Academic program description form

University name: Central Technical University

Technical Institute – Kut

Scientific Department: Department of Electricity

Name of the academic or professional program: Electrical Technologies

Name of final certificate: Diploma in Electrical Power Technologies

Academic system: semester
Description preparation date: 2/20/2024
Date of filling the file: 2/20/2024

the signature
Name of the Department Head
Eng. Abdel Karim Shahid Saber
the date

the signature
Name of the scientific assistant
Prof. Dr. Adel Saber Akar
the date 12/3/2024

Check the file before Division of Quality Assurance and University Performance
Name of the Director of the Quality Assurance and University Performance Division: Eng. Zaman Khalil Ibrahim
The date
The signature

14/3/2024

Authentication of the Dean

الأستاذ الدكتور
مهدي فرحان نبلية
عميد المعهد التقني - كوت

Republic of Iraq
Ministry of Higher Education & Scientific Research
Supervision and Scientific Evaluation Directorate
Quality Assurance and Academic Accreditation

Academic Program Specification Form for The Academic

University: Middle Technical University
College: Technical institute-Kut
Department: Electrical Techniques
Date of Form Completion: 18 / 2 /2024

Dean 's Name	Dean 's Assistant	Head of Department
Dr. madi farhan buniya	For Scientific Affairs	Date : / / 2024
Date : / / 2024	Date : / / 2024	Signature
Signature	Signature	

Quality Assurance And University Performance Manager
Date : 18 / 2 / 2024
Signature

First stage

TEMPLATE FOR PROGRAM SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

PROGRAM SPECIFICATION

This Program Specification provides a concise summary of the main features of the program and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the program.

1. Teaching Institution	Central Technical University - Technical Institute Cote
2. University Department/Centre	Department of electrical techniques
3. Program Title	Electrical Power Branch
4. Title of Final Award	Technical Diploma
5. Modes of Attendance offered	Semester first and second for the academic year 2020-2021
6. Accreditation	ABET
7. Other external influences	The opinions of experts in the corresponding departments of foreign universities
8. Date of production/revision of this specification	18 / 2 /2024
9. Aims of the Program	
The department aims to prepare and graduate qualified technical staff to carry out the operation and	
maintenance of units Electricity in generating stations, transmission and distribution of electric power and	
maintenance of protection and control devices for the electric power system	

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Knowledge and Understanding

A1- Operation and maintenance of electrical units for electrical power plants
A2- Operation and maintenance of electrical equipment for transmission and distribution of electrical energy.
A3- Maintenance of protection and control devices for the electrical power system
A4- Extending and maintaining ground and air qiblas

B. Subject-specific skills

B1 - Maintenance skill
B2 - Diagnostic skill
B3 - Repair skill

Teaching and Learning Methods

1 - The lectures.
2 - Discussion and dialogue.
3- Enriching questions.
4- Direct interrogation.

Assessment methods

1 - True and False Questions.
2 - Multiple choice questions
3- Explanation questions.
4 - Duties.
5- Self-assessment.
Exams (monthly, quarterly, and final).

C. Thinking Skills

c1 - Presenting new ideas about the topic by the student, presenting the topic and giving solutions.
C2 - differentiate between problems and explain and analyze phenomena and problems.
C3- Theoretical lectures
C4- Field visits

Teaching and Learning Methods

1- The use of modern means in presenting the theoretical and practical side
2- Giving the student extra-curricular assignments
3- Interrogation of students through seminars
4- Use the brainstorming method
5- Acquisition of scientific skills through laboratory experiments

Assessment methods
1 - Various tests (daily, monthly, quarterly, final) 2 - Oral exams. 3- Duties. 4 - Graduation projects.

D. General and Transferable Skills (other skills relevant to employability and personal development)
D1- Work in the field of maintenance and repair of engines and electrical equipment D 2- Working in the field of maintenance and repair of electrical control devices D 3- A practical visit D4 - summer training
Teaching and Learning Methods
1- Lectures + labs + summer training 2- Preparing and implementing research and projects by students 3- Develop and update the vocabulary of materials to keep pace with development
Assessment Methods
Written + quarterly exams + final exams + daily assessment • Discussing research and projects by scientific committees in the department

11. Programme Structure				Bachelor Degree Requires (x) credits
Level/Year	Course or Module Code	Course or Module Title	Credit Rating	
first	**Elec001**	**electrical Circuits and measurements**	8	
first	**Elec002**	**Electrical installations**	8	
first	**Elec003**	**electronic**	8	
first	**Elec004**	**Maintenance lab workshop**	12	
first	**Elec005**	**Mathematic**	4	
first	**Elec006**	**Computer Application**	6	

first	**Elec007**	**engineering drawing**	6	
first	**Elec008**	**human rights**	4	
first	**Elec009**	**occupational safety**	2	
first	**Elec010**	**digital electronics**	4	
first	**Elec011**	**English language**	2	
second	**Elec012**	**Electrical machines**	10	
second	**Elec013**	**electrical networks**	8	
second	**Elec014**	**Manufacturing installation**	8	
second	**Elec015**	**power electronic**	10	
second	**Elec016**	**Maintenance lab workshop**	8	
second	**Elec017**	**The computer applications**	6	
second	**Elec018**	**Electrical drawing**	3	
Second	**Elec019**	**Programmable Logic Controller PLC**	3	
Second	**Elec020**	**English language**	2	
Second	**Elec021**	**research project**	4	

12. Awards and Credits

Obtaining a technical diploma in the field of electrical technologies, electrical power branch

13. Personal Development Planning

1 - A graduate of the scientific + professional branch (electricity and computers).
2 - Acceptance rate of not less than 60%

14. Admission criteria.

- Follow up on the latest publications on websites and public libraries
- View the latest equipment and technologies in the field of work

