test + report
tenth		- Voltage gain calculation - Impedance analysis	common source amplifier	- Practical application - Using the oscilloscope	Performance Evaluation + Short Test
eleventh		- Current gain analysis - Matching circuit design	Joint Bank Amplifier	- Group work - Edit circuits	Lab report + analytical test
twelfth		- Optical response measurement - Efficiency calculation	Photodiode properties	- Experiments under variable lighting - Data recording	Practical assessment + theoretical test
thirteenth		- Alarm circuit design - Sensitivity test	Application circuit for using a photodiode	- Mini-project - Testing the waters	Practical presentation + technical report
fourteenth		- Optical properties analysis - Plotting response curves	Properties of phototransistor	- Advanced experiments - Using light sources	Lab Report + Performance Test
fifteenth		- Building an optical control system - Measuring response time	Application circuit for using phototransistor	- Final Project - Functional Test	Comprehensive Evaluation + Final Presentation

Continuously developing educational content to keep pace with modern requirements, such as:

- 1–IncludeQualitative specializations in line with digital transformation**
- 2–OrganizationDiscussion sessions with industry leaders**
- 3– Follow–upGlobal technical developments in the fieldElectronics**
- 4– ResidenceApplied exhibitions to showcase modern innovations**
- 5–DevelopmentField training programs in leading companies**

12.infrastructure

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7-

Required textbooks

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- 3. An Introduction to semiconductors (KI Gross &**
Rwood

8-

Main References (Sources)

- 4. Power Electronics / Daa Mahdi Faris, Yous**
Ibrahim Taha, Mosul University Press 19

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<https://youtu.be/yEHKsiIyF8s?si=CbGnmTHRUx2tBg2N>

2)Electronic references, websites,

11. Course Name
DC machines
12. Course Name/Code
DC machines
13. Available attendance forms
In-person
14. semester/year
Modular Courses
15. Number of study hours (total)
5 = 15 *75
16. Date this description was prepared
11-6-2024
8- Name of the rapporteur
Name: Parwein Rahim Karim e-mail : : preween_hwj@ntu.edu.iq
17. Course objectives (general objectives of the course)
1. the basic theoretical principles of DC machines, including understand the similarity between magnetic and electric circuits, and the concepts of electromotive force and magnetism 2. Distinguish between different types of DC machines in terms of their power supply method (parallel, series, compound, self-contained separate), and understand their main components and functions 3. Analyze the electrical and mechanical performance of DC generators and motors by studying efficiency and losses, and knowing how to calculate power, torque, and voltage equations 4. Understand various operating effects such as product reaction, voltage and speed regulation, parallel operation conditions of generators, as well as starting, stopping and reversing applications in motors 5. Master performance-related calculations such as efficiency, electromotive force, resistance and critical speed, and speed and torque regulation under different loading conditions 6. Learn about solar pumping systems linked to DC motors, understand their configuration, advantages, and applications in industrial and agricultural fields.
18. Course outcomes , teaching, learning and assessment methods
Course outcomes

- 13. Gain basic theoretical knowledge related to DC machines, their components and operating methods**
- 14. Develop the computational and technical skills necessary to analyze the performance of generators and motors**
- 15. Develop the ability to apply concepts in practical fields, especially solar pumping systems**
- 16. Promoting professional values and awareness of the importance of electrical energy and its sustainable uses**

identification:It is decided My theory - This course covers the study of DC machines in terms of their composition, internal structure, and basic operating principles, with a focus on the types of generators and motors their operating characteristics, and analyzing their performance under various operating conditions. The course also covers calculations of electromotive force, efficiency, torque, and speed regulation, in addition to the applications of these machines in solar pumping systems. The course aims to prepare students to understand the theoretical and practical aspects of these machines and their use in various energy fields .

Its importance:

- 1- Understand the basics of electrical machine operation, especially DC generators and motors which enhances a deep understanding of the structure of electrical power systems**
- 2- Enhance the ability to analyze and design control and simulation systems for DC motors in industrial applications**
- 3- Enabling students to conduct practical experiments related to electrical and mechanical properties, linking the theoretical and practical aspects**
- 4- ,Preparing students for renewable energy applications especially in systems such as solar pumping that rely primarily on DC motors**
- 5- Qualifying students to work in the maintenance and operation of machines in industrial facilities, power plants, and the field of solar energy**

6- ,Enhance understanding of the concepts of losses efficiency, and speed regulation, which are essential .in any efficient power system

How is it determined?

- 19. Study of labor market needs**
- 20. Review of professional standards**
- 21. Evaluate students' capabilities and the workshop**
- 22. Formulate clear and measurable goals**
- 23. Linking with other courses**
- 24. Periodic update according to developments**

Evaluation methods	Teaching and learning methods	Outputs
Written tests (essay and -1 . (objective questions Analytical reports on protection -2 . systems Theoretical tests-1 Practical tests -2 Reports -3	-1 Theoretical lectures: to provide basic concepts and .detailed explanation Presentations and visual -2 media: to explain the machine installation and .operating stages Class discussions: to -3 enhance critical and .analytical understanding Solving classroom -4 problems and exercises: to apply mathematical and .technical concepts Field visits or virtual -5 laboratories: to enhance understanding by linking it .to real-life application Homework and short -6 research: to expand self-knowledge and develop .analytical skills	ت- knowledge A1- Knowledge of the structure and parts of DC machines such as generators and motors and their basic .components A2- Understand the working principle of DC generator and motor and the ,types of power supply (separate .(parallel, series, combined A3- Distinguish between types of losses and efficiency and how to calculate .them theoretically ,A4- Analysis of load characteristics voltage and speed regulation of DC .machines A5- Identifying the methods of starting engines, speed control and braking .(stopping) A6- Understand the relationship between voltage, current and torque in .different operating conditions A7- Knowledge of DC machines applications in industrial fields, and renewable energy systems such as solar .pumping systems
Detailed laboratory reports for -1 .each experiment Tests The process inside The -2 . laboratory Observation Direct from before -3 Professor during to implement . Experience	For direct laboratory -1 .experiments Training practical The -2 wave from before The teacher) Education Cooperative -3 work within difference small Projects Miniature To solve . problems Applied	B - Skills Operation and testing of DC - B1 .machines in a laboratory environment B2- Measuring the electrical properties of generators and motors (such as .(voltage, current, efficiency

Evaluation performance -4 Students in solution problems And . connect Circles Show verbal or writing For the-5 . project practical basic		B3- Draw and analyze experimental curves such as magnetization curves .and load curves B4- Diagnose minor faults and determine the causes of abnormal .performance B4- Implementation and connection of practical circuits for starting and speed .control systems B5- Preparing technical reports based on practical experiences and measured .data
Direct classroom and laboratory -1 observation: To assess behavior and discipline in the classroom and .laboratory : evaluation the job Collective -2 from during quality cooperation . inside The group Calendar Self or calendar Peer -3 ,evaluation : to measure interaction . trust, and accountability Commitment In time And -4 . delivery Reports in Its dates Share The student in -5 Discussions Safiya and interaction Positive	Group discussions and .1 classroom activities: to encourage cooperation and .respect for opinions Participation in the job -2 Laboratory Collective : for development spirit team And bear Responsibility Observation Direct inside -3 Laboratory : for planting Commitment And discipline : instructions teacher -4 Continuous : to plant values like Trust Scientific And . respect Laws Storm mental and -5 positions Dramatic or simulation Real : To plant values Ethics and respect Professional	C- Values Adherence to occupational safety -A1 rules inside the laboratory when .handling machines A2- Teamwork and cooperation with colleagues in implementing .experiments and solving problems A3- Assume responsibility and discipline in performing duties and .practical activities A4- Developing the spirit of initiative and innovation in finding practical .solutions to technical problems A5- Respect and maintain laboratory .tools and equipment A6- Enhancing self-confidence when conducting experiments and submitting .reports A7- Commitment to scientific ethics in preparing reports and documenting .results

Course structure A- (Theoretical vocabulary) .19

Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	watches	week
Short test (theoretical)	An introductory lecture about the method + definitions of terms in magnetic + circuits computational examples	- Magnetic circuits Calculating - magnetomotive force Similarities between magnetic circuits and . electric circuits	Explaining the-5 curriculum vocabulary to the student Learn about-6 magnetic circuits and their similarities to .electrical circuits	2	the first
Theoretical test	theoretical explanation For the basic principles of DC + machines	Basic principles of DC machines - Main parts of machines - Magnetic poles - Product .The external structure -	Student-6 understanding of the working principle of .DC machine	2	the second

	presentation of the parts of a DC machine		Student's mouth for-7 the parts of a DC .machine		
Theoretical test	Presentation on the types of DC machines calculation examples + to calculate the induced electromotive force generated in each type of machine and to calculate the losses and efficiency of the machine	:Types of DC machines - separate power supply self-power supply - parallel - series) (compound Efficiency of DC - machines - Losses Types of losses - fixed) (losses and variable losses Power distribution stages in DC machines - Giving computational examples on how to calculate efficiency and losses	Introducing the-6 student to the types of DC machines and classifying them according to the type of power supply and the method of connecting .the field coils The student learns-7 how to calculate the efficiency of the .machine The student learns-8 how to measure the various losses in the .machine The student learns-9 the stages of power distribution in DC .machines	2	the third
Theoretical test	+ Presentation Calculation Examples	Electromotive force Factors affecting strength electromotive force - giving hematical examples of how to calculate force electromotive force for all types .Generators	The student should -1 define the concept of electromotive force and distinguish it from .electric potential The student should -2 explain the factors that affect the amount of .electromotive force The student should -3 apply the appropriate physical laws to calculate the .electromotive force The student will -4 solve numerical problems related to calculating the electromotive force of different types of .generators The student should -5 be able to distinguish between types of generators (DC, AC) in terms of the method of generating driving .force The student should -6 use the technical data of the generators to	2	Fourth

			the EMF calculate .generated by them The student should -7 link physical variables such as the number of ,turns, magnetic flux and speed with the .EMF value resulting		
Practical test in -1 the laboratory: to assess the student's ability to draw and analyze the magnetization curve and determine the resistance and critical velocity .from the data Analytical -2 :laboratory reports The student is required to document the readings, analyze the results, and calculate critical values with a physical .interpretation Short written test -3 (Quiz)	A theoretical -1 presentation supported by illustrations of the magnetization curve a data through and aprojector discussion of the curve's behavior when the field and current .change Direct laboratory -2 experiment using a DC machine to measure the no-load voltage at different speeds, and draw the .magnetization curve Analytical activities -3 and group discussions to solve real-life numerical examples including calculating critical ,EMF resistance, and critical .speed	dy of magnetization curve (curve) load (and how to find (resistance critical and critical speed on gnetization curve examples of how Driving force calculation ctrical and critical resistance ritical speed of DC machines	The student -1 explains the behavior of the magnetization curve of a DC machine in the no-load condition and deduces the relationship between voltage and magnetic field. The student -2 calculates the critical resistance and critical speed theoretically and practically using experimental equations and diagrams and deduces their effect on the self-excitation process in .the generator -3 The student applies the steps of analyzing and calculating the electromotive force in different operating conditions with a practical explanation of the magnetization .prevention	2	Fifth
A detailed -1 analytical laboratory report Short written test -2 :(Quiz) Theoretical and numerical questions that measure the student's understanding of voltage regulation concepts and load .characteristics	Theoretical explanation supported by interactive graphic displays: Presenting performance curves for each type of DC machine with practical examples from industrial realities, showing how voltage or torque changes with load .changes Integrated practical application :laboratory	Study the load characteristics of all types of DC machines, draw their curves, and study the voltage regulation of different types of .generators	The student explains -1 the behavior of DC machines under the influence of loads of all types (motors and ,generators: shunt series, compound), and analyzes their operational characteristics based .on performance curves The student -2 accurately calculates the voltage regulation ,of DC generator types compares their performance under	2	Sixth

Practical -3 evaluation inside the laboratory	Conduct experiments DC machines on (mounted, series) compound) to record values of voltage current, speed and torque Voltage regulation analysis is performed practically by comparing the voltage under no load and under full load		different load conditions, and is able to deduce the physical effects behind each behavior The student applies -3 the steps of recording and analyzing experimental data to draw voltage-current speed-torque efficiency-load curves and uses these curves to evaluate the practical performance of machines		
Laboratory -1 report Drawing -2 performance curves Calculate -3 voltage regulation and product reaction effect Analyze the -4 method of reducing the effect by using an alternating pole or brush distribution Short written test -5 (Quiz) Mathematical -6 examples on voltage regulation and voltage calculation under load	A detailed -1 theoretical explanation supported by graphs and diagrams: explaining the load characteristics and the effect of the load on voltage and torque with comparative curves between generator types Show a video or -2 practical simulation of the product's reaction using An explanatory video, then a detailed discussion of ways to reduce it	duct reaction and its effect pregnancy and explaining s to reduce the effect of product reaction hematical examples	The student explains -1 the operating characteristics of DC motors under load with the ability to analyze the change in performance through voltage-current, speed- torque, and efficiency- load curves The student explains -2 the phenomenon of product reaction and its effect on the magnetic field and voltage regulation, and compares methods for reducing it, such as distributing the turns using an alternating or opposite pole, and the inclination of the brushes The student applies -3 analytical steps to calculate voltage regulation and the effect of product reaction through realistic numerical examples	2	Seventh
A written test -1 that includes interpretive questions and drawing diagrams illustrating the standardization	A detailed -1 theoretical presentation supported by illustrations and time diagrams of currents during consolidation	DC in Communication machines	The student defines -1 the rectification process in DC machines explains its steps and the mechanism of its operation inside the commutator, and	2	The eighth

process, in addition study to case analysis questions about the effects of poor .standardization Report My -2 laboratory or simulation : Analytical Required In it from The student analysis Data performance whenDC machine there are standardization issues and provide a technical report that includes .realistic solutions Display My -3 presentation verbal or project small	with emphasis on the change in current within the coils as they pass under the .brushes simulation visible -2 or an experience / Laboratory Virtual Real Explain The spark The resulting on ill Monotheism, And compare performance when Use Poles Interchangeability or Without it discussions -3 Analytical and activities Safiya		differentiates between ideal and non-ideal .rectification Analyzes The -2 student impact factors Different like Pregnancy rose an act Product And speed rotation on quality Monotheism, It is suggested means practical To improve it like Poles ,Interchangeability tendency Brushes, And . distribution The rolls		
Written test -1 : (short or monthly) Questions about -2 the basic conditions for parallel connection Numerical -3 problems to calculate load distribution and currents using the internal resistance .of each generator a report My -4 laboratory or paper : activity practical The student -5 connects two generators in .parallel / discussion Oral -6 Presentation My presentation	A detailed -1 theoretical explanation supported by diagrams to illustrate the steps of ,parallel connection and the effect of internal resistance and voltage curve on current distribution .between generators activity practical or -2 hypothetical inside laboratory solution Issues -3 Numerical Applied	Operating DC generators in parallel Reasons for operating • DC generators in parallel Conditions for • operating DC generators in parallel Load distribution on • generators connected in parallel and giving mathematical examples	The student explains -1 the need to operate DC generators in parallel in industrial electrical systems and power plants, and explains the operational and technical advantages of ,this (backup maintenance, voltage .(stability He specifies The -2 student Terms and Conditions necessary To deliver generators or more on parallelism ,like match effort Polarity, And agree curves to organize effort, And understands what It follows on breach With this Terms and . Conditions solves The student -3 Issues Numerical To distribute Pregnancy between Generators ,Tied on parallelism And it is calculated The current that Pull it all generator building on	2	Ninth

			His resistance Interior And a curve to organize Effort		
Written test -1 including interpretive questions and numerical examples : Practical report -2 from the laboratory Classroom -3 analysis activity or : oral discussion	A detailed -1 theoretical explanation supported by animations and videos that illustrate the principle of torque generation, how counter-motive force is generated during rotation, and its effect .on current and speed Discussions Safiya-2 and analysis comparative It is required In it	DC motors Motor Operation Theory Reverse Electromotive - Force Backward Electromotive - Force Equation Comparison of DC Motors and Generators	The student explains -1 the theory of DC motor operation and analyzes how torque is generated as a result of the effect of the magnetic field on the .current conductors Explains The -2 student concept power The driver electrical Back EMF , and its It derived equation is explains its role in regulating the engine speed and protecting it from high current .during start-up Compare The -3 student between Generators and engines in terms ofDC function, power flow direction, operating characteristics, and internal parts composition, and deduces the similarities and differences practically and .theoretically	2	tenth
. Written test -1 -2 Practical/laboratory report Class discussion - 3 or individual/group : presentation	A theoretical - 1 explanation supported by schematic drawings and illustrative curves showing the relationship between torque, current, and speed, clarifying the concepts of the resulting torque within the product and the torque delivered to the drive .shaft simulation or -2 activity My laboratory practical To register) Data Operation voltage, The current	Torque - Torque on the product - Torque on the (Shaft) drive shaft Power distribution in DC motors - Maximum electromagnetic power condition in DC motors	The student explains -1 the difference between the electromagnetic and the(T_e) torque net mechanical torque ,(T_s) on the drive shaft with the ability to ,calculate each of them and analyze the losses resulting from friction , and mechanical losses The student -2 analyzes the power distribution in a DC motor, starting with the electrical	2	eleventh

	Speed) and its use To account determination and ability in Cases different, including In it the condition Dangerous (Greatest) .(Ability Activities -3 Analytical and issues Numerical		power input, then the internally generated power (electromagnetic and ,power) ending with the mechanical power . output The student -3 deduces the maximum power in condition ,motors understands its operational significance, and applies the equations .associated with it		
) Written test -1 : (Quiz/Short Exam Mathematical -2 problems that explain how torque and speed change .with load Analyze the -3 relationship ,between current load, speed, and .torque Display My -4 presentation or : discussion Oral The student is asked to provide a comparison between the three .types	A theoretical -1 explanation with drawings of speed and torque curves for each ,type of motor explaining how these values change with changes in load and current, supported by real-life examples of applications for each .type discussion Safiya -2 comparison And collective analytical, It is required In it from students comparison between Types different, And present Examples from life Industrial on all type Why? It is used in . that The application	eral properties of speed d torque of motors (parallel) Complex sequence	The student explains -1 the relationship between speed and (Speed-Torque torque forCharacteristics) .each type of DC motor The student applies -2 mathematical and analytical concepts to calculate the effect of a change in current or load on speed and torque, and deduces typical operating characteristics and problems associated . with each type	2	twelfth
A written test -1 that includes direct arithmetic problems to calculate speed regulation and analyze the effect of	A theoretical -1 presentation supported by realistic numerical examples to calculate speed regulation in each type of DC motors with a	- Speed regulation rate calculation examples Comparison of DC motors in various industrial applications	It is calculated The -1 student an average to organize speed For engines The current .Continuous Its significance is	2	thirteenth

load on .performance discussion Oral -2 or an offer My : application Requests In it from The student clarification any type from Engines is suitable for aDC particular industrial application and why, supported by .calculations	technical interpretation of the .results activity -2 comparative My analysis inside the line ,or Using simulation Includes Tables Explain the difference in performance industrial between engine The shint In succession, The ship		explained in evaluating .engine performance compare The -2 student between Types Engines The current continuous from where ,to organize speed behavior Determination, And the response under Loads different, And connects that By use industrial . optimum per Type		
A written test containing applied numerical problems: such as calculating the resulting speed when the voltage is reduced, or determining the braking resistance required to stop a motor dynamically within a certain .time	Theoretical explanation supported by drawing control circuits and presenting numerical examples to calculate the speed when changing voltage or current in the field coils, with practical comparison of the .results	- DC motor speed control Speed regulation by voltage - Speed regulation by field Mathematical examples Reversing the direction of - rotation of the machine Methods of stopping engines - Dynamic stopping - Calculating examples	The student explains -1 the methods of controlling the speed of DC motors using armature voltage and magnetic control and ,field control solves mathematical problems that demonstrate the effect of each method on .speed Analyzes The -2 student mechanism reverse direction ,DC rotation engine and explains the different methods of ,stopping it (natural ,(dynamic, reversible with the application of computational examples that illustrate the behavior of torque and current during .these processes	2	fourteenth
A written test or -1) short questions :that includes (quiz Choosing the - appropriate type of (DC or AC) system for a specific .application Analyzing a - realistic situation	Theoretical explanation supported by system installation diagrams and real-life photos of solar water ,pumping projects with a functional analysis of each .system component	Solar water pumping systems Pumping SystemsSolar “ -1 ic components of .2 solar pumping systems es of solar .3 pumping systems ssification of water .1 pumping systems according to the type of operating current	The student explains -1 the working principle of solar pumping systems, and distinguishes between their basic components ,such as: solar cells ,control unit, pump water tank, mounting ,structure etc.	2	fifteenth

that requires pumping water according to .specific solar hours Display My -2 presentation or a report My : application In which the student explains his comparison between the two .systems It presents a preliminary concept for the design of a complete solar ,pumping system identifying potential advantages and .limitations	an exercise applied ♦ Clear or project Mini Project : In this the student ,project designs a solar pumping system suitable for an agricultural or home application, choosing the appropriate components according to the type of current .and consumption	DC pumps .1 AC pumps .2 antages of solar .4 pumping systems advantages of .5 r pumping systems Solar pumping	The student classifies -2 solar pumping systems according to the type of current(DC/AC) , compares them in terms of efficiency, system cost, complexity, and suitability for rural applications, and analyzes the advantages and disadvantages of each type.		
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Course structure B-(Practical vocabulary) -10

Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	watches	week
Field evaluation -1) during work Observation which ,(Checklist includes the student's commitment to safety procedures and the accuracy of implementing the .delivery steps Report practical -2 Evaluated from ,where organization ,inclusion Data ,health Connections and analysis Results, with comparison between The two methods practically	Direct instructional -1 explanation at the beginning of the experiment, supported by explanatory panels or an educational video on safety .and connection method activity practical applied -2 inside laboratory, It is done In it to divide students to Groups To apply The two methods practically And . registration Notes	Study of -1 general safety methods - how to - write a report introduction to distribution panels on devices in the laboratory and a general idea about the different types of DC machines assembled by Lamp method -1 Method of-2 measuring resistance	The student -1 identifies the basic occupational safety procedures in the electrical machinery laboratory, and follows them accurately during .practical experiments It is considered The -2 student Report practically organized It contains on Elements ,Basic (Introduction ,steps the job, Data ,Results, Discussion ,(Conclusion Get to know The -3 student on ingredients paintings distribution in laboratory, And a job all device linked By running machinery The current Continuous He specifies The -4 student Types Different For machines The ,current continuous And explains the difference between	3	the first

