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

Academic Program and Course Description Guide

2024

Introduction:

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

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

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

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

Concepts and terminology:

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

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

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

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

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

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

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

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

Academic Program Description Form

University Name: .... Al-Furat Al-Awsat Technical University....
Faculty/Institute: .... Technical Institute Kufa....
Scientific Department: .. Electrical technologies....
Academic or Professional Program Name: Diploma in Electrical Technologies
Final Certificate Name: .... Technical Diploma....
Academic System: … Annual system …
Description Preparation Date: 18/2/2024
File Completion Date: 29/2/2024

Signature:
Head of Department Name:
Hashem Dahir Muhammad
Date:

Signature:
Scientific Associate Name:
Ammar Jaber Kadhim
Date:

The file is checked by:
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department:
Date:
Signature:

Approval of the Dean

1. **Program Vision**
The Department of Electrical Technologies should be better and in continuous progress so that we can graduate skilled and professional technicians in their field of work.

2. **Program Mission**
Graduating technicians with good competencies in the field of advanced electrical technologies after completing the application so that they are able to teach in higher institutes and manage scientific laboratories in electrical power distribution stations.

3. **Program Objectives**
The department aims to graduate technical personnel qualified to carry out the work of operating and maintaining electrical units in stations for generating, transmitting and distributing electrical energy and maintaining the prevention and control devices in the electrical energy system.

4. **Program Accreditation**
Engineering specializations ABET

5. **Other external influences**
There is a close relationship with the job market that needs our graduates

6. **Program Structure**

Program Structure	**Number of Courses**	**Credit hours**	**Percentage**	**Reviews***
Institution Requirements				
College Requirements				
Department Requirements	**18**	**127**	**50%**	**Basic**
Summer Training	**1**	**4**	**50%**	**Basic**
Other				

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

7. Program Description

Year/Level	**Course Code**	**Course Name**	**Credit Hours**	
			theoretical	**practical**

The first stage	**RELEC1001**	**Electrical circuits and measurements**	**2**	**2**
The first stage	**RELEC1002**	**Electrical installations**	**2**	**2**
The first stage	**RELEC1003**	**electronics**	**2**	**2**
The first stage	**RELEC1004**	**Labs**	**-**	**6**
The first stage	**RELEC1005**	**mathematics**	**2**	**-**
The first stage	**RELEC1006**	**computer applications**	**1**	**2**
The first stage	**RELEC1007**	**Engineering and electrical drawing**	**-**	**3**
The first stage	**RELEC1008**	**Human rights and democracy**	**2**	**-**
The first stage	**RELEC1009**	**Occupational safety**	**2**	**-**
The first stage	**RELEC10010**	**Digital electronics**	**1**	**2**
The first stage	**RELEC10011**	**English Language**	**2**	**-**
The second stage	RELEC2001	Electrical machines	2	3
The second stage	RELEC2002	electrical networks	2	3
The second stage	RELEC2003	power electronics	2	3
The second stage	RELEC2004	Maintenance laboratories workshop	-	4
The second stage	RELEC2006	computer applications	1	2
The second stage	RELEC2007	The project	-	2
The second stage	RELEC2008	electrical drawing	-	3
The second stage	RELEC2009	Programmable logic control (PLC)	1	2
The second stage	RELEC20010	English language	2	-

8. Expected learning outcomes of the program	
Knowledge	
1- The ability to establish electricity and maintain electrical appliances. 2- The ability to draw electrical maps using AutoCAD. 3- The ability to carry out electrical maintenance work. 4- Teaching leadership skills, the value and quality of commitment, ethical behavior and respect for others.	1- The student must be familiar with the basics of the required technology. 2- That the student understands the required scientific and technical details. 3- The student should analyze and solve practical problems.
Skills	
1- Be able to install and operate electrical machines. 2- Be able to conduct laboratory experiments 3- The ability to maintain	1- Good knowledge of the principles of electrical technologies associated with them. 2- Technical ability in his field of work.

laboratory equipment. 4- Implementing sections of electrical works projects. 5- Calculating the amounts of electricity disbursed	
Learning Outcomes 3	Learning Outcomes Statement 3
Ethics	
1- The ability to work within a team 2- The ability to communicate effectively. 3- The ability to adapt to similar specializations (communications - computers - electronics) 4- Effective influence on society and the labor market through training and development programs related to specialization and at various levels.	1- Commitment to the ethics of the educational institution. 2- Receiving information and cognitive acceptance
Learning Outcomes 5	Learning Outcomes Statement 5

9. **Teaching and Learning Strategies**
Lectures, laboratories, workshops, summer training, projects.

10. Evaluation methods
1- Exams. 2- Writing and submitting reports. 3- Scientific discussions. 4- For attendance and daily activities.

11. Faculty

Faculty Members

Academic Rank	**Specialization**		**Special Requirements /Skills (if applicable)**		**Number of the teaching staff**	
	General	**Special**			**Staff**	**Lecturer**
Hashem Dahir Muhammad	**Electrical engineering**	**Electrical power engineering**			✓	

Seham Abdul Hussein Massan	**Communications Engineering**	**Digital systems and computer electronics**			✓	
Ali Abdel Yasir Kadhim	**Electrical engineering**	**Electrical power engineering**			✓	
Monther Muhammad	**General electricity**	**The control**			✓	
Ammar Jaber Kadhim	**Physics**	**Nanotechnology**			✓	
Nizar Abadi Habib	**Computer Engineering**	**Computer Engineering**			✓	
Nasser Muhammed Hussain	**Communications Engineering**	**Communications Engineering**			✓	
Sameer Moein Mohamed	**General Electrical**	**Electrical installations**			✓	
Alaa Jasim Kadhim Mohammed	**Technical engineering**	**Computer communication networks**			✓	
Nabil Hilal Taleb	**General Electrical**	**General Electrical**			✓	
Salah Youssef Harb	**General Electrical**	**General Electrical**			✓	
Fadhila Jaber Badan	**General Electrical**	**Network Electric**			✓	
Khansa Abdul-Reza Sughair	**General Electrical**	**Network Electric**			✓	
Zainab Hadi Muhammad	**Accounting**	**Accounting**			✓	
Kabila Abd ALZahra Murza	**General Electrical**	**Network Electric**			✓	
Mona Abd AL Amir Mahmoud	**General Electrical**	**General Electrical**			✓	
Russell Salim Abd	**Electrical engineering**	**General Electrical**			✓	

ALShaheed						
Mustafa Rahman Abd Alabbas	**General electricity**	**Electrical Power**			✓	
Zahraa Ahmed Ghani	**Electronic and Communication Engineering**	**Electronic and Communication Engineering**				✓
Hayder khenyab hashim	**Electrical engeneering**	**communications system**				✓
Asmaa jasim kadhum	**Mechatronics**	**Mechatronics**				✓

Professional Development
Mentoring new faculty members
Directing new faculty members to the necessity of working on developing the scientific method, methods of delivering scientific lectures, and how to deliver practical material to the student in the easiest interactive ways.
Professional development of faculty members
Working to develop realistic, practical ideas, working to develop scientific laboratories, and paying more attention to the practical side, as the students' specialization is a technical specialization.

12. **Acceptance Criterion**
- Students graduating from professional preparatory schools in the corresponding specialization (electronics - general electricity - computer - refrigeration and air conditioning) are accepted from the program, as the student who graduated from the corresponding specialization is accepted into the program in the first stage. **- Must be a graduate of the same academic year.** **- He must not be an employee.** **- Distinguished Employees Channel.** **1- The student must not be more than forty years old.** **2- He has actual service for the two years preceding the year of admission.** **3- His registration must not be regulated and he must not have been accepted by other admission channels.** **4- An employee accepted into technical institutes must have an average of not less than (60%) in preparatory studies in its branches (scientific, vocational).**

13. **The most important sources of information about the program**
1- Books prescribed by the Ministry of Higher Education and Scientific Research 2- Accredited external scientific sources 3- Use of libraries and the Internet

14. Program Development Plan
The department has a well-thought-out methodology in order to develop the department and achieve the goals of the university and the institute, as the department presidency, the department council, and the scientific committee work to provide all the requirements for developing the department.

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
2024-2023 The first stage	RELEC1001	Electrical circuits and measurements	Basic	✓				✓				✓			✓
	RELEC1002	Electrical installations	Basic	✓		✓		✓				✓		✓	✓
	RELEC1003	electronics	Basic	✓		✓		✓			✓	✓		✓	✓
	RELEC1004	labs	Basic	✓	✓		✓				✓		✓	✓	✓
	RELEC1005	mathematics	Assist	✓				✓							✓
	RELEC1006	computer applications	Assist		✓	✓			✓	✓		✓	✓		✓
	RELEC1007	Engineering and electrical drawing	Basic		✓	✓			✓	✓		✓	✓		✓
	RELEC1008	Human rights and democracy	Assist				✓						✓		✓
	RELEC1009	Occupational safety	Assist				✓						✓		✓
	RELEC10010	Digital	Basic	✓	✓				✓	✓	✓	✓	✓	✓	✓

		electronics													
	RELEC10011	English Language	**Assist**	✓	✓					✓	✓	✓	✓	✓	✓
2024-2023 **The second stage**	**RELEC2001**	**Electrical machines**	**Basic**	✓				✓	✓		✓	✓	✓	✓	✓
	RELEC2002	**electrical networks**	**Basic**	✓		✓		✓	✓		✓	✓	✓	✓	✓
	RELEC2003	**power electronics**	**Basic**	✓				✓	✓		✓	✓	✓	✓	✓
	RELEC2004	**Maintenance laboratories workshop**	**Basic**	✓			✓	✓	✓		✓	✓	✓	✓	✓
	RELEC2005	**Industrial establishments**		✓		✓		✓	✓		✓	✓	✓	✓	✓
	RELEC2006	**computer applications 2**	**Assist**		✓					✓		✓	✓	✓	✓
	RELEC2007	**The project**	**Basic**	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
	RELEC2008	**Electrical drawing**	**Basic**		✓	✓				✓		✓	✓	✓	✓
	RELEC2009	**Programmable logic control (PLC)**	**Basic**	✓	✓			✓	✓	✓		✓	✓	✓	✓
	RELEC20010	**English Langauge**	**Assist**	✓	✓					✓	✓	✓	✓	✓	✓