Curriculum Skills Map

please tick in the relevant boxes where individual Program Learning Outcomes are being assessed

r / Level	Course Code	Course Title	Core (C) Title or Option (O)	Program Learning Outcomes															
				Knowledge and understanding				Subject-specific skills				Thinking Skills				General and Transferable Skills (or) Other skills relevant to employability and personal development			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
first	Elec001	electrical Circuits and measurements	C	/					/				/			/			
	Elec002	Electrical installations	C	/				/				/				/			
first	Elec003	Electronic	C		/				/				/				/		
	Elec004	Maintenance lab workshop	C	/				/				/				/			
first	Elec005	Mathematic	C		/					/				/				/	
	Elec006	Computer Application	C	/					/				/				/		
first	Elec007	engineering drawing	C		/				/				/				/		
	Elec008	human rights	C		/					/				/			/		
first	Elec009	occupational safety	C			/				/			/				/		
	Elec010	digital electronics	C			/					/			/				/	
first	Elec011	English language	C		/					/			/				/		
	Elec012	Electrical machines	C				/			/				/					/
second	Elec013	electrical networks	C			/			/						/				/
second	Elec014	Manufacturing installation	C				/			/				/				/	
second	Elec015	power electronic	C					/		/					/				/
second	Elec016	Maintenance lab workshop	C			/				/				/				/	

second	Elec017	The computer applications	C		/			/					/			/					
second	Elec018	Electrical drawing	C			/					/				/						/
second	Elec019	Programmable Logic Controller PLC	C			/				/					/				/		
second	Elec020	English language	C				/				/					/					/
second	Elec021	research project	C			/				/					/				/		

Electrical circuits & Measurement

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

A student will be produced to electrical circuits and electrical measurements

1. Teaching Institution	**Technical Institution-Kut**
2. University Department/Centre	**Electric/ first year**
3. Course title/code	**Electrical Measurement & circuits**
4. Program(s) to which it contributes	**Technical Diploma**
5. Modes of Attendance offered	**Compulsory, Seminar scheduled hours (4 hours)**
6. Semester/Year	**First year/ 2020-2021**
7. Number of hours tuition (total)	**120**
8. Date of production/revision of this specification	**18/2/2024**
9. Aims of the Course	
A student will be produced to electrical circuits and electrical measurements	
The student is prepared to study the different circuits in the alternating current circuits and constant current, and to learn about the different theories of these circuits	
The students will be introduced to the different measurement devices.	
The students will achieve the theoretical experiments on DC and AC	

circuits, and also train to use of electrical appliances for various laboratory measurements

10· Learning Outcomes, Teaching ,Learning and Assessment Methode
Knowledge and Understanding **A1. Introduce students to electrical circuits** **A2. Introduce students to the maintenance of electrical control panels** **A3. Introduce students to the operation and maintenance of electrical motors** **A4. Introduce students to ways of maintenance and repair of electrical equipment** **A5. Introduce students to the ways various electrical measurements** **A6 .Introduce students to study different AC and DC circuits** **A7- Introduce students to the various theories to the study of these circuits** **O8- Introduce students to the measurement devices** **O9- train students in order to use of electrical appliances for various laboratory measurements**
B. Subject-specific skills **B1 Perform experiments to verify the theoretical side** **B2 Acquire the skill of designing and implementing various electrical circuits** **B3 Acquire the skill to use the various electrical measurement devices** **B4 Acquire the skill to use for resolving the problems of electrical circuits theories**
Teaching and Learning Methods
Labs + workshops + scientific visits **Lectures + laboratory experiments + use and touching instrumentation + scientific films**
Assessment methods
Theoretical + Ppractical + Oral + Written + debate
C. Thinking Skills **C1. Homework (student exercises)** **C2. Theoretical lectures** **C3. Practical skills within the labs** **C4. Discussing in class**
Teaching and Learning Methods
Lectures + practical + scientific films + Debates

Assessment methods
Theoretical (Written) + Ppractical + Oral + debate

D. General and Transferable Skills (other skills relevant to employability and personal development) **D1. Practical skills in the laboratory, workshops and laboratories** **D2. Scientific films** **D3. Scientific visits** **D4.Mathematical skills and the ability to use scientific theories in electrical measurements and calculations**

11. Course Structure					
Week	**Hours**	**ILOs**	**Unit/Module or Topic Title**	**Teaching Method**	**Assessment Method**
1	**4**	**Lectures + labs**	**System units used in electricity**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
2	**4**	**Lectures + labs**	**The constant current circuits include: 1. Connect resistors respectively with examples 2. connecting resistors in parallel with examples 3-linking Mixed resistors with examples 2. interstellar connectivity and triangular (Y / Δ) for the resistors and the conversion of all of them to the other with examples**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
3	**4**	**Lectures + labs**	**Applications on circuit**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
4	**4**	**Lectures + labs**	**A. Kirchhoff's laws B. Maxwell with a solution examples**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
5	**4**	**Lectures + labs**	**1. Thevenn theory 2. Norton theory**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
6	**4**	**Lectures + labs**	**Applications on Thevenn and Norton's theory**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
7	**4**	**Lectures + labs**	**Superposition theory**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
8	**4**	**Lectures + labs**	**Quantities of alternating current AC**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
9	**4**	**Lectures + labs**	**Quantities of alternating current vectors**	**Lectures + labs**	**Theoretical + Ppractical + Oral**

10	**4**	**Lectures + labs**	**Study the effect of the alternating current circuit with R, C L solution examples**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
11	**4**	**Lectures + labs**	**The effect of AC on the circuit containing resistance and inductance with practical examples**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
12	**4**	**Lectures + labs**	**The effect of AC on the circuit containing resistance and inductance in parallel with practical examples**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
13	**4**	**Lectures + labs**	**The use of descriptions 1-7 (J-Operator)**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
14	**4**	**Lectures + labs**	**Resonance with solving examples**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
15	**4**	**Lectures + labs**	**Parallel resonant circuit with solution examples**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
16	**4**	**Lectures + labs**	**Application of theories such as Norton, Thvenn on AC circuits with a solution examples**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
17	**4**	**Lectures + labs**	**The power in AC circuits**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
18	**4**	**Lectures + labs**	**Apparent power (defined) - How to draw factor triangle**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
19	**4**	**Lectures + labs**	**Theory of transfer the greatest possible power in circles AC with examples**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
20	**4**	**Lectures + labs**	**Practical ways of measuring resistors with high, medium and small values**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
21	**4**	**Lectures + labs**	**AC circles three phases - with a solution examples**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
22	**4**	**Lectures + labs**	**Solving practical examples on AC with three phases**	**Lectures + labs**	**Theoretical + Ppractical**