			Engine The birth And the principle a job all . From it -5 Implemented The student practical installation DC machine using the lamp and resistance measurement methods, and the two methods are compared in terms of accuracy and .safety		
Direct practical -1 evaluation of performance within ,the laboratory including measurement accuracy, safety compliance, and accurate curve .drawing a report My -2 laboratory Includes comparison curves ,between Both cases and analysis technical To influence speed And type excitement on . effort The result	A practical laboratory experiment to record open voltage values versus excitation current, using a separate, self-powered, two- .speed generator acting Results Graphically inside the line and discussion impact magnetism The remaining, And inclination The curve Differently type . The birth And his speed	Determine the magnetic properties of a separate-fed DC generator at normal speed and then half-normal speed. Determine the magnetic properties of a parallel self-fed DC generator at normal speed and then half-normal .speed	The student draws -1 the magnetic E vs) properties curve of a separately (If powered generator at ,two different speeds and explains the relationship between excitation and the .resulting voltage Analyzes The -2 student impact speed in a self-OCC on curve feeding generator (parallel), comparing performance at rated .speed and half speed	3	the second
Direct -1 practical evaluation in the : laboratory accuracy in ,taking readings determining the point of contact the between andOCC curve the resistance . line Laboratory -2	A practical -1 laboratory experiment in which the voltage is measured at different speeds with the excitation current constant, then the relationship between the voltage and speed is . drawn Analytical activity to -2 andOCC curve plot the intersect it with lines	Speed-voltage relationship for a separately powered alternator and determination of the critical resistance	The student -1 analyzes the relationship between rotational speed and open-circuit output voltage , and concludes the effect of speed on the magnetic properties . curve The student -2 determines the critical resistance of the , generator practically explains its importance in the process of	3	the third

report including drawing and analysis of the curve, with a technical explanation of the nature of the critical resistance and its effect on voltage build-up	representing different resistance values to determine the critical . resistance		,building self-voltage and draws a straight-line . resistance curve		
Practical -1 evaluation of students during the experiment in terms of accuracy ,of measurement speed control, and extracting correct data to draw the . curve Laboratory -2 report including drawings and technical analysis to determine the critical resistance and comment on the differences between the two . cases	Direct laboratory -1 experiment by measuring the output voltage at different excitation currents, and the OCC curve drawing of the generator at the .two speeds discussion Safiya -2 Interactive To analyze The curve And inclination line resistance Passing by At a point origin, And specify value resistance . Critical Graphically	Determine the critical resistance of a parallel self-powered DC generator at normal speed and half .normal speed	The student -1 determines the critical resistance of a self-powered generator by drawing the magnetic) properties curve and (OCC intersecting it with .the load lines Analyze The -2 student impact speed on resistance Critical And he concludes the difference between Its value when speed regular And a half Speed	3	Fourth
Direct -1 practical evaluation during the experiment in terms of the accuracy of ,measurements connecting circuits, and extracting the data needed to .draw curves	Carry out an actual -1 or simulated laboratory experiment to measure the internal and external voltage when the load current changes for each .of the two types Drawing My-2 statement Interactive inside the line or in The report practical To represent curve Properties and analysis	A- Load characteristics of a separately powered DC generator and determine the internal and external characteristics .curve B- Load characteristics of a self-powered DC	The student -1 draws the curve of internal properties and (E vs IL) external properties for two (V vs IL) :generators separate and self-powered, and compares the behavior of each of .them Analyze The -2 student impact	3	Fifth

Report My -2 laboratory It contains on Fees Bayani And the interpretation Technical For differences between The birth separate ,The birth Self And explain Reasons Decrease in Effort	Differences Operational .	generator and determination of the curve Internal and external .properties	stream Pregnancy on effort Internal and external And it is explained role) Losses Interior lost voltage inside .(The product		
A practical -1 test or laboratory report in which the results of the experiment are analyzed and the electrical behavior is .compared Short written -2 or oral questions that measure the student's understanding of the differences between the two types and the behavior of each under different .loads	A theoretical lecture -1 supported by illustrative drawings of voltage versus current curves for each type of .generator A practical -2 experiment in the laboratory during which both types (cumulative and differential) are operated and the load properties are .measured	Load characteristics of a DC generator accumulative-) .(differential	Distinguish the -1 load characteristics of the accumulator and differential DC generator in terms of performance and voltage behavior with load .change Analyze the -2 curves of the relationship between voltage and current and explain the effect of cumulative or differential conduction on .stability	3	Sixth
A practical -1 laboratory report containing ,results, tables graphs, and .analysis An analytical -2 question in the	A theoretical -1 explanation supported by graphs of the internal and external characteristics curves of .the series generator Practical activity -2 :inside the laboratory	Load characteristics of a DC generator (self-powered series and finding the internal and external	Understanding -1 the behavior of voltage and current in a self-powered series DC generator under the influence of .different loads	3	Seventh

,theoretical test :such as Observing -3 the student's performance during the experiment connection) ,accuracy measurement ,accuracy practical .(understanding	Connecting a series * .generator circuit Generator and load * .gradually Measure the required * .(V, I, E) values Draw curves based on * .practical values Group discussion -3 about generator ,behavior, when to use it and why it is not used much in modern .applications	characteristics .curves	Draw and -2 analyze the (E vs I) internal V vs) and external characteristics (I curves of the generator and explain the difference between .them		
Direct -1 observation of the student's performance during the experiment ,connection) ,operation .(monitoring Oral or -2 written questions after the experiment to measure understanding .of the concepts A practical -3 report that includes an explanation of the experiment ,steps, readings analysis of results, and .conclusions	A brief theoretical -1 explanation before the experiment about the principles and conditions of parallel .operation Practical -2 implementation of the experiment inside the laboratory using two self-generators and current and voltage .measuring devices Group discussion -3 during and after the experiment to interpret the readings and analyze .the results	Parallel operation of a self-powered .DC generator	The student -1 should be able to distinguish the conditions required to operate two self-generators in .parallel The student -2 should be able to practically implement the parallel operation experiment and analyze the behavior of generators during .operation	3	The eighth
Observing -1 the student's practical performance in implementing the electrical	A short theoretical -1 presentation explaining the principle of each method with speed and .torque curves Practical -2 implementation of a	How to control the speed of a parallel DC motor by A-Field current B-Source voltage	The student -1 should be able to distinguish between the two main methods of controlling the speed of a parallel	3	Ninth

circuit safely and accurately Ask -2 analytical questions about the effect of changing the field current or source voltage on speed and torque A practical -3 report containing a description of the experiment readings, graphs observations , and conclusions	speed control experiment inside the laboratory, observing changes in performance Post-experiment -3 discussion to link theoretical results to practical results and analyze the differences		DC motor (via field current and via source voltage The student -2 should practically carry out an experiment to change the motor speed using both methods, and record the relationship between the variables (speed current, voltage		
Direct -1 observation of the student's skills in connecting operating and safely measuring during the experiment Applied or -2 analytical questions to link theoretical concepts to practical data A detailed -3 practical report :containing Readings table * Graphs (e.g * current vs torque, speed vs current efficiency vs load Analysis of * the relationship with mechanical (BHP) power	A brief theoretical -1 explanation of the behavior of a series motor under load, with an explanation of the mathematical relationships and an approximate graph for each relationship Practical -2 implementation of the motor experiment with gradual measurements of current, speed and torque, with calculation BHP of efficiency and Analyze group data -3 after the experiment is completed to interpret the results and compare them with theoretical values	Load characteristics of a series DC motor and find the relationship between current-torque- efficiency-speed BHP with	The student can -1 deduce the relationship between the load current, torque speed and efficiency of a series DC motor during operation under different loads The student -2 should link the) mechanical power with the (BHP rest of the variables to explain the engine's performance practically	3	tenth

Direct -1 practical evaluation of the student's skill in operating the engine and taking accurate .measurements Analytical or -2 oral questions to test theoretical understanding of the relationships between .variables A practical -3 report that :includes Table of * readings for ,current, speed ,torque, power .and efficiency Relationship * :graphs .Current vs) Torque, Speed ,vs. Current .Efficiency vs .vsBHP ,Load (Current Explain the * behavior of a compound engine compared to other types of .engines	A brief theoretical -1 introduction explaining the difference between the accumulator compound engine and other engines, and the effect of the series engine .on performance curves Practical -2 implementation of the experiment by measuring the load ,current, motor speed torque, mechanical power, and efficiency at .different loads Analyze and compare -3 the results with parallel and series motors to understand the behavior .of the compound motor	Load characteristics of a series compound current motor and finding the relationship between current-torque-efficiency-speed .BHP with	The student will -1 be able to practically analyze the load characteristics of a series-compound DC motor, and understand the effect of the additional field component on . performance To deduce the -2 relationship between ,load current, torque ,efficiency, speed and mechanical (BHP) power through . experimental data	3	eleventh
Monitoring the -1 student's practical performance in terms of accuracy in ,connecting ,operating devices .and reading values Written or oral -2 questions to measure theoretical	A theoretical presentation -1 illustrating both the Solenoid and Hopkinson tests with basic equations and .illustrative diagrams :Practical implementation -2 Solenbohn test on a DC * .motor without load Hopkinson test by * connecting two machines in	A- Determine the efficiency of a DC machine without load using the Solenbohn .method b- Determine the efficiency of a parallel-fed DC machine (motor	The student should -1 explain the principle of the Solenbohn test and how to use it to estimate the efficiency of the machine without .loading it The student should -2 practically perform the	3	twelfth

understanding and practical steps for calculating .proficiency A practical -3 report for each test :that includes Objectives of the - experiment Size chart - Solution steps and - calculations Comparison - between the two methods	parallel while monitoring the .input and output power Group discussion after -3 each experiment to analyze the differences between the .two methods	generator) using the Hopkinson .method	Hopkinson test on two similar machines and accurately calculate the efficiency under .operating conditions The student should -3 compare the two methods in terms of ,accuracy, type of load and operating .requirements		
Direct -1 observation of the student's performance while implementing the experiment steps and connecting the .devices accurately Short evaluation -2 questions to explain the concepts of losses and their calculation .equations A practical -3 report that :includes Reading table for * each part of the .experiment :Loss calculation * $I^2R_{I^2R} = \text{Copper Iron and mechanical} = \text{from .no-load operation}$ Approximate * graph of loss .distribution Conclusions -4 about the losses that most affect .efficiency	A preliminary theoretical -1 explanation that clarifies the types of losses in a DC machine and the source of .each type Practical experience in -2 separating losses using :techniques such as No-load operation (to * estimate iron and mechanical (losses Measure current, voltage * and resistance to determine .copper losses Analytical discussion of the * experimental results to understand how to improve .efficiency and reduce losses	Isolating losses from a DC .machine	The student should -1 distinguish between the ,types of losses (copper iron, mechanical) in a .DC machine The student should -2 apply practical methods to separate and estimate each type of loss in the engine or .generator To conclude the -3 effect of each type of losses on the performance and efficiency of the .machine	3	thirteenth
Observing -1 'students performance during the process of ,connecting operating, and dealing with the .system components	A theoretical and practical -1 explanation of the working principle of the solar pumping system and the use .of DC motors in it Field study inside the -2 laboratory or at a pilot site of the system components and .their practical connection	Practical study of the components of a solar pumping system	The student should -1 be familiar with the basic components of the solar pumping :system Solar panels, charge) controller, voltage ,converter, DC motor	3	fourteenth

Oral or written -2 questions about the functions of each component and how .it works A practical -3 :report containing .System diagram * Explain the * system components .and their functions .Connecting steps * Observations on -4 system performance under different .conditions	Group discussion to -3 clarify the effect of changing radiation on the electrical and mechanical performance .of the system		,water pump, sensors .(electrical protection The student -2 understands how to connect components practically and operate the system effectively .and efficiently To link the -3 characteristics of DC motors to the behavior of the solar system during changes in solar .radiation		
Practical -1 assessment of the student's ability to connect the system and measure readings accurately .and safely Analytical -2 questions about the system performance under different conditions (such as changing radiation .(or load A comprehensive -3 practical report :that includes Measurement * ,table (voltage ,current, speed, flow .(lift Graphs (such as * the relationship between voltage and flux, or current and .(efficiency Analyze results * and compare theoretical and .actual performance -4 Recommendations to improve system .efficiency	A simplified theoretical -1 presentation of the equations of power, lift and water flow in solar pumping systems .DC motors using Practical implementation -2 of an experiment to operate a water pump connected to a solar panel (or a simulated source) with changing the .radiation level or voltage Collecting and analyzing -3 :data in terms of Voltage and current * entering the motor Rotational speed * Water pumping rate * Hydraulic and electrical * efficiency	Performance analysis of a DC motor-driven water pump in a solar pumping system	The student will be -1 able to analyze the relationship between solar radiation, output ,voltage, load current and motor speed in a .solar pumping system The student should -2 measure the performance of the water pump in terms of flow rate, hydraulic lift, and motor power under different .radiation conditions The student should -3 evaluate the efficiency of the system as a whole (from the panel to the pump) and deduce the factors .affecting it	3	fifteenth

Continuously developing educational content to keep pace with modern requirements, such as

- .Including qualitative specializations that are in line with the digital transformation –1**
- .Organizing discussion sessions with industrial sector leaders –2**
- .Following up on global technical developments in the electrical field –3**
- .Holding applied exhibitions to display modern innovations –4**
- .Developing field training programs in leading companies –5**

infrastructure .21

Well-equipped and equipped halls and laboratories are available to provide a suitable environment for teaching and learning	classrooms, laboratories and workshops
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Electrical Machines (Dr. Muhammad Zaki Muhammad Khader / University of Mosul	Required textbooks -9
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Text book of electrical technology by BL Theraja	Main References (Sources) -10
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IEEE Transactions on Industrial Applications • International Journal of Electrical Power & Energy Systems •	Recommended books and (إ), references (scientific journals (.reports, etc
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MIT OpenCourseWare – Massachusetts • Institute of Technology Electronics Tutorials •	,Electronic references (إ)websites
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22. Course Name t
Electrical networks 1
23. Course Code
Electrical networks 1
24. Available attendance forms
In presence
25. semester/year
Decisions
26. Number of study hours (total)
60 =15*4
27. Date this description was prepared
11-6-2024
8- Name of the rapporteur
Name: Alaa Yass Ahmed e-mail : : alaaalyass85@ntu.edu.iq
28. Course objectives (general objectives of the course)
Complete knowledge of hydroelectric, thermal and gas generating stations and -1 .an idea about some other stations such as diesel A-2 Using overhead lines - Mechanical calculations including: - Calculating tension and slack when the distances from the ground are equal- Calculating the weight of snow accumulated on the wire- Calculating the amount of wind pressure force acting on the wire ,A-3 Calculations of the basic elements of overhead lines - Electrical calculations including: - Calculating the resistance- Calculating the internal and external inductance of a single wire- Calculating the inductance of a three- way system consisting of three wires separated by equal distances from each other, Or at different distances or exchanged in location A-4 Calculate the capacitance of the single - phase system A triode consisting of three wires spaced equally apart, or At different distances and exchange locations
29. Course outcomes , teaching, learning and assessment methods
Course outcomes A- Cognitive objectives 1. Operation and maintenance of electrical units of power plants.

Introducing the student to the types of power stations and introducing the student to the operating mechanism of each type of station and the degree of efficiency of each type of power station

2. Operation and maintenance of electrical equipment for the transmission and distribution of electrical energy.
3. Maintenance of protection and control devices for the electrical power system.
4. Extension and maintenance of underground and overhead cables.

Engineering Design Fundamentals: Knowledge of basic engineering design principles such as analysis and design of electrical and mechanical systems

Evaluation methods	Teaching and learning methods	Outputs
5. Theoretical tests 6. My work performance evaluation 7. Safiya's participation 8. Research reports	4. Theoretical lectures 5. Group discussions 6. Case studies	A- knowledge The student gets to know Methods of -1 generating electrical energy Distinguish between each type of .2 energy source Explain the mechanism of electrical .3 energy production
5. Short and final tests 6. Performance evaluation during practical training 7. Applied projects 8. Field visit reports	4. Interactive lectures 5. Real-life case studies 6. Field visits to facilities	B- Skills The student gets to know Methods of -1 generating electrical energy Distinguish between each type of .2 energy source Explain the mechanism of electrical .3 energy production
5. Continuous assessment 6. Performance evaluation during practical training	4. Interaction and application 5. modern technologies 6. group learning	C-Values Student participation in classroom activities and submitting assignments on time

7. Final evaluation 8. Field visit reports		Adherence to occupational safety .rules while working in laboratories Attention control and attention test (selective attention)
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Number of units	Weekly hours			Second academic year	Name of the material Electrical networks 1
	M	A	N		
4	4	2	2		

Details of the curriculum for Electrical Networks 1 (theoretical curriculum) two hours per week

30. Course structure A- (Theoretical vocabulary)					
week	watches	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
and First second	2	The student learns how electrical energy is generated, the development of energy uses, and the components of the electrical power system from generation to ,consumption in addition to	How to generate electrical ,energy energy ,development electrical power system from generation to ,consumption standard voltages	Interactive lectures supported by PowerPoint presentations , documentary videos, and a conceptual map of energy flow in the electrical system.	A + short test research assignment on the stages of development of energy systems

		the standard .voltages used			
the third	2	The student understands the working principle of hydroelectric and thermal ,power plants and compares them in terms ,of uses efficiency, and .environment	Hydroelectric and thermal power plants	,Explanatory video ,comparative study class discussion.	+ Analytical report short descriptive test.
Fourth	2	Identify gas and diesel stations, and distinguish between their characteristics and applications. □	Gas generating stations and an idea about some other stations such as diesel	Real case presentation + application study	Oral presentation + in a group individual written assessment
Fifth	2	Explains the components of a bus bar system, and analyzes the layouts of transformer stations inside and outside buildings.	) Bus Bar SystemBE and layouts transformer stati inside and outs buildings	□ Analysis of engineering ,drawings interactive ,discussion practical examples.	a test My work + my duty my house
Sixth	2	Classifies air lines and analyzes their use and types ,short) (medium, long	Air lines, their uses, the division of lines in short, medium, and l .lines	+ Video lecture comparison exercises	a question My article + exercise my house
Seventh	2	Performs ,tension, sag ,snow weight and wind pressure calculations on overhead lines.	Overhead - lines mechanical calculations :including Calculating - tension and relaxation when the distances from the ground	Solving applied + problems numerical simulation(via programs such as MATLAB).	a test in the chapter

			surface are equal Calculate - the weight of snow accumulated .on the wire Calculating - the amount of wind pressure acting on the wire		
The eighth	2	Calculates the internal and external resistance and inductance of single and .triple wires	Calculations of the basic elements of - overhead lines electrical ,calculations :including Resistance - calculation Calculate the - internal and external inductance of a single wire Calculating the - inductance of a three-wire system consisting of three wires separated by a distance of At equal distances fr each other, o different distances .exchange locati	training Practical + Explanations Detailed	a test My analysis
Ninth	2	Calculates capacitance in single- and triple-phase systems and analyzes the effect of distances and .site switching	Calculating the- capacitance of a ,single-phase system a three-phase system consisting of three wires separated by At equal or different distances from each other, and they .exchange locations	solution exercises , discussion Collective	a test Academic
tenth	2	review Solution Issues from Weeks previous	Solve various problems for the seventh and eighth weeks	session Review , exercises Safiya	a test short Academic
eleventh	2	Analyzes short and medium lines	,Solving short lines including representing them as	fee circles Electrical + Applications	+ Drawing circles geometry problems

		and represents them with electrical circuits(T , π) and , calculates their efficiency	an electrical circuit and calculating their .efficiency The solution of the intermediate lines is :divided into T- shaped electrical .circuit Represent it as an electrical circuit in the shape of the letterri.		
twelfth	2	Learn about the types of air transport insulators, the phenomenon ,of discharge its causes and methods of .treatment	Overhead transmission line insulators, their ,types, shapes ,installation discharge phenomenon, its causes, and methods .used to get rid of it	View videos + view models of insulators	a report Practical + Test
thirteenth	2	knowledge ingredients Midwives floor And its types	- Ground cal - compone classification - range cables	Use Models or Fees Graphic	a report My research
fourteenth	2	procedure Accounts Capacity And the conversation For midwives	Calculating capacitance and inductance for single-pole and three-pole grounding cables	workshop work , solve Issues	a test technical Academic
fifteenth	2	to understand Gradient effort And lost Insulation in Midwives	Voltage gradient in cables, loss calculation and ,angle in insulators cable breakdown	Case studies of + collapse discussion of causes and prevention.	a test comprehensive ultimate

**of the curriculum for Electrical Networks 1 (practical Details
curriculum) two hours per week**

11-Course structure B-(Practical vocabulary)					
week	watches	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
the first	2	recognize The student on ingredients laboratory Electrical ,	Learn about laboratory equipment	session Introductory inside Lab + Presentation	note performance The student inside Lab +

		Appliances basic , mechanism Its operation and procedures Safety inside The laboratory .		My explanation Practical + Discussion around Use Tools .	Questions directly on ingredients Devices + Evaluation behavior Safety
Second and third	2	can The student from delivery Transformers Y way and download it With loads balanced And other balanced , analytical impact that on an effort tie	Loading distribution transformers with balanced and unbalanced resistive and inductive loads in they shape, Δ and the effect of that on the neutral voltage	to implement experiments Process for connecting transformers With loads Various + Discussion Results within Groups .	a report practical detailed on all Experience + Evaluation performance during Delivery + Questions Analytical in end Experience .
Fourth	2	can The student from to implement practical synchronization between Converter synchronicity Trilogy The stage and the network Foreign Ministry and analysis Her steps	Synchronization between the three- phase synchronous transformer and the external network	to explain theoretical For synchronization + execution practical For the experience with tracking Signs Synchronization .	evaluation success practical Synchronization + Report Detailed + Discussion around Mistakes potential
Fifth	2	He paints The student curve Pregnancy Based on to Data Taken from experience And explains behavior order under Loads Different	Draw a load curve	to gather Data from experiments Previous + Training on The drawing The graph And analysis .	delivery fee My statement Explanatory + Questions Analytical on behavior Pregnancy
Sixth	2	Explains The student Ways to improve Factors ability , and applies practically Use Capacitors To improve it .	Improving the power factor of networks	to explain theoretical around concept Factors Ability + Execution an experience Using Capacitors .	a report It contains on the accounts Improvements + Testing practical To measure bezel Improvement
Seventh	2	It is concluded The student Elements line Transfer (resistance , impedance , inductance) from Tests The palace And pregnancy .	Study the transmission line model and calculate the basic elements by load and short circuit .test	procedure Tests practical Using Models Lines Transport + Analysis Readings .	a report detailed With results + questions Oral on accuracy Measurements And its interpretation .
eighth and ninth	2	compare The student between features line Transportation when	Study of the characteristics of the transmission	to implement experiments Multiple with all type from	a report Comparison + Representation Results in

		suppository In types different from Loads (resistive , inductive , capacitive) from where voltage And the current .	line model at the receiving end when loaded with resistive , inductive and capacitive , loads	Loads + Discussion Differences .	Tables Fees + Test practical basic .
tenth	2	It is calculated The student amount drop effort in model line Transport , compare that With the results expected	Voltage drop on transmission line model	measurement Voltage on Lines during Download + Compare values The calculated And the measurement .	analysis Results Written + Test applied small .
eleventh	2	Applies The student Techniques compensation Facial For lines Transportation And he rules on Its effectiveness in to improve Performance .	Face compensation for power transmission lines	to explain detailed on Techniques Compensation + Experience Using simulation or tools Laboratory	a report Lab + Discussion Artistic around impact Compensation
twelfth	2	He specifies The student type Holidays in cables floor building on road Delivery And readings , whether He was The stage connected On the ground or castle between Phases	Identify faults in ground cables using One phase -1 connection to the ground 2- In case of short circuit between phases	an offer Scenarios Faults + Implementation experiments a statement Holidays Practically .	analysis condition Holidays in Report + Questions Applied To determine Holidays building on Measurements .
thirteenth and fourteenth	2	Review The student experiments previous In a way comprehensive And corrects Concepts wrong , with Strengthening Skills The process .	General review of experiences	Sessions review practical Group + Replay to implement parts from experiments According to The need	sharing Active + Test preparatory practical or My theory
fifteenth	2	Applies The student all Skills acquired in exam practical comprehensive Covers all experiments	Practical exam with experiments	a test practical complete Includes to implement an experience and analysis Its results under supervision direct .	revision immediate According to performance Practical + Notes Oral + Evaluation Written

Continuously updating the curriculum to keep pace with developments in the :labor market (Curriculum Update Committee, Scientific Committee) such as

4– Updating the curriculum to keep pace with developments

. in the field of electrical networks

5– .Holding scientific seminars with specialists in the field

6– Monitoring scientific developments in electrical network systems and power generation

32. infrastructure

Classrooms, laboratories and worksho

There are classrooms equipped to accommodate students and prepared to provide a suitable learning .environment

11- Required textbooks

**Electrical Networks Lectures Booklet
1
" Electrical Machines and Power Systems" Study and Analysis**

12- Main References (Sources)