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

Course Description Form

1. Course Name:	
Electrical circuits and measurements	
2. Course Code:	
RELEC1001	
3. Semester / Year:	
Annual	
4. Description Preparation Date:	
5/7/2021	
5. Available Attendance Forms:	
Theoretical lectures, practical lectures	
6. Number of Credit Hours (Total) / Number of Units (Total)	
120 annual hours (60 theoretical hours, 60 practical hours)	
7. Course administrator's name (mention all, if more than one name)	
Name: Asmaa jasim kadhum Email: asmaajasim@atu.edu.iq	
8. Course Objectives	
Course Objectives	**1. Introducing the student to the foundations of electrical engineering.** **2. Introducing the student to the terms used in electrical circuits.** **3. Introducing the student to how to connect electrical circuit components and use devices to measure electrical quantities.** **4. Introducing the student to the laws and theories used in simplifying and solving direct current and current electrical circuits Alternating.** **5. Introducing the student to the components of the electrical system.** **6. Introducing the student to the principles of parts of electrical circuits, how to deal with each part, and calculate voltage, current, and power Concerning the types of electrical loads (resistive, inductive, or capacitive).**
9. Teaching and Learning Strategies	
Strategy	**1. Using modern means to present the theoretical and practical aspects, such as electronic display devices Different ways to attract attention and attract students so that the idea reaches the student better.** **2. Giving students extracurricular assignments that require the use of skills and self-explanations in experimental ways.** **3. Interrogating students through discussion sessions by asking intellectual questions (how, why, when, Where, which) for specific topics.** **4. Using brainstorming and feedback methods in order to activate the accumulated experiences of students By linking the academic subjects taken in the previous academic levels and linking them to the new ones.** **5. Providing students with practical skills by conducting**

		practical experiments on laboratory equipment.			
10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
First	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**The system of units used in electricity and units of measurement for each substance (its parts and multiples) Mathematical applications for converting values using units. Defining the basic units of voltage, current and resistance - electrical circuit components - Ohm's law - factors affecting resistance value - specific resistance of conductive and insulating materials.**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Second	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**DC circuits include: 1- Connecting resistors in series with examples 2- Connecting resistors in parallel with examples 3- Mixed connection of resistors with examples 4- Star and trigonometric connections (Y / Δ) of resistors and conversion from each to the other, with examples.**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Third	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Applications on series, parallel, mixed interconnect, star and triangular circuits**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Fourth	**2**	**The**	**a. Kirchhoff's Laws -**	**Lecture**	**1-Direct**

		student must be able to understand and solve scientific problems related to the lesson	Definition of Kirchhoff's Laws for Current and Voltage with Questions Answered b. Maxwell solution with examples		evaluation . 2-Exams (written + practical)
Fifth	2	The student must be able to understand and solve scientific problems related to the lesson	1. Thevenin's Theorem - Definition of Theory - How to apply it in DC circuits 2. Norton's theory - definition of the theory - how to apply it in DC circuits	Lecture	1-Direct evaluation . 2-Exams (written + practical)
Sixth	2	The student must be able to understand and solve scientific problems related to the lesson	Applications to Thevenin and Norton Theorem	Lecture	1-Direct evaluation . 2-Exams (written + practical)
Seventh	2	The student must be able to understand and solve scientific problems related to the lesson	Matching theory - definition of the theory - steps to apply it in solving direct current circuits that contain more than one source - solving examples Definition of current source and voltage source (continuous power distributor) and how to convert from one to the other - The theory of transferring the greatest possible power - Definition of the theory and derivation of its relations - Application examples	Lecture	1-Direct evaluation . 2-Exams (written + practical)
Eighth	2	The student	Alternating quantities, including - their	Lecture	1-Direct evaluation

		must be able to understand and solve scientific problems related to the lesson	definition, the characteristics of alternating current - how to generate alternating current, its waveform and its relations - the definition of the effective value (RMS) and the average value and their relations to find the formation factor and the value factor for irregular waveforms with applied examples		. 2-Exams (written + practical)
Ninth	2	The student must be able to understand and solve scientific problems related to the lesson	Alternating vector quantities - their definition - phase and directional representation of them - phase angle and how to find them - finding the resultant of vector quantities including multiplication, division, addition and subtraction - with applied examples	Lecture	1-Direct evaluation . 2-Exams (written + practical)
The tenth	2	The student must be able to understand and solve scientific problems related to the lesson	Study the effect of alternating current on a circuit that contains only resistance, a circuit that contains only pure inductance - a circuit that contains only pure capacitance - find a phase angle between voltage and current for each circuit with an example solution	Lecture	1-Direct evaluation . 2-Exams (written + practical)
Eleventh	2	The student must be able to understand and solve scientific problems related to the lesson	The effect of alternating current on a circuit containing resistance and inductance, respectively -A circuit containing a resistance and a capacitor in series -A circuit that contains resistance, inductance, and capacitance in series -Finding the	Lecture	1-Direct evaluation . 2-Exams (written + practical)

			relationship between current and voltage in the three cases-Phase angle-The total impedance of the circuit with applied examples.		
Twelveth	2	The student must be able to understand and solve scientific problems related to the lesson	The effect of alternating current on a circuit containing resistance and inductance in parallel -A circuit containing a resistor and a capacitor in parallel -A circuit containing resistance, inductance, and capacitance in parallel - Finding the relationship between current and voltage in the three cases -Phase angle - definition and how to find it- Find the impedance – Permittivity with .application examples	Lecture	1-Direct evaluation . 2-Exams (written + practical)
Thirteenth	2	The student must be able to understand and solve scientific problems related to the lesson	1-7 (J- Use profile Operator) or the composite operator to find the total impedance, total permittivity, current, voltage and phase angle for circuits connecting impedances in series and in parallel with a solution of examples	Lecture	1-Direct evaluation . 2-Exams (written + practical)
fourteenth	2	The student must be able to understand and solve scientific problems related to the lesson	Resonance circuits, including – series resonance circuit – defining the state of resonance and how to access it – calculating the current, voltage, impedance and frequency angle at resonance – finding the width of the beam – finding the quality factor – and drawing the relationship	Lecture	1-Direct evaluation . 2-Exams (written + practical)

			between inductive reactance and capacitive reactance with frequency – solving examples		
Fifteenth	2	The student must be able to understand and solve scientific problems related to the lesson	Parallel resonance circuit - its definition - calculate the current, voltage, impedance, impedance angle, phase angle and resonant frequency - find the width of the beam - and draw graphic relations with the frequency - find the quality factor - solve examples	Lecture	1-Direct evaluation . 2-Exams (written + practical)
Sixteen	2	The student must be able to understand and solve scientific problems related to the lesson	Application of theories such as Norton's theory and Theven's theory and congruence on alternating current circuits, with examples	Lecture	1-Direct evaluation . 2-Exams (written + practical)
Seventeenth	2	The student must be able to understand and solve scientific problems related to the lesson	Power in alternating current circuits, including power calculation in circuits containing resistance only, circuits containing inductance only, circuits containing capacitance only, circuit containing resistance, inductance, and capacitance in series and parallel, definition of active power and how to calculate it, passive power, and how to calculate it	Lecture	1-Direct evaluation . 2-Exams (written + practical)
Eighteen	2	The student must be able to understand and solve	Total apparent power (its definition) - How to draw the power triangle - Power factor - Its definition and impact on alternating current	Lecture	1-Direct evaluation . 2-Exams (written + practical)

		scientific problems related to the lesson	circuits - How to improve the power factor - With applied examples		
Nineteenth	2	The student must be able to understand and solve scientific problems related to the lesson	The theory of transferring the greatest possible power in alternating current circuits - the derivation of its relations - with applied examples	Lecture	1-Direct evaluation . 2-Exams (written + practical)
Twentieth	2	The student must be able to understand and solve scientific problems related to the lesson	Practical methods for measuring resistors with high, medium and small values - using an ohmmeter in series and parallel - the ammeter and voltmeter method - the compensation method - using the Wheatstone bridge - the voltage divider method - the switching method - with solving examples for each method	Lecture	1-Direct evaluation . 2-Exams (written + practical)
Twenty first	2	The student must be able to understand and solve scientific problems related to the lesson	Alternating current circuits with three phases - its definition and how to generate alternating current one phase - two phases - three phases - with drawing each circuit of the star and triangle connections in alternating current circuits with three phases and the special relations for calculating current, line voltages, phase, total capacity and line capacity - phase capacity – Characteristics of each link when used in balanced and unbalanced loads, with an example solution	Lecture	1-Direct evaluation . 2-Exams (written + practical)

Twenty tow	2	The student must be able to understand and solve scientific problems related to the lesson	Solve practical examples about alternating current with (three phases) triangular and star connections with balanced and unbalanced loads	Lecture	1-Direct evaluation . 2-Exams (written + practical)
Twenty third	2	The student must be able to understand and solve scientific problems related to the lesson	Methods of measuring power for loads with three phases - the wattmeter device, how to connect it to the circuit to measure the active power - and calculate the inactive power and the apparent power with an example solution Measuring power using a wattmeter and voltage - how to find the total power in this way and in the case of star and triangular connections - using two wattmeters - using three wattmeters	Lecture	1-Direct evaluation . 2-Exams (written + practical)
Twenty fourth	2	The student must be able to understand and solve scientific problems related to the lesson	Magnetism - magnetic circle - introduction to magnetism, north and south poles - types of magnetic materials - basic characteristics of magnetic materials and their definition, include magnetic field - magnetic flux - magnetic driving force - magnetic flux density and factors affecting magnetic flux - permeability and its impact - magnetic circuits and the application of Kirchhoff's laws on it.	Lecture	1-Direct evaluation . 2-Exams (written + practical)
Twenty fifth	2	The student must be	Solve practical examples on magnetism	Lecture	1-Direct evaluation . 2-Exams

		able to understand and solve scientific problems related to the lesson			(written + practical)
Twenty sixth	2	The student must be able to understand and solve scientific problems related to the lesson	The coil's self-inductance (electromagnetic induction) - its definition - the special relationships to find the coil's self-inductance - the mutual induction between two coils - and the relationships to find the mutual induction according to the type of connection of the two coils, including: Connect Series, Mutual and opposite	Lecture	1-Direct evaluation . 2-Exams (written + practical)
Twenty seventh	2	The student must be able to understand and solve scientific problems related to the lesson	Curves of growth and decay of the current in the inductive circuit - explanation of this circuit and its effect on direct current - the general relationship of growth and decay of the current in the coil - drawing the current and calculating the time constant - solving examples Charging and discharging capacitors, including the use of capacitors in DC circuits, the general relationship for charging and discharging capacitors, the current figure - the effect of the time constant with its calculation - examples solution	Lecture	1-Direct evaluation . 2-Exams (written + practical)
Twenty eighth	2	The student	Measuring devices, including - types of	Lecture	1-Direct evaluation

		must be able to understand and solve scientific problems related to the lesson	**measuring devices - the nature of their work - measuring devices with a moving coil - its installation and use in measuring voltage and current, with mentioning its advantages and disadvantages and drawing the device**		**. 2-Exams (written + practical)**
Twenty ninth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**The measuring device with an iron core - its composition and how to use it in measurement - its advantages and disadvantages and drawing a diagram of the device**	**Lecture**	**1-Direct evaluation . 2-Exams (written + practical)**
Thirty	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Wattmeter measuring devices - its composition - device diagram - its arrangement in the electric circuit to measure power - moment equations - its advantages - disadvantages - the oscilloscope device - device drawing - its structure - how to operate and use it**	**Lecture**	**1-Direct evaluation . 2-Exams (written + practical)**