					+ Oral
23	4	Lectures + labs	Power measurement using Ammeter	Lectures + labs	Theoretical + Ppractical + Oral
24	4	Lectures + labs	Magnetism - magnetic circuit -	Lectures + labs	Theoretical + Ppractical + Oral
25	4	Lectures + labs	Solving practical examples of magnetism	Lectures + labs	Theoretical + Ppractical + Oral
26	4	Lectures + labs	Self-inductance (electromagnetic induction)	Lectures + labs	Theoretical + Ppractical + Oral
27	4	Lectures + labs	Curves of growth and decay of the power of the circuits - a solution examples	Lectures + labs	Theoretical + Ppractical + Oral
28	4	Lectures + labs	Measurement devices include - types of measurement devices	Lectures + labs	Theoretical + Ppractical + Oral
29	4	Lectures + labs	Metering device with the Iron Heart -	Lectures + labs	Theoretical + Ppractical + Oral
30	4	Lectures + labs	Wattmeter devices -	Lectures + labs	Theoretical + Ppractical + Oral

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	مشروع كتاب الدوائر الكهربائية Electrical technology (Edward Hughes)
Special requirements (include for example workshops, periodicals, IT software, websites)	Basic circuits (A.M.F. Brooks) Introduction to electric circuits (M. Romanwitz)
Community-based facilities (include for example, guest Lectures , internship , field studies)	Basic electrical engineering (Fitzgrald & Rlgginborthan)

13. Admissions	
Pre-requisites	**One class**
Minimum number of students	**30**
Maximum number of students	**50**

Electrical installation

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

A student will be produced to the various electrical systems INSTALLATION.

1. Teaching Institution	**Technical Institution-Kut**
2. University Department/Centre	**Electric**
3. Course title/code	**Electrical installation**
4. Program (s) to which it contributes	**Technical Diploma**
5. Modes of Attendance offered	**Compulsory, Seminar scheduled hours (4 hours)**
6. Semester/Year	**First year/ 2020-2021**
7. Number of hours tuition (total)	**120**
8. Date of production/revision of this specification	**18/2/2024**
9. Aims of the Course	

A student will be produced to the various electrical systems INSTALLATION.
The student will be able to identify the materials and electrical wiring systems used in factories, homes, and the establishment and installation of electrical machinery and methods of control and protection of the different loads incorporation.
The student will be able to see the process of electrical Baltosissat (lighting) as well as how to establish and installation of electrical machinery.
The students will achieve the theoretical experiments on DC and AC circuits, and also train to use of electrical appliances for various laboratory measurements

10· Learning Outcomes, Teaching ,Learning and Assessment Methode

Knowledge and Understanding

A1. Introduce students to the various systems ELECTRICAL INSTALLATION

A2. Introduce students to electrical material

A3. Introduce students to the wiring used in laboratories and houses systems

A4. Introduce students to ways of maintenance and repair of electrical equipment

A5. Introduce students to the methods of the establishment and installation of electrical machinery

A6 .Introduce students the methods of control and protection of the different loads incorporation

A7- Introduce students to the various theories to the study of these circuits

A8- Introduce students to the measurement devices

A9- train students in order to use of electrical appliances for various laboratory measurements

A10- training students practical electric Baltosissat (lighting) as well as how to establish and installation of electrical machinery.

B. Subject-specific skills

B1 Perform experiments to verify the theoretical side

B2 Acquire the skill of designing and implementing various electrical circuits

B3 Acquire the skill to use the various electrical measurement devices

B4 Acquire the skill to use for resolving the problems of electrical circuits theories

B 5 - acquire skill in various ELECTRICAL INSTALLATION

B 6 - acquire the skill of wiring used in factories and homes

B7 acquire the skill of the establishment and installation of electrical machinery

B8 acquire the skill of the design and implementation of methods of control and protection of the different loads incorporation

Teaching and Learning Methods

Labs + workshops + scientific visits **Lectures + laboratory experiments + use and touching instrumentation + scientific films**
Assessment methods
Theoretical + Ppractical + Oral + Written + debate
C. Thinking Skills **C1. Homework (student exercises)** **C2. Theoretical lectures** **C3. Practical skills within the labs** **C4. Discussing in class**
Teaching and Learning Methods
Lectures + practical + scientific films + Debates
Assessment methods
Theoretical (Written) + Ppractical + Oral + debate

D. General and Transferable Skills (other skills relevant to employability and personal development) **D1. Practical skills in the laboratory, workshops and laboratories** **D2. Scientific films** **D3. Scientific visits** **D4.Mathematical skills and the ability to use scientific theories in electrical measurements and calculations** **D5 skills designing and implementing ways to control and protection of the**