"Power System Analysis " John J. Grainger & William D. Stevenson

ت) Recommended books and ,references (scientific journals (.reports, etc

" Transmission and distribution of electrical energy"

Author: Dr. Mahmoud Gilani

Publisher: Dar Al-Fajr for Publishing and Distribution – Cairo

ث) ,Electronic referenceswebsites

<https://www.qrcodechimp.com/page/srcyif3uvk4a4>

33. Course Name		
Maintenance Workshop 1		
34. Course Code		
Maintenance Workshop 1		
35. Available attendance forms		
In presence		
36. semester/year		
Decisions		
37. Number of study hours (total)		
45 =15*3		
38. Date this description was prepared		
11-6-2024		
8- Name of the rapporteur		
Name: Alaa Yass Ahmed		
e-mail : : alaaalyass85@ntu.edu.iq		
39. Course objectives (general objectives of the course)		
The student will also be able to: 1. Uses various equipment, tools and components used in workshops. 2. Acquires technical skills and experience in the field of various electrical maintenance works. 3. Gain self-confidence to practice electrical engineering work, track faults and learn how to repair them. 4.		
40. Course outcomes , teaching, learning and assessment methods		
Course outcomes		
A-1identification The student on works Maintenance For devices Electrical		
A-2 identification The student on Business Technical electrical in Track Malfunctions For devices electrical And get to know on How to Fixit A -3 identification The student on various the components electrical and electronic		
How to Use it in building circles Electrical		
A-4 identification The student on How to Unlock And installation		
Yes In the face of machines Electrical A -5 identification The student on How to to examine machines electrical after Wrapit		
Outputs	Teaching and learning methods	Evaluation methods

knowledge A-1 Introducing the student to electrical appliances maintenance work. A-2 Introducing the student to electrical technical work in tracing faults in electrical devices and learning how to repair them. A-3 Introducing the student to the various electrical and electronic components and how to use them in building electrical circuits. A-4 Introducing the student to how to disassemble and assemble electrical machine parts	7. Theoretical lectures 8. Group discussions 9. Case studies	9. Theoretical tests 10. My work performance evaluation 11. Safiya's participation 12. Research reports
B- Skills B1 - Acquire the skill of assembling DC machines, methods of rewinding DC machines. B2 - Acquire the skill of designing and studying three-phase electrical transformers. B3 - Acquire the skill of rewinding Stator coils of a three-phase induction motor and a squirrel cage. B-4 Acquire the skill of assembling the engine and testing the engine under the load assigned to it. B-5 Acquire the skill of periodic maintenance of a split-phase motor, conduct the necessary tests on it, identify faults and methods of treating them.	7. Interactive lectures 8. Real-life case studies 9. Field visits to facilities	9. Short and final tests 10. Performance evaluation during practical training 11. Applied projects 12. Field visit reports
C-Values C-1 Practical skills enable The student researches identifying and treating faults in electrical appliances. C-2 Practical skills that enable the student to cooperate In working with others. C-3 Maintaining the safety of the equipment and furniture in the workshop, as they are public property. C-4 The student's ability to think in an organized manner and .thus make decisions	7. Interaction and application 8. modern technologies 9. group learning	9. Continuous assessment 10. Performance evaluation during practical training 11. Final evaluation 12. Field visit reports

Name of the material	Second academic year	Weekly hours			Number of units
		N	A	M	
		0	3	3	
Maintenance Workshop 1					3

**Details of the curriculum for the Maintenance Workshop 1 course
(practical curriculum only) three hours each week**

Course structure -10					
week	watches	Outputs Learning required	or the topic / name Unity	Teaching method	Evaluation method
the first	3	acquisition Skill and experience Technical in Unity theme	- installation machinery The current continuous - Ways re He wrapped machinery direct current fee Detailed	to implement exercises	evaluation continuous
the second	3	acquisition Skill and experience Technical in Unity theme	stabilizing Brushes - How to cleaning surface Units the situation Applied For brushes carbon - carbon	to implement exercises	evaluation continuous
the third	3	acquisition Skill and experience Technical in Unity theme	a test Communication And the pieces And isolation	to implement exercises	evaluation continuous
the four	3	acquisition Skill and experience Technical in topic Unity	Files member Production For the birth stream continuous- to prepare and collecting information- He wrapped file member Production And install Files on Examples Simplified on Sewers the heart Iron Wrap	to implement exercises	evaluation continuous
Fifth	3	acquisition Skill and experience Technical in topic Unity	Insulation Palo Varnish- drying - delivery The children Shelf Final- choice Final For member Production- fee complete For member Production Fully His files And its connections and its uses	to implement exercises	evaluation continuous
Sixth	3	acquisition Skill and experience Technical in Unity theme	Files field- to gather Information For files parallelism And the sequence- formation Connectors same The clip The big one- Properties Domain files succession And parallelism Ways Tie it in god.Wrap on . Template	to implement exercises	evaluation continuous
Seventh Eighth+	3	acquisition Skill and experience Technical in Unity theme	a job Files And install Monogamy Poles- Test Complete machine- converter electrician- to equip And cut sheets Iron Heart And collect it He wrapped Files And isolation Varnished and training	to implement exercises	evaluation continuous

			simplified before Form on a job template Wrap		
Ninth	3	acquisition Skill and experience Technical in topic Unity	delivery And connect The children Shelf - a test Polarity- a test Listen Arriya - a test The contract And test Insulation in Files. Examples on design And replay He wrapped adapter small ability	to implement exercises	evaluation continuous
tenth	3	acquisition Skill and experience Technical in topic Unity	- D A ship Transformers The three Phases design basic Detailed drawing	to implement exercises	evaluation continuous
eleventh	3	acquisition Skill and experience Technical in topic Unity	to equip And cutting sheets the heart Iron And Installation And - Wrapping files - collect it drying - isolation Palo Varnish	to implement exercises	evaluation continuous
twelfth	3	acquisition Skill and experience Technical in Unity theme	a test leakage - a test Listen Arriya a test Polarity	to implement exercises	evaluation continuous
the third ten	3	acquisition Skill and experience Technical in Unity theme	Engines deductive(Hittah) re He wrapped Files fixed member For engine inductive tripartite Phases The cage squirrel- account And drawing shape The year For files And Remove Materials Insulating and cleaning sewers- isolation Sewers Member constant-He wrapped Files And its formation then Install it on sewers	to implement exercises	evaluation continuous
the fourteen	3	acquisition Skill and experience Technical in Unity theme	He wrapped And delivery I Shelf Files And test Listen Arriya	to implement exercises	evaluation continuous
fifteenth	3	acquisition Skill and experience Technical in Unity theme	to choose - to choose The contract in Files Select leak - Insulation And its measurement Ground For the engine	to implement exercises	evaluation continuous

- 11 structure Infrastructure :

1-books The reporter Required

The booklet Laboratory private In the workshop

2- the reviewer Home (Sources)	- 1 He wrapped Engines electrical ,Dr moon - 2 Reference in Transformers electrical , Franklin Sticant , SA
A books References that Recommended It has(magazines) Scientific, Reports ,)	- 1Troubleshooting And maintenance machines Electrical Bank settings International For shapes Illustrative Technical.
for - the reviewer electronic, Sites Internet	- 1 location The Institute Technical /Al-Rumaitha- - 2Sites Companies Global

- 12 plan development The decision Academic :
- 1Participation in The state Art Different Private By the material To gain My coach The workshop expertise Bigger - 2 examining on last what I reached for him Technology Modern in This is amazing The material .

41. Course Name		
Programmable Logic Control(PLC)		
42. Course Code		
Programmable Logic Control(PLC)		
43. Available attendance forms		
My presence		
44. semester/year		
Decisions		
45. Number of study hours (total)		
45 =15*3		
46. Date this description was prepared		
11-6-2024		
8- Name of the rapporteur		
Name: Alaa Yass Ahmed e-mail : : alaaalyass85@ntu.edu.iq		
47. Course objectives (general objectives of the course)		
1- identification The student on principles Control logical The programmer . -2 Introducing the student to how programmable logic controls the operation of equipment and devices for various purp		
48. Course outcomes , teaching, learning and assessment methods		
Course outcomes A-1 identification The student principles a job Control logical The programmer. A - 2 identification The student Special Azt Use the PLC A- 3 identification The student System Store Information in the PLC A-4 Introducing the student to the PLC instructions A-5 Introducing the student to the PLC programming languages		
Outputs	Teaching and learning methods	Evaluation methods
ج- knowledge A-1 identification The student principles a job Control logical The programmer. A- 2 identification The student features Use the PLC	10. Theoretical lectures 11. Group discussions 12. Case studies	13. Theoretical tests 14. My work performance evaluation 15. Safiya's participation

		16. Research reports
B- Skills B- 1acquisition The student skill programming PLC B- The student acquires the skill of 2 usingPLC to control the field in factories .and laboratories B- 3 acquisition The student skill maintenance Units the PLC	10. Interactive lectures 11. Real-life case studies 12. Field visits to facilities	13. Short and final tests 14. Performance evaluation during practical training 15. Applied projects 16. Field visit reports
C-Values C-1 Encouraging the development of students' professional and technical thinking. C-2 Working to develop a distinguished personality for the student by developing cultural and social awareness that qualifies him, after graduation, to contribute effectively to serving his community. C-3 Expanding the cognitive horizon and using brainstorming to generate new ideas. C-4 Practical skills that enable the student to usePLC applications in future life.	10. Interaction and application 11. modern technologies 12. group learning	13. Continuous assessment 14. Performance evaluation during practical training 15. Final evaluation 16. Field visit reports

Name of the material	Second academic year	Weekly hours			Number of units
		N	A	M	
		1	2	3	
Programmable Logic Control					3

Details of the curriculum for Electrical Networks 1 (theoretical and practical curriculum) three hours per week

- 10 structure Course :

week	watches	Learning outcomes Required	name Unity/or the topic	road education	Evaluation method
the first	3	Understanding the topic of unity	Chapter 1 Introduction to Programmable Controllers 1-1 Definition 1-2 A Historical Background 1-3 Principles of Operation 1-4 PLCs Versus Other Types of Controls. 1-5 PLC Product Application Ranges. 1-6 Ladder Diagrams and the PLC 1-7 Advantages of PLCs	Lectures+ Applications practical	evaluation direct + Exams
the second	3	Understanding the topic of unity	Number Systems and Codes 2-1 Number Systems 2-2 Number Conversions 2-3 One's and Two's Complement 2-4 Binary Codes 2-5 Register Word Formats..	Lectures+ Applications practical	evaluation direct + Exams
the third	3	Understanding the topic of unity	Chapter 3 Logic Concepts 3-1 The Binary Concept 3-2 Logic Functions 3-3 Principles of Boolean Algebra and Logic 3-4 PLC Circuits and Logic Contact Symbology	Lectures+ Applications practical	evaluation direct + Exams
the fur	3	Understanding the topic of unity	Processors, the Power Supply, and Programming Dev es 4-1 Introduction 4-2 Processors 4-3 Processor Scan 4-4 Error Checking and Diagnostics 4-5 The System Power Supply 4-6 Programming Devices	Lectures+ Applications practical	evaluation direct + Exams
Fifth	3	Understanding the topic of unity	The Memory System and I/O Interaction 5-1 Memory Overview 5-2 Memory Types 5-3 Memory Structure and Capacity 5-4 Memory Organization and I/O Interaction	Lectures+ Applications practical	evaluation direct + Exams
Sixth	3	Understanding the topic of unity	Configuring the PLC Memory—I/O Addressing 5-6 Summary of Memory, Scanning, and I/O Interaction 5-7 Memory Considerations.	Lectures+ Applications practical	evaluation direct + Exams
Seventh	3	Understanding the topic of unity	The Discrete Input/Output System 7-1 Introduction to Discrete I/O Systems 7-2 I/O Rack Enclosures and Table Mapping 7-3 Remote I/O Systems. 7-3 PLC Instructions for Discrete Inputs 7-5 Types of Discrete Inputs.	Lectures+ Applications practical	evaluation direct + Exams
The eighth	3	Understanding the topic of unity	PLC Instructions for Discrete Outputs 8-1 Discrete Outputs 8-2 Discrete Bypass/Control Stations 8- 3 Interpreting I/O Specifications 8-4 Summary of Discrete I/O	Lectures+ Applications practical	evaluation direct + Exams

Ninth	3	Understanding the topic of unity	The Analog Input/Output System 9-1 Overview of Analog Input Signals 9-2 Instructions for Analog Input Modules. 9-3 Analog Input Data Representation. 9-3 Analog Input Data Handling 9-5 Analog Input Connections. 9-6 Overview of Analog Output Signals	Lectures+ Applications practical	evaluation direct + Exams
tenth	3	Understanding the topic of unity	Instructions for Analog Output Modules 10-8 Analog Output Data Representation 10-9 Analog Output Data Handling 10-10 Analog Output Connections 10-11 Analog Output Bypass/Control Stations	Lectures+ Applications practical	evaluation direct + Exams
eleventh	3	Understanding the topic of unity	Special Function I/O and Serial Communication Interfacing 11-1 Introduction to Special I/O Modules 11-2 Special Discrete Interfaces 11-3 Special Analog, Temperature, and PID Interfaces 11-4 Positioning Interfaces. 11-5 ASCII, Computer, and Network Interfaces 11-6 Fuzzy Logic Interfaces.. 11-7 Peripheral Interfacing	Lectures+ Applications practical	evaluation direct + Exams
the second ten	3	Understanding the topic of unity	Programming Languages 12-1 Introduction to Programming Languages 12-2 Types of PLC Languages. 12-3 Ladder Diagram Format 12-4 Ladder Relay Instructions 12-5 Ladder Relay Programming 12-6 Timers and Counters 12-7 Timer Instructions	Lectures+ Applications practical	evaluation direct + Exams
the third ten	3	Understanding the topic of unity	Counter Instructions 13-9 Program/Flow Control Instructions 13-10 Arithmetic Instructions 13-11 Data Manipulation Instructions . 13-12 Data Transfer Instructions. 13-13 Special Function Instructions 13-14 Network Communication Instructions 13-15 Boolean Mne.	Lectures+ Applications practical	evaluation direct + Exams
the fourteen	3	Understanding the topic of unity	PLC System Documentation 14-1 Introduction to Documentation 142 Steps for Documentation 14-3 PLC Documentation Systems -4 Conclusion .	Lectures+ Applications practical	evaluation direct + Exams
fifteenth	3	Understanding the topic of unity	PLC Start-Up and Maintenance 15-1 PLC System Layout 15-2 Power Requirements and Safety Circuitry 15-3 Noise, Heat, and Voltage Considerations 15-4 I/O Installation, Wiring, and Precautions	Lectures+ Applications practical	evaluation direct + Exams

- 12 plan development The decision Academic :	
.1 Participation in The state Art Different Private With material Control logical programmer (PLC) .2 examining on last what I reached for him Technology Modern in Applications the .PLC .3 stay Do Art Developmental For the cadre laboratory Which Develop Their ability in training Students In the picture The most efficient .4 to open laboratory specialized With material the PLC LD A ship the components , Principles , Applications , Uses	

- 11 structure	
Infrastructure:	
1-books The reporter Required	Lectures Academic
2- the reviewer Home (Sources)	the reviewer Related By the material and existing I have library The Institute
A books References that Recommended It has(magazines) Scientific, Reports ,)	books and magazines Scientific related to the subject ofPLC: Basics , Instructions , applications.
for - the reviewer electronic, Sites Internet	locationThe Institute sources Internet different, Sites Companies Global

49. Course Name
industrial establishments
50. Course Code
ELTP208
51. Available attendance forms
in presence
52. semester/year
Decisions
53. Number of study hours(kidney)
4*15=60
54. Date this description was prepared
11-6-2024
8- Name of the rapporteur
Name: Muhammad Ibrahim Muhammad e-mail : : mohammedwais-hit@ntu.edu.iq
55. Course objectives (general objectives of the course)
1- Training the student on the methods of foundationsIndustrialComparis between different types of foundati 2 - Understand the main concepts and know the rules and laws used calculating electrical loads and cable si The capacity of the circuit breaker to be connect 3- Introducing the student to the types of cables and the load capacity of ea cable.To the maximumA current that can pass through 4 -Preparing the student to study the various calculations required in electri installations and to become familiar with the various theories for studyi those calculation 5Preparing and enabling the student to establish factories and heavy equipment and how control them from equipment used in factories and electrical laborato
56. OutputsThe decisionTeaching, learning and assessment methods
Course outcomes
17. Understanding industrial basics (voltage, current, resistance).
18. Installation of foundations(Lighting, control circuits, factory establishment motors).
19. Use of protection devices (breakers, fuses, grounding and controls).
20. Reading electrical diagramsAnd implement it practically.
21. Implementing safety proceduresAnd risk prevention.
22. Breakdown maintenance(Detect and repair common faults).

identificationIt is a theoretical-practical course that aims to teach students the basics of designing, installing, and maintaining electrical systems in facilities (such as homes, laboratories, and workshops), which the course seeks to achieve for students.

Its importance:

- 1- Providing safe electricity**For homes and factories.
- 2- Prevent fires and electric shocks.**
- 3- Operate machinery and equipment efficiently.**
- 4- Meet the requirements of regulations and standard specifications.**
- 5- Facilitate maintenance and reduce breakdowns**

How is it determined?:

- 25. Study of labor market needs**
- 26. Review of professional standards**
- 27. Evaluate students' capabilities and the workshop**
- 28. Formulate clear and measurable goals**
- 29. Linking with other courses**
- 30. Periodic update according to developments**

Outputs	Teaching and learning methods	Evaluation methods
ح- knowledge A1-During the academic year, the student learns the basics of electrical installations. A2-The student learns about electrical installations, how to read them, and the factors affecting them.. A3-The student learns the types of connections used in home installations.. A4-knowledgeSafety standardsand the risk of electric shock	1- Theoretical lectures using presentations. 2- Real-life case studies of foundation failures. 3- Short research on modern distribution systems	1- Written tests (essay and objective questions). 2- Analytical reports on protection systems. 1-Theoretical tests 2- Practical tests 3- Reports

B - Skills B1-Ability to design and conduct experiments, analyze and interpret data. B2-Ability to identify, formulate and solve problems. B3 -Mastery of the necessary mathematical, basic and engineering sciences. B4-Ability to use the techniques and skills required in the work.	1- Practical experiments (workshops on electrical installations). 2- Simulation using programs such as:AutoCAD Electrical. 3- Field visits to electrical construction sites	1- Practical performance tests (such as installing a lighting circuit). 2- Project evaluation (design and implementation of a control circuit)
C- Values A1-Commitmentwith safety standards at work A2-to bearProfessional responsibilityIn implementing the foundations A3-the jobWith a teamTo implement electrical projects A4-respectStandards and regulations(such as delivery terms)	1- Group discussions on professional ethics. 2- Role playingFor situations that require ethical decisions. 3- Observe and imitate models of distinguished professionals.	1- Peer evaluationFor team performance. 2- Observing behavior during practical training (commitment to safety). 3- Self-reports on practical experiences

57. Course structure A- (Theoretical vocabulary)

week	watches	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
the first	2	Identify cables-Cable components and operating voltage, cable types according to the type of insulation (MIMPVCTRSVRI) and paper cables with lead sheath.	• cables-Cable components and operating voltage, cable types according to the type of insulation (MIMPVCTRSVRI) and paper cables with lead sheath.	An introductory lecture about the method + classification of materials (conductor, semiconductor, insulator)	Short test (theoretical) on the classification of materials
the second	2	8-Student understanding of the basicsCable extension and faults 9-Get to knowIdentify faults inelectrical circuits	Cable laying methods, possible faults in cables, how to determine the type and location of the fault.	Theoretical explanation of the principles of electricity (potential difference, current, resistance) + presentation of the components of an electrical circuit	Electrical circuit components identification test.
the third	2	10-Introducing the student toHow to protect and handle motors from overcurrents	Protection of electric motors, protection against overcurrents due to short circuits	Study of the properties of copper and aluminum (electrical, mechanical) + their applications	Practical Evaluation (Comparison between Copper and Aluminum)

Fourth	2	4- TStudent supervisorHow to protect and handle motors from overcurrents	Protection aga overcurrents due increased loads	Explanation of insulating materials (air, oil, solids) + permittivity laws	Short test on the properties of insulators
Fifth	2	6-Study of propertiesLines and how to deal with the fall of one of the phases	Protection against the disappearance or fall of one of the phases and protection against voltage drop	Lecture on Magnetism (Force, Magnetic Materials, Laws)	Students are assessed individually by giving them the opportunity to participate in the class by answering questions.
Sixth	2	6-Understand the topicbreakersmagnetic circuits	Circuit breakers, types (oil, SF6, vacuum breakers, air pressure breakers)	Application of Kirchhoff's laws to magnetic circuits	Short tests andEvaluate participation in discussions
Seventh	2	4-Introducing the student toSubstations, Busbars, and Switchboards	Substations, Busb Pneumatic Switchbo Classification of Control Pa	Study of mechanical properties (tensile, stress, elasticity)	Theoretical test on mechanical properties
The eighth	2	5-Study stagesLighting and the foundations of optical engineering 6-Knowing how electrical energy is generated, transmitted and distributed	Lighting, basics of optical engineering, light sources, lighting systems and their types, light measuring devices	Explanation of the stages of energy transmission (generation, transmission, distribution) + distribution panels	Power transmission diagram + distribution panels explanation
Ninth	2	7-Solving various questions to strengthen the student's knowledge of the subject, such as lighting for halls, workshops, and laboratories. 8-Teaching a student how to supply electricity to a buildingIn additionTo know the capacity of the electrical transformers used	Solved questions on how to design and calculate electrical lighting for halls, workshops and courtyards	Theoretical explanation of generation, transmission and distribution systems. +Visual presentation of building power supply diagrams + practical examples. +Workshop on installing distribution panels	Short test on types of stations and transformer capacities
tenth	2	3-Knowing and studying electrical switches and their types 4-Teaching the student toInsulation and grounding	Grounded system and isolated system comparison in case of fault, equalities and advantages of each system	Explanation of electrical switch types + drawing of application circuits	Circle drawing test using keys.
eleventh	2	7-Introducing the student to the protection devices used inIndustrial establishments andelectrical	Voltage drop in single-phase and three-phase feeders, meaning of voltage drop, causes of voltage drop,	Study of fuses (types, specifications, how to choose them)	Evaluating the selection of suitable fuses for different circuits

		8-Learn about fuses, their types, advantages and disadvantages 9-Teaching the student how to select a fuse and coordinate the fuses in the same electrical circuit.	damage resulting from voltage drop, testing feeder sizes (cables), factors on which current rates depend		
twelfth	2	3-Solve questions to strengthen the student	Solved questions on voltage drop calculations	Sweet questions and training	Short tests and Evaluate participation in discussions
thirteenth	2	7-Study of electrical wiring systems 8-Knowing how to number wires and cables at work and taking into account the colors of the wires when Establishment	Technical methods of wiring, study of wiring systems, wiring methods, and methods used for this	View wiring systems(BB, TRS, PVC) + Wire numbering	Wiring systems knowledge assessment.
fourteenth	2	5-Teaching the student the types Foundations household electrical 6-Know the advantages and disadvantages of each type, safety requirements and general appearance. For establishment And the tools used in it	Establishing dangerous places (examples of dangerous places) The specifics of establishing in dangerous places and the steps that must be taken for that	Home Foundation Study (Safety Requirements, Tools, Cost)	Evaluate participation in discussions
fifteenth	2	6-study Grounding Knowing its components and connection and connection equipment 7-Know the different ways to reduce resistance. Grounding and the necessary equipment and devices Ground it 8-Teaching the student the importance of Grounding The difference between grounded and ungrounded systems and measurement methods	Grounding, its types, installation of grounding conductors for substations, buildings and lightning arresters	Lecture on grounding (components, measurement methods, importance)	Short tests and Evaluate participation in discussions