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	1- Introductory Circuit Analysis (Tenth Edition) By BOYLESTED 2-Fundamentals of Electric Circuits (Tenth Edition) By Charles K. Alexander and Matthew N. O. Sadiku
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Electrical installations
2. Course Code:
RELEC1002
3. Semester / Year:
Annual
4. Description Preparation Date:
5/7/2021
5. Available Attendance Forms:
Theoretical lectures, practical lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
120 annual hours (60 theoretical hours, 60 practical hours)
7. Course administrator's name (mention all, if more than one name)
Name: **Ali Abdel Yasir Kadhim** Email: kin.ali@atu.edu.iq
8. Course Objectives

Course Objectives	**To introduce the student to the various electrical installation systems.** **The student will be able to identify electrical materials and wiring systems used in laboratories and homes, establish and install electrical machines, and methods of controlling and protecting various loads during the establishment.**
9. Teaching and Learning Strategies	
Strategy	**1. Using modern means to present the theoretical and practical aspects, such as electronic display devices Different ways to attract attention and attract students so that the idea reaches the student better.** **2. Giving students extracurricular assignments that require the use of skills and self-explanations in experimental ways.** **3. Interrogating students through discussion sessions by asking intellectual questions (how, why, when, Where, which) for specific topics.** **4. Using brainstorming and feedback methods in order to activate the accumulated experiences of students By linking the academic subjects taken in the previous academic levels and linking them to the new ones.** **5. Providing students with practical skills by conducting practical**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	**2**	**The student must be able to understand and solve**	**An overview of the subject's curriculum vocabulary and scientific sources from methodological and auxiliary books**	**Lecture**	**1-Direct evaluation.** **2-Exams (written + practical)**

		scientific problems related to the lesson	- Classification of materials into: • Conductor electrical materials • Semiconductors • Insulators		
Second	2	The student must be able to understand and solve scientific problems related to the lesson	Principles of electricity - Potential difference, current intensity, electric current intensity (amps), factors affecting the intensity of the electric current, resistance, factors affecting resistance. - Electrical circuit components source, types of electrical sockets, wires and their types, electrical loads of all kinds - Switches, their types, protective equipment, junction boxes Electric lamps, their types and uses	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Third	2	The student must be able to understand and solve scientific problems related to the lesson	Electrical conductive materials. - Copper Cupper - Electrical properties of copper - Mechanical properties of copper - Aluminum - Electrical properties of aluminum - Mechanical properties of aluminum - Their advantages and uses in the field of electricity High-resistance alloys – properties that make them good elements for electrical uses	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Fourth	2	The	Insulation Materials	Lecture	1-Direct

		student must be able to understand and solve scientific problems related to the lesson	Examples of insulating materials - air, oil, their properties and uses - Properties of insulating materials in relation to their tolerance to temperature - Solid insulating materials (cotton, paper, asbestos, glass fabric, industrial tissues and films, mica, other materials), permittivity (dielectric constant), laws and solved examples		evaluation. 2-Exams (written + practical)
Fifth	2	The student must be able to understand and solve scientific problems related to the lesson	Magnetic properties of materials - Magnetic force, types of magnetic materials, associated terms - magnetic properties - laws related to magnetism - Solved examples	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Sixth	2	The student must be able to understand and solve scientific problems related to the lesson	Magnetic circuits - Applying Kirchhoff's laws to it. Solved examples of magnetism-	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Seventh	2	The student must be able to understand and solve scientific problems related to the lesson	Mechanical properties of electrical materials - Tensile, stress, elongation, elasticity, others - Solved examples	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Eighth	2	The	The stages that	Lecture	1-Direct

		student must be able to understand and solve scientific problems related to the lesson	electrical energy passes through - Electrical power generation (a brief overview of the types of generating stations) - Electrical energy transmission (systems used, advantages and disadvantages) - Raising and lowering secondary stations and their capacities -Distribution of electrical energy (systems used) of various types		evaluation. 2-Exams (written + practical)
Ninth	2	The student must be able to understand and solve scientific problems related to the lesson	- Initial principles on how to prepare a consumer from a secondary station, the materials needed for that, and the type of consumer - Home and industrial distribution panels (installation and connection) - How to supply a large building with electricity, with an example - Capacity of the electrical transformers used (KVA) and their locations in the electrical network -Diagrams and solved examples	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Tenth	2	The student must be able to understand and solve scientific	Types of switches used in electrical installations and their importance - Traditional Toggle Switch (single-pole, two-way, middle,	Lecture	1-Direct evaluation. 2-Exams (written + practical)

		problems related to the lesson	two-pole, three-way) - Push button switch - Other (from recently used) -Draw electrical circuits containing these switches in complete circuits		
Eleventh	2	The student must be able to understand and solve scientific problems related to the lesson	Protection devices used in electrical installations (fuses) - Definition of (fuse, rated current, fusing current, fusing coefficient, expected current and cutting current, fusing time, arc duration time, total operating time) - Types of fuses with the advantages and disadvantages of each, how to choose a fuse -Coordination between breakers in the same electrical circuit	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Twelveth	2	The student must be able to understand and solve scientific problems related to the lesson	Circuit Breakers With its composition and working principle (Magnetic Circuit Breakers) - Magnetic Circuit Breakers With its working principle (Magnetic and Thermal Circuit Breakers) - - Miniature Circuit Breaker (MCB) installation and wiring - Earth leakage circuit breaker (ELCB) installation and working theory - How to distribute loads within the building through the used distribution	Lecture	1-Direct evaluation. 2-Exams (written + practical)

			panel and calculate the breaker capacity		
Thirteenth	2	The student must be able to understand and solve scientific problems related to the lesson	Electrical Wiring Systems - B.B. non-insulated conductor system, T.R.S. strong rubber strapping system - System of conductors insulated with (P.V.C), system of conductors insulated with (P.C.P), wiring system inside plastic pipes and the necessary equipment for that, numbering of wires and cables at work, taking into account the colors of the wires when installing	Lecture	1-Direct evaluation. 2-Exams (written + practical)
fourteenth	2	The student must be able to understand and solve scientific problems related to the lesson	Domestic electrical installations Types of home electrical installations, advantages and disadvantages of each, safety conditions, cost, required durability, and the general appearance and shape of the establishment. – Tools used in home construction - Establishing laboratories and workshops and calculating the cost	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Fifteenth	2	The student must be able to understand and solve scientific problems	Grounding - Grounding Components (Earth resistance, Earth Resistivity, Grounding Electrode, Bonding Equipment)	Lecture	1-Direct evaluation. 2-Exams (written + practical)

		related to the lesson	**- Different methods to reduce grounding resistance - Devices and equipment that must be grounded -The Importance of Grounding -The difference between a grounded and ungrounded system, grounding measurement methods**		
Sixteen	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Lightning Rod Lighting Rod - Lightning, the importance of the lightning rod, components of the lightning rod - Important matters when designing a lightning rod -Equipment and structures that must be protected from lightning strikes**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Seventeenth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Electric shock - Its definition and causes, the relationship of the amount of voltage and current difference to the shock, the path of the current, the intensity of the current passing through the body, the time of passage of the current, and the causes of electric shock. - General rules for safety from shock and post-shock procedures - Factors on which the effect of electric current in the body**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**

			depends -Preventive measures that can be taken to protect against electrical hazards		
Eighteen	2	The student must be able to understand and solve scientific problems related to the lesson	Protection against ground leakage current Earth leakage current circuit breaker - Earth leakage voltage circuit breaker -Places of installation of shock leakage protection breakers (ElCB): Determine the breaker capacity according to the load	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Nineteenth	2	The student must be able to understand and solve scientific problems related to the lesson	Single and three phase kwh meter - The theory of work, connection (wiring), installation, how to read, and install the meter - Means of adjusting the counter in case of errors (speed - creep - light load) -The smart meter - its components and how to connect and read it	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Twentieth	2	The student must be able to understand and solve scientific problems related to the lesson	Inspection and testing of domestic and industrial electrical installations - Probe checking for polarity, insulation resistance test, toroidal circuit continuity test - How to find faults in cables feeding electrical installations (cuts - seams - all types) -Determine the	Lecture	1-Direct evaluation. 2-Exams (written + practical)

			location of the ground fault in conductors using the Murray loop		
Twenty first	2	The student must be able to understand and solve scientific problems related to the lesson	Alarm and warning circuits - circuit components (bells), push-button switches - heat, flame and smoke detectors, indicators, power source, connectors and connectors and their specifications.	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Twenty tow	2	The student must be able to understand and solve scientific problems related to the lesson	Alarms and protection devices (open - closed) against fire and theft - Internal and external surveillance systems (cameras), fire alarm and detection systems - Laser lighting applications • Optical fiber lighting • Sound lighting systems	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Twenty third	2	The student must be able to understand and solve scientific problems related to the lesson	-The calling system used in hotels, restaurants and hospitals -Internal communication system -Signal system in departments and hospitals	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Twenty fourth	2	The student must be able to understand and solve scientific problems related to the lesson	DC Motors - Structure - Theory of Action - Classification - DC motor applications -How to do wiring and solved mathematical examples	Lecture	1-Direct evaluation. 2-Exams (written + practical)