different loads incorporation

D6 skills in different ELECTRICAL INSTALLATION

D7 skills wiring used in factories and homes

D8 establishment and installation of electrical machinery skills

11. Course Structure					
Week	**Hours**	**ILOs**	**Unit/Module or Topic Title**	**Teaching Method**	**Assessment Method**
1	4	Lectures + labs	Classification of materials to: • electrical conducting materials • Semiconductor • isolators Insulators	Lectures + labs	Theoretical + Ppractical + Oral
2	4	Lectures + labs	Electricity principles - Voltage, current intensity,	Lectures + labs	Theoretical + Ppractical + Oral
3	4	Lectures + labs	Electrical conducting materials. - Copper and Aluminum	Lectures + labs	Theoretical + Ppractical + Oral
4	4	Lectures + labs	Insulation Materials - Examples of insulating materials - air, oil	Lectures + labs	Theoretical + Ppractical + Oral
5	4	Lectures + labs	Magnetic properties of materials - Examples Solved	Lectures + labs	Theoretical + Ppractical + Oral
6	4	Lectures + labs	Magnetic circuits - The application of Kirchhoff's laws Examples unresolved on magnetism	Lectures + labs	Theoretical + Ppractical + Oral
7	4	Lectures + labs	Mechanical properties of electrical materials - Tensile, stress, elongation, flexibility, and other - Solved examples	Lectures + labs	Theoretical + Ppractical + Oral
8	4	Lectures + labs	The stages of the electric power - Power generation (brief summary of the types of power plants) - Power transmission (the systems used, the advantages and disadvantages) - Substations and lowering the crane and stings - Distribution of electric	Lectures + labs	Theoretical + Ppractical + Oral

			power (systems used) of various kinds		
9	**4**	**Lectures + labs**	**Raw principles on how the consumer from secondary processing plant and materials to the consumer and that type - Distribution panels for domestic and industrial (installation and link) - How to feed electricity to a large building with an example so - Electrical transformers used Capacity (KVA) and sites used in the electrical grid - Schemes and examples Solved**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
10	**4**	**Lectures + labs**	**Types of switches used in electrical installations, their importance**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
11	**4**	**Lectures + labs**	**Protection devices used in the ELECTRICAL INSTALLATION (fuses) - Definition (smelter, rated current, a stream smelting, fusion laboratories, the current and projected stream cutting, melting time, the time of the electric arc time total operating time) - Types of fuses with the advantages and disadvantages of each, how to choose Alvasam - Coordination between Alfoasam in the same electrical circui**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
12	**4**	**Lectures +**	**Breakers session Circuit Breakers**	**Lectures + labs**	**Theoretical + Ppractical**

		labs	**With the composition and the principle of his work (Magnetic Circuit Breakers) - magnetic circuit breakers With the principle of his work (Magnetic and Thermal Circuit Breakers) thermal circuit breakers and magnetic - -qguata Small session (Miniature Circuit Breaker) MCB installation and wiring - Boycotted the session with a ground leakage (Earth leakage circuit breaker) ELCB installation and theory work - How to distribute the loads inside the building through a distribution board used and account cutter Capacity**		**+ Oral**
13	**4**	**Lectures + labs**	**Electrical wiring systems Electrical Wiring Systems - Non-conductor system isolated B.B, rubber packing strong T.R.S system - Insulated conductors PayPal system (P.V.C), insulated conductors PayPal system (P.C.P), wiring system within the plastics and preparing the necessary pipes Therefore, wires and cables in the work numbering, taking into account the wire colors at Launch**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
14	**4**	**Lectures + labs**	**Household electric INSTALLATION -Types of household electrical INSTALLATION advantages and**	**Lectures + labs**	**Theoretical + Ppractical + Oral**

			disadvantages of each, safety conditions, cost, durability and required general appearance and shape of the founding -Tools used in household INSTALLATION - The establishment of laboratories and workshops and calculate cost		
15	4	Lectures + labs	Grounding Grounding -Grounding Grounding Components Components (soil and ground Earth resistance Earth resistance and resistance quality of the land of Earth Resistivity, grounding electrodes Grounding Electrode, connectivity and networking equipment Bonding(-Different ways to reduce the grounding resistance Reduce Resistance Grounding -Devices and equipment which must be Toarbha Devices must be grounding -The importance of a good grounding The Importance of Grounding - The difference between the system grounded and non-grounded, measurement methods Grounding Measurering	Lectures + labs	Theoretical + Ppractical + Oral
16	4	Lectures + labs	Lightning Lighting Rod -Thunderbolt, the importance of a lightning rod, lightning rod components - What's important when	Lectures + labs	Theoretical + Ppractical + Oral

			lightning rod equipment and structures that must be protected from lightning design		
17	**4**	**Lectures + labs**	**Electric shock** **-Definition, causes and the relationship of the amount of voltage and current shock and the path of the power and intensity of the current through the body, the current passage of time, the causes of electric shock** **-General rules for the safety of shock and procedures for post-traumatic stress** **-Factors upon which the effect of electric current in the body** **- Preventive measures that can be taken to protect against electrical hazards**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
18	**4**	**Lectures + labs**	**Protection from leakage complacent** **- Circuit breaker against ground leakage Earth leakage current circuit breaker** **- Voltage categorically against ground leakage Earth leakage voltage circuit breaker** **- Places the installation of protection against leakage breakers Radhi (ElCB) :, determine cutter capacity by pregnancy**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
19	**4**	**Lectures + labs**	**Electrical power measuring device single-phase and triple eccentric Single and three phase kwh meter))**	**Lectures + labs**	**Theoretical + Ppractical + Oral**

			- Work and linkage theory (wiring) and installation and how to read, the installation of the meter - The means of adjusting the counter when errors (speed - crawl - a light load) - Intelligent counter - its components and the method of linking and read it		
20	4	Lectures + labs	Inspection and testing of electrical INSTALLATION domestic and industrial executed -Examination of the investigation for the Arctic, insulation resistance test, test continuity ringed circle -How to find a fault in the feeder cables for electric Tosissat (cutting - seek - fuels(- Locate ground holidays in connectors with loop Mori	Lectures + labs	Theoretical + Ppractical + Oral
21	4	Lectures + labs	AC circles Matthelath phases - define how to generate AC single phase - two phases - three phases - with the draw each wiring circuit thanks starburst and triangular in circles AC three phase and special relations to calculate current and voltage line and phase omnipotence and the ability of the line - phase capability - features each linking when used in loads balanced and unbalanced with a solution examples	Lectures + labs	Theoretical + Ppractical + Oral
22	4	Lectures +	Solving practical examples on AC with three phases and	Lectures + labs	Theoretical + Ppractical