12- Course structure B-(Practical vocabulary)

week	watches	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
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the first	2	4-Implementing safety procedures in workshops and factories. 5-First aid for electric shock. 6-Take fire prevention measures.	Warnings and precautions to be taken while working in workshops and factories, as well as training on how to provide first aid for electric shock and how to warn of fires.	Lecture and practical application of safety and first aid	Short theoretical test + practical application for first aid and safety
the second	2	Recognizing symbols for electrical tools and components.	Knowing the symbols for devices, tools, and all necessary pendants used in electrical installations	Display electrical symbols and classify tools	Symbol and Tool Classification Test
the third	2	Preparing cables for work-Peeling process-Preparing ends for reinforced and plastic insulated cables. Use of mechanical piston-Hydraulic crimping of the metal ends of the cable connectors	Preparing cables for work-Peeling process-Preparing ends for reinforced and plastic-insulated cables using a mechanical press.-Hydraulic crimping of the metal ends of the cable connectors	Practical training on Wasalti workTwist and T	Practical evaluationImplementation of Twist and T joints
Fourth	2	Use of fuses of all kinds (wireable)-Khartoum-High capacity circuit breaker (HCCB) for power circuit protection including dismantling, installation and fixing using small circuit breaker-Thermal curve drawing of the breaker	Use of fuses of all kinds (wireable)-Khartoum-High capacity circuit breaker (HCCB) for power circuit protection including dismantling, installation and fixing using small circuit breaker-Thermal curve drawing of the breaker	Practical application of my connectionMarried Joint and T with Weld	Evaluation of the quality of joints and welding(Married Joint and T)
Fifth	2	Thermal and magnetic protection starters (direct-on-line starters) Use of starters with different operating voltages to start the engine, including internal rewiring of the starter-Adjusting current limits	Thermal and magnetic protection starters (direct-on-line starters) Use of starters with different operating voltages to start the engine, including internal rewiring of the starter-Adjusting current limits	Practical application ofto implement connectionStraight and T for CTS wires with solder	Check straight connections andT with welding

Sixth	2	The key to the knife and how to use it to control an electrical circuit-How to protect the user from the dangers of sparks	The key to the knife and how to use it to control an electrical circuit-How to protect the user from the dangers of sparks	Practical training forConnecting and welding aluminum and paper cables	Aluminum joint and welding evaluation
Seventh	2	Multiple keys- Use of different types of it-Use the specified keys to end the movement.	Multiple keys-Use of different types of it-Use the specified keys to end the movement.	Practical application ofInstalling a simple lighting circuit (switch + lamp) with a systemClead	Circuit installation test (switch + lamp)
The eighth	2	Measuring ground resistance using a ground meter- Measurement of the laboratory grounding network, ground leakage circuit breakers, and selection of the disconnecting current	Measuring ground resistance using a ground meter- Measurement of the laboratory grounding network, ground leakage circuit breakers, and selection of the disconnecting current	Implementation and practical application ofInstalling two lamps in parallel in a systemClead	Parallel Circuit Installation Evaluation
Ninth	2	1- Using voltage breakers for leakage current 2- Creating an automatic circuit to fill the tanks using a float switch	1- Using voltage breakers for leakage current 2- Creating an automatic circuit to fill the tanks using a float switch	Practical training forInstallation of lighting circuit, fan and socket with separate control	Evaluation of lighting, fan and socket circuit installation
tenth	2	Use specific keys 1- In elevators, a circuit is created to achieve the elevator operation theory and implement it. 2- Use the specified keys in the crane to create a circuit that shows the operation of the crane in the transport and ascension states and implement the circuit.	Use specific keys 1- In elevators, a circuit is created to achieve the elevator operation theory and implement it. 2- Use the specified keys in the crane to create a circuit that shows the operation of the crane in the transport and ascension states and implement the circuit.	Training onTwo-way lamp control circuit installation (ladder system)	Ladder circuit installation test

eleventh	2	Stopping the engines (braking) in a way 1- Direct currentDC Brake 2- Reverse currentCounter current braking	Stopping the engines (braking) in a way 1- Direct currentDC Brake 2- Reverse currentCounter current braking	Practical application ofInstalling a 3-way control circuit usingTwo Pole Relay	3-Place Control Circuit Installation Evaluation
twelfth	2	3D electrical energy meters-Disassembly and assembly Connect and play-How to set the meter to measure power factor using an ammeter. Using a magnetic ring to measure current and voltage.	3D electrical energy meters-Disassembly and assembly Connect and play-How to set the meter to measure power factor using an ammeter. Using a magnetic ring to measure current and voltage.	Practical training forInstalling a control circuit for multiple lamps usingTwo-way switch.	Multi-lamp circuit installation evaluation
thirteenth	2	Making a control circuit to operate a three-phase induction motor using contactors in the following way?	Making a control circuit to operate a three-phase induction motor using contactors in the following way?	Practical application ofInstallation and operation of a fluorescent lamp withThermal Relay	Test andFluorescent lamp operation check
fourteenth	2	Three-phase induction motor starter switch (/Y) Mapping (connection and disconnection diagram for different switch states) Studying possible faults. Rotary switches and their use in starting a three-phase induction motor-to reverse the trend-To operate a motor from two sources-To operate two motors alternately	Three-phase induction motor starter switch (/Y) Mapping (connection and disconnection diagram for different switch states) Studying possible faults. Rotary switches and their use in starting a three-phase induction motor-to reverse the trend-To operate a motor from two sources-To operate two motors alternately	Implementation and practical application ofInstalling two fluorescent lamps in series withChook.	Evaluation of installing two fluorescent lamps in series
fifteenth	2	Metal pipe installation (pipe cutting)-Make a tooth for her- Connection using plugs-Making a bend for the bream using a bending machine)	Metal pipe installation (pipe cutting)-Make a tooth for her- Connection using plugs-Making a bend for the bream using a bending machine)	Practical training forInstallation of a mercury lamp and a sodium lamp	Mercury and sodium lamp installation test

58. Curriculum Development Plan

Continuously developing educational content to keep pace with modern requirements, such as:

- 1–IncludeQualitative specializations in line with digital transformation**
- 2–OrganizationDiscussion sessions with industry leaders**
- 3– Follow–upGlobal technical developments in the electrical field**
- 4– ResidenceApplied exhibitions to showcase modern innovations**
- 5–DevelopmentField training programs in leading companies**

59. infrastructure

Classrooms, laboratories and workshops	Well-equipped and equipped halls and laboratories are available to provide a suitable environment for teaching and learning.
13- Required textbooks	Home and industrial electrical installations •Basics of Electricity and Electrical Circuits •International Electrical Code (IEC) - Latest Edition
14- Main References (Sources)	"Electrical Engineering: Principles and Applications" "Electrical Engineering: An Introduction" "Fundamentals of Electrical Engineering" "Electricity and Electronics for HVAC"
A- Recommended books and references (scientific journals, reports, etc.)	Electrical Systems Design Electric Power Systems: A Conceptual Introduction "Electrical Engineering: Know It All"
B-Electronic references, websites,.....	https://www.qrcodechimp.com/page/srcyif3uvk4a4

60. Course Name
Electrical Installations
61. Course Code
ELTP 105
62. Available attendance forms
In presence
63. semester/the second
Decisions
64. Number of study hours/4
60=15*4
65. Date this description was prepared
2025-6-20
106 - Name of the rapporteur
Name: Wissam Ibrahim Hussein e-mail : Wisamibrahim_hwj@ntu.edu.iq
66. Course objectives (general objectives of the course)
- Logic circuit applications(The mosque HalfThe perfect collector, the half-and-full subtractor, the comparisons - Encodersand circles Prediction - Identifying types of series circuitsTD,(JK),(SR - Flip flop) - Learn about the types of recorders and methodsIts design,How to enter and exit .dataIncluding,And scroll the records to the right and to the left - Identify the typesCounters,Synchronous and asynchronous, and their design methods
Specific objectives

Outputs	Teaching and learning methods	Evaluation methods
- Acquire the skill of designing and connecting comparator and switching circuitsFor systemsDecimal and binary - Building circles(The mosqueThe half and full offererFor numbersUp to four ranks - Building different types of oscillators and generating square waves	Theoretical lectures -1 .using presentations Real-life case studies -2 .of foundation failure A brief research on -3 modern distribution systems	Written tests (essay and objective -1<br).(questions<br=""/>Analytical reports on protection -2 .systems Theoretical tests -1 Practical tests -2 Reports -3

• Building progressive positive meter circuitsAnd descending and circlesDigital to analog conversion		
B - Skills B1-Ability to design and conduct experiments .analyze and interpret data B2-Ability to identify, formulate and solve .problems B3 -Mastery of the necessary mathematical, basic .and engineering sciences B4-Ability to use the techniques and skills required .in the work	Practical experiments -1 workshops in electrical) .(installations Simulation using -2 :programs such as AutoCAD Electrical Field visits to electrical -3 construction sites	Practical performance tests (such -1 .(as installing the lighting circuit Project evaluation (control circuit -2 (design and implementation
C- Values A1-Commitmentwith occupational safety standards A2-to bearProfessional responsibilityIn implementing the foundations A3-the jobWith the teamTo implement electrical projects A4-respectStandards and Regulations(such as (delivery terms	Group discussions on -1 professional ethics Role-playing in -2 situations that require .making ethical decisions Observe and imitate -3 models of distinguished .professionals	Peer evaluation of team -1 performance Monitoring behavior during -2 practical training (commitment to .(safety Self-reports on practical -3 experiences

67. structure The decision-(Vocabulary Theory)

week	hours	Required learning outcomes	/Unit name	Teaching method	Evaluation method
the first	2	Definition of number systems	Number systems	Learn about digital systems	Learn about digital systems
		Historical overview			
		System components			
the second	2	Convert from decimal to binary	Converting between number systems	Learn about digital systems: the binary system	Learn about digital systems and the gateway system
		Converting from decimal to other systems			
		Convert from hexadecimal to binary			
the third	2	Convert from binary to octal	Converting between number systems	Identifying Digital Systems 16	Learn about modular circuits
		Convert from hexadecimal to octal			
		Convert from octal to hexadecimal			
Fourth	2	Addition and subtraction in binary	- Collection the proposal in order The duoY. Use The complement the first 2F the proposal The duoY	Learn about digital systems the gateway system	Getting to know the vibrators
		Supplement 1			
		Supplement 2			
Fifth	2	Gates and their importance	Gates logical, Foundations . Gates logical	Getting to know the electronic gates	Identifying meters
		Fundamentals of logic gates			
Sixth	2	circle AND Electronic	AND Using This He would like And resistance, gate NOT Using diode	Learn about Punic algebra	Learn about data conversion circuits
		NOT Using diode			
Seventh	2	((gate NAND	NAND) Lao ((gate) No (NOR gate) or (confinement A XOR	Learn about modular circuits	, Traditional tests , assignments formative , assessment - practical tests, self and peer , assessment participation and contribution
		((gate NOR			
		((gate XOR			
The eighth	2	Bolognese relation	De Morquin's theory	Learn about transmission circuits	, Traditional tests , assignments formative , assessment - practical tests, self and peer , assessment
		Finding the truth table			

					participation and contribution
Ninth	2	Writing the equation from the logic circuit	De Morquin's theory	Getting to know De Morcain's theory	,Traditional tests ,assignments formative ,assessment -practical tests, self and peer ,assessment participation and contribution
		Use of both types of total results			
tenth	2	Karnaugh Map for Dusty People	Karnaugh Map	Learn about the Karnaugh map	,Traditional tests ,assignments formative ,assessment -practical tests, self and peer ,assessment participation and contribution
		Examples			
eleventh	2	Karnaugh map for three variables	Karnaugh Map	Learn about the Karnaugh map	,Traditional tests ,assignments formative ,assessment -practical tests, self and peer ,assessment participation and contribution
		Examples			
twelfth	2	Karnaugh map for four variables	Karnaugh Map	Learn about the Karnaugh map	,Traditional tests ,assignments formative ,assessment ,practical tests self- and peer ,assessment participation and contribution
		Examples			
thirteenth	2	Single-order digital comparator	Digital Comparator	Digital Comparator Recognition	,Traditional tests ,assignments formative ,assessment ,practical tests self- and peer ,assessment participation and contribution
		Two-order digital comparator			
fourteenth	2	binary to octal	rDecoder	Recognize the ascending	,Traditional tests ,assignments formative ,assessment ,practical tests self- and peer ,assessment participation and contribution
		binary to decimal			

fifteenth		Octal to binary	Encoding	Learn about descending circuits	,Traditional tests ,assignments formative ,assessment ,practical tests self- and peer ,assessment participation and contribution
		decimal to binary			

13-structure theScheduledfor-(Vocabulary The process)					
week	hours	Required learning outcomes	Unit name/the topic	Teaching method	Evaluation method
the first	2	Learn about digital systems	Number systems	,Presentation ,explanation questions and ,answers discussion	Traditional ,tests ,assignments formative ,assessment ,practical tests self- and peer ,assessment participation and contribution
the second	2	Learn about digital systems: the binary system	Converting between number systems	,Presentation ,explanation questions and ,answers discussion	Traditional ,tests ,assignments formative ,assessment ,practical tests self- and peer ,assessment participation and contribution
the third	2	Identifying Digital Systems 16	Converting between number systems	,Presentation ,explanation questions and ,answers discussion	Traditional ,tests ,assignments formative ,assessment ,practical tests self- and peer ,assessment participation and contribution
Fourth	2	Learn about digital	Collection the - proposal in	,Presentation ,explanation	,Traditional tests ,assignments

		systems, the gateway system	order The duoY.Use The complement the first 2F the proposal .The duoY	questions and ,answers discussion	formative ,assessment ,practical tests self- and peer ,assessment participation and contribution
Fifth	2	Getting to know the electronic gates	Gates logical,Foundations . Gates logical	,Presentation ,explanation questions and ,answers discussion	,Traditional tests ,assignments formative ,assessment ,practical tests self- and peer ,assessment participation and contribution
Sixth	2	Learn about Punic algebra	ANDUsing This He would like And resistance,gate NOT Using diode	,Presentation ,explanation questions and ,answers discussion	Traditional ,tests ,assignments formative ,assessment ,practical tests self- and peer ,assessment participation and contribution
Seventh	2	Learn about modular circuits	(gateNAND (,gate)No(NOR gate)or(confinement ,A XOR	,Presentation ,explanation questions and ,answers discussion	Traditional ,tests ,assignments formative ,assessment ,practical tests self- and peer ,assessment participation and contribution
The eighth	2	Learn about transmission circuits	De Mocan's theory	,Presentation ,explanation questions and ,answers discussion	Traditional ,tests ,assignments formative ,assessment ,practical tests self- and peer ,assessment participation and contribution
Ninth	2	Learn about programmable logic devices	De Mocan's theory	,Presentation ,explanation questions and ,answers discussion	Traditional ,tests ,assignments formative ,assessment ,practical tests self- and peer ,assessment participation and contribution

tenth	2	Getting to know the vibrators	Karnaugh Map	,Presentation ,explanation questions and ,answers discussion	Traditional ,tests ,assignments formative ,assessment ,practical tests self- and peer ,assessment participation and contribution
eleventh	2	Learn about flip flop circuits	Karnaugh Map	,Presentation ,explanation questions and ,answers discussion	Traditional ,tests ,assignments formative ,assessment ,practical tests self- and peer ,assessment participation and contribution
twelfth	2	Identifying meters	Karnaugh Map	,Presentation ,explanation questions and ,answers discussion	Traditional ,tests ,assignments formative ,assessment ,practical tests self- and peer ,assessment participation and contribution
thirteenth	2	Identifying meters	Digital Comparator	,Presentation ,explanation questions and ,answers discussion	Traditional ,tests ,assignments formative ,assessment ,practical tests self- and peer ,assessment participation and contribution
fourteenth	2	Learn about data conversion circuits	decoder Decoder	,Presentation ,explanation questions and ,answers discussion	Traditional ,tests ,assignments formative ,assessment ,practical tests self- and peer ,assessment participation and contribution
fifteenth	2	Learn about data conversion circuits and .digital systems	Coding Encoding	,Presentation ,explanation questions and ,answers discussion	Traditional ,tests ,assignments formative ,assessment ,practical tests self- and peer

					,assessment participation and contribution
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68. Curriculum Development Plan

,Continuous development of educational content to keep pace with modern requirements

:such as

IncludeQualitative specializations in line with digital transformation1–

Discussion sessions on regulation with industry leaders2–

Follow–upGlobal technological developments in the electrical field3

ResidenceApplied exhibitions to showcase modern innovations4

Developmental field training programs in leading companies5

69. infrastructure

Classrooms, laboratories, and workshops	Available Halls and laboratories Equipped Preparing well To .provide environment suitable For teaching and learning
15- Required textbooks	Compositions electrical Household and industrial basics electricity and circles electrical• The code electrician International(IEC) -Release Late
16- Main references	Engineering electrical:Principles and applications "Engineering electrical:introduction" "basics Engineering electrical" electricity and electronics For systems heating and ventilation and a "conditioning air
A)Recommended books and references	:Digital DesignBy M. Morris Mano ○ This book is considered one of the basic books in the .field of digital circuit design ○ Digital FundamentalsBy Thomas L. Floyd: This book covers the basic concepts and practical applications of digital .circuits 2. :Websites 3. :Online training courses ○ Coursera:Offering training courses in digital .electronics from prestigious universities ○ edX:Offers similar courses covering the basics of .digital circuits and their design 4. :scientific journals ○ IEEE Xplore:Contains recent articles and research in .the field of digital electronics

	These resources provide comprehensive coverage of the basic .concepts and practical applications of digital circuits • Suggested related links: in formatQRC 
for)Library AFor electronics,and websites	https://www.qrcodechimp.com/page/srcyif3uvk4a4

70. Course Name
Electrical networks 2
71. Course Code
Electrical networks 2
72. Available attendance forms
In presence
73. semester/year
Decisions
74. Number of study hours (total)
60 =15*4
75. Date this description was prepared
11-6-2024
8- Name of the rapporteur
Name: Alaa Yass Ahmed e-mail : : : alaaalyass85@ntu.edu.iq
76. Course objectives (general objectives of the course)
Complete knowledge of hydroelectric, thermal and gas generating -1 .stations and an idea about some other stations such as diesel A-2 Using overhead lines - Mechanical calculations including: - Calculating tension and slack when the distances from the ground are equal- Calculating the weight of snow accumulated on the wire- Calculating the amount of wind pressure force acting on the wire A-3 Calculations of the basic elements of overhead lines - Electrical calculations, including: - Calculating the resistance- Calculating the internal and external inductance of a single wire- Calculating the inductance of a three- way system consisting of three wires separated by equal distances from each other, Or at different distances or exchanged in location A-4 Calculate the capacitance of the single - phase system A triode consisting of three wires spaced equally apart, or At different distances and exchange locations
77. Course outcomes , teaching, learning and assessment methods
Course outcomes
A- Cognitive objectives
5. Operation and maintenance of electrical units of power plants.

Introducing the student to the types of power stations and introducing the student to the operating mechanism of each type of station and the degree of efficiency of each type of power station 6. Operation and maintenance of electrical equipment for the transmission and distribution of electrical energy. 7. Maintenance of protection and control devices for the electrical power system. 8. Extension and maintenance of underground and overhead cables. Engineering Design Fundamentals: Knowledge of basic engineering design principles such as analysis and design of electrical and mechanical systems		
Outputs	Teaching and learning methods	Evaluation methods
Ġ- knowledge The student gets to know Methods of -1 generating electrical energy Distinguish between each type of .2 energy source Explain the mechanism of electrical .3 energy production	13. Theoretical lectures 14. Group discussions 15. Case studies	17. Theoretical tests 18. My work performance evaluation 19. Safiya's participation 20. Research reports
B- Skills The student gets to know Methods of -1 generating electrical energy Distinguish between each type of .2 energy source Explain the mechanism of electrical .3 energy production	13. Interactive lectures 14. Real-life case studies 15. Field visits to facilities	17. Short and final tests 18. Performance evaluation during practical training 19. Applied projects 20. Field visit reports
C-Values Student participation in classroom activities and submitting assignments on time	13. Interaction and application 14. modern technologies 15. group learning	17. Continuous assessment 18. Performance evaluation during practical training

Adherence to occupational safety rules while working in laboratories Attention control and attention test (selective attention)		19. Final evaluation 20. Field visit reports
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Name of the material Electrical networks 2	Second academic year	Weekly hours			Number of units
		N	A	M	
		2	2	4	

Details of the curriculum for Electrical Networks 2 (theoretical curriculum) two hours per week

78. Course structure A- (Theoretical vocabulary)					
week	watches	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
the first	2	to understand Unity theme	DC distribution networks and distributors that are fed from one end – to the other that are fed from two ends Single-ended AC distributors	Interactive lectures supported by PowerPoint presentations , documentary videos, and a conceptual map of energy flow in the electrical system.	A + short test research assignment on the stages of development of energy systems

the second	2	to understand Unity theme	Ring distributors of - all types comparison between different distributors	,Explanatory video ,comparative study class discussion.	+ Analytical report short descriptive test.
the third	2	to understand Unity theme	Solve various examples for the first and second weeks	Real case presentation + application study	Oral presentation + in a group individual written assessment
Fourth	2	to understand Unity theme	Conditions for the stability of synchronous generators operating in parallel with the grid - load capacity curve How synchronous generators operate in parallel with each other and with the grid	□ Analysis of engineering ,drawings interactive ,discussion practical examples.	Practical test + homework
Fifth	2	to understand Unity theme	Methods for improving power factor are divided :into Static - - capacitors Synchronous motors - Phase advance devices	+ Video lecture comparison exercises	Essay question + homework
Sixth	2	to understand Unity theme	Types of errors in electrical networks and their division :into Symmetrical faults and fault current calculation in an electrical circuit	Solving applied + problems numerical simulation(via programs such as MATLAB).	Class test

			- Asymmetrical errors and fault current calculation in electrical circuit Basic Units -) Calculation PU (		
Seventh	2	to understand Unity theme	Protection ,principles ,definition various systems, and uses of protection ,relays ,disconnectors and circuit breakers in the electrical power system and measuring ,devices :including Voltage - - transformers Current transformers	Practical training + detailed explanations	Analytical test
The eighth	2	to understand Unity theme	Relays, their classification according to their working ,theory inductive relays against ,overcurrent against reverse ,power electronic relays	Exercise solutions, group discussion	achievement test
Ninth	2	to understand Unity theme	How to protect overhead lines Distance - protection (line impedance measurement - protection) Bar protection)BB (	Review session, classroom exercises	Short achievement test

tenth	2	to understand Unity theme	How to protect power transformers using differential protection	Electrical circuit drawing + applications	+ Drawing circles geometry problems
eleventh	2	to understand Unity theme	How to protect synchronous generators :using -Differential Protection -Digital Protection -Reverse Power Protection	View videos + view models of insulators	Practical report + test
twelfth	2	to understand Unity theme	Stator overcurrent protection and rotor overcurrent protection	Use of models or graphs	Research report
The thirteenth	2	to understand Unity theme	Percentage Reactance	Workshop, problem solving	Technical achievement test
fourteenth	2	to understand Unity theme	Power circuit diagram at the receiving end	Case studies of + collapse discussion of causes and prevention.	Final comprehensive exam
fifteenth	2	to understand Unity theme	Economic operation of ,power plants ,load factor ,load capacity calculating the cost per kilowatt-hour		Practical report + test

of the curriculum for the Electrical Networks 2 course (practical Details curriculum) two hours per week