Twenty fifth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**AC Motors** **- Single phase motor (construction - work theory - types) Single phase induction motor** **- Three phase motor (construction - work theory - types) Three phase induction motor**	**Lecture**	**1-Direct evaluation.** **2-Exams (written + practical)**
Twenty sixth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Power circuits and control circuits** **- Switches used in control circuits - push button switches** **- rotary switches (ON-OFF) (Rev-ON-OFF) star delta rotary switch (□-Y)** **-A power circuit and a control circuit to operate a single-phase motor and a three-phase motor**	**Lecture**	**1-Direct evaluation.** **2-Exams (written + practical)**
Twenty seventh	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**-Contactor installation - working theory - operating voltage - circuits to control the operation of the contactor, types of collectors** **-The information written on the pickup is coil voltage, electrode voltage, electrode current or power, and operating time** **- Explaining the circuit of turning a device on and off (ON-OFF) using a single push button and a pickup**	**Lecture**	**1-Direct evaluation.** **2-Exams (written + practical)**
Twenty eighth	**2**	**The student must be**	**- Thermal relay against surges (installation -**	**Lecture**	**1-Direct evaluation.** **2-Exams**

		able to understand and solve scientific problems related to the lesson	**working theory - adjusting the current rating - uses) -Inverse – Time Over current Relaying protection -Solution example**		**(written + practical)**
Twenty ninth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**TIMER - Its types (mechanical - electronic - programmed) - work theory - timekeeping - low-voltage relays - Types of time supervisor in terms of job - Types of time tracking in terms of installation - Its applications in electrical installation circuits**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Thirty	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Testing and inspection of installation - Testing devices Ohmmeter (resistance meter), buzzer system or battery lamps, micrometer, ground tester - Types of testing Polarity test, ground system quality test, wire insulation resistance test, back circuit continuity test**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	الكتب المقررة المطلوبة التأسيسات المكائن الكهربائية تأليف الدكتور مظفر أنور النعمة, نوري باوي داود, جبار عبيد كاظم.
Main references (sources)	1- Electrical installation and workshop technology Vol. I, II, III (by F.G. Thompson).

	2- Electrical installation technology (by Michael Neidle).
Recommended books and references (scientific journals, reports...)	1- Practice on low voltage switch gears (by Siemense Publications). 2- ABB Publications
Electronic References, Websites	موقع المعهد التقني/ الرميث, مواقع تجارية عالمية مثل شركة AB Siemense

1. Course Name:
Electronics
2. Course Code:
RELEC1003
3. Semester / Year:
Annual
4. Description Preparation Date:
5. Available Attendance Forms:
Theoretical lectures, practical lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
120 annual hours (60 theoretical hours, 60 practical hours)
7. Course administrator's name (mention all, if more than one name)
Name: **Ammar Jaber Kadhim** Email: Ammar.kadhim.iku@atu.edu.iq
8. Course Objectives

Course Objectives	**The student will be able to become familiar with: electronic components manufactured from semi-finished products Conductors of all types, composition, properties, uses in electronic circuits and applications - analysis of their electronic circuits with optoelectronic components and their applications.**
9. Teaching and Learning Strategies	
Strategy	**1. Lectures in modern and traditional methods + laboratories, weekly reports on each experiment carried out + field visits + summer training.** **2. Library activities and connection to the international information network (the Internet) to obtain additional knowledge of academic subjects.** **3. Practical laboratories are monitored by the subject teacher and the department's technical staff.** **4. Discussion with students' participation that addresses some practical problems.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Semiconductor theory - atomic structure - energy levels - crystals - conduction in crystals - gap current - how gaps move**	**Lecture**	**1-Direct evaluation.** **2-Exams (written + practical)**

Second	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Vaccination - positive (P) crystal, negative (N) crystal, electron current and gap current - total resistance**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Third & Fourth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Semiconductor diodes - PN junction formation - barrier voltage - energy hill - thermal effects - biased diode - forward bias - reverse bias - characteristic curves in the forward and reverse directions - ephemeral crossing current - minority carrier current - surface leakage current - voltage Breakdown – Breakdown Voltage (PIV) Maximum Forward Current – Maximum Reverse Voltage – (PIVmax) – Diode Equivalent Circuit**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Fifth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Diode as a current combiner - a half-wave combiner - the continuous value of the current and its calculation - the effective value of the output frequency**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Sixth	**2**	**The student must be able to understand and solve scientific**	**Full-wave unification - using the center-branch transformer - bridge combiner - calculating the continuous and effective values of**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**

		problems related to the lesson	the current - extracting the output frequency - comparison between the half-wave combiner and the full-wave combiner - comparison between the full-wave combiners		
Seventh	2	The student must be able to understand and solve scientific problems related to the lesson	Filters – Capacitance Filtering – (LC) Filter (RC) Filter – Constant Ripple Output Voltage	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Eighth	2	The student must be able to understand and solve scientific problems related to the lesson	Ripple factor, voltage multiplier, trimming circuits - positive trimming - negative trimming - compound trimming	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Ninth & Tenth	2	The student must be able to understand and solve scientific problems related to the lesson	Zener diode - composition - symbols - properties - avalanche refraction, zener refraction - breaking voltage - power tolerance - zener impedance - temperature effects - zener approximation, constant voltage regulation	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Eleventh & Twelveth	2	The student must be able to understand and solve scientific	Bipolar transistor - its structure - its areas - its symbol - biasing voltages - (α dc) - (β dc) the relationship between (α dc) - (β dc) types	Lecture	1-Direct evaluation. 2-Exams (written + practical)

		problems related to the lesson	of bias - approximation connection formulas in the transistor and the equivalent circuit		
Thirteenth	2	The student must be able to understand and solve scientific problems related to the lesson	Transistor characteristic curves - working areas, definition of (I_{CEO}) and (I_{CBO}) - current gain curve - relationship between (I_C) and (I_{CEO})	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Fourteenth	2	The student must be able to understand and solve scientific problems related to the lesson	Transistor bias circuits - base bias - emitter bias	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Fifteenth & Sixteen	2	The student must be able to understand and solve scientific problems related to the lesson	Collector bias - self-bias - feed-back bias - voltage divider bias - applied examples	Lecture	1-Direct evaluation. 2-Exams (written + practical)
seventeenth	2	The student must be able to understand and solve scientific problems related to the lesson	DC equivalent circuit of the transistor – DC load line	Lecture	1-Direct evaluation. 2-Exams (written + practical)
eighteenth	2	The student must be able to understand	Action points - rest point (Q-Point) applied examples	Lecture	1-Direct evaluation. 2-Exams (written + practical)

		and solve scientific problems related to the lesson			
Nineteenth & Twenty & twenty one	2	The student must be able to understand and solve scientific problems related to the lesson	Transistor in small signal amplification - alternating equivalent circuit - ideal approximation - hybrid constants - equivalent circuit using coefficients (h) - voltage gain - current gain - power gain - input and output resistors - small signal amplifiers - base market - emitter market	Lecture	1-Direct evaluation. 2-Exams (written + practical)
twenty one	2	The student must be able to understand and solve scientific problems related to the lesson	The use of a transistor in voltage regulation - a series regulator - a parallel regulator in a constant voltage source circuit	Lecture	1-Direct evaluation. 2-Exams (written + practical)
twenty third & wenty fourth	2	The student must be able to understand and solve scientific problems related to the lesson	Junction field effect transistor (JEFT) - its structure - its symbol - working theory - characteristic curves - exchange conductivity curve - definition of narrowing voltage (VP), (IDSS), (VGSOff) - characteristic curves for (MOSFET) - (D-MOSFET) - (E-MOSFET)	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Twenty-fifth & twenty-sixth	2	The student must be able to	Bias circuits (FET) – constant current source bias – working point self-	Lecture	1-Direct evaluation. 2-Exams (written +

		understand and solve scientific problems related to the lesson	**bias – equivalent circuit of (FET) Use of (FET) in small signal amplification**		**practical)**
Twenty-seventh	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Comparison between the types of FET (FET, MOSFET) and (BJT)**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Twenty-eighth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Light Dependent Resistor (LDR) - Light Emitting Diode - Photodiode Breakout Board Seven Their Structure and Applications**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
twenty-ninth & thirty	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**The phototransistor - its structure - its operation - its applications - the process**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	مبادئ الالكترونيات 1984 تأليف مالفينو, - ترجمة بدر محمد علي الوتار, د. رياض كمال Principles of Electronics 1984, written by Malvino, translated by Badr Muhammad - Ali Al-Wattar, Dr. Riad Kamal
Main references (sources)	ترونيك الصناعي 1985 تاليف ضياء مهدي فارس , نبيل - يونس, حلمي أمين Industrial Electronics 1985, written by Diya Mahdi Fares, Nabil -

	Younis, Helmi Amin
Recommended books and references (scientific journals, reports...)	semiconductors (K.I. Gross & J.Y. Rwood)
Electronic References, Websites	ع المعهد التقني/ الرميثة, مواقع الشركات العالمية Website of the Techni Institute/Rumaitha, websites international companies

1. Course Name:
Mathematics
2. Course Code:
RELEC1005
3. Semester / Year:
Annual
4. Description Preparation Date:
5. Available Attendance Forms:
Theoretical lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
120 annual hours (theoretical hours)
7. Course administrator's name (mention all, if more than one name)
Name: **Seham Abdul Hussein Massan** Email: kin.shm@atu.edu.iq
8. Course Objectives