		labs	Baltusilat triangular and starburst with loads balanced and unbalanced Methods of measurement capability for loads with three phases - Allowatmitr device linked to how the department to measure the effective - the ability and calculation ability is effective with the virtual and the ability to solve Example		+ Oral
23	4	Lectures + labs	Power measurement using Atmitr and effort - how to find the total power in this way in the case of stellar plug and triangulation - using Atmitran - use three watts Mitrat	Lectures + labs	Theoretical + Ppractical + Oral
24	4	Lectures + labs	Magnetism - magnetic circuit - Introduction to magnetic north and south pole - types of magnetic materials - the basic qualities of the materials, magnetic and defined and includes a magnetic field - magnetic flux - the driving force of magnetism - the density of magnetic flux and the factors that affect the magnetic flux - permeability and Toterha-magnetic circuits and the application of Kirchhoff's laws on her	Lectures + labs	Theoretical + Ppractical + Oral
25	4	Lectures + labs	Solving practical examples of magnetism	Lectures + labs	Theoretical + Ppractical + Oral
26	4	Lectures + labs	Self-inductance of the file (electromagnetic induction) - definition - special relations	Lectures + labs	Theoretical + Ppractical + Oral

			to find a self-inductance of the file - the mutual inductance between the two files - and relationships to create mutual inductance and quality by linking the two files includes: Linking succession of synergistic and Taaksi		
27	4	Lectures + labs	Curves of growth and decay of the power of the circle Hittite - Explain this circuit and its impact in the DC - public relations for the growth and decay of power in the file - the current fee fixed time and expense - to solve examples Charge and discharge capacitors and includes the use of the widening circles in the DC public relations for loading and unloading intensive and drawing power - time constant effect with his account - a solution examples	Lectures + labs	Theoretical + Ppractical + Oral
28	4	Lectures + labs	- Thermal supervisor against overcurrent (installation - working theory - Adjust codified power - uses) - Overcurrent protection reverse chronological Inverse - Time Over regime current Relaying - Example solution	Lectures + labs	Theoretical + Ppractical + Oral
29	4	Lectures + labs	TIMER - Types (mechanic - Ketrona-programmed) - Theory - timekeeping - follow-ups of low-voltage - Types of temporary supervisor in terms of	Lectures + labs	Theoretical + Ppractical + Oral

			function - types of temporary supervisor in terms of structure - Applications in circles ELECTRICAL INSTALLATION Inspection and testing of electrical Tosissat Testing and inspection of Installation		
30	**4**	**Lectures + labs**	**Test Devices Ground Tester -Test types Polar test, test the quality of the ground system, wire insulator resistance test, test the continuity of the background circuit**	**Lectures + labs**	**Theoretical + Ppractical + Oral**

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	**ملزمة التأسيسات الكهربائية**
Special requirements (include for example workshops, periodicals, IT software, websites)	**مشروع كتاب التأسيسات الكهربائية**
Community-based facilities (include for example, guest Lectures , internship , field studies)	**Electrical installation technology (by Thompson) Electrical installation technology (by Michael Neidle) Practice on low voltage switch gears (by Siemense Publication)**

13. Admissions	
Pre-requisites	**One class**
Minimum number of students	**30**

Maximum number of students	**50**

Electronics1

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

A student will be produced to various electronic components

1. Teaching Institution	Technical Institution-Kut
2. University Department/Centre	**Electric**
3. Course title/code	**Electronics1**
4. Programme(s) to which it contributes	**Technical Diploma**
5. Modes of Attendance offered	**Compulsory, Seminar scheduled hours (4 hours)**
6. Semester/Year	**First year/ 2022-2023**
7. Number of hours tuition (total)	**120**
8. Date of production/revision of this specification	**18/2/2024**

9. Aims of the Course
A student will be produced to various electronic components
The student is prepared to study : the electronic components manufacturer of semiconductor different kinds - installed - characteristics - their use in electronic circuits - applications - their own electronic circuit components of

the electronic and optical applications analysis.
The students will be introduced to the different measurement devices.
The student will be able to: **1. use basic electronic devices in the lab** **2 . connect electronic items in simple electronic circuits** **3. Know specifications and special characteristics of electronic machining** **4. Identify and apply circuits for some of the components and implementation**

10· Learning Outcomes, Teaching ,Learning and Assessment Methode
A- Knowledge and Understanding **A1. Introduce students to electronic circuits** **A2. Introduce students to various electronic components** **A3. Introduce students to the electronic components manufacturer of semiconductor different kinds** **A4. Introduce students to the use of electronic components in electronic circuits** **A5. Introduce students to the electronic circuit analysis and applications** **A6 .Introduce students to the basic electronic devices in the lab** **A7- Introduce students to connect electronic items in simple electronic circuits** **A8- Introduce students to the measurement devices** **A9- train students in order to use of electrical appliances for various laboratory measurements** **A10- introduce students to the specifications and special characteristics of electronic machining** **A11- introduce students to the practical circuits to some of the components and implementation**
B. Subject-specific skills **B1 Perform experiments to verify the theoretical side** **B2 Acquire the skill of designing and implementing various electrical circuits** **B3 Acquire the skill to use the various electrical measurement devices** **B4 Acquire the skill to use for resolving the problems of electrical circuits theories** **B5 Acquire the skill of the use of electronic components in electronic circuits** **B6 Acquire the skill of electronic circuit analysis and applications** **B4 Acquire the skill of connecting electronic items in simple electronic circuits** **B5 Acquire the skill of applied design circles for some of the**

components and implementation
Teaching and Learning Methods
Labs + workshops + scientific visits **Lectures + laboratory experiments + use and touching instrumentation + scientific films**
Assessment methods
Theoretical + Ppractical + Oral + Written + debate
C. Thinking Skills **C1. Homework (student exercises)** **C2. Theoretical lectures** **C3. Practical skills within the labs** **C4. Discussing in class**
Teaching and Learning Methods
Lectures + practical + scientific films + Debates
Assessment methods
Theoretical (Written) + Ppractical + Oral + debates