14-Course structure B-(Practical vocabulary)					
week	watches	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method

the first	2	The student learns about the operation of a fixed-time relay as a means of protection against overcurrent.	Fixed time relay against overcurrent	Practical explanation of the device + conducting an experiment on a protection board	My work performance note + brief report
Second and third	2	The student understands the principle of the inverse function against increasing current and applies it to a real device.	Inverse function against overcurrent	Theoretical explanation + experience connecting and testing the device	Technical Report + Analytical Questions
Fourth	2	The student applies a directional earth fault protection experiment and analyzes the results.	Directional earth fault protection	Schematic view of the connection + practical implementation of the experiment	Wiring diagram + written conclusions
Fifth	2	The student will be able to measure the useless power in an electrical circuit.	Measurement of useless power	Practical connection of devices + reading and discussing the results	Correct reading + interpretation of results in a report
Sixth	2	The student learns about the different types of cables and their components.	Identify the components of different types of cables	View real samples + compare features	Field Notes + Worksheet
Seventh	2	The student observes the components of the gas station and its function during the visit.	Visit to a gas station	Field visit + questions directed by the accompanying engineer	Descriptive report of the visit + analytical question
eighth and ninth	2	The student learns about the parts of a steam power plant and the mechanism of power generation in it.	Visit to a steam station	Field visit + practical explanation of the components	Detailed report + comparison with a gas station
tenth	2	The student follows the stages of work in a hydroelectric station and analyzes its energy production.	Visit to a hydroelectric station	Field visit + asking questions to technicians	Technical report + oral summary
eleventh	2	The student performs a breakdown voltage test on transformer oil.	Breakdown voltage test of a sample of transformer oil	Explanation of test steps + practical implementation	Reading values + recording a practical report
twelfth	2	Learn about the types of high and low voltage circuit breakers and their working principle.	Identify the high and low voltage circuit breaker	Real-world hardware demonstration + hands-on experience	Descriptive report + diagram

thirteenth and fourteenth	2	Understands the principle of automatic recovery of transmission lines and performs simulations of their condition.	Automatic restoration of transmission lines	Theoretical explanation + implementation of an experiment using a protection board	Performance Report + Practice Questions
fifteenth	2	Carries out overload and short circuit protection experiments on transmission lines.	Protection of transmission lines against overload and short circuit current	Fault simulation + monitoring of protection device performance	Results analysis + practical test

79. Curriculum Development Plan

Continuously updating the curriculum to keep pace with developments in the labor market (Curriculum Update Committee, Scientific Committee) such as

7– Updating the curriculum to keep pace with developments

. in the field of electrical networks

8– .Holding scientific seminars with specialists in the field

9– Monitoring scientific developments in electrical network systems and power generation

80. infrastructure

Classrooms, laboratories and workshop

There are classrooms equipped to accommodate students and prepared to provide a suitable learning environment

17- Required textbooks

**Electrical Networks Lectures Booklet 2
" Electrical Machines and Power Systems" Study and Analysis**

18- Main References (Sources)

"Power System Analysis " John J. Grainger & William D. Stevenson

ج) Recommended books and references (scientific journals (.reports, etc

**" Transmission and distribution of electrical energy"
Author: Dr. Mahmoud Gilani**

	Publisher: Dar Al-Fajr for Publishing and Distribution – Cairo
ح) ,Electronic references,websites	https://www.qrcodechimp.com/page/srcyif3uvk4a4

81. Course Name
Maintenance Workshop 2
82. Course Code
Maintenance Workshop 2
83. Available attendance forms
In presence
84. semester/year
Decisions
85. Number of study hours (total)
45 =15*3
86. Date this description was prepared
11-6-2024
8- Name of the rapporteur
Name: Alaa Yass Ahmed e-mail : : : alaaalyass85@ntu.edu.iq
87. Course objectives (general objectives of the course)
The student will also be able to: 1. Uses various equipment, tools and components used in workshops. .2 Acquires technical skills and experience in the field of various electrical maintenance works. 3. Gain self-confidence to practice electrical engineering work, track faults and learn how to repair them. .4
88. Course outcomes , teaching, learning and assessment methods
Course outcomes A-1identification The student on works Maintenance For devices Electrical A-2 identification The student on Business Technical electrical in Track Malfunctions For devices electrical And get to know on How to Fixit A -3 identification The student on various the components electrical and electronic How to Use it in building circles Electrical

A-4 identification The student on How to Unlock And installation Yes In the face of machines Electrical A -5 identification The student on How to to examine machines electrical after Wrapit		
Outputs	Teaching and learning methods	Evaluation methods
knowledge A-1 Introducing the student to electrical appliances maintenance work. A-2 Introducing the student to electrical technical work in tracing faults in electrical devices and learning how to repair them. A-3 Introducing the student to the various electrical and electronic components and how to use them in building electrical circuits. A-4 Introducing the student to how to disassemble and assemble electrical machine parts	16. Theoretical lectures 17. Group discussions 18. Case studies	21. Theoretical tests 22. My work performance evaluation 23. Safiya's participation 24. Research reports
B- Skills B1 - Acquire the skill of assembling DC machines, methods of rewinding DC machines. B2 - Acquire the skill of designing and studying three-phase electrical transformers. B3 - Acquire the skill of rewinding Stator coils of a three-phase induction motor and a squirrel cage. B-4 Acquire the skill of assembling the engine and testing the engine under the load assigned to it. B-5 Acquire the skill of periodic maintenance of a split-phase motor, conduct the necessary tests on it, identify faults and methods of treating them.	16. Interactive lectures 17. Real-life case studies 18. Field visits to facilities	21. Short and final tests 22. Performance evaluation during practical training 23. Applied projects 24. Field visit reports
C-Values C-1 Practical skills enable The student researches identifying and treating faults in electrical appliances. C-2 Practical skills that enable the student to cooperate In working with others. C-3 Maintaining the safety of the equipment and furniture in the workshop, as they are public property. C-4 The student's ability to think in an organized manner and .thus make decisions	16. Interaction and application 17. modern technologies 18. group learning	21. Continuous assessment 22. Performance evaluation during practical training 23. Final evaluation 24. Field visit reports

Name of the material Maintenance Workshop 2	Second academic year	Weekly hours			Number of units
		N	A	M	
		0	3	3	

**Details of the curriculum for the Maintenance Workshop 2 course
(practical curriculum only) three hours each week**

Course structure -10					
week	hours	Outputs Learning required	or the topic / name Unity	Teaching method	Evaluation method
the first	3	acquisition Skill and experience Technical in Unity theme	Motor assembly and motor testing at the specified load - Study of the starting phase of three-phase motors - Direct method - Self- starter method	to implement exercises	evaluation continuous
the second	3	acquisition Skill and experience Technical in Unity theme	Induction motor protection devices and the use of timers	to implement exercises	evaluation continuous
the third	3	acquisition Skill and experience Technical in Unity theme	Change the final drive connection from star to .triangle and note Δ operated -Y The motor is originally the differences in current and torque in both .cases	to implement exercises	evaluation continuous
the four	3	acquisition Skill and experience Technical in topic Unity	Single phase induction motor, practical study of different types of single phase induction motors motor construction - capacitor motor - split- phase motor	to implement exercises	evaluation continuous
Fifth	3	acquisition Skill and experience Technical in topic Unity	Split-phase motor winding, testing, and periodic maintenance – faults and how to treat them – reversing the direction of rotation of the motor	to implement exercises	evaluation continuous
Sixth	3	acquisition Skill and experience Technical in Unity theme	Split-phase motor drawing - multiple examples	to implement exercises	evaluation continuous
Seventh Eighth+	3	acquisition Skill and experience Technical in Unity theme	Shaded pole motor winding of different types	to implement exercises	evaluation continuous
Ninth	3	acquisition Skill and experience Technical in topic Unity	- Continuity test - Polarity test - Ground test Short circuit test	to implement exercises	evaluation continuous
tenth	3	acquisition Skill and	Electrical and mechanical faults and their treatment methods	to implement exercises	evaluation continuous

		experience Technical in topic Unity			
eleventh	3	acquisition Skill and experience Technical in topic Unity	Winding the capacitor motor, carrying out the - necessary tests on it - polarity continuity test ground fault - short circuit between the coils	to implement exercises	evaluation continuous
twelfth	3	acquisition Skill and experience Technical in Unity theme	Winding the ceiling and table fan motor and performing the necessary tests	to implement exercises	evaluation continuous
the third ten	3	acquisition Skill and experience Technical in Unity theme	Home appliance maintenance - home refrigerator - mechanical and electrical faults and their treatment methods	to implement exercises	evaluation continuous
the fourteen	3	acquisition Skill and experience Technical in Unity theme	Home appliance maintenance - home freezers - home air conditioners - mechanical - and electrical faults and their solutions periodic maintenance	to implement exercises	evaluation continuous
fifteenth	3	acquisition Skill and experience Technical in Unity theme	Home appliance maintenance - washing - machine - electrical faults and how to fix them periodic maintenance	to implement exercises	evaluation continuous

- 11 structure Infrastructure :

1-books The reporter Required	The booklet Laboratory private In the workshop
2- the reviewer Home (Sources)	- 1 He wrapped Engines electrical ,Dr moon - 2 Reference in Transformers electrical , Franklin Sticant , SA
A books References that Recommended It has(magazines) Scientific, Reports ,)	- 1Troubleshooting And maintenance machines Electrical Bank settings International For shapes Illustrative Technical.
for - the reviewer electronic, Sites Internet	-1 location The Institute Technical /Al- Rumaitha- 2Sites Companies Global

- 12 plan development The decision Academic :

- 1Participation in The state Art Different Private By the material To gain My coach The workshop expertise Bigger
- 2 examining on last what I reached for him Technology Modern in This is amazing The material .

89. Course Name
Engineering drawing
90. Course Code
ELTP106
91. Available attendance forms
in presence
92. semester/year
Decisions
93. Number of study hours(kidney)
3*30=90
94. Date this description was prepared
22-6-2025
8- Name of the rapporteur
Name: Sattam Al-Jubouri Dhiyab Ghanem Majdab e-mail : : SattamAljubori654-hwj@ntu.edu.iq
95. Course objectives (general objectives of the course)
- 1 Understanding the basic rules of engineering drawing using a computer. -2 Draw basic models using this program. -3 Design and draw the proposed models.
96. OutputsThe decisionTeaching, learning and assessment methods
Course outcomes
1- Engine Detailed drawings: accurately show the dimensions and components of the design.
2-Assembly drawings: show how the components will be fitted together.
3-Diagrams (architectural/electrical/mechanical): represent the general systems and subsystems.
4-Bills of materials (BOM): list parts, materials, and quantities.
5-3D models: to realistically display the design.
6-Digital manufacturing files (STL, DXF, etc.): used in manufacturing and printing machines.
7-Revision and release documents: document various changes and releases.
identification:

Engineering drawing is a universal language for engineers and technicians, used to convey design ideas with complete accuracy, in addition to being a key tool for implementing manufacturing, infrastructure, architecture, and others, by adhering to unified standards. (ISO/ASME/ANSI) Specifies the characteristics of the shape, dimensions, materials, tolerances, and type of sections and surfaces.

Its importance:

1: 3D representation on a 2D surface: Via orthogonal projection methods (front/top/side projection)

2: Accurate and clear specifications: Includes length, angles, scales, line type, tolerances, materials, surface description, and data such as the artist's name, references, and time stamps. .

How is it determined: So that it includes all the information necessary to ensure that the item is manufactured or executed accurately and clearly. In general, the output is divided into a detailed drawing (Detail Drawing) and Assembly Drawing

Outputs	Teaching and learning methods	Evaluation methods
A-knowledge A1-knowledge And understanding basics The drawing Engineering Using AutoCAD A2 - ID And drawing shapes Engineering Basic Using the computer A3-knowledge And understanding orders The program A4 - Knowing how to draw shapes Binary Dimensions A5 - Knowing how to draw shapes The Trilogy Dimensions A6-Knowledge of writing and setting dimensions For shapes Engineering	•Direct practical training: Using AutoCAD in classes paternal uncle Why with realistic examples in drawing? Engineering. •Interactive education : Combining short theoretical explanation with practical application, and encouraging students to solve exercises gradually	1 - Monitor students' performance step by step during practical lessons, providing immediate feedback to improve performance.

	(from simple to complex).). •cooperation and offers:Implement small projects within teams to enhance teamwork and present the results for discussion.	2- Use short exercises after each unit to measure understanding of key concepts and commands.
B -Skills B1 - Drawing shapesEngineering BinaryDimensions B2 - Drawing shapesEngineering The TrilogyDimensions B3-to implementCommands to get the drawingEngineering B4 - Putting the dimensions of the drawing and writing on the drawing	1.Direct practical training: •Using AutoCAD in computer labs with gradual exercises (from simple to complex)). 2.Project-based learning: •Implement small projects (such as creating electrical diagrams) to link theory with practice.. 3.Collaboration and Offers: •Work in teams to create integrated drawings and present the results for group discussion.	1- Short practical evaluation: •Quick tests during classes to measure mastery of basic commands (such as drawing shapesD/ 3D).2 2- Applied projects: •Evaluate a final project (such as creating a complete

		engineering drawing) with an emphasis on accuracy and adherence to standards .. 3- Peer assessment: •Students participate in evaluating each other's work under the supervision of the teacher to promote self-assessment.
C-values A1 - Instilling a spirit of creativity in students and ensuring that they find innovative solutions to various problems. A2 - Developing students' ability to work as effective teams that produce distinguished results.	Stimulating the creative side of students by presenting various scientific problems and asking students to find appropriate scientific solutions	Direct evaluation: This evaluation is carried out by the instructor

A3 - Developing a sense of responsibility among students and preparing them psychologically to bear the burdens placed on their shoulders. A4 - Developing the values of diligence and perseverance in completing work to achieve satisfactory results.	for them in various ways. Developing the spirit of cooperation among students by forming work teams and motivating students to make all necessary efforts to work in different circumstances and with different people.	directly, by observing the student's interaction during the lecture and recording the notes. About that Practical projects: The student's ability to achieve and innovate, to work within teams, and to produce results and solutions to various scientific problems are evaluated.
97. Course structure (Theoretical and practical vocabulary)		

week	watches	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
the first	3hours	Introducing the student to the interfaces program AutoCAD How to use	The importance of engineering drawing. Getting to know the interfaces AutoCAD program	Show about Road power point With the app	Through participation and exams
the second	3hours	How to use Commands for purpose The drawing	Display orders borderDrawing and units	Show about Road power point With the app	Through participation and exams
the third	3hours	Student education On how Using commands For more accurate drawing	Drawing accuracy commands GRID , POLAR, OSNAP	Show about Road power point With the app	Through participation and exams
Fourth	3hours	How to use Ready-made commands	Drawing commands ElementsRect angle Circle, Polygon, Arc	Show about Road power point With the app	Through participation and exams
Fifth	3hours	Student education Use Commands	Modification ordersErase Copy, Move, Mirror,	Show about Road power point With the app	Participation

		To modify and facilitate The drawing			
Sixth	3hours	Student education On the dimensions of the drawing precisely	Put different dimensions on Drawing elements and control it Using a square Dimensions mode dialogue	Show about Road power point With the app	Through participation and exams
Seventh	3hours	How to control Font type and color	Control specifications Drawing types of lines, Element colors, Its characteristics	Show about Road power point With the app	Through participation and exams
The eighth	3hours	How to use Commands to facilitate The drawing	Element drawing commands Ellipse, Donut, Wipeout, Revision Cloud	Show about Road power point With the app	Through participation and exams
Ninth	3hours	Student education Use Commands To modify and facilitate The drawing	Modification orders OtherOffset, Scale, Stretch, Rotate	Show about Road power point With the app	Through participation and exams
tenth	3hours	Knowing how Add text Line control color and others	Add texts Its methods and control With its specifications	Show about Road power point With the app	Through participation

					ion and exams
eleven th	3hours	To know the account spaces Sizes and lengths	Dealing with orders tape Parametric	Show about Road power point With the app	Through participation and exams
twelfth	3hours	How to use misleading And specification and others	Hovering and shading and sectors	Show about Road power point With the app	Through participation and exams
thirteenth	3hours	Student education Use Commands to work Layers and control	Layers And control its settings	Show about Road power point With the app	Through participation and exams
fourteenth	3hours	Teaching the student how to drawing blocks	Blocks(Blocks)	Show about Road power point With the app	Through participation and exams
fifteenth	3hours	Student education Types of blocks	Types of blocks And include and control it for its specifications.	Show about Road power point With the app	Through participation

					ion and exams
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98. Curriculum Development Plan

Continuously updating the curriculum to keep pace with developments in the labor market (Curriculum Update Committee, Scientific Committee) such as:

- 10- Updating the curriculum to keep pace with developments in the field Engineering drawing.
- 11- Follow up on scientific developments inUpdate the program continuously.

99. infrastructure	
Classrooms, laboratories and workshop	Equipped laboratories are available to accommodate students and are prepared To provide a suitable environment for learning
19- Required textbooks	The prescribed engineering drawing lectures binder
20- Main References (Sources)	https://faculty.uobasrah.edu.iq/uploads/teaching/1711798938.pdf
A- Recommended books and references (scientific journals, reports, etc.)	https://www.smartdraw.com/cad/engineering-drawing-software.htm?srsId=AfmBOoqDqQ2hjW1riiDu_ZmtTLd6-itW7EDrm7zUii1JMSEtmWi8ii2i
B-Electronic references, websites,.....	https://www.qrcodechimp.com/page/srcyif3uvk4a4

100. Course Name
electrical drawing
101. Course Name/Code
ELTP106
102. Available attendance forms
In presence
103. semester/year
Decisions
104. Number of study hours(kidney)
3*30=90
105. Date this description was prepared
22-6-2025
8- Name of the rapporteur
Name: Alaa Yass Ahmed
e-mail : : alaaalyass85@ntu.edu.iq
106. Course objectives (general objectives of the course)
- 1. Understand the basic rules of electrical drawing using a computer. -2 Draw basic models using this program. -3 Design and draw the proposed models.
107. OutputsThe decisionTeaching, learning and assessment methods
Course outcomes 1. Circuit Diagrams 2. Electrical Wiring Diagrams 3. Distribution Diagrams 4. Load and Cable Schedules 5. Grounding Diagram 6. Bill of Materials (BOM) 7. Documents
identification: An electrical diagram is a graphic representation of electrical components and circuits using standard symbols. This diagram is intended to

simplify understanding how electrical devices and materials are connected within a system. It is used to illustrate how electrical current flows in a circuit and is used in the design and maintenance of electrical systems such as lighting, heating, cooling, and power systems..

Its importance: Electrical drawings are of great importance in the design, operation, and maintenance of electrical systems. Here are some aspects that highlight the importance of this type of drawing:

1. Electrical circuit design illustration
2. Facilitate maintenance and repair
3. Precise system control
4. Ensure safety and security

How is it determined: It is determined based on the type of electrical system, the components used, the required connections, and safety and efficiency requirements. By accurately identifying these factors, an effective electrical drawing can be created to aid in the design, operation, and maintenance of a safe and efficient electrical system..

Outputs	Teaching and learning methods	Evaluation methods
١- knowledge A1-knowledgeAnd understanding basics The drawing Electrician Using AutoCAD A2 - IDAnddrawing shapeselectrical BasicUsing the computer A3-knowledgeAnd understanding ordersThe program A4-Knowledge of writing and setting dimensions For shapes Electrical 5- Knowing the symbols of the electrical circuit 6- How to draw an integrated electrical circuit	•Direct practical training:Using AutoCAD in classespaternal uncleWhy with realistic examples in drawing?Engine ering. •Interactive education : Combining short theoretical explanation with practical application, and	1- Monitor students' performance step by step during practical lessons, providing immediate feedback to improve performance . 2- Use short exercises after each unit to

	encouraging students to solve exercises gradually (from simple to complex).). •cooperation and offers:Implement small projects within teams to enhance teamwork and present the results for discussion.	measure understanding of key concepts and commands.
B -Skills B1-Drawing symbols that are not in the program B2-Integrated circuit drawing B3-to implementCommands to getelectrical drawing B4 - Putting the dimensions of the drawing and writing on the drawing	4.Direct practical training: •Using AutoCAD in computer labs with gradual exercises from simple to complex. 5.Project-based learning: •Implement small projects (such as creating electrical diagrams) to link theory with practice.. 6.Collaboration and Offers: •Work in teams to create	1- Short practical evaluation: •Quick tests during classes to measure mastery of basic commands. 2- Applied projects: •Evaluate a final project (such as creating a complete engineering drawing) with an emphasis on accuracy and

	integrated drawings and present the results for group discussion.	adherence to standards.. 3- Peer assessment: •Students participate in evaluating each other's work under the supervision of the teacher to promote self-assessment.
C-values A1 - Instilling a spirit of creativity in students and ensuring that they find innovative solutions to various problems. A2 - Developing students' ability to work as effective teams that produce distinguished results. A3 - Developing a sense of responsibility among students and preparing them psychologically to bear the burdens placed on their shoulders. A4 - Developing the values of diligence and perseverance in completing work to achieve satisfactory results.	Stimulating the creative side of students by presenting various scientific problems and asking students to find appropriate scientific solutions for them in various ways. Developing the spirit of cooperation among students by forming work teams and motivating students to make all necessary	Direct evaluation: This evaluation is carried out by the instructor directly, by observing the student's interaction during the lecture and recording the notes. About that Practical projects: The student's ability to achieve and innovate, to

				efforts to work in different circumstances and with different people.	work within teams, and to produce results and solutions to various scientific problems are evaluated.
108. Course structure (Theoretical and practical vocabulary)					
week	watches	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
the first	3hours	Introducing the student to the interfaces program AutoCAD How to use	The importance of drawingelectrician. Getting to know the interfaces AutoCAD program	Show about roadPower Point With the app	Through participation and exams
the second	3hours	How to use Commands purpose The drawing	Display orders borderDrawing and units	Show about roadPower Point With the app	Through participation and exams
the third	3hours	Student education On how Using commands For more accurate drawing	Drawing accuracy commands GRID , POLAR, OSNAP	Show about roadPower Point With the app	Through participation and exams

Fourth	3hours	How to use Ready-made commands	Drawing commands Elements Rectangle, Circle, Polygon, Arc	Show about roadPower Point With the app	Through participation and exams
Fifth	3hours	Student education Use Commands To modify and facilitate The drawing	Modification orders Erase Copy, Move, Mirror,	Show about roadPower Point With the app	Participation
Sixth	3hours	Student education On the dimensions of the drawing precisely	dimension Different on Drawing elements and control it Using a square Dimensions mode dialogue	Show about roadPower Point With the app	Through participation and exams
Seventh	3hours	How to control Font type and color	Control specifications Drawing types of lines, Element colors, Its characteristics	Show about roadPower Point With the app	Through participation and exams
The eighth	3hours	How to use Commands to facilitate The drawing	Element drawing commands Ellipse, Donut, Wipeout, Revision Cloud	Show about roadPower Point With the app	Through participation and exams

Ninth	3 hours	Student education Use Commands To modify and facilitate The drawing	Modification orders Other Offset, Scale, Stretch, Rotate	Show about roadPower Point With the app	Through participation and exams
tenth	3 hours	Knowing how Add text Line control color and others	Add texts Its methods and control With its specifications	Show about roadPower Point With the app	Through participation and exams
eleventh	3 hours	To know account spaces Sizes and lengths	Dealing with orders tape Parametric	Show about roadPower Point With the app	Through participation and exams
twelfth	3 hours	How to Use Tools for drawing Required circle	drawing circles Electrical using Existing symbols Or draw non-symbols Present in the program	Show about roadPower Point With the app	Through participation and exams
thirteenth	3 hours	Student education How to do it Drawing and operation	drawing an operating circuit And a control circuit for the engine	Show about roadPower Point With the app	Through participation and exams

fourteenth	3 hours	Student education	Drawing models cable trays	Show about roadPower Point With the app	Through participation and exams
fifteenth	3 hours	Student education Print on The program	Printing	Show about roadPower Point With the app	Through participation and exams

109. Curriculum Development Plan					
Continuously updating the curriculum to keep pace with developments in the labor market (Curriculum Update Committee, Scientific Committee) such as:					
12– Updating the curriculum to keep pace with developments in the field electrical drawing.					
13– Follow up on scientific developments in Update AutoCAD software continuously.					