Course Objectives	**1- Understand simple mathematical laws and equations.** **2- Understanding the main concepts and knowing the rules and laws of mathematics and their application in electrical technologies.** **3- The Mathematics Topic aims to clarify the practical and philosophical challenges of current engineering mathematics that stimulated this** **Continuous development, as well as presenting the basic concepts of calculus that are useful for further study of engineering sciences and mathematics** **Applied in the scientific and practical fields** **4- Students acquire skills to solve topics.**
9. Teaching and Learning Strategies	
Strategy	**1. Developing students' ability to discuss and reach the most appropriate solutions to problems and exercises through brainstorming and management** **Discussions by the teacher.** **2. Giving students extracurricular assignments that require them to apply skills and self-explanations in experimental ways.** **3. Developing the student's ability for theoretical analysis and deduction.** **4. Developing the student's ability to link mathematics topics to sensory reality and their applications in public life.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	**2**	**The student must be**	**Matrices / determinants / and their properties**	**Lecture**	**1-Direct evaluation.**

		able to understand and solve scientific problems related to the lesson			2-Exams (written + practical)
Second	2	The student must be able to understand and solve scientific problems related to the lesson	Solving linear equations - Cramer's method - Applications to determinants - Using the compensation method to find the value of currents in a multi-source electrical circuit	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Third	2	The student must be able to understand and solve scientific problems related to the lesson	Vectors / Vector analysis / Vector and scalar quantities / Vector algebra / Vector arithmetic in space Phase and directional representation of alternating quantities, phase angle - finding the resultant of vector quantities	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Furid	2	The student must be able to understand and solve scientific problems related to the lesson	Unit of orthogonal vectors / vector scale / scalar and vector multiplication / applications to vectors / magnetic flux / Maxwell / numerical multiplication of vectors using angle / numerical multiplication of vectors using coordinates	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Fifth	2	The student must be able to understand and solve scientific problems related to the lesson	Function/trigonometric functions and trigonometric relationships/logarithmic functions Calculating the DC current value for a semi-bridge circuit / Calculating the effective value of the line voltage / load of the transistor	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Sixth	2	The student must be able to	Exponential function / Hyperbolic functions / Applications of drawing exponential functions for a	Lecture	1-Direct evaluation. 2-Exams

		understand and solve scientific problems related to the lesson	first-order electrical circuit, representing an R-C filter circuit with an exponential function		(written + practical)
Seventh	2	The student must be able to understand and solve scientific problems related to the lesson	Objectives / Objectives of algebraic and trigonometric functions / Applications to objectives	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Eighth	2	The student must be able to understand and solve scientific problems related to the lesson	Differentiation / derivative / derivative of algebraic functions / chain rule - building a differential circuit / calculating speed and acceleration - speed of light	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Ninth	2	The student must be able to understand and solve scientific problems related to the lesson	Implicit function / higher-order derived standard function / representing a physical system with the implicit function	Lecture	1-Direct evaluation. 2-Exams (written + practical)
The tenth	2	The student must be able to understand and solve scientific problems related to the lesson	Derivative of trigonometric functions / Derivative of logarithmic functions / Calculating the effective value of the current in the R-L-C circuit / Voltage gain in the bill	Lecture	1-Direct evaluation. 2-Exams (written + practical)
eleventh	2	The student must be able to understand	Derivative of exponential functions / derivative of hyperbolic functions / calculation of the time constant	Lecture	1-Direct evaluation. 2-Exams (written

		and solve scientific problems related to the lesson			+ practical)
twelveth	2	The student must be able to understand and solve scientific problems related to the lesson	Applications of the derivative/tangent and perpendicular equation/velocity and acceleration/change Calculations of the rate of change of voltage and current as a function of time	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Thirteenth	2	The student must be able to understand and solve scientific problems related to the lesson	Increasing and decreasing / maxima and minima / inflection points / drawing functions Response plot of a second order circuit R-L-C	Lecture	1-Direct evaluation. 2-Exams (written + practical)
fourteenth	2	The student must be able to understand and solve scientific problems related to the lesson	General physics and engineering applications	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Fifteenth	2	The student must be able to understand and solve scientific problems related to the lesson	Integration / indefinite integration / integration of algebraic and logarithmic functions. Calculating the value of an expanded shipment	Lecture	1-Direct evaluation. 2-Exams (written + practical)
sixteenth	2	The student must be able to understand and solve	Integration of exponential and trigonometric functions	Lecture	1-Direct evaluation. 2-Exams (written +

		scientific problems related to the lesson			practical)
seventeenth	2	The student must be able to understand and solve scientific problems related to the lesson	Definite integration / Applications of definite integration / Area under the curve / Area between two curves / Electrical power calculations	Lecture	1-Direct evaluation. 2-Exams (written + practical)
eighteenth	2	The student must be able to understand and solve scientific problems related to the lesson	Rotational volumes / arc length of the curve	Lecture	1-Direct evaluation. 2-Exams (written + practical)
nineteenth	2	The student must be able to understand and solve scientific problems related to the lesson	Physical and engineering applications (work - torque - momentum - moment of inertia)	Lecture	1-Direct evaluation. 2-Exams (written + practical)
twenty one & twenty tow	2	The student must be able to understand and solve scientific problems related to the lesson	General methods of integration include substitution, division, and the use of partial, exponential, and logarithmic fractions Building an integrator circuit using resistance and inductance / representing an electrical circuit using integral equations / an amplifier circuit using an integrated circuit	Lecture	1-Direct evaluation. 2-Exams (written + practical)
twenty third	2	The student must be able to	Numerical methods in integration / trapezoid rule / Simpson's rule Find distance from	Lecture	1-Direct evaluation. 2-Exams

		understand and solve scientific problems related to the lesson	acceleration and velocity Finding the value of the effective current of a rectifier		(written + practical)
twenty fourth & Twenty-fifth	2	The student must be able to understand and solve scientific problems related to the lesson	Solving discrete, homogeneous and linear differential equations with their various applications within the field of specialization / positive, negative and compound pruning circuits	Lecture	1-Direct evaluation. 2-Exams (written + practical)
twenty-sixth	2	The student must be able to understand and solve scientific problems related to the lesson	Complex numbers / addition, subtraction, multiplication and division / geometric representation of complex numbers / the relationship of electrical units to complex numbers	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Twenty-seventh	2	The student must be able to understand and solve scientific problems related to the lesson	The polar formula / converting an algebraic characteristic to polarity and vice versa / the sign of the coefficient (j) in electronic circuits / the exponential formula in conversion / de Moniz's theory and its uses in solving complex electrical circuits / calculations of power transmission lines using line constants	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Twenty-eighth	2	The student must be able to understand and solve scientific problems related to the lesson	Forces and roots / Representing roots by drawing / Finding the roots of electrical circuits to determine stability / Star and triangle representation	Lecture	1-Direct evaluation. 2-Exams (written + practical)
twenty-ninth	2	The student must be	Statistical operations / frequency distributions / histogram / frequency curve	Lecture	1-Direct evaluation. 2-

		able to understand and solve scientific problems related to the lesson	**/ probability and range / arithmetic and geometric mean - sample**		**Exams (written + practical)**
thirty	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Arithmetic mean / range standard deviation / variance, dispersion and relative / relationship between mean, median and mode / coefficient of variation - standard variable**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	مكتبة المعهد للحصول على المصادر الاضافية للمناهج الدراسية. The institute's library for additional curricula resources.
Main references (sources)	George B. Thomas, Jr., "Thomas 'Calculus", 12th edition, Addison Wesley, Pearson Education, Inc, 2010.
Recommended books and references (scientific journals, reports...)	جميع المجلات العلمية الرصينة التي لها علاقة بالمفهوم الواسع للرياضيات و المثلثات الكروية All solid scientific journals that are related to the broad concept of mathematics and spherical triangles
Electronic References, Websites	Internet sites related to mathematics and spherical triangles

1. Course Name:
Labs
2. Course Code:
RELEC1004
3. Semester / Year:
Annual
4. Description Preparation Date:
5. Available Attendance Forms:
Practical lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
180 annual hours
7. Course administrator's name (mention all, if more than one name)
Name: **Khansa Abdul-Reza Sughair** Email:
8. Course Objectives

Course Objectives	**1. Uses the various devices, tools, and components used in workshops.** **2. Acquires technical skill and experience in the field of various electrical maintenance works.** **3. Gain self-confidence to practice electrical technical work in tracking faults and learning how to repair them.** **4. Distinguish and identify various electrical and electronic components and how to use them in building various circuits.** **5. Learn how to use the devices, tools, and machines used in workshops to assist in electrical maintenance work.**
9. Teaching and Learning Strategies	
Strategy	**1. Providing students with the basics and additional topics related to the previous learning outcomes of the skills, to solve practical problems. -** **2. Applying the topics studied theoretically at the practical level in the department's various workshops. -** **3. Organizing visits and scientific trips to electrical maintenance workshops in production sites. -** **4. Use of hand tools and measuring tools and the ability to work and operate machines in the optimal manner. -** **5. Showing scientific films about maintaining electrical appliances.**

10. Course Structure

Number of Weeks	Hours Every week	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
3	**6**	**The student must be able to understand and solve scientific problems**	**The filings**	**Workshop and laboratories**	**1-Direct evaluation.** **2-Exams (written +**

		related to the lesson			**practical)**
3	**6**	**The student must be able to understand and solve scientific problems related to the lesson**	**Welding**	**Workshop and laboratories**	**1-Direct evaluation. 2-Exams (written + practical)**
3	**6**	**The student must be able to understand and solve scientific problems related to the lesson**	**Plumbing**	**Workshop and laboratories**	**1-Direct evaluation. 2-Exams (written + practical)**
3	**6**	**The student must be able to understand and solve scientific problems related to the lesson**	**Lathing**	**Workshop and laboratories**	**1-Direct evaluation. 2-Exams (written + practical)**
3	**6**	**The student must be able to understand and solve scientific problems related to the lesson**	**Carpentry**	**Workshop and laboratories**	**1-Direct evaluation. 2-Exams (written + practical)**
15	**6**	**The student must be able to understand and solve scientific problems related to the lesson**	**electric Workshop**	**Workshop and laboratories**	**1-Direct evaluation. 2-Exams (written + practical)**

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Laboratory notebook for each workshop
Main references (sources)	1- Winding electric motors, Dr. moon - 2- Reference in electrical transformers, - S.A. Sticant, Franklin 3- Electronics in the service of electrical applications. Noel M. Maurice

Recommended books and references (scientific journals, reports...)	1 Identifying faults and maintaining electrical machines. Prepared by the World Bank - for technical illustrations. 2 Fundamentals and maintenance of transistor circuits, written by Larson
Electronic References, Websites	Website of the Technical Institute/Rumaitha, websites of international companies

1. Course Name:
Computer applications
2. Course Code:
RELEC1006
3. Semester / Year:
Annual
4. Description Preparation Date:
5/7/2021
5. Available Attendance Forms:
Theoretical lectures, practical lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
90 annual hours
7. Course administrator's name (mention all, if more than one name)
Name: **Seham Abdul Hussein Massan** Email: kin.shm@atu.edu.iq
8. Course Objectives