D. General and Transferable Skills (other skills relevant to employability and personal development) **D1. Practical skills in the laboratory, workshops and laboratories** **D2. Scientific films** **D3. Scientific visits** **D4.Mathematical skills and the ability to use scientific theories in electrical measurements and calculations** **D5- use of electronic components in electronic circuits skills**

D6- skills in circuit analysis and applications
D7 skills linked to electronic items in simple electronic circuits applied
D8- design circles for some of the components and implementation skills
D9 skills of a process that achieved the theoretical side tests

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	Lectures + labs	Semiconductor theory - the atomic structure - energy levels - crystals - Plug in crystals - the gap stream - how to move the gaps	Lectures + labs	Theoretical + Ppractical + Oral
2	4	Lectures + labs	Vaccination - develop a positive type (P) negative crystal of the type (N) electrons stream and stream gaps - the total resistance	Lectures + labs	Theoretical + Ppractical + Oral
3	4	Lectures + labs	Binaries Semiconductor - Link (PN) composition of the evacuation zone - Voltage barrier - Tel energy - thermal effects - bilateral biased - aligned front - reverse bias - curves properties in both directions, the front and reverse - obsolescent transit - stream stream of minority carriers - stream surface leakage - effort refraction - breakdown voltage (PIV) greatest stream in front of me - the greatest effort Reverse - (PIVmax) - the equivalent of a binary circuit	Lectures + labs	Theoretical + Ppractical + Oral
4	4	Lectures + labs	Binaries Semiconductor - Link (PN) composition of the evacuation zone - Voltage barrier - Tel energy - thermal effects - bilateral biased - aligned front - reverse bias - curves properties in both directions, the front and reverse - obsolescent transit - stream stream of minority carriers - stream surface leakage - effort refraction - breakdown voltage (PIV) greatest stream in front of me - the greatest effort Reverse - (PIVmax) - the equivalent of a	Lectures + labs	Theoretical + Ppractical + Oral

			binary circuit		
5	4	Lectures + labs	Bilateral unifier of the stream - a standard half-wave - continuous stream and the calculated value - the effective value of the output frequency	Lectures + labs	Theoretical + Ppractical + Oral
6	4	Lectures + labs	The unification of the full wave - by using a converted forking centrist - Unified Alguenatri - account ongoing and effective current values - the extraction output frequency - a comparison between a standard half-wave and full-wave uniform - a comparison of the full wave Mouhdat	Lectures + labs	Theoretical + Ppractical + Oral
7	4	Lectures + labs	Filters - filtration using widening - candidate (LC) candidate (RC) - constant output voltage spikes	Lectures + labs	Theoretical + Ppractical + Oral
8	4	Lectures + labs	Ripple multiplier factor circles effort pruning - pruning positive - negative pruning - pruning compound	Lectures + labs	Theoretical + Ppractical + Oral
9	4	Lectures + labs	Atnaia Zeinr - mounted - Rmsen - properties - refraction Alanhiara refraction Zeinr - refraction effort - with carrying capacity - the reluctance Zeinr - the effects of temperature - rounded Zeinr continuous voltage regulation	Lectures + labs	Theoretical + Ppractical + Oral
10	4	Lectures + labs	Atnaia Zeinr - mounted - Rmsen - properties - refraction Alanhiara refraction Zeinr - refraction effort - with carrying capacity - the reluctance Zeinr - the effects of temperature - rounded Zeinr continuous voltage regulation	Lectures + labs	Theoretical + Ppractical + Oral
11	4	Lectures + labs	Bipolar transistor - mounted - regions - his character - Althiaz efforts - (α dc) - (β dc) the relationship between the (α dc) - (β dc) types of bias - linking formats rounding the transistor and circuit	Lectures + labs	Theoretical + Ppractical + Oral

12	4	Lectures + labs	Bipolar transistor - mounted - regions - his character - Althiaz efforts - (α dc) - (β dc) the relationship between the (α dc) - (β dc) types of bias - linking formats rounding the transistor and circuit	Lectures + labs	Theoretical + Ppractical + Oral
13	4	Lectures + labs	Curves properties of the transistor - the definition of working areas (ICBO) and (ICEO) - curved earning power - the relationship between (IC) and (ICEO)	Lectures + labs	Theoretical + Ppractical + Oral
14	4	Lectures + labs	Aligned transistor circuits - Base bias - bias motive	Lectures + labs	Theoretical + Ppractical + Oral
15	4	Lectures + labs	Parallel resonant circuit - defined - account Bias mosque - Self-Aligned - siding background nutrition - the bias voltage divider - Practical examples	Lectures + labs	Theoretical + Ppractical + Oral
16	4	Lectures + labs	Bias mosque - Self-Aligned - siding background nutrition - the bias voltage divider - Practical examples	Lectures + labs	Theoretical + Ppractical + Oral
17	4	Lectures + labs	Circuit the equivalent continuous Transistors - DC load line	Lectures + labs	Theoretical + Ppractical + Oral
18	4	Lectures + labs	Work - points dormancy points (Q-Point) Practical examples	Lectures + labs	Theoretical + Ppractical + Oral
19	4	Lectures + labs	Transistors in Enlarge small signals - the equivalent circuit alternating - the perfect rounding - constants hybrids - the equivalent circuit using coefficients (h) - Earn effort - earning power - the ability to earn - Mquaomta input and output - small signal amplifiers - Qaeda market - motive market	Lectures + labs	Theoretical + Ppractical + Oral
20	4	Lectures + labs	Transistors in Enlarge small signals - the equivalent circuit alternating - the perfect rounding - constants hybrids - the equivalent circuit using	Lectures + labs	Theoretical + Ppractical + Oral