110. infrastructure	
Classrooms, laboratories and workshops	Equipped laboratories are available to accommodate students and are prepared To provide a suitable environment for learning
21- Required textbooks	Electrical drawing lecture notes
22- Main References (Sources)	https://faculty.uobasrah.edu.iq/uploads/teaching/1711798938.pdf
A-Recommended books and references (scientific journals, reports, etc.)	https://www.smartdraw.com/cad/engineering-drawing-software.htm?srsId=AfmBOoqDqQ2hjW1riiDu_ZmtTLd6-itW7EDrm7zUii1JMSEtmWi8ii2i

B-Electronic references, websites,.....	https://www.qrcodechimp.com/page/srcyi f3uvk4a4
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111. Course Name
Computer 1
112. Course Code/
NTU102
113. Available attendance forms
In presence
114. / Chapter/Year
Second semester / 2024/2025
115. Number of study hours (total)
45=15*3
116. Date this description was prepared
2025/6/20
8- Name of the rapporteur
Name: Sattam Al-Jubouri Dhiyab Ghanem Majdab e-mail : : SattamAljubori654-hwj@ntu.edu.iq
117. Course objectives (general objectives of the course) This course aims to introduce students to the basic concepts of information technology and computer use. This course includes studying computer hardware components such as the processor, memory and input/output units, as well as software, including operating systems and various applications. well as the concept of computer viruses and how to deal with them

Top scorer of the University Computer Science 1 course:

- Provide students with a comprehensive understanding of computer components and their functions
- Develop students' skills in using operating systems and basic software.
- Knowledge of computer generations
- Knowledge of using software
- Learn how to format floppy disks
- Educating students about the importance of information security and data protection methods.
- Knowing the concept of computer viruses and how to deal with them
- Know how to access the Internet
- Learn about computer components
- Learn about the evolution of computers throughout history
- Dealing with operating systems
- Gaining the skill of using the Windows operating system
- Learn about software types
- Identify and use storage unit types
- Perform basic computer maintenance
- Understanding networking basics
- Application of information security principles

- Gain the skill to get rid of viruses that may infect the computer
- Use of office software
- Searching the Internet and Using Email

Enable students to understand the basics of networking and use the Internet .effectively

118. Course outcomes , teaching, learning and assessment methods

Course outcomes

identification: It is a set of knowledge, skills and values that the course seeks to achieve in students .

Its importance: It provides the learner with a clear idea of what he will be able to do after completing the course, and helps in designing and evaluating academic courses.

How is it determined? The course outcomes are determined based on the objectives of the academic program to which the course belongs.

Outputs	Teaching and learning methods	Evaluation methods
Knowledge : outputs By the end of this course, the student is :expected to be able to	1. Lecture using PowerPoint 2. Discussion with students	Oral and written questions and -1 discussions Presentation of the lecture -2 Using 3- Data Show

Identify the hardware and software .1 .components of the computer Explain the difference between operating .2 .systems and application programs Describe the basics of the Internet and .3 .networks Understanding the basic concepts of .4 .information security Distinguish between types of software and .5 .their uses in the work environment	3. Display exercise solutions for each .topic 4. Assigning students to practical cases 5. Student costs for preparing reports on course topics	solve Show explanations And -3 mathematical problems ,Practical application -4 ,cooperative learning brainstorming
Second : Skills outputs: Running and using popular operating .1 systems such asWindows . Microsoft Office ,applications (Word .(Excel, PowerPoint Send and receive email and manage .3 .attachments Browse the Internet effectively using .4 .search engines Perform file saving, retrieval, and .5 .organization operations on the computer	Practical (applied) training .1 Project-based learning .2 Cooperative learning .3 .Simulation and software .4 Self-education using the .5 Internet Targeted training .6 Practical duties .7	Practical application .1 Projects .2 Direct observation .3 Homework and practical .4 activities Self-assessment .5 Presentations .6

Third: Values and Attitudes : Demonstrate commitment to .1 .computer and information ethics Respecting the intellectual property .2 .rights of software and digital content Work as a team when carrying out .3 .joint tasks and projects Demonstrate interest in developing .4 .personal technical skills Adhere to safety and cybersecurity .5 .procedures when using the computer	Class discussions .1 Case studies .2 Values-based learning .3 Group activities .4 Behavioral role model of the .5 teacher	Direct observation .1 Class discussions and .2 participation Achievement book .3 Questionnaires and self- .4 assessment
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119. (Theoretical and practical vocabulary) Course structure

week	Methods of measurement and evaluation	Technologies used	Teaching method	Chapter title	Theoretical time And my work	Subheadings
the first	Assignments -1 Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam	Presenting the lecture using the , data show presenting explanations, and solving	Theoretical and practical	Introduction to the computer and its history of development	1 hour theoretical hours of 2 work	History of computer development from the first generation to

	Cooperative -6 learning	mathematical problems using Microsoft Board , practical ,application collaborative learning, and .brainstorming				the current generation Introduction to computer types ,desktop) ,laptop, tablet ,(server Introduction to the computer and its history of development
the second	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture using the , data show presenting explanations, and solving mathematical problems using Microsoft Board , practical ,application collaborative	Theoreti cal and practical	Computer hardware components	1 1 hour theoretical hours of 2 work	The main physical components of a computer are the) processor CPU ,()) memoryRAM storage units ,())HDD, SSD ,() and input and .output units

		learning, and .brainstorming				Explain the function of each component and how it .works
the third	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture using the , data show presenting explanations, and solving mathematical problems using Microsoft Board , practical ,application collaborative learning, and .brainstorming	Theoreti cal and practical	- Software and operating systems	1 hour theoretical hours of 2 work	Software :definition Operating systems (such asWindows, Linux and (application .programs Functions and types of operating .systems Familiarize yourself with different user .interfaces

Fourth	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture using the , data show presenting explanations, and solving mathematical problems using Microsoft Board , practical ,application collaborative learning, and .brainstorming	Theoretical and practical	Operating system Windows 11	1 hour theoretical hours of 2 work	Windows system concept Its advantages and basic requirements How to create and manage files and folders Organize files effectively and use file .systems Data Backup and Restore
Fifth	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture using the , data show presenting explanations, and solving mathematical problems using Microsoft Board , practical ,application	Theoretical and practical	Desktop Home Screen Components	1 hour theoretical hours of 2 work	Icon concept How to deal with mouse activities The importance and components of the taskbar

		collaborative learning, and .brainstorming				
Sixth	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture using the , data show presenting explanations, and solving mathematical problems using Microsoft Board , practical ,application collaborative learning, and .brainstorming	Theoretical and practical	Start menu	1 hour theoretical hours of 2 work	UseStart to access programs The concept of assigned tasks Exit the system andshut down the calculator
Seventh	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture using the , data show presenting explanations, and solving mathematical problems using Microsoft Board , practical ,application	Theoretical and practical	My Computer	1 hour theoretical hours of 2 work	Getting to knowMy Computer tablets Formatting floppy disks Dealing with the trash Recover deleted items

		collaborative learning, and .brainstorming				
The eighth	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture using the , data show presenting explanations, and solving mathematical problems using Microsoft Board , practical ,application collaborative learning, and .brainstorming	Theoretical and practical	Control Panel	1 hour theoretical hours of 2 work	Taking advantage of control panel programs Control Panel Icons Settings in the control panel Desktop background appearance Add and remove programs
Ninth	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture using the , data show presenting explanations, and solving mathematical problems using Microsoft Board , practical	Theoretical and practical	) Programs Accessories (	1 hour theoretical hours of 2 work	Benefit from additional) programs Accessories (Like calculator and calendar

		application, and .learning					
tenth	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture using the , data show presenting explanations, and solving mathematical problems using Microsoft Board , practical ,application collaborative learning, and .brainstorming	Theoreti cal and practical	Use of media programs	1 hour theoretical hours of 2 work	Image media Video media Window Media player	
eleventh	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture , using data show ,presenting explanations and solving mathematical problems usingMicrosoft Board , ,practical application ,collaborative learning .and brainstorming	Theoretical and practical	Help	1 hour theoretical hours of 2 work	Learn how to get helpand its different .methods	
Twelve	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4	Presenting the lecture , using data show ,presenting explanations and solving mathematical problems usingMicrosoft Board ,	Theoretical and practical	Information security	1 hour theoretical hours of 2 work	Basic principles of information security	

	Final written exam -5 Cooperative learning -6	,practical application ,collaborative learning .and brainstorming				Types of cyber ,threats (viruses malware, data protection ,strategies ,passwords (encryption
thirteenth	Assignments and duties -1 Quiz -2 Practical test -3 Monthly test -4 Final written exam -5 Cooperative learning -6	Presenting the lecture , using data show ,presenting explanations and solving mathematical problems usingMicrosoft Board , ,practical application ,collaborative learning .and brainstorming	Theoretical and practical	Networks and the Internet	1 hour theoretical hours of 2 work	Introduction to Computer Networks Types of networks LAN, WAN How to connect ,to the Internet Internet protocols
Fourteenth	Assignments and duties -1 Quiz -2 Practical test -3 Monthly test -4 Final written exam -5 Cooperative learning -6	Presenting the lecture , using data show ,presenting explanations and solving mathematical problems usingMicrosoft Board , ,practical application ,collaborative learning .and brainstorming	Theoretical and practical	Online Search and Web Tools	1 hour theoretical hours of 2 work	Use search engines effectively Evaluating the credibility of online sources Introduction to cloud tools and services like Google Drive

The fifteenth	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture , using data show ,presenting explanations and solving mathematical problems usingMicrosoft Board , ,practical application ,collaborative learning .and brainstorming	Theoretical and practical	Online Search and Web Tools	1 hour theoretical hours of 2 work	Learn about artificial intelligence platforms manage email Send and receive emails
Curriculum Development Plan						
Continuously updating the curriculum to keep pace with developments in the labor market (Curriculum Update :Committee, Scientific Committee) such as 14- Develop curricula that are compatible with the labor market 15- Holding scientific seminars and conferences aimed at updating curricula 16- Follow up on scientific developments in the field of specialization						
Infrastructure -11						
Classrooms, playgrounds and workshops		Available				
23- Required textbooks		Available				

24- Main References (Sources)	The book “Computer Basics and Office Applications” by Dr. Ziad -1 :Muhammad Abboud, Dr. Ghassan Hamid Abdul Majeed and others This book covers the basics of computer science, according to the / curriculum of the Ministry of Higher Education and Scientific Research Research and Development Department, and is a reference for first-year .students in all Iraqi universities .2 :The book "Computer Principles" by Dr. Osama Youssef Khalil This book covers the basics of computer hardware, software, and .operating systems, and is a good reference for beginners .3 The book "Introduction to Computers" by Dr. Muhammad Al- :Saeed This book provides a detailed explanation of the computer and its .components, types of software, and networks .4 The book "Principles of Computer and Information Technology" by :Dr. Hossam El-Din Mustafa It contains a simplified explanation of the various components of the computer, along with an explanation of the programs and applications .used in it .5 The book "Computer Basics and Applications" by Dr. Abdullah :Hassan ,This book covers a variety of topics including computer components .operating systems, word processing, and spreadsheets .6 The book “Introduction to Computers and Their Applications” by : Dr. Abdul Rahman Al-Shaiji The book covers the basic principles of computers in terms of hardware .and software, and includes practical applications
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	.7 The book “Computer Principles: A Comprehensive Guide” by a :group of authors A comprehensive book that explains in detail everything related to .computer components, software, and networks, with illustrative examples
ح) Recommended books and references (scientific (.journals, reports, etc	1. Hasoub Academy" : website ○ ,Provides comprehensive articles and lessons on computer basics programming, and operating systems. 2. Learn"" website: ○ It contains free educational courses in various computer fields, including computer basics. 3. Rawaq"" website: ○ It offers free courses in Arabic that include topics on computer principles and information technology. 4. Noor Library"" website: ○ It contains many Arabic books in the field of computers, including books on basic principles. 5. My Educational Lessons YouTube Channel: ○ Provides a visual explanation of computer principles and programming concepts in Arabic.
د) ,Electronic references ,websites	.1w3schools.com To learn programming languages such asHTML, CSS, JavaScript . .2geeksforgeeks.org .Detailed explanation of programming concepts and algorithms .3tutorialspoint.com

	.Lessons in computer, networking, cyber security , operating systems .4mozilla.org) A comprehensive reference for web developersHTML, CSS, JavaScript .(
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120. Course Name
Computer2
121. / Course Code
/NTU201
122. Available attendance forms
In presence
123. / Chapter/Year
First semester / 2024/2025
124. Number of study hours (total)
45=15*3
125. Date this description was prepared
2025/6/20
8- Name of the rapporteur
Name: Sattam Al-Jubouri Dhiyab Ghanem Majdab e-mail : : SattamAljubori654-hwj@ntu.edu.iq
126. Course objectives (general objectives of the course)

This course aims to introduce students to the basic concepts of information technology and computer use. This course includes studying computer hardware components such as the processor, memory and input/output units, as well as software, including operating systems and various applications, as well as the concept of computer viruses and how to deal with them.

Top scorer of the University Computer Science 2 course:

- **Provide students with a comprehensive understanding of computer components and their functions.**
- **Develop students' skills in using operating systems and basic software.**
- **Knowledge of computer generations**
- **Knowledge of using software**
- **Learn how to format floppy disks**
- **Educating students about the importance of information security and data protection methods.**
- **Knowing the concept of computer viruses and how to deal with them**
- **Know how to access the Internet**
- **Learn about computer components**
- **Learn about the evolution of computers throughout history**

- **Dealing with operating systems**
- **Gaining the skill of using the Windows operating system**
- **Learn about software types**
- **Identify and use storage unit types**
- **Perform basic computer maintenance**
- **Understanding networking basics**
- **Application of information security principles**
- **Gain the skill to get rid of viruses that may infect the computer**
- **Use of office software**
- **Searching the Internet and Using Email**

**Enable students to understand the basics of networking and use the Internet
.effectively**

127. **Course outcomes , teaching, learning and assessment methods**

Course outcomes

identification: It is a set of knowledge, skills and values that the course seeks to achieve in students .

Its importance: It provides the learner with a clear idea of what he will be able to do after completing the course, and helps in designing and evaluating academic courses.

How is it determined? The course outcomes are determined based on the objectives of the academic program to which the course belongs.

Outputs	Teaching and learning methods	Evaluation methods
Knowledge : outputs By the end of this course, the student is :expected to be able to Identify the hardware and software .1 .components of the computer Explain the difference between .2 operating systems and application .programs Describe the basics of the Internet and .3 .networks Understanding the basic concepts of .4 .information security Distinguish between types of software .5 .and their uses in the work environment	6. Lecture using PowerPoint 7. Discussion with students 8. Display exercise .solutions for each topic 9. Assigning students to practical cases 10. Student costs for preparing reports on course topics	Oral and written -1 questions and discussions Display the lecture -2 using The data show Presenting -3 explanations and solving mathematical .problems Practical -4 application, cooperative learning, brainstorming
Second : Skills outputs: Running and using popular operating .1 systems such asWindows .	Practical (applied) training .1 Project-based learning .2 Cooperative learning .3 .Simulation and software .4 Self-education using the Internet .5	Practical application .1 Projects .2 Direct observation .3 Homework and .4 practical activities

Microsoft Office ,applications (Word .(Excel, PowerPoint Send and receive email and manage .3 .attachments Browse the Internet effectively using .4 .search engines Perform file saving, retrieval, and .5 organization operations on the .computer	Targeted training .6 Practical duties .7	Self-assessment .5 Presentations .6
Third: Valuesand Attitudes : Demonstrate commitment to computer .1 .and information ethics Respecting the intellectual property .2 .rights of software and digital content Work as a team when carrying out .3 .joint tasks and projects Demonstrate interest in developing .4 .personal technical skills Adhere to safety and cybersecurity .5 .procedures when using the computer	Class discussions .1 Case studies .2 Values-based learning .3 Group activities .4 Behavioral role model of the .5 teacher	Direct observation .1 Class discussions and .2 participation Achievement book .3 Questionnaires and .4 self-assessment

128. (Theoretical and practical vocabulary) Course structure

week	Methods of measurement and evaluation	Technologies used	Teaching method	Chapter title	Theoretical time And my work	Subheadings	
the first	Assignments -1 Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture using the , data show presenting explanations, and solving mathematical problems using Microsoft Board , practical ,application collaborative learning, and .brainstorming	Theoretical and practical	Introduction to Microsoft Office	1 hour theoretical hours of 2 work	Learn about - Office programs The importance of , Word, Excel and PowerPoint in the work environment	
the second	Assignments -1 Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture using the , data show presenting explanations, and solving mathematical problems using	Theoretical and practical	Getting started with Microsoft Word	1 1 hour theoretical 1 hours 2 of work	Main - interface Create a new - document Save and - open) documents	

		Microsoft Board , practical ,application collaborative learning, and .brainstorming				HDD, SSD , drives	
the third	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture using the , data show presenting explanations, and solving mathematical problems using Microsoft Board , practical ,application collaborative learning, and .brainstorming	Theore tical and practic al	Formatting text in Word	1 hour theoretica hours 2 of work	Font - formatting Paragraphs Distances - and separation Icons and - lists	
Fourth	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4	Presenting the lecture using the , data show presenting explanations, and	Theore tical and	Working with tables and images in Word	1 hour theoretical hours of 2 work	Insert tables Insert and - edit images	

	Final written -5 exam Cooperative -6 learning	solving mathematical problems using Microsoft Board , practical ,application collaborative learning, and .brainstorming	practic al			Working with - illustrations	
Fifth	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture using the , data show presenting explanations, and solving mathematical problems using Microsoft Board , practical ,application collaborative learning, and .brainstorming	Theore tical and practic al	Insert other elements inWord	1 hour theoretical hours of 2 work	Insert - hyperlinks Add equation - Use of - symbols	
Sixth	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4	Presenting the lecture using the , data show presenting explanations, and	Theore tical and practic al	Print and final review inWord	1 hour theoretical hours of 2 work	Preview - before printing Review - spelling and	

	Final written -5 exam Cooperative -6 learning	solving mathematical problems using Microsoft Board , practical ,application collaborative learning, and .brainstorming				grammatical .errors Prepare the - page for printing	
Seventh	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture using the , data show presenting explanations, and solving mathematical problems using Microsoft Board , practical ,application collaborative learning, and .brainstorming	Theore tical and practic al	Working with documents inWord	1 hour theoretical hours of 2 work	Create a table - of contents Add indexes - Use of - patterns and templates	
The eighth	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4	Presenting the lecture using the , data show presenting explanations, and	Theore tical and practic al	Working on projects inWord	1 hour theoretical hours of 2 work	Final project - UsingWord Submitting - the project work	

	Final written -5 exam Cooperative -6 learning	solving mathematical problems using Microsoft Board , practical ,application collaborative learning, and .brainstorming					
Ninth	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture using the , data show presenting explanations, and solving mathematical problems using Microsoft Board , practical ,application collaborative learning, and .brainstorming	Theore tical and practic al	Getting Started with Microsoft Excel	1 hour theoretical hours of 2 work	Main interface - Create - spreadsheets Data types - (texts)	
tenth	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4	Presenting the lecture using the , data show presenting explanations, and	Theore tical and practic al	Function inExcel	1 hour theoretical hours of 2 work	Basic formulas - Equations	

	Final written -5 exam Cooperative -6 learning	solving mathematical problems using Microsoft Board , practical ,application collaborative learning, and .brainstorming				Mathematical and financial functions	
eleventh	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture , using data show ,presenting explanations and solving mathematical problems usingMicrosoft Board , ,practical application ,collaborative learning .and brainstorming	Theoretic al and practical	Formatting tables and creating charts	1 hour theoretical hours of work 2	Formatting cells - and tables Create charts - Customize - charts	
The second ten	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture , using data show ,presenting explanations and solving mathematical problems usingMicrosoft Board , ,practical application ,collaborative learning .and brainstorming	Theoretic al and practical	Printing inExcel	1 hour theoretical hours of work 2	Prepare the - page for printing Report - coordination Use multiple - worksheets	

thirteenth	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture , using data show ,presenting explanations and solving mathematical problems usingMicrosoft Board , ,practical application ,collaborative learning .and brainstorming	Theoretic al and practical	Getting Started with Microsoft PowerPoint	1 hour theoretical hours of work 2	Main interface Create a new- presentation Save and open presentations
Fourteenth	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture , using data show ,presenting explanations and solving mathematical problems usingMicrosoft Board , ,practical application ,collaborative learning .and brainstorming	Theoretic al and practical	Design slides and content inPowerPoint	1 hour theoretical hours of work 2	Text formatting - Insert images and tables Add shapes and - illustrations
The fifteenth	Assignments -1 and duties Quiz -2 Practical test -3 Monthly test -4 Final written -5 exam Cooperative -6 learning	Presenting the lecture , using data show ,presenting explanations and solving mathematical problems usingMicrosoft Board , ,practical application ,collaborative learning .and brainstorming	Theoretic al and practical	Professional effects and presentation	1 hour theoretical hours of work 2	Add transitions an .motion effects Practice giving - professional presentations

Curriculum Development Plan	
Continuously updating the curriculum to keep pace with developments in the labor market (Curriculum Update :Committee, Scientific Committee) such as 17- Develop curricula that are compatible with the labor market 18- Holding scientific seminars and conferences aimed at updating curricula 19- Follow up on scientific developments in the field of specialization	
Infrastructure-11	
Classrooms, playgrounds and workshops	Available
25- Required textbooks	Available
26- Main References (Sources)	The book “Computer Basics and Office Applications” by Dr. Ziad -1 :Muhammad Abboud, Dr. Ghassan Hamid Abdul Majeed and others This book covers the basics of computer science, according to the / curriculum of the Ministry of Higher Education and Scientific Research Research and Development Department, and is a reference for first-year .students in all Iraqi universities .2 :The book "Computer Principles" by Dr. Osama Youssef Khalil This book covers the basics of computer hardware, software, and .operating systems, and is a good reference for beginners .3 The book "Introduction to Computers" by Dr. Muhammad Al- :Saeed

	This book provides a detailed explanation of the computer and its components, types of software, and networks .4 The book "Principles of Computer and Information Technology" by :Dr. Hossam El-Din Mustafa It contains a simplified explanation of the various components of the computer, along with an explanation of the programs and applications used in it .5 The book "Computer Basics and Applications" by Dr. Abdullah :Hassan ,This book covers a variety of topics including computer components operating systems, word processing, and spreadsheets .6 The book "Introduction to Computers and Their Applications" by : Dr. Abdul Rahman Al-Shaiji The book covers the basic principles of computers in terms of hardware and software, and includes practical applications .7 The book "Computer Principles: A Comprehensive Guide" by a :group of authors A comprehensive book that explains in detail everything related to computer components, software, and networks, with illustrative examples
ج) Recommended books and references (scientific (.journals, reports, etc	6. Hasoub Academy" : website ○ ,Provides comprehensive articles and lessons on computer basics programming, and operating systems. 7. Learn"" website: ○ It contains free educational courses in various computer fields, including computer basics.