Course Objectives	**Teaching the student the basics of computer operating programs and the most important commands, then entering the AUTO CAD drawing program, learning about the drawing interface and the drawing and modification commands, entering 3D drawing, then learning about the concept of viruses and the speed of combating them.**
9. Teaching and Learning Strategies	
Strategy	**1. Homework assignments** **2. Theoretical lectures** **3. Applied skills within the laboratory** **4. Class discussion** Preparing and implementing research and projects by students within the department's subjects, including computer applications and presenting them at annual student conferences. Developing and updating the vocabulary of the computer applications subject to keep pace with developments in order to achieve personal development at the level of students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First + Second	**2**	**The student must be able to understand and solve scientific problems**	**Introduction to computers and their benefits, generations, connecting calculator parts, physical calculator components and**	**Lecture**	**1-Direct evaluation.** **2-Exams (written + practical)**

		related to the lesson	means of input and output, software, memory measurement units, definition of files and folders.		
Third+ fourth	2	The student must be able to understand and solve scientific problems related to the lesson	Windows 7 operating system, system features, basic requirements for operation, components of the main desktop screen DESKTOP, the concept of the icon, the method for dealing with mouse activities, the importance and components of the TASKBAR taskbar, using START to enter programs, exiting the system and turning off the calculator	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Fifth+ Sixth	2	The student must be able to understand and solve scientific problems related to the lesson	The concept of the window and recognition of its main components Dealing with the COMPUTER icon, MY DOCUMENTS, RECYCLE BIN, copying files and folders, cutting and pasting	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Seventh+ Eighth	2	The student must be able to understand and solve scientific problems related to the lesson	File, folder and disk properties, change desktop wallpaper DESKTOP BACKGROUND, WINDOWS COLOR, SCREEN SAVER	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Ninth + The tenth	2	The student must be able to understand and solve scientific	Getting to know the CONTROL PANAL, mouse properties, programs and their features, PROGRAM AND FEATURES, and how to delete	Lecture	1-Direct evaluation. 2-Exams (written + practical)

		problems related to the lesson	installed programs, getting to know some ACCESSORIES such as the CALCULATOR, WORDPAD, and WINDOSWS MEDIA PLAYER to play video files.		
eleventh	2	The student must be able to understand and solve scientific problems related to the lesson	AUTOCAD program: its definition, importance, installation, and operation. Getting to know the program interface and ways to access commands, creating a new file, storing and opening files, auxiliary commands, DRAWING LIMITS, UNITS.	Lecture	1-Direct evaluation. 2-Exams (written + practical)
twelveth	2	The student must be able to understand and solve scientific problems related to the lesson	Commands:OSNAP ، ORTTHO ، LWT ، OTRACK ، POLAR ، SNAP ، GRID ، DISTANCE ، AREA	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Thirteenth	2	The student must be able to understand and solve scientific problems related to the lesson	VIEW TOOLS: ZOOM command, PAN command, REGEN command	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Fourteenth + Fifteenth + sixteen	2	The student must be able to understand and solve scientific problems	Basic drawing commands DRAW : LINE ، MULTILINE ، CONSTRUCTION LINE ، POLYLINE ، POLYGON ، RECTANGLE ، ARC ،CIRCLE، DONUT	Lecture	1-Direct evaluation. 2-Exams (written + practical)

		related to the lesson	‹REVCLOUD ‹ SPLINE ‹ ELLIPS ‹ MACKE BLOCK ‹ INSERT BLOCK ‹ MBLOCK ‹ WBLOCK‹ HATCH ‹REGION		
Seventeenth + eighteen	2	The student must be able to understand and solve scientific problems related to the lesson	Modification orders MODIFY :ERASE ‹ COPY ‹ MIRROR ‹ OFFSET‹ARRAY ‹ MOVE ‹ ROTATE ‹ SCALE ‹ CHAMFER ‹FILLET ‹ STRETCH ‹TRIM ‹ EXTEND ‹ BREAK ‹ EXPLODE	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Nineteenth + Twenty	2	The student must be able to understand and solve scientific problems related to the lesson	TEXT writing commands and their modification: MULTILINE TEXT, SINGLE LINE TEXT, how to create new writing style forms, getting to know the DESIGN CENTER and benefiting from ready-made electrical templates.	Lecture	1-Direct evaluation. 2-Exams (written + practical)
twenty one + twenty tow	2	The student must be able to understand and solve scientific problems related to the lesson	Division commands: MEASURE, DIVIDE, controlling drawing specifications: LINETYPE, LINE WEIGHT, COLOR, modifying graphic properties using: PROPERTIES, MATCH PROPERTIES, GRIPS	Lecture	1-Direct evaluation. 2-Exams (written + practical)
twenty third	2	The student must be able to understand and solve scientific problems related to the lesson	DIMENSION	Lecture	1-Direct evaluation. 2-Exams (written + practical)

twenty fourth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Introduction to 3D drawing, features of 3D drawing, types of 3D drawings, learning about the ELEV and THICKNESS commands.**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Twenty-fifth + twenty-sixth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Preview 3D drawing using 3DVIEW, split screen 3D drawing using VPORTS, User Coordinate System UCS**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Twenty-seventh + Twenty-eighth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Creating 3D surfaces with 3D SURFACE** **Creating three-dimensional solid objects with 3D SOLIDS**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Twenty-ninth + Thirty	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**The concept of computer viruses, motives for the spread of viruses, how to become infected with viruses, types of viruses according to the nature of infection and damage, signs of viruses infecting computers, precautions that must be taken to avoid viruses entering computers, dealing with an anti-virus program**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
11. Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc					
12. Learning and Teaching Resources					

Required textbooks (curricular books, if any)	Methodical books
Main references (sources)	References related to the subject and found in the institute's library
Recommended books and references (scientific journals, reports...)	Books and magazines related to computers: basics, applications, using Autocad, viruses
Electronic References, Websites	The Institute's website, various Internet sources, websites of international companies

1. Course Name:	
Engineering and electrical drawing	
2. Course Code:	
RELEC1007	
3. Semester / Year:	
Annual	
4. Description Preparation Date:	
1 / 7 / 2021	
5. Available Attendance Forms:	
Practical lectures	
6. Number of Credit Hours (Total) / Number of Units (Total)	
90 annual hours	
7. Course administrator's name (mention all, if more than one name)	
Name: Email:	
8. Course Objectives	
Course Objectives	**1. This course aims to demonstrate the importance of studying engineering and electrical drawing.** **2. The student's familiarity with the foundations and rules of engineering and electrical drawing that will benefit him in his specialized studies and practical life.** **3. The student will be able to build his imagination around the subject of the drawing.** **4. The student will be able to know engineering rules and theories.** **5. The student will be able to develop speed resulting from alertness, frequent practice, and following proper methods.** **6. The student uses computer software in engineering and electrical drawing.** **7. Identify electrical symbols and draw various electrical diagrams.**
9. Teaching and Learning Strategies	
Strategy	**1. Using modern means to present the theoretical and practical aspects, such as electronic display devices Different ways to attract attention and attract students so that the idea reaches the student better.** **2. Giving students extracurricular assignments that require the use of skills and self-explanations in experimental ways.** **3. Interrogating students through discussion sessions by asking intellectual questions (how, why, when, Where, which) for specific topics.** **4. Using brainstorming and feedback methods in order to activate the accumulated experiences of students By linking the academic subjects taken in the previous academic levels**

	and linking them to the new ones. **5. Providing students with practical skills by conducting practical**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
The first	**3**	**The student must be able to understand and solve scientific problems related to the lesson**	**The importance of engineering drawing. Recognizing the interfaces of AutoCAD. Ways to execute AutoCAD commands, and ways to exit them. Navigate between interfaces, show menus, show and hide bars.**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
The second	**3**	**The student must be able to understand and solve scientific problems related to the lesson**	**Methods of drawing a straight line using Cartesian coordinates, the relative method and the polar method.**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
The third	**3**	**The student must be able to understand and solve scientific problems related to the lesson**	**Display commands, dimensions of the working environment, drawing boundaries and units, save the file and then it can be opened in a previous version of the program using the following commands: (Zoom, drawing Limits, Units, Options)**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
The fourth	**3**	**The student must be able to understand and solve scientific**	**Drawing accuracy orders SNAP, GRID, ORTHO, POLAR, OSNAP, OTRACK, DUCS, DYN, LWT((Drawing isometric**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**

		problems related to the lesson	objects using the GRID command		
Fifth	3	The student must be able to understand and solve scientific problems related to the lesson	Commands for drawing elements:)Rectangle, Circle, Polygon, Arc, Ellipse, Donut, Wipeout, Revision Cloud(	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Sixth	3	The student must be able to understand and solve scientific problems related to the lesson	Modification orders)Erase, Copy, Move, Mirror, Offset, Scale, Stretch, Rotate(	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Seventh	3	The student must be able to understand and solve scientific problems related to the lesson	Setting different dimensions on drawing elements and controlling them using the Dimensions Style dialog box Linear, Aligned, Arc Length, Radius, Diameter, Angular, Baseline, Continue, -Mleader, Dimension Style…	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Eighth	3	The student must be able to understand and solve scientific problems related to the lesson	Control drawing specifications (types of lines, colors of elements, their properties, and transferring properties to another element (Match Properties))	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Ninth	3	The student must be able to understand and solve	Other major element drawing orders: (Polyline, Point, Spline, Helix, Table)	Lecture	1-Direct evaluation. 2-Exams (written + practical)

		scientific problems related to the lesson			
The tenth	**3**	**The student must be able to understand and solve scientific problems related to the lesson**	**Other modification commands: (Array, Trim, Extend, Break, Fillet, Chamfer, Explode,Align)**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Eleventh	**3**	**The student must be able to understand and solve scientific problems related to the lesson**	**Adding Single Line & Multiline Text, its methods and controlling its specifications.**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Twelveth	**3**	**The student must be able to understand and solve scientific problems related to the lesson**	**Calculate areas (Area), volumes (Distance), point coordinates (ID Point), and item specifications (List) using the Inquiry command. Handling Parametric bar orders**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Thirteenth	**3**	**The student must be able to understand and solve scientific problems related to the lesson**	**Hatch, Gradient, and sectors**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
fourteenth	**3**	**The student must be able to understand and solve scientific**	**Layers and controlling their settings.**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**

		problems related to the lesson			
Fifteenth	3	The student must be able to understand and solve scientific problems related to the lesson	Blocks, their types, inclusions, and control of their specifications.	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Sixteen	3	The student must be able to understand and solve scientific problems related to the lesson	Convert drawing from 2D to 3D commands)Region, Boundary, Join(	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Seventeenth	3	The student must be able to understand and solve scientific problems related to the lesson	Surfaces and objects Basic 3D shapes commands)Box, Wedge, Cone, Sphere, Cylinder, Tours, Pyramid(	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Eighteen	3	The student must be able to understand and solve scientific problems related to the lesson	Commands for creating 3D objects (Extrude, Press/pull, Polysolid, Union, Subtract, Intersect, Revolve, Sweep, Loft)	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Nineteenth	3	The student must be able to understand and solve scientific problems	Commands for modifying objects)Shell, Separate, Slice, Thicken(Working with coordinate bar commands (Ucs)	Lecture	1-Direct evaluation. 2-Exams (written + practical)