			coefficients (h) - Earn effort - earning power - the ability to earn - Mquaomta input and output - small signal amplifiers - Qaeda market - motive market		
21	4	Lectures + labs	Transistors in Enlarge small signals - the equivalent circuit alternating - the perfect rounding - constants hybrids - the equivalent circuit using coefficients (h) - Earn effort - earning power - the ability to earn - Mquaomta input and output - small signal amplifiers - Qaeda market - motive marketwith a solution examples	Lectures + labs	Theoretical + Ppractical + Oral
22	4	Lectures + labs	he use of a transistor in the voltage regulation - an orderly succession - structured parallel source of an ongoing effort Department	Lectures + labs	Theoretical + Ppractical + Oral
23	4	Lectures + labs	Transistor junctional field effect (JEFT) - mounted - his character - Theory - curves properties - curved conductivity of reciprocity - the definition of a narrow effort (VP), (IDSS), (VGSOff) - curves properties (MOSFET) - (D-MOSFET) - (E-MOSFET)	Lectures + labs	Theoretical + Ppractical + Oral
24	4	Lectures + labs	Transistor junctional field effect (JEFT) - mounted - his character - Theory - curves properties - curved conductivity of reciprocity - the definition of a narrow effort (VP), (IDSS), (VGSOff) - curves properties (MOSFET) - (D-MOSFET) - (E-MOSFET)	Lectures + labs	Theoretical + Ppractical + Oral
25	4	Lectures + labs	Aligned circles (FET) - bias constant current source - working point of self-aligned - the equivalent of the circuit (FET) use (FET) to enlarge the small signal	Lectures + labs	Theoretical + Ppractical + Oral
26	4	Lecture	Aligned circles (FET) - bias constant current source -	Lectures + labs	Theoretical + Ppractical +

		s + labs	working point of self-aligned - the equivalent of the circuit (FET) use (FET) to enlarge the small signal		Oral
27	4	Lectures + labs	A comparison of the types (FET) (FET, MOSFET) and the (BJT)	Lectures + labs	Theoretical + Ppractical + Oral
28	4	Lectures + labs	Based on light-resistant (LDR) - light emitting diode - photodiode panel of seven installed applications and pieces	Lectures + labs	Theoretical + Ppractical + Oral
29	4	Lectures + labs	Optical transistor - installed - work - applications - process	Lectures + labs	Theoretical + Ppractical + Oral
30	4	Lectures + labs	Optical transistor - installed - work - applications – process	Lectures + labs	Theoretical + Ppractical + Oral

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	مبادئ الالكترونيات 1984–تاليف مالفينو, ترجمة بدر محمد علي الوتار
Special requirements (include for example workshops, periodicals, IT software, websites)	الالكترونيك الصناعي 1985–تاليف ضياء مهدي فارس واخرون
Community-based facilities (include for example, guest Lectures , internship , field studies)	An introduction to semiconductors (K.I. Gross & J.Y. Rwood) الكترونيات القدرة 1991– تاليف ضياء مهدي فارس, ابراهيم طه

13. Admissions	
Pre-requisites	One class

Minimum number of students	**30**
Maximum number of students	**50**

Laboratories

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

Students need to acquire skills in the use of hand tools, measuring tools and operation of appliances, machinery and used in each workshop.

1. Teaching Institution	**Technical Institution-Kut**
2. University Department/Centre	**Electric**
3. Course title/code	**Laboratories**
4. Programme(s) to which it contributes	**Technical Diploma**
5. Modes of Attendance offered	**Compulsory, Seminar scheduled hours (6 hours)**
6. Semester/Year	**First year/ 2022-2023**
7. Number of hours tuition (total)	**180**
8. Date of production/revision of this specification	**18/2/2024**
9. Aims of the Course	
*** Students need to acquire skills in the use of hand tools, measuring tools and operation of appliances, machinery and used in each workshop.**	

*** Students need to acquire skills in the use of hand tools, measuring tools and the ability to work and run the machines optimal way**

*** Focus on training students on the refrigerator works properly and how to use the tools of measurement and rasps and cutting Banchar hole and Algulwzh**

*** Training is focus in the welding workshop on a different number, tools and equipment inside the workshop is the ideal way**

*** Focus on training students on how to plan for the sheet metal and how cutting, assembly, welding and assembly process and the process of welding, sheet and cutting the use of planning manual and mechanical tools and bending tools and manual and mechanical welding tools**

*** The focus is on training students on various turning machines and training necessary measure to implement a variety of exercises and how the external and internal teeth and how to choose the pens cutting tools**

*** The training focused on the use of tools and tools used and measurement tools and learn about the different Woodworking Machinery and safety procedures and maintenance of machines**

*** The student will be able to:**

1- equipment, tools and various components used in the workshops used

2. acquire the skill and expertise in the field of various electrical maintenance work

3. gaining self-confidence to practice works of art in the electrical trace faults and learn how to repair

4. distinguish and recognize the various electrical and electronic components and how they are used in the construction of various departments

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Knowledge and Understanding

A1. Introduce students to the manual skills in the use of hand tools and measuring devices and machines

A2. introduce students to the refrigerator works properly and how to use the tools of measurement and rasps and cutting

A3. introduce students and trained in welding on a different number, tools and equipment

A4. introduce students and trained in various turnings machines

A5. introduce students to use the number of tools and tools and measuring instruments used and identify the different Woodworking Machinery