	8. Rawaq"" website: ○ It offers free courses in Arabic that include topics on computer principles and information technology. 9. Noor Library"" website: ○ It contains many Arabic books in the field of computers, including books on basic principles. 10. My Educational Lessons YouTube Channel: ○ Provides a visual explanation of computer principles and programming concepts in Arabic.
ج) ,Electronic references ,websites	.1w3schools.com To learn programming languages such asHTML, CSS, JavaScript . .2geeksforgeeks.org .Detailed explanation of programming concepts and algorithms .3tutorialspoint.com .Lessons in computer, networking, cyber security , operating systems .4mozilla.org) A comprehensive reference for web developersHTML, CSS, JavaScript .(

129. Course Name
Sports
130. / Course Code
/NTU 104
131. Available attendance forms
presence
132. / Chapter/Year
First semester / 2024/2025
133. Number of study hours (total)
30=15*2
134. Date this description was prepared
2025/6/18
8- Name of the rapporteur
Name: Sattam Al-Jubouri Dhiyab Ghanem Majdab e-mail : : SattamAljubori654-hwj@ntu.edu.iq
135. Course objectives (general objectives of the course)
The goal of sports courses is to develop the individual physically, psychologically, and socially . through sports activities. Here are the most important general objectives of the sports course

University Sports Course Top Scorer:

.1Developing physical fitness and general health:

Enhancing students' physical fitness levels in line with the requirements of university life and daily activities.

Contribute to the prevention of chronic diseases associated with lack of movement (such as obesity, heart (disease, diabetes.

Developing motor and .2athletic skills:

,Providing students with basic and advanced skills in selected sports activities (such as: football, basketball (volleyball, swimming, or fitness exercises.

Developing neuromuscular coordination and various motor abilities.

Promoting positive values and .3behaviors :

Instilling the concepts of sportsmanship, commitment, discipline, and cooperation.

Building positive healthy behaviors that contribute to improving the quality of life.

.4Raising awareness of the importance of physical activity:

Enabling the student to understand the relationship between physical activity and mental and physical health.

Encouraging students to adopt an active and continuous lifestyle after university.

Developing psychological and social .5aspects :

Strengthening self-confidence, controlling emotions, and accepting loss.

Enhancing communication and teamwork skills in an educational sports environment.

**Supporting the academic and applied aspects in related disciplines (for specialized students .6)
:**

Enabling students to understand sports rules, laws and training principles.

Preparing students for career paths in athletic training, public health, or physical education

identification: It is a set of knowledge, skills and values that the course seeks to achieve in students .

Its importance: It provides the learner with a clear idea of what he will be able to do after completing the course, and helps in designing and evaluating academic courses.

How is it determined? The course outcomes are determined based on the objectives of the academic program to which the course belongs.

Outputs	Teaching and learning methods	Evaluation methods
Knowledge : outputs Identify the benefits of physical activity for -1 .general health Knowing the rules and methods of different -2 .sports Understanding the concepts of physical -3 fitness, nutrition, and safety during physical .performance	Theoretical explanation -1 .and classroom discussions Use of multimedia and -2 .presentations Linking mathematical -3 .concepts to life applications	Theoretical tests -1 multiple choice, true or) .(false, essay .Oral questions -2 Teacher's comments -3 on understanding and .class participation
Skills : outputs Performing basic motor skills (such as -1 .(running, jumping, throwing	.Learning by doing -1 Individual and group -2 .training	Direct observation -1 .during performance Practical evaluation -2 .using the rubric

Properly implementing skills related to group -2 .and individual sports Use sports equipment and tools in a correct -3 .and safe manner			Learning based on -3 .educational stations Practical simulation of -4 .games			Filming and -3 reviewing the .performance Practical -4 .competitions		
Third: Values and Attitudes : Enhancing the spirit of cooperation and -1 .teamwork during sports activities Commitment to the rules of the game and -2 .sportsmanship Respect colleagues and teachers and behave -3 .ethically in competitions			Cooperative group -1 .activities Discussions about the -2 importance of values in .sports Educational situations -3 .during play A good example from the -4 .teacher			Classroom -1 observation of behavior and values during the .activity Self-evaluation and -2 'my colleagues . evaluation Reports or records of -3 .student behavior in class .And sustainable		
137. Course structure (Theoretical and practical vocabulary)								
Methods of measurement and evaluation	Technologies used	Teaching method	Subheadings	Time(theoretical/ practical)	Chapter title			

Written test- Oral participation	Presentati on– Smart Board	Lecture+ Discussio n	Definition of physical education- its objectives- its importance	1 hour theoreti cal	Introduction to Physical Education	
Share- Short Quiz	PowerPoin t- Video	Interactiv e lecture + discussio n	The importance of sports for general and mental health	1 hour theoreti cal	Health and Sports	
Note- Fitness Test	Sports Equipment - Video	Practical explanati on+ groups	Strength- Endurance - Speed- Flexibility- Balance	2 hours theoreti cal	Components of physical fitness	
My work performance evaluation	Video- Timer	Practical training+ supervisi on	The Importance of Warm-Up– Practical Applications	2 hours theoreti cal	Warm-up and cool-down	
Practical calendar	Simple Tools- Video	Group activity+ applicatio n	Flexibility exercises- dynamic and static balance	2 hours theoreti cal	Flexibility and balance	
Running Test- Performance Monitoring	Running Track- Temporary	Training stations	Endurance Tests- Progressive Exercises	2 hours	Muscular and cardiac endurance	

Recording Results- Notes	Weights-Resistance bands	targeted training	Resistance Training- Strength Basics	theoretical	Muscle strength	
Timing Test- Notes	Cones- Timing	Individual + group training	Speed Tests- Agility Exercises	2 hours	Speed and agility	
Theoretical Test- Participation	Blackboard - Video	Explanation+ Discussion	Football- Basketball- Volleyball	theoretical	Team Games Rules	
Practical evaluation	Balls- Network	Field training	Passing- Shooting- Control	2 hours	football skills	
Individual Performance Note	Balls- Hoops	Training stations	Dribbling- Shooting- Passing	theoretical	basketball skills	
Share and rate	Volleyball- Net	Pair+ Group Training	Send- Pass- Smash	2 hours	volleyball skills	
Group evaluation	Whistle- Refereeing Tools	Supervised matches	Skills Application- Team Division	theoretical	Practical matches	
Interact and share	Examples and scenarios	Discussion and dialogue	The concept of sportsmanship- ethics of play	2 hours	sportsmanship and ethics	

Final exam+ comprehensive performance evaluation	Full tools	Comprehensive testing and evaluation	Comprehensive Review- Practical Tests	theoretical	Final assessment	
Curriculum Development Plan Continuously updating the curriculum to keep pace with developments in the labor market (Curriculum :Update Committee, Scientific Committee) such as 20– Develop curricula that are compatible with the labor market 21– Holding scientific seminars and conferences aimed at updating curricula 22– Follow up on scientific developments in the field of specialization						
138. infrastructure						
Classrooms, playgrounds and workshops		Available				
27- Required textbooks		Available				
28- Main References (Sources)		Physical Education and Sports - Foundations and Concepts :Author Dr. Nabil Awadallah, Dr. Khalil Balasma :Edition				

	Third Edition, 2018 :publisher Arab Thought House, Cairo
ز) Recommended books and references (scientific (journals, reports, etc	Physical Education and Sports - Foundations and Concepts :Author Dr. Nabil Awadallah, Dr. Khalil Balasma :Edition Third Edition, 2018 :publisher Arab Thought House, Cairo
س) ,Electronic references,websites	https://sdl.edu.sa ,A major source of books, research and academic journals in Arabic and English < Available to Saudi university students via unified access

139. Course Name
Mathematics 1
140. / Course Code
/TIAH100
141. Available attendance forms
In presence

142. / Chapter/Year
First semester / 2024/2025
143. Number of study hours (total)
30=15*2
144. Date this description was prepared
2025/6/19
8- Name of the rapporteur
Name: Sattam Al-Jubouri Dhiyab Ghanem Majdab e-mail : : SattamAljubori654-hwj@ntu.edu.iq
Course objectives (general objectives of the course) .8 Providing learners with basic mathematical knowledge and skills that enhance logical and analytical thinking, enable them to solve problems systematically, and apply mathematical concepts to real-life and academic situations, while developing academic values such as .discipline, precision, and teamwork : University Sports Course Top Scorer • Gain the mathematical knowledge necessary for the prescribed topics and .understand the meanings behind each mathematical concept • Develop an understanding of the nature of the foundations of mathematics as an integrated system of fundamental mathematical concepts, which will provide a .significant basis for understanding other mathematical disciplines • .The learner should be able to know the methods of solving equations • .The learner will be able to solve partial differential equations • .The student should be able to calculate the area and volume of objects .The learner will be able to solve all differential and integral problems

Course outcomes , teaching, learning and assessment methods .9

Course outcomes

identification: It is a set of knowledge, skills and values that the course seeks to achieve in students.

Its importance: It provides the learner with a clear idea of what he will be able to do after completing the course, and helps in designing and evaluating academic courses.

How is it determined? The course outcomes are determined based on the objectives of the academic program to which the course belongs.

Outputs	Teaching and learning methods	Evaluation methods
Knowledge : outputs Acquiring basic mathematical _1 .concepts and terms Understanding and interpreting_2 mathematical theories and laws Distinguishing between different_3 .types of mathematical problems	.Theoretical lectures _1 Explanation using_2 .examples .Presentations _3 Using visual and _4 .interactive means	• Test theory • Oral questions • Safiya's participation • Discussions and written questions
Second : Skills outputs: Solve mathematical problems using _1 .correct and systematic steps Applying mathematical concepts in _2 .real-life situations	Solving classroom and _1 .individual exercises .Problem-based learning _2 Using educational_3 programs such asExcelr .	1 - Evaluate practical performance in solving .problems

Using mathematical tools or _3 .software in analysis and calculation	Mathematical applications .in practical life	Homework and -2 .practical projects . Practical tests -3 Skills - based -4 .assessment
Third: Values and Attitudes : Commitment to accuracy and -1 discipline in solving exercises and .problems Enhancing the value of cooperation -2 .and teamwork Respecting different opinions in -3 .mathematical thinking methods	Open and respectful -1 .discussions in class Cooperative learning in -2 .groups Providing life situations -3 that reinforce values .through mathematics Raising open questions -4 with more than one solution .	Classroom -1 observation of behavior .And discipline Colleagues evaluate -2 .each other Individual reports on -3 educational experience .and behavior Self-assessment -4 .questionnaires

Course structure (theoretical and practical vocabulary) .10

						Chapter title
	Technologies	Teaching method	Main title	Subtitle	theoretical	week
	Explanation Questions , and	a lecture	Trigonometric ratios	Properties of trigonometric ratios	2 hours	First week

		,Answers Discussion					
		Explanation Questions , and ,Answers Discussion	a lecture	logarithms	logarithms	2 hours	The second week
		Explanation Questions , and ,Answers Discussion	a lecture	Differentiatio n and derivation	Differentiation and derivation	2 hours	The third week
		Explanation Questions , and ,Answers Discussion	a lecture	Differentiatio n and derivation	Derivative laws of algebraic functions	2 hours	Week 4
		Explanation Questions , and ,Answers Discussion	a lecture	Differentiatio n and derivation	composite function (chain rule)	2 hours	Week 5
		Explanation Questions , and	a lecture	Differentiatio n and derivation	Practical exercises	2 hours	Week 6

		,Answers Discussion					
		Explanation Questions , and ,Answers Discussion	a lecture	Differentiatio n and derivation	Derivative of implicit functions, derivative of trigonometric functions, and inverse trigonometric functions	2 hours	The seventh week
		Explanation Questions , and ,Answers Discussion	a lecture	Differentiatio n and derivation	Practical exercises	2 hours	The eighth week
		Explanation Questions , and ,Answers Discussion	a lecture	Derivation	Derivation rules	2 hours	Week 9
		Explanation Questions , and ,Answers Discussion	a lecture	Derivation	Completing the derivation rules	2 hours	The tenth week
		Explanation Questions ,	a lecture	Derivation	Derivative of logarithmic functions	2 hours	Week eleven

		and ,Answers Discussion					
		Explanation Questions , and ,Answers Discussion	a lecture	Derivation	Practical exercises	2 hours	The twelfth week
		Explanation Questions , and ,Answers Discussion	a lecture	integration	integration	2 hours	thirteenth week
		Explanation Questions , and ,Answers Discussion	a lecture	integration	Complete integration	2 hours	Fourteenth week
		Explanation Questions , and ,Answers Discussion	a lecture	integration	Practical exercises	2 hours	The fifteenth week

Curriculum Development Plan

Continuously updating the curriculum to keep pace with developments in the labor market (Curriculum Update Committee, Scientific Committee) such as: -1 Course analysis and needs identification (review of current educational outcomes) -2 Updating scientific content and diversifying teaching and learning methods -3 Follow up on scientific developments and improve evaluation methods	
Infrastructure-11	
Classrooms, playgrounds and workshops	Available
29- Required textbooks	Available
30- Main References (Sources)	Thomas Calculus 12th edition George B. Thomas. Maurice D. Weir. Joel R. Hass .
31- Recommended books and references (scientific journals, reports, etc)	Journal of the American Mathematical Society (JAMS (.Mathematics for Science and Engineering - Author: Adnan Yousef Al-Atoum Real Analysis - Dr. Abdul Karim Adwan Introduction to Linear Algebra - Dr. Mohamed Rizk Basics of Statistics - Dr. Mohamed Fathy

Electronic references, websites	Khan Academy Free Interactive Lessons – Coursera Mathematics courses from prestigious universities edX Massive Open Courses – Project Euclid Access to mathematics and statistics research ArXiv Archive of Recent Research in Mathematics –
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Course Name
Mathematics 2
/ Course Code
101 / TIAH
Available attendance forms
In presence
/ Chapter/Year
Second semester / 2024/2025
Number of study hours (total)
30=15*2
Date this description was prepared
2025/6/19
8- Name of the rapporteur
Name: Sattam Al-Jubouri Dhiyab Ghanem Majdab e-mail : : SattamAljubori654-hwj@ntu.edu.iq

Course objectives (general objectives of the course) .8

Providing learners with basic mathematical knowledge and skills that enhance logical and analytical thinking, enable them to solve problems systematically, and apply mathematical concepts to real-life and academic situations, while developing academic values such as .discipline, precision, and teamwork

: University Sports Course Top Scorer

- **Gain the mathematical knowledge necessary for the prescribed topics and .understand the meanings behind each mathematical concept**
- **Develop an understanding of the nature of the foundations of mathematics as an integrated system of fundamental mathematical concepts, which will provide a .significant basis for understanding other mathematical disciplines**
- **.The learner should be able to know the methods of solving equations**
- **.The learner will be able to solve partial differential equations**
- **.The student should be able to calculate the area and volume of objects**
- **.The learner will be able to solve all differential and integral problems**

Course outcomes , teaching, learning and assessment methods .9

Course outcomes

identification: It is a set of knowledge, skills and values that the course seeks to achieve in students.

Its importance: It provides the learner with a clear idea of what he will be able to do after completing the course, and helps in designing and evaluating academic courses.

How is it determined? The course outcomes are determined based on the objectives of the academic program to which the course belongs.

Outputs	Teaching and learning methods	Evaluation methods
Knowledge : outputs Acquiring basic mathematical concepts _1 .and terms Understanding and interpreting_2 mathematical theories and laws Distinguishing between different types of_3 .mathematical problems	Theoretical _1 .lectures Explanation using_2 .examples .Presentations _3 Using visual and _4 .interactive means	• Theoretical tests • Oral questions • Safiya's participation • and discussions • Written questions
Skills : outputs Solve mathematical problems using _1 .correct and systematic steps Applying mathematical concepts in real- _2 .life situations Using mathematical tools or software in _3 .analysis and calculation	Solving classroom _1 and individual .exercises Problem-based _2 .learning Using educational_3 programs such as Excelr Mathematical . applications in .practical life	2 - Evaluate practical performance in solving .problems Homework and -2 .practical projects . Practical tests -3 Skills - based -4 .assessment

Third: Values and Attitudes : Commitment to accuracy and discipline -1 .in solving exercises and problems Enhancing the value of cooperation and -2 .teamwork Respecting different opinions in -3 .mathematical thinking methods	Open and -1 respectful .discussions in class Cooperative -2 .learning in groups Providing life -3 situations that reinforce values .through mathematics Raising open -4 questions with more . than one solution	Classroom -1 observation of behavior .And discipline Colleagues evaluate -2 .each other Individual reports on -3 educational experience .and behavior Self-assessment -4 .questionnaires
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Course structure (theoretical and practical vocabulary) .10

Chapter title						
week	theoretical	Subtitle	Main title	Teaching method	Technologies	Measurement
First week	2 hours	Matrices and determinants	Matrices	a lecture	,Explanation Questions ,and Answers Discussion	Written test
The second week	2 hours	Types of arrays	Matrices	a lecture	,Explanation Questions	Written test

					,and Answers Discussion		
The third week	2 hours	Some algebraic operations on the matrix	Matrices	a lecture	,Explanation Questions ,and Answers Discussion	Oral exam	
Week 4	2 hours	Finding the determinants of a matrix of capacity 3×3	Matrices	a lecture	,Explanation Questions ,and Answers Discussion	Written test	
Week 5	2 hours	Linear transactions	Linear transaction s	a lecture	,Explanation Questions ,and Answers Discussion	Written test	
Week 6	2 hours	Cramer's theory or rule	Cramer's rule	a lecture	,Explanation Questions ,and Answers Discussion	Oral exam	
The seventh week	2 hours	Practical exercises	Cramer's rule	a lecture	,Explanation Questions ,and Answers Discussion	Written test	
The eighth week	2 hours	Vectors and numerical values	Vectors	a lecture	,Explanation Questions ,and Answers Discussion	Written test	

Week 9	2 hours	Algebraic operations on vectors	Vectors	a lecture	,Explanation Questions ,and Answers Discussion	Written test	
The tenth week	2 hours	Practical exercises	Vectors	a lecture	,Explanation Questions ,and Answers Discussion	Written test	
Week eleven	2 hours	Complex numbers	Complex numbers	a lecture	,Explanation Questions ,and Answers Discussion	Written test	
The twelfth week	2 hours	Algebraic operations on complex numbers	Complex numbers	a lecture	,Explanation Questions ,and Answers Discussion	Oral exam	
thirteenth week	2 hours	Practical exercises	Complex numbers	a lecture	,Explanation Questions ,and Answers Discussion	Oral exam	
Fourteenth week	2 hours	Complex number writing formulas	Complex numbers	a lecture	,Explanation Questions ,and Answers Discussion	Oral exam	

The fifteenth week	2 hours	Practical exercises	Complex numbers	a lecture	,Explanation Questions ,and Answers Discussion	Written test
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Curriculum Development Plan
Continuously updating the curriculum to keep pace with developments in the labor market (Curriculum Update Committee, Scientific :Committee) such as

- 23– Course analysis and needs identification (review of (current learning outcomes**
- 24– Updating scientific content and diversifying teaching and learning methods**
- 25– Follow up on scientific developments and improve . evaluation methods**

Infrastructure–11

Classrooms, playgrounds and workshops	Available
31- Required textbooks	Available
32- Main References (Sources)	Thomas Calculus 12th edition George B. Thomas. Maurice D. Weir. Joel R. Hass .
ض) Recommended books and references (scientific (.journals, reports, etc	Journal of the American Mathematical Society (JAMS (.Mathematics for Science and Engineering - Author: Adnan Yousef Al-Atoum Real Analysis - Dr. Abdul Karim Adwan Introduction to Linear Algebra - Dr. Mohamed Rizk Basics of Statistics - Dr. Mohamed Fathy
ط) ,Electronic references ,websites	Khan Academy Free Interactive Lessons – Coursera Mathematics courses from prestigious universities edX Massive Open Courses – Project Euclid Access to mathematics and statistics research ArXiv Archive of Recent Research in Mathematics –

145. Course Name
Power Electronics 1
146. Course Code:
Power Electronics 1
147. Available Attendance Mode:
In-person
148. Semester / Academic Year:
Modular Courses
149. Total Study Hours:
$5 \times 15 = 75$
150. Date of Course Description Preparation:
19-06-2025
8- Name of the rapporteur
Name: Taha Abdel Salam Taha e-mail : : Taha.a.taha@ntu.edu.iq
151. Course Objectives (General Objectives):
1- To introduce students to the basic and electronic components of power systems such as transformers, thyristors, and control circuits. 2- To enable students to analyze and design power electronic circuits to achieve high performance and required efficiency. 3- To enhance students' understanding of protection techniques in power systems, such as overcurrent and electrical stress protection. 4- To link theoretical knowledge with practical and industrial applications fields such as smart grids and industrial electronics.
152. Course Learning Outcomes and Methods of Teaching, Learning, and Assessment:
Learning Outcomes: 1. Understand the components and types of power electronic circuits. 2. Analyze and diagnose the performance of power electronic circuits. 3. Design electronic systems for power control. 4. Apply protection techniques in power electronic systems. 5. Use simulation tools to analyze circuits (such as MATLAB/Simulink). 6. Work collaboratively and effectively solve engineering problems.

Course Definition:

A course that explores how electronic devices and circuits are used to efficiently control and distribute electrical energy, with a focus on analysis, design, and protection in power systems.

Course Importance:

- **Enabling precise control in electrical power systems.**
- **Improving the efficiency of power conversion and distribution.**
- **Developing skills in the design and maintenance of power electronic devices.**
- **Supporting modern industrial applications such as smart grids and electric drives.**
- **Enhancing understanding of safety and protection in power systems.**

How Objectives Are Determined:

- **Studying the needs of the current industrial and engineering market.**
 - **Reviewing relevant academic curricula and standards.**
 - **Analyzing student needs and prior knowledge in the field.**
- **Identifying the practical and theoretical skills required by the job market.**
- **Keeping up with technological advancements in the field of power electronics.**

Outcomes	Teaching and Learning Methods	Assessment Methods
Knowledge	- Theoretical lectures	- Written exams
1. Understanding power circuit components	- Reading references and books	- Short questions
2. Comprehending control and power concepts	- Presentations	- Periodic evaluations
3. Identifying protection techniques	- Case studies	- Written reports
4. Knowing basics of simulation software	- Simulation using MATLAB/Simulink	- Electronic tests
Skills	- Practical lab training	- Practical project evaluations
1. Analyzing electrical circuits	- Circuit design projects	- Project reports
2. Designing electronic systems	- Teamwork	- Presentation assessments
3. Applying protection techniques	- Classroom discussions	- Class participation evaluation

4. Using simulation tools	- Solving applied problems	- Practical performance evaluation
Evaluation	- Comprehensive content review	- Final exams
1. Measuring theoretical understanding	- Periodic tests	- Written exams
2. Evaluating practical skills	- Applied projects	- Practical performance evaluation
3. Measuring teamwork and collaboration skills	- Group activities	- Group work evaluation
4. Monitoring improvement and innovation	- Presentations and research	- Research reports and articles

Chapter One

Time Distribution	Theory	Practical	Main Title	Subtopic	Teaching Method	Technologies	Assessment Methods
Week 1	2 hours	3 hours	Power Electronics	Introduction of Power Electronics	Theoretical explanation and practical application	Use of data show, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance
Week 2	2 hours	3 hours	Power Electronics	Classification of Power Electronic Converters	Theoretical explanation and practical application	Use of data show, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance
Week 3	2 hours	3 hours	Power Electronics	Single Phase Half Wave Uncontrolled Rectifier	Theoretical explanation and practical application	Use of data show, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance

Week 4	2 hours	3 hours	Power Electronics	Single Phase Full Wave Uncontrolled Rectifier	Theoretical explanation and practical application	Use of data show, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance
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Chapter Two

Time Distribution	Theory	Practical	Main Title	Subtopic	Teaching Method	Technologies	Assessment Methods
Week 5	2 hours	3 hours	Three Phase Rectifier (uncontrolled)	Three phase half bridge uncontrolled rectifier	Theoretical explanation and practical application	Use of data show, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance
Week 6	2 hours	3 hours	Three Phase Rectifier (uncontrolled)	Three phase full bridge uncontrolled rectifier	Theoretical explanation and practical application	Use of data show, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance
Week 7	2 hours	3 hours	Three Phase Rectifier (uncontrolled)	Comparison between single phase and three phase	Theoretical explanation and practical application	Use of data show, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance

Chapter Three

Time Distribution	Theory	Practical	Subtopic	Teaching Method	Technologies	Assessment Methods
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Week 8	2 hours	3 hours	Transistor as Switch	Introduction and Operating Modes of Transistors	Theoretical explanation and practical application	Use of data show, presentation, explanation, Q&A, discussion
Week 9	2 hours	3 hours	Transistor as Switch	BJT switching time	Theoretical explanation and practical application	Use of data show, presentation, explanation, Q&A, discussion
Week 10	2 hours	3 hours	Transistor as Switch	Improving BJT Switching Time	Theoretical explanation and practical application	Use of data show, presentation, explanation, Q&A, discussion

Chapter Four

Time Distribution	Theory	Practical	Main Topics	Subtopics	Teaching Method	Technologies	Assessment Methods
Week 11	2 hours	3 hours	Field Effect Transistor	MOSFET	Theoretical explanation and practical application	Use of data show, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance

Week 12	2 hours	3 hours	Field Effect Transistor	Working Principle of MOSFET	Theoretical explanation and practical application	Use of data show, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance
Week 13	2 hours	3 hours	Field Effect Transistor	Unijunction Transistor (UJT)	Theoretical explanation and practical application	Use of data show, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance
Weeks 14 and 15	2 hours	3 hours	Field Effect Transistor	UJT Characteristics	Theoretical explanation and practical application	Use of data show, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance

10. Course Development Plan

Continuous development of educational content to keep pace with modern requirements such as:

- Integrating the latest digital technologies and tools into the course.
- Regularly updating scientific and practical information.
- Including real case studies and modern industrial applications.
- Encouraging interactive learning and practical projects.
- Reviewing and adapting content based on student feedback and labor market needs.