		related to the lesson			
Twentieth	3	The student must be able to understand and solve scientific problems related to the lesson	Drawing projections, using program commands to show the projection	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Twenty first	3	The student must be able to understand and solve scientific problems related to the lesson	printing	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Twenty tow	3	The student must be able to understand and solve scientific problems related to the lesson	Drawing electrical circuits Use the program library to use the icons in the Design Center Draw symbols that are not in the program Save the symbols in a special file for use in new files	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Twenty third	3	The student must be able to understand and solve scientific problems related to the lesson	Draw some electrical and electronic circuits Draw input and output sine waves or any other wave	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Twenty fourth	3	The student must be able to understand and solve scientific	Draw a drive circuit and control circuit for a motor	Lecture	1-Direct evaluation. 2-Exams (written + practical)

		problems related to the lesson			
Twenty fifth	3	The student must be able to understand and solve scientific problems related to the lesson	An example of the foundations of a small building or residential house.	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Twenty sixth	3	The student must be able to understand and solve scientific problems related to the lesson	Drawing models of cable trays.	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Twenty seventh	3	The student must be able to understand and solve scientific problems related to the lesson	The importance of engineering drawing. Recognizing the interfaces of AutoCAD. Ways to execute AutoCAD commands, and ways to exit them. Navigate between interfaces, show menus, show and hide bars.	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Twenty eighth	3	The student must be able to understand and solve scientific problems related to the lesson	Methods of drawing a straight line using Cartesian coordinates, the relative method and the polar method.	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Twenty ninth	3	The student must be able to understand	Display commands, dimensions of the working environment, drawing boundaries	Lecture	1-Direct evaluation. 2-Exams (written + practical)

		and solve scientific problems related to the lesson	**and units, save the file and then it can be opened in a previous version of the program using the following commands: (Zoom, drawing Limits, Units, Options)**		
Thirty	**3**	**The student must be able to understand and solve scientific problems related to the lesson**	**Drawing accuracy orders SNAP, GRID, ORTHO, POLAR, OSNAP, OTRACK, DUCS, DYN, LWT((Drawing isometric objects using the GRID command**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Methodological vocabulary
Main references (sources)	References available in the institute's library
Recommended books and references (scientific journals, reports...)	1- Various magazines specialized in computer applications 2- Electrical installation plans
Electronic References, Websites	The Institute's website, Internet sources, websites of international companies

1. Course Name:
Human rights and democracy
2. Course Code:
RELEC1008
3. Semester / Year:
Annual
4. Description Preparation Date:
5 / 7 / 202
5. Available Attendance Forms:
Theoretical lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
60 annual hours
7. Course administrator's name (mention all, if more than one name)
Name: Email:
8. Course Objectives

Course Objectives	**Identify and introduce the principles and values of human rights and principles of democracy, and educate generations to respect, adhere to, and work by them.**
9. Teaching and Learning Strategies	
Strategy	**1. Using modern means to present the theoretical and practical aspects, such as electronic display devices Different ways to attract attention and attract students so that the idea reaches the student better.** **2. Giving students extracurricular assignments that require the use of skills and self-explanations in experimental ways.** **3. Interrogating students through discussion sessions by asking intellectual questions (how, why, when, Where, which) for specific topics.** **4. Using brainstorming and feedback methods in order to activate the accumulated experiences of students By linking the academic subjects taken in the previous academic levels and linking them to the new ones.** **5. Providing students with practical skills by conducting practical**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	**2**	**The student must be able to understand and solve**	**Human rights, their definition, and goals**	**Lecture**	**1-Direct evaluation.** **2-Exams (written + practical)**

		scientific problems related to the lesson			
Second	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**The roots of human rights and their developments in human history: human rights in ancient and medieval times**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Third	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Human rights in ancient civilizations, especially the Mesopotamian civilization**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Forth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Human rights in divine laws, with a focus on human rights in Islam**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Fifth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Human rights in the Middle Ages: human rights in political doctrines, schools, and theories, human rights in companies and their declarations, revolutions, and constitutions (English documents, American Revolution, French Revolution, Russian Revolution)**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Sixth	**2**	**The student**	**Human rights in contemporary and**	**Lecture**	**1-Direct evaluation.**

		must be able to understand and solve scientific problems related to the lesson	modern history: international recognition of human rights since World War I and the League/United Nations		2-Exams (written + practical)
Seventh	2	The student must be able to understand and solve scientific problems related to the lesson	Regional recognition of human rights: European Convention on Human Rights 1950, American Convention on Human Rights 1969, African Charter on Human Rights 1981, Arab Charter on Human Rights 1994.	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Eighth	2	The student must be able to understand and solve scientific problems related to the lesson	NGOs and human rights (International Committee of the Red Cross, Amnesty International, Human Rights Watch)	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Ninth	2	The student must be able to understand and solve scientific problems related to the lesson	National human rights organizations	Lecture	1-Direct evaluation. 2-Exams (written + practical)
The tenth	2	The student must be able to understand and solve scientific problems related to the lesson	Human rights in Iraqi constitutions between theory and reality	Lecture	1-Direct evaluation. 2-Exams (written + practical)
eleventh	2	The	The relationship	Lecture	1-Direct

		student must be able to understand and solve scientific problems related to the lesson	between human rights and public freedoms 1-In the Universal Declaration of Human Rights		evaluation. 2-Exams (written + practical)
twelveth	2	The student must be able to understand and solve scientific problems related to the lesson	2-In regional charters and national constitutions	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Thirteenth	2	The student must be able to understand and solve scientific problems related to the lesson	Necessary human rights and collective human rights	Lecture	1-Direct evaluation. 2-Exams (written + practical)
fourteenth	2	The student must be able to understand and solve scientific problems related to the lesson	Economic, social and cultural human rights and civil and political human rights.	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Fifteenth	2	The student must be able to understand and solve scientific problems related to the lesson	Modern human rights: facts in development, the right to a clean environment, the right to solidarity, the right to religion	Lecture	1-Direct evaluation. 2-Exams (written + practical)
sixteenth	2	The student	Guarantees of respect and	Lecture	1-Direct evaluation.

		must be able to understand and solve scientific problems related to the lesson	protection of human rights at the national level, guarantees in the constitution and laws, guarantees in the principle of the rule of law.		2-Exams (written + practical)
seventeenth	2	The student must be able to understand and solve scientific problems related to the lesson	Guarantees in constitutional oversight, guarantees in freedom of the press and public opinion, the role of non-governmental organizations in respecting and protecting human rights.	Lecture	1-Direct evaluation. 2-Exams (written + practical)
eighteenth	2	The student must be able to understand and solve scientific problems related to the lesson	Guarantees, respect and protection of human rights at the international level: -The role of the United Nations and its specialized agencies in providing guarantees	Lecture	1-Direct evaluation. 2-Exams (written + practical)
nineteenth	2	The student must be able to understand and solve scientific problems related to the lesson	-The role of regional organizations (the Arab League, the European Union, the African Union, the Organization of American States, the ASEAN Organization) -The role of international, regional non-governmental organizations and public opinion in respecting and protecting human rights	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Twentieth	2	The student must be able to	The general theory of freedoms: the origin of rights and freedoms, the	Lecture	1-Direct evaluation. 2-Exams (written +

		understand and solve scientific problems related to the lesson	project's position on declared rights and freedoms, the use of the term general freedoms.		practical)
twenty one	2	The student must be able to understand and solve scientific problems related to the lesson	The functional nature of the concept of public freedoms: philosophical considerations of the functional right, structural considerations of the positive right, economic considerations and public freedoms.	Lecture	1-Direct evaluation. 2-Exams (written + practical)
twenty tow & twenty third	2	The student must be able to understand and solve scientific problems related to the lesson	The legal rule of the state of law	Lecture	1-Direct evaluation. 2-Exams (written + practical)
twenty fourth	2	The student must be able to understand and solve scientific problems related to the lesson	Regulation of public freedoms by public authorities	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Twenty-fifth	2	The student must be able to understand and solve scientific problems related to the lesson	Non-judicial litigation or grievance	Lecture	1-Direct evaluation. 2-Exams (written + practical)
twenty-sixth	2	The student must be	Judicial appeal, determining the state's responsibility	Lecture	1-Direct evaluation. 2-Exams

		able to understand and solve scientific problems related to the lesson	**for its legitimate actions**		**(written + practical)**
Twenty-seventh	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**-The impact of double judiciary on public freedoms -Public freedoms under administrative jurisprudence**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Twenty-eighth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Equality: The historical development of the concept of equality**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
twenty-ninth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**The modern development of the idea of equality**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
thirty	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**-gender equality -Equality between individuals according to their beliefs and race**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
11. Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc					
12. Learning and Teaching Resources					

Required textbooks (curricular books, if any)	Methodical books
Main references (sources)	References related to the subject and found in the institute's library
Recommended books and references (scientific journals, reports...)	Books and magazines related to the subject of human rights and democracy
Electronic References, Websites	The Institute's website, various Internet sources, websites of humanitarian organizations and legal authorities.

1. Course Name:
Occupational safety
2. Course Code:
RELEC1009
3. Semester / Year:
Annual
4. Description Preparation Date:
5/7/2021
5. Available Attendance Forms:
Theoretical lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
30 annual hours
7. Course administrator's name (mention all, if more than one name)
Name: Email:
8. Course Objectives

Course Objectives	**1- This course aims to demonstrate the importance of studying occupational safety** **2- The student's familiarity with the foundations and rules of occupational safety that will benefit him in his specialized studies and future professional life** **3- The student will be able to know the general rules to prevent accidents and injuries during work.** **4- The student will be able to remain alert, pay attention, and follow proper methods**
9. Teaching and Learning Strategies	
Strategy	**1. Using modern means to present the theoretical and practical aspects, such as electronic display devices Different ways to attract attention and attract students so that the idea reaches the student better.** **2. Giving students extracurricular assignments that require the use of skills and self-explanations in experimental ways.** **3. Interrogating students through discussion sessions by asking intellectual questions (how, why, when, Where, which) for specific topics.** **4. Using brainstorming and feedback methods in order to activate the accumulated experiences of students By linking the academic subjects taken in the previous academic levels and linking them to the new ones.** **5. Providing students with practical skills by conducting practical**

10. Course Structure

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

The first	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Causes of electric current injury**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
The second	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Types of electrical injuries**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
The third	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Relief for someone injured by electrical current - extricating the injured person**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
The fourth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Artificial respiration - treatment of burns**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Fifth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Monthly exam**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Sixth	**2**	**The**	**Effects resulting**	**Lecture**	**1-Direct**

		student must be able to understand and solve scientific problems related to the lesson	from the passage of electric current to the ground		evaluation. 2-Exams (written + practical)
Seventh	2	The student must be able to understand and solve scientific problems related to the lesson	Fire alarm systems - control unit	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Eighth	2	The student must be able to understand and solve scientific problems related to the lesson	Fire detectors - heat detectors - smoke detectors	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Ninth	2	The student must be able to understand and solve scientific problems related to the lesson	Buildings that must be provided with a fire alarm system	Lecture	1-Direct evaluation. 2-Exams (written + practical)
The tenth	2	The student must be able to understand and solve scientific problems related to the lesson	Monthly exam	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Eleventh	2	The student	Audible alarms, bells and horns	Lecture	1-Direct evaluation.

		must be able to understand and solve scientific problems related to the lesson			**2-Exams (written + practical)**
Twelveth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Guidance on occupational health and safety**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Thirteenth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Reducing unsafe behavior and practices**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
fourteenth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Personal protective equipment - vision protection - hearing protection**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Fifteenth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**Personal protective clothing**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
11. Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc					

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Occupational safety books
Main references (sources)	Books related to the topic of safety and accident prevention at work sites in the institute's library.
Recommended books and references (scientific journals, reports...)	1- Books related to safety. 2- General Civil Defense Magazine.
Electronic References, Websites	1- Signed by the Technical Institute/Rumaitha. 2- General Civil Defense Department website. 3- Websites of international companies.

13. Course Name:
Digital Electronics
14. Course Code:
RELEC1210
15. Semester / Year:
Annual
16. Description Preparation Date:
5/7/2021
17. Available Attendance Forms:
Theoretical lectures
18. Number of Credit Hours (Total) / Number of Units (Total)
60 annual hours
19. Course administrator's name (mention all, if more than one name)
Name: Email:
20. Course Objectives

Course Objectives	**1- Introducing the student to the electronic components that operate with a digital signal.** **2- Introducing the student to the applications of digital electronic components.** **3- Study of different number systems, numerical mathematics.** **4- Teach the student how to convert a signal from digital to linear, or from linear to digital.**
21. Teaching and Learning Strategies	
Strategy	**1. Using modern means to present the theoretical and practical aspects, such as various electronic display devices to attract students** **Looking and pulling the students so that the idea reaches the student better.** **2. Giving students extra-curricular assignments that require practicing skills and self-explanations using experimental methods.** **3. Interrogating students through discussion sessions by asking intellectual questions (how, why, when, where, any specific topics).** **4. Using the method of brainstorming and feedback in order to activate the accumulated experiences of students by linking the study materials taken in the previous school stages and linking them to the new ones.**

22. Course Structure

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

The first	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**1 Number Systems 1.1 Analogue Versus Digital 1.2 Introduction to Number Systems 1.3 Decimal Number System 1.4 Binary Number System 1.4.1 Advantages 1.5 Octal Number System 1.6 Hexadecimal Number System 1.7 Number Systems – Some Common Terms 1.7.1 Binary Number System 1.7.2 Decimal Number System 1.7.3 Octal Number System 1.7.4 Hexadecimal**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
The second	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**2 Binary Codes Binary Coded Decimal 2.1.1 BCD-to-Binary Conversion 2.1.2 Binary-to-BCD Conversion 2.1.3 Higher-Density BCD Encoding 2.1.4 Packed and Unpacked BCD Numbers 2.2 Excess-3 Code 2.3 Gray Code 2.3.1 Binary–Gray Code Conversion 2.3.2 Gray Code–Binary Conversion 2.3.3 Gray Code**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
The third	**2**	**The student must be able to understand and solve scientific problems**	**3 Digital Arithmetic 3.1 Basic Rules of Binary Addition and Subtraction 3.2 Addition of Larger-Bit Binary Numbers 3.2.1 Addition Using**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**

		related to the lesson	the 2's Complement Method 3.3 Subtraction of Larger-Bit Binary Numbers 3.3.1 Subtraction Using 2's Complement Arithmetic 3.4 BCD Addition and Subtraction in Excess-3 Code 3.4.1 Addition 3.4.2 Subtraction 3.5 Binary Multiplication 3.5.1 Repeated Left-Shift and Add Algorithm 3.5.2 Repeated Add and Right-Shift Algorithm 3.6 Binary Division 3.6.1 Repeated Right-Shift and Subtract Algorithm		
The fourth	2	The student must be able to understand and solve scientific problems related to the lesson	4 Logic Gates and Related Devices 4.1 Positive and Negative Logic 4.2 Truth Table 4.3 Logic Gates 4.3.1 OR Gate 4.3.2 AND Gate 4.3.3 NOT Gate 4.3.4 EXCLUSIVE-OR Gate 4.3.5 NAND Gate 4.3.6 NOR Gate 4.3.7 EXCLUSIVE-NOR Gate 4.3.8 INHIBIT Gate 4.4 Universal Gates	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Fifth	2	The student	5-Logic Families Logic Families –	Lecture	1-Direct evaluation.

		must be able to understand and solve scientific problems related to the lesson	Significance and Types 5.1.1 Significance 5.1.2 Types of Logic Family 5.2 Characteristic Parameters 1 5.3 Transistor Transistor Logic (TTL)		2-Exams (written + practical)
Sixth	2	The student must be able to understand and solve scientific problems related to the lesson	6-Boolean Algebra and Simplification Techniques 6.1 Introduction to Boolean Algebra 189 6.1.1 Variables, Literals and Terms in Boolean Expressions 6.1.2 Equivalent and Complement of Boolean Expressions 6.1.3 Dual of a Boolean Expression 6.2 Postulates of Boolean Algebra 6.3 Theorems of Boolean Algebra	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Seventh	2	The student must be able to understand and solve scientific problems related to the lesson	7-Arithmetic Circuits 7.1 Combinational Circuits 7.2 Implementing Combinational Logic 7.3 Arithmetic Circuits – Basic Building Blocks 7.3.1 Half-Adder 7.3.2 Full Adder 7.3.3 Half-Subtractor 7.3.4 Full Subtractor 7.3.5 Controlled Inverter 7.4 Adder–Subtractor 2	Lecture	1-Direct evaluation. 2-Exams (written + practical)
Eighth	2	The student must be able to understand and solve scientific problems related to	8-Multiplexers and Demultiplexers 8.1 Multiplexer 8.1.1 Inside the Multiplexer 8.1.2 Implementing Boolean Functions with Multiplexers	Lecture	1-Direct evaluation. 2-Exams (written + practical)

		the lesson	8.1.3 Multiplexers for Parallel-to-Serial Data Conversion 8.1.4 Cascading Multiplexer Circuits 280 8.2 Encoders 8.2.1 Priority Encoder 8.3 Demultiplexers and Decoders 8.3.1 Implementing Boolean Functions with Decoders 8.3.2 Cascading Decoder Circuits		
Ninth	2	The student must be able to understand and solve scientific problems related to the lesson	9-Programmable Logic Devices Fixed Logic Versus Programmable Logic 9.1.1 Advantages and Disadvantages 9.2 Programmable Logic Devices – An Overview	Lecture	1-Direct evaluation. 2-Exams (written + practical)
The tenth	2	The student must be able to understand and solve scientific problems related to the lesson	10-Flip-Flops and Related Devices 10.1 Multivibrator 10.1.1 Bistable Multivibrator 10.1.2 Schmitt Trigger 10.1.3 Monostable Multivibrator 10.1.4 Astable Multivibrator 10.2 Integrated Circuit (IC) Multivibrators 10.2.1 Digital IC-Based Monostable Multivibrator 10.2.2 IC Timer-Based Multivibrators 10.3 R-S Flip-Flop 10.3.1 R-S Flip-Flop with Active LOW Inputs 10.3.2 R-S Flip-Flop with Active HIGH Inputs 10.3.3 Clocked R-S Flip-Flop	Lecture	1-Direct evaluation. 2-Exams (written + practical)

Eleventh	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**10.7.1 J-K Flip-Flop as D Flip-Flop 10.7.2 D Latch 10.8 Synchronous and Asynchronous Inputs 10.9 Flip-Flop Timing Parameters**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Twelveth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**12-Counters and Registers 11.1 Ripple (Asynchronous) Counter 11.1.1 Propagatio الاء جاسم كاظمn Delay in Ripple Counters 11.2 Synchronous Counter 11.3 Modulus of a Counter 11.4 Binary Ripple Counter – Operational Basics 11.4.1 Binary Ripple Counters with a Modulus of Less than 2N 11.4.2 Ripple Counters in IC Form**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
Thirteenth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**13-Counters and Registers Synchronous (or Parallel) Counters 11.6 UP/DOWN Counters 11.7 Decade and BCD Counters 11.8 Presettable Counters**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**
fourteenth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**14-Data Conversion Circuits – D/A and A/D Converters 12.1 Digital-to-Analogue Converters 12.1.1 Simple Resistive Divider Network for D/A Conversion 12.1.2 Binary Ladder Network for D/A**	**Lecture**	**1-Direct evaluation. 2-Exams (written + practical)**

			Conversion **12.2 D/A Converter Specifications** **12.2.1 Resolution** **12.2.2 Accuracy** **12.2.3 Conversion Speed or Settling Time** **12.2.4 Dynamic Range**		
Fifteenth	**2**	**The student must be able to understand and solve scientific problems related to the lesson**	**15-Data Conversion Circuits – D/A and A/D Converters** **Types of D/A Converter** **12.3.1 Multiplying D/A Converters** **12.3.2 Bipolar-Output D/A Converters** **12.3.3 Companding D/A Converters** **Types of A/D Converter**	**Lecture**	**1-Direct evaluation.** **2-Exams (written + practical)**

23. Course Evaluation

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

24. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Academic lectures
Main references (sources)	References related to the material in the institute's library
Recommended books and references (scientific journals, reports...)	Scientific books and journals related to the subject of digital electronics: Basics, instructions, applications.
Electronic References, Websites	The Institute's website, various Internet sources, websites of international companies