11. Infrastructure

Providing classrooms equipped with modern display technologies (projector, smart board). Laboratories equipped with measurement devices and power electronics circuit simulators. Practical workshops for conducting experiments and circuit design.	Classrooms, Laboratories, and Workshops
Basic books covering principles of power electronics, such as: • <i>Power Electronics</i> – Muhammad H. Rashid • <i>Power Electronics: Converters, Applications and Design</i> – Ned Mohan	Required Textbooks
Recommended books and references (scientific journals, reports, etc.): Peer-reviewed scientific journals such as IEEE Transactions on Power Electronics Technical reports from electronics and energy companies Specialized books on control and power systems	Main References (Sources)

153. Course Name
Power Electronics 2
154. Course Code:
Power Electronics 2
155. Available Attendance Mode:
In-person
156. Semester / Academic Year:
Modular Courses
157. Total Study Hours:
$5 \times 15 = 75$
158. Date of Course Description Preparation:
19-06-2025
8- Name of the rapporteur
Name: Taha Abdel Salam Taha e-mail : : Taha.a.taha@ntu.edu.iq
159. Course Objectives (General Objectives):
5- To introduce students to the basic and electronic components of power systems such as transformers, thyristors, and control circuits. 6- To enable students to analyze and design power electronic circuits to achieve high performance and required efficiency. 7- To enhance students' understanding of protection techniques in power systems, such as overcurrent and electrical stress protection. 8- To link theoretical knowledge with practical and industrial applications fields such as smart grids and industrial electronics.
160. Course Learning Outcomes and Methods of Teaching, Learning, and Assessment:
Learning Outcomes: 7. Understand the components and types of power electronic circuits. 8. Analyze and diagnose the performance of power electronic circuits. 9. Design electronic systems for power control. 10. Apply protection techniques in power electronic systems. 11. Use simulation tools to analyze circuits (such as MATLAB/Simulink). 12. Work collaboratively and effectively solve engineering problems. Course Definition: A course that explores how electronic devices and circuits are used to

efficiently control and distribute electrical energy, with a focus on analysis, design, and protection in power systems.

Course Importance:

- Enabling precise control in electrical power systems.
- Improving the efficiency of power conversion and distribution.
- Developing skills in the design and maintenance of power electronic devices.
- Supporting modern industrial applications such as smart grids and electric drives.
- Enhancing understanding of safety and protection in power systems.

How Objectives Are Determined:

- Studying the needs of the current industrial and engineering market.
 - Reviewing relevant academic curricula and standards.
 - Analyzing student needs and prior knowledge in the field.
- Identifying the practical and theoretical skills required by the job market.
- Keeping up with technological advancements in the field of power electronics.

Outcomes	Teaching and Learning Methods	Assessment Methods
Knowledge	- Theoretical lectures	- Written exams
1. Understanding power circuit components	- Reading references and books	- Short questions
2. Comprehending control and power concepts	- Presentations	- Periodic evaluations
3. Identifying protection techniques	- Case studies	- Written reports
4. Knowing basics of simulation software	- Simulation using MATLAB/Simulink	- Electronic tests
Skills	- Practical lab training	- Practical project evaluations
1. Analyzing electrical circuits	- Circuit design projects	- Project reports
2. Designing electronic systems	- Teamwork	- Presentation assessments
3. Applying protection techniques	- Classroom discussions	- Class participation evaluation
4. Using simulation tools	- Solving applied problems	- Practical performance evaluation

Evaluation	- Comprehensive content review	- Final exams
1. Measuring theoretical understanding	- Periodic tests	- Written exams
2. Evaluating practical skills	- Applied projects	- Practical performance evaluation
3. Measuring teamwork and collaboration skills	- Group activities	- Group work evaluation
4. Monitoring improvement and innovation	- Presentations and research	- Research reports and articles

Chapter One

Week	Theory Time	Practical Time	Main Title	Sub-title	Teaching Method	Techniques	Assessment Methods
Week 1	2 hours	3 hours	Amplifiers	Operational Amplifier	Theoretical explanation and practical application	Using data show device, presentation, explanation, Q&A, discussion	Daily quizzes, daily homework, student inquiries, attendance
Week 2	2 hours	3 hours	Amplifiers	Inverting Voltage Amplifier	Theoretical explanation and practical application	Using data show device, presentation, explanation, Q&A, discussion	Daily quizzes, daily homework, student inquiries, attendance
Week 3	2 hours	3 hours	Amplifiers	Non-Inverting Voltage Amplifier	Theoretical explanation and practical application	Using data show device, presentation, explanation, Q&A, discussion	Daily quizzes, daily homework, student inquiries, attendance

Week 4	2 hours	3 hours	Amplifiers	Applications of Amplifier	Theoretical explanation and practical application	Using data show device, presentation, explanation, Q&A, discussion	Daily quizzes, daily homework, student inquiries, attendance
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Chapter Two

Week	Theory Time	Practical Time	Main Title	Sub-title	Teaching Method	Techniques	Assessment Methods
Week 1	2 hours	3 hours	Amplifiers	Operational Amplifier	Theoretical explanation and practical application	Use of data show device, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance
Week 2	2 hours	3 hours	Amplifiers	Inverting Voltage Amplifier	Theoretical explanation and practical application	Use of data show device, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance
Week 3	2 hours	3 hours	Amplifiers	Non-Inverting Voltage Amplifier	Theoretical explanation and practical application	Use of data show device, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance

Week 4	2 hours	3 hours	Amplifiers	Applications of Amplifier	Theoretical explanation and practical application	Use of data show device, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance
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Chapter Three

Time Distribution	Theory	Practical	Main Title	Sub-title	Teaching Method	Techniques	Assessment Methods
Week 8	2 hours	3 hours	Thyristor Construction, Characteristics and Family	Thyristor definition and characteristics	Theoretical explanation and practical application	Use of data show device, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance
Week 9	2 hours	3 hours	Thyristor Construction, Characteristics and Family	Thyristor Family	Theoretical explanation and practical application	Use of data show device, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance
Week 10	2 hours	3 hours	Thyristor Construction, Characteristics and Family	Test	Theoretical explanation and practical application	Use of data show device, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance

Chapter Four

Time Distribution	Theory	Practical	Main Titles	Sub-titles	Teaching Method	Techniques	Assessment Methods
Week 11	2 hours	3 hours	AC to DC Converter	What is an AC/DC Converter	Theoretical explanation and practical application	Use of data show device, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance
Week 12	2 hours	3 hours	AC to DC Converter	Applications	Theoretical explanation and practical application	Use of data show device, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance
Week 13	2 hours	3 hours	AC to DC Converter	Half Wave Single Phase Controlled AC/DC Converter	Theoretical explanation and practical application	Use of data show device, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance
Weeks 14 and 15	2 hours	3 hours	AC to DC Converter	Full Wave AC/DC Converter (Resistive Load)	Theoretical explanation and practical application	Use of data show device, presentation, explanation, Q&A, discussion	Daily quizzes, daily assignments, student inquiries, attendance

10. Course Development Plan	
Continuous development of educational content to keep pace with modern requirements such as: • Integrating the latest digital technologies and tools into the course. • Regularly updating scientific and practical information. • Including real case studies and modern industrial applications. • Encouraging interactive learning and practical projects. • Reviewing and adapting content based on student feedback and labor market needs.	
11. Infrastructure	
Providing classrooms equipped with modern display technologies (projector, smart board). Laboratories equipped with measurement devices and power electronics circuit simulators. Practical workshops for conducting experiments and circuit design.	Classrooms, Laboratories, and Workshops
Basic books covering principles of power electronics, such as: • <i>Power Electronics</i> – Muhammad H. Rashid • <i>Power Electronics: Converters, Applications and Design</i> – Ned Mohan	Required Textbooks
Recommended books and references (scientific journals, reports, etc.): Peer-reviewed scientific journals such as IEEE Transactions on Power Electronics Technical reports from electronics and energy companies Specialized books on control and power systems	Main References (Sources)

a description Human Rights and Democracy Course	
1. Course Name	
Human Rights and Democracy	
2. Course Code	
NTU 100	
3. Available attendance forms	
Traditional attendance (face-to-face , (blended learning	
4. semester/year	
2025-2024 Level 1 ,First Semester	
5. Number of study hours (total(	
30hours	
6. Date this description was prepared	
2025/6/11	
8- Name of the rapporteur	
Name: Ahmed Zaki Habib	
e-mail : : AhmedZaki-Haw@ntu.edu.iq	
-8Goals Course) Objectives (Public For the decision maker(	
Introducing the student to the basic concepts of human rights and democracy .	
Promoting awareness of human values, justice, and freedom .	
Understanding the legal and international legitimacy foundations of human rights .	
Linking the principles of democracy to the practices of public and institutional life.	

9 Outputs The decision and methods education and learning and evaluation
A-Objectives cognitive Learn the basic concepts related to human rights and democracy . Analysis of legal texts related to public rights and freedoms.

B - Objectives Skills Private As scheduled .

The ability to discuss legal issues from a legal and humanitarian perspective .

Evaluating different democratic practices within the local and international context.

C-Objectives emotional and the value

Promoting human values, tolerance and acceptance of others .

Developing a sense of responsibility towards respecting rights and community participation.

-Methods education and learning

Lessons theory Intense ,Model Data with films Educational

-Evaluation methods

Commitment And perseverance on the audience ,reports , homework and exams Daily And monthly ,exam end the chapter

-Course structure: Human Rights and Democracy) theoretical vocabulary(					
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	watch es	week
Monthly exams and a final exam	theoretical	Human rights, definition, objectives .	The student should define the concept of human rights and explain their basic objectives .	2	1
Monthly exams and a final exam	theoretical	The roots of human rights and their development in human history, human rights in ancient and medieval times .	The student should explain the historical development of the idea of rights throughout the ages .	2	2
Monthly exams and a final exam	theoretical	Human rights in the civilization of Mesopotamia .	The student should explain how human rights principles appeared in ancient societies .	2	3
Monthly exams and a final exam	theoretical	Human Rights in Divine Laws, a special study of human rights in Islam .	The student should mention examples of ancient texts and laws (such as the Code of Hammurabi) that dealt with human rights .	2	4
Monthly exams and a final exam	theoretical	Human rights in the Middle Ages, rights in doctrines, schools, theories, corporations, their declarations and constitutions .	To explain how the heavenly religions dealt with human rights, especially in Islam .	2	5
Monthly exams and a final exam	theoretical	Human rights in contemporary and modern history , international recognition of human rights in the League of Nations .	The student should describe how philosophies and schools of thought have dealt with rights .	2	6
Monthly exams and a final exam	theoretical	Regional recognition of human rights, European Convention on Human Rights 1950, American Convention 1969 .	To learn about the role of the League of Nations and the United Nations in recognizing human rights.	2	7
Monthly exams and a final exam	theoretical	Introduction to Democracy - Definition of democracy - The difference between democratic and non-democratic systems	- The student should be able to distinguish between a democratic and a non-democratic system. - To learn about the characteristics of the democratic system.	2	8

Monthly exams and a final exam	theoretical	Types of democracy - Direct democracy Representative democracy - Participatory democracy	- To identify the types of democracy and their examples. - To explain the difference between them.	2	9
Monthly exams and a final exam	theoretical	Basic principles of democracy Majority rule - Rule of law - Respect for rights and freedoms	- The student should explain the basic principles of any democratic system. - To link principles to human values.	2	10
Monthly exams and a final exam	theoretical	Active citizenship - The concept of citizenship - The duties and rights of the citizen - Participation in public life	- The student should realize his role as a citizen - To express the importance of participation in public life	2	11
Monthly exams and a final exam	theoretical	Democracy and human rights - The relationship between democracy and the protection of rights - freedom of expression, assembly and organization	- To link democracy and guaranteeing rights - To analyze the importance of freedom of opinion in democratic systems	2	12
Monthly exams and a final exam	theoretical	Institutions of the democratic system - Parliament - Judiciary - Media - Civil society organizations	- To explain the functions of each institution - To understand the balance between powers	2	13
Monthly exams and a final exam	theoretical	Institutions of the democratic system Challenges facing democracy	-To explain the functions of each institution. - To discuss the obstacles to building a democratic system.	2	14-15

-Infrastructure, human rights and democracy	
Available	Classrooms
	-1Required textbooks
	-2Main references (sources(
The Human Rights Book ,Dr. Muhammad Nour Farhat Introduction to Human Rights , Dr. Mahmoud Sharif Bassiouni Democracy and Human Rights , Dr. Abdel-Ilah Belqaziz	A -Recommended books and references)Scientific journals, reports, etc(.
	B - Electronic references, Internet sites

B - Objectives Skills Private As scheduled . To form grammatically and verbally correct sentences in everyday life situations . To pronounce English words and terms correctly and clearly . To write a paragraph or a short message in correct language .
C - Objectives emotional and the value The student must show a desire to learn English and use it in his daily life . To be confident when speaking English in front of others . To appreciate the importance of the English language in his academic and professional future .
-Methods education and learning Lessons theory Intense ,Model Data with films Educational
-Evaluation methods Commitment And perseverance on the audience ,reports , homework and exams Daily And monthly ,exam end the chapter
Traditional attendance (in person (2. Blended learning
11. semester/year
2025-2024 Level 1, First Semester
12. Number of study hours (total(
30
13. Date this description was prepared
2025/6/11
8- Name of the rapporteur
Name: Ahmed Zaki Habib e-mail : : AhmedZaki-Haw@ntu.edu.iq
-8Goals Course) Objectives (Public For the decision maker(Develop basic English language skills: listening, speaking, reading, and writing . Enhancing the student's ability to use the English language in daily and professional situations . Introducing the student to the English terms related to his major .

.9 Outputs The decision and methods education and learning and evaluation
A-Objectives cognitive The student should become familiar with the basic vocabulary and terms related to daily life and his professional specialization . To distinguish between different tenses and use them in correct sentences . The student should understand the structure of the English sentence in terms of subject, verb and object .

-English language course structure (theoretical vocabulary)					
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	watch es	week
Diagnostic, formal and summative	theoretical	Unit one: hello Am/are/is, my/your This is with practice at work	Identify and use the verb am/are/is correctly in simple sentences. Use the pronouns my/ your to describe basic personal information.	2	1
Diagnostic, formal and summative	theoretical	Unit two :your world He/she /they, his/her Questions	Use subject pronouns he/she/they and possessive adjectives his/her accurately. Form and answer basic yes/no and wh - questions using “to be ”.	2	2
Diagnostic, formal and summative	theoretical	Unit three: all about	Provide simple personal information (eg, age, nationality, likes/dislikes). Respond to personal questions using correct sentence structures .	2	3
Diagnostic, formal and summative	theoretical	Unit four:family and friends Possessive adjectives Possessive's Has/have Adjective+ noun	Use possessive adjectives and possessive's to talk about relationships and belongings. Use has/have correctly with singular and plural nouns .	2	4
Diagnostic, formal and summative	theoretical	Unit Five: the way I live Present simple I/you /we /they A and an Adjective + noun	Use the present simple tense with I/you/we/they to describe routines. Use articles a/ an correctly. Create descriptive phrases using adjective + noun structure	2	5
Diagnostic, formal and summative	theoretical	Unit six: every day Present simple he/she Questions and negatives Adverbs of frequency	Use the present simple tense with he/she and form questions and negatives. Use adverbs of frequency (eg, always, usually, never) to describe daily habits.	2	6
Diagnostic, formal and summative	theoretical	Unit seven: my favorite Question words Pronouns This and that	Use question words (eg, what, who, where) to ask for specific information. Distinguish between subject and object pronouns. Use this/that to refer to objects near or far .	2	7

Diagnostic, formal and summative	theoretical	Unit eight :where I live There is /are... Prepositions	Describe a place using There is/There are and common prepositions of place. Talk about furniture, rooms, and locations using basic vocabulary .	2	8
Diagnostic, formal and summative	theoretical	Unit nine: Times past Was /were born Past simple - irregular verbs	Use was/were born to describe personal history. Recognize and use common irregular verbs in the past simple tense .	2	9
Diagnostic, formal and summative	theoretical	Unit ten: we had a great time! Past simple - regular & irregular Question Negatives Ago	Use past simple tense for both regular and irregular verbs to describe past events. Form questions and negatives in the past tense. Use the time expression ago to talk about past events .	2	10
Diagnostic, formal and summative	theoretical	Unit eleven: I can do that! Can /can't Adverbs Requests	Use can/can't to express ability and permission. Use adverbs to describe how something is done (eg, quickly, well). Make and respond to simple requests .	2	11
Diagnostic, formal and summative	theoretical	Unit twelve: Please I'd like... Some and any Like and would like and thank you	Use some/any in affirmative and negative sentences. Express preferences using like and would like. Practice polite expressions such as thank you, please, I'd like ...	2	12
Diagnostic, formal and summative	theoretical	Unit thirteen: here and now Present continuous Present simple & present continuous	Use the present continuous tense to describe current actions. Distinguish between present simple and present continuous in context .	2	13
Diagnostic, formal and summative	theoretical	It's time to go! Future plans Revision writing email and informant letter	Make and talk about future plans using simple future expressions (eg, going to). Review and consolidate key grammar and vocabulary from previous units. Write an email and an informal letter using appropriate format and language .	2	14-15

-English language infrastructure	
Available	Classrooms ,laboratories and workshops
	-1 Required textbooks
	-2 Main references (sources(
New Headway (Beginner to Pre-Intermediate) Liz and John Soars - Oxford Cutting Edge Longman/Pearson	A -Recommended books and references)Scientific journals, reports, etc(.
https://learnenglish.britishcouncil.org	B - Electronic references, Internet sites

Arabic language course description	
14. Course Name	Arabic Language
15. Course Code	NTU 104
16. Available attendance forms	Traditional attendance (in person (2. Blended learning
17. semester/year	2025-2024 Level 1 ,First Semester
18. Number of study hours (total(	30
19. Date this description was prepared	2025/6/11
8- Name of the rapporteur	
Name: Ahmed Zaki Habib e-mail : AhmedZaki-Haw@ntu.edu.iq	
-8Goals Course) Objectives (Public For the decision maker(This course aims to develop students' language skills in understanding ,expression, and writing in Modern Standard Arabic, enabling them to use the language correctly in academic and professional contexts, with a focus on written and oral communication skills in the workplace.	

.9 Outputs The decision and methods education and learning and evaluation

A- Objectives cognitive

Explains the basic rules of the Arabic language) grammar, morphology, spelling (.)

Distinguish between types of texts and linguistic structures .

Defines correct styles in formal writing.

B - Objectives Skills Private As scheduled .

Writes grammatically and spelling correctly .

Writes professional letters and reports in correct language .

He speaks Modern Standard Arabic in formal situations .

C- Objectives emotional and the value Shows interest in improving his language skills . He is committed to using the Arabic language in a professional and respectful manner . It enhances his pride in his Arabic language as a language of communication and identity.	
-Methods education and learning	
Lessons theory Intense ,Model Data with films Educational	
-Evaluation methods	
Commitment And perseverance on the audience ,reports , homework and exams Daily And monthly ,exam end the chapter	

-The structure of the Arabic language course (theoretical vocabulary(					
Evaluation method	Teaching method	Unit name/topic	Required learning outcomes	watch es	week
My formation and conclusion	theoretical	Introduction to Grammatical Mistakes - The Closed Taa, The Long Taa, and The Open Taa	Distinguish between the closed taa, the open taa, and the long taa in terms of form and function . Corrects common mistakes in using different ta's in Arabic words .	2	1
My formation and conclusion	theoretical	Rules for writing the extended and shortened alif - solar and lunar letters	Distinguish between the extended alif (a) and the shortened alif (i) in terms of written usage . It applies the rules for writing the letter Alif according to its position and linguistic origin .	2	2
My formation and conclusion	theoretical	Dad and Tha	Defines the solar and lunar letters . The definite article" al "is used correctly depending on the type of the first letter in the word.	2	3
My formation and conclusion	theoretical	Writing the hamza	Distinguish between the sounds of the letters Dad and Dha in terms of pronunciation and usage . Corrects common mistakes in writing words that contain one of the two letters.	2	4
My formation and conclusion	theoretical	punctuation marks	He recognizes the types of hamzas (disconnected, connected, medial, extreme (.	2	5

			Apply the correct spelling rules for writing the hamza in its various positions.		
My formation and conclusion	theoretical	Noun, verb, and the difference between them	Identify the types of punctuation marks and their uses . Use punctuation accurately in writing to improve clarity of meaning .	2	6
My formation and conclusion	theoretical	Effects	Distinguish between noun and verb in terms of meaning and structure . Classifies words in sentences according to their type: noun, verb, or particle.	2	7
My formation and conclusion	theoretical	Number	Explains the types of objects and their functions in the sentence . Analyze sentences to extract different objects	2	8
My formation and conclusion	theoretical	Common language errors applications	Distinguish between numbers in terms of type (singular, compound, conjoined) and agreement . Uses number and countable rules correctly in different contexts.	2	9
My formation and conclusion	theoretical	Noon and Tanween - Meanings of Prepositions	Identify the most common linguistic errors in writing and expression . Corrects common language errors through practical activities and models.	2	10
My formation and conclusion	theoretical	Formal aspects of administrative discourse	Distinguish between the letter noon and tanween in terms of pronunciation and function . Explains the meanings of prepositions in different contexts	2	11
My formation and conclusion	theoretical	Language of administrative discourse	Learn the basic formal components of administrative letters . Adhere to the formal elements when writing an administrative letter (header, address, date ,signature, etc.(.	2	12
My formation and conclusion	theoretical	Introduction to Grammatical Mistakes - The Closed Taa, The Long Taa, and The Open Taa	Uses formal and direct language that is appropriate to the nature of administrative discourse . Avoid slang and grammatical errors when writing formal letters.	2	13-14

My formation and conclusion	theoretical	Examples of administrative correspondence	Analyzes various forms of administrative correspondence (request, complaint, report , etc (.. Writes administrative correspondence forms in a correct manner in terms of form and content.	2	15
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-Arabic language infrastructure	
Available	Classrooms
	-1 Required textbooks
	-2 Main references (sources(
	A -Recommended books and references)Scientific journals, reports, etc(.
	B - Electronic references, Internet sites