A6 . introduce students to the electrical works of art tracking malfunctions and learn how to repair **A7 introduce students to the various electrical and electronic components and how they are used in the construction of various circles.** **O8- Introduce students to the measurement devices** **O9- train students in order to use of electrical appliances for various laboratory measurements**
B. Subject-specific skills **B1 Conduct their own experiments in the use of hand tools and measuring devices and machines run** **B-2 - to acquire the skill of the refrigerator to use tools properly** **B 3 - acquire the skill of welding on a different number, tools and equipment for** **B4- acquire the skill to use the various turning machines** **B5- acquire the skill of using a number carpentry** **B6- acquire the skill of various electrical maintenance work** **B7- acquire trace faults and how to repair skill**
Teaching and Learning Methods
Labs + workshops + scientific visits **Lectures + laboratory experiments + use and touching instrumentation + scientific films**
Assessment methods
Theoretical + Ppractical + Oral + Written + debate
C. Thinking Skills **C1. Homework (student exercises)** **C2. Theoretical lectures** **C3. Practical skills within the labs** **C4. Discussing in class**
Teaching and Learning Methods
Lectures + practical + scientific films + Debates
Assessment methods
Theoretical (Written) + Ppractical + Oral + debate

D. General and Transferable Skills (other skills relevant to employability and

personal development)
D1. Practical skills in the laboratory, workshops and laboratories
D2. Scientific films
D3. Scientific visits
D4 The use of various electrical components Skills
D5- skills in the use of welding machines and turnings, plumbing, carpentry and refrigerator optimally
D 6 - skills trace faults and repair
D7- various electrical maintenance work skills
D8- skills of a process that achieved the theoretical side tests

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	6	Lectures + labs	Measuring instruments: (ruler - measuring tape - Vernier - and micrometer and how to use and maintain them	Lectures + labs	Theoretical + Ppractical + Oral
2	6	Lectures + labs	Cutting Chainsaw: chainsaw and hand weapon Saw	Lectures + labs	Theoretical + Ppractical + Oral
3	6	Lectures + labs	Types of drills Exercises	Lectures + labs	Theoretical + Ppractical + Oral
4	6	Lectures + labs	Practical welding workshop	Lectures + labs	Theoretical + Ppractical + Oral
5	6	Lectures + labs	Practical welding workshop	Lectures + labs	Theoretical + Ppractical + Oral
6	6	Lectures + labs	Practical welding workshop	Lectures + labs	Theoretical + Ppractical + Oral
7	6	Lectures + labs	Practical plumbing workshop	Lectures + labs	Theoretical + Ppractical + Oral
8	6	Lectures + labs	Practical plumbing workshop	Lectures + labs	Theoretical + Ppractical + Oral
9	6	Lectures + labs	Practical plumbing workshop	Lectures + labs	Theoretical + Ppractical + Oral
10	6	Lectures + labs	Practical turnings workshop	Lectures + labs	Theoretical + Ppractical + Oral
11	6	Lectures + labs	Practical turnings workshop	Lectures + labs	Theoretical + Ppractical + Oral
12	6	Lectures + labs	Practical turnings workshop	Lectures + labs	Theoretical + Ppractical + Oral
13	6	Lectures + labs	Practical carpentry workshop	Lectures + labs	Theoretical + Ppractical + Oral
14	6	Lectures + labs	Practical carpentry workshop	Lectures + labs	Theoretical + Ppractical + Oral

15	6	Lectures + labs	Practical carpentry workshop	Lectures + labs	Theoretical + Ppractical + Oral
16	6	Lectures + labs	Fundamental principles of industrial security	Lectures + labs	Theoretical + Ppractical + Oral
17	6	Lectures + labs	Training on the electrical welding process	Lectures + labs	Theoretical + Ppractical + Oral
18	6	Lectures + labs	Resistors types	Lectures + labs	Theoretical + Ppractical + Oral
19	6	Lectures + labs	Coils types	Lectures + labs	Theoretical + Ppractical + Oral
20	6	Lectures + labs	Printed boards and regular used in the construction of electronic circuits	Lectures + labs	Theoretical + Ppractical + Oral
21	6	Lectures + labs	Training on work coils using different types of ways of winding	Lectures + labs	Theoretical + Ppractical + Oral
22	6	Lectures + labs	Study parts of water pump air conditioner	Lectures + labs	Theoretical + Ppractical + Oral
23	6	Lectures + labs	Training on the drawing engine water pump You air chilled and Rewinding + files and conducting types of tests, continuity test	Lectures + labs	Theoretical + Ppractical + Oral
24	6	Lectures + labs	Testing Ground leakage testing of minors in the files, test Polar examination, start the engine and treatment of electrical and mechanical faults	Lectures + labs	Theoretical + Ppractical + Oral
25	6	Lectures + labs	Study the work of electric irons and parts thereof theory, training to dismantle and assemble the parts irons and identify the types of faults and how to address them	Lectures + labs	Theoretical + Ppractical + Oral
26	6	Lectures + labs	Study propeller parts for desktop and and re-	Lectures + labs	Theoretical + Ppractical + Oral

			assembled and identify the mechanical and electrical faults and how to address them		
27	6	Lectures + labs	Study ceiling fan parts and training Tvkiquea and re-assembled and identify the mechanical and electrical faults and how to address them	Lectures + labs	Theoretical + Ppractical + Oral
28	6	Lectures + labs	Study the types of transformers and get to know their parts, simplified design Wolf transferred decreases with taking out one and installed and tested, as well as streamlined design Wolf transferred decreases with taking out a socket medial and installed and tested	Lectures + labs	Theoretical + Ppractical + Oral
29	6	Lectures + labs	Drawing circuit files start racing, movement, and how to link centrifuge key and widening, if any, winding movement files and start racing and installed in the sewer, linking files, examine and start the engine	Lectures + labs	Theoretical + Ppractical + Oral
30	6	Lectures + labs	Disassemble and assemble and study the parts truck batteries and handle faults expected Training oxy-acetylene welding gas and liquid	Lectures + labs	Theoretical + Ppractical + Oral

12. Infrastructure

Required reading: **· CORE TEXTS** **· COURSE MATERIALS** **· OTHER**	**Textbooks**
Special requirements (include for example workshops, periodicals, IT software, websites)	**Scientific books from libraries**
Community-based facilities (include for example, guest Lectures , internship , field studies)	**Various online sources**
13. Admissions	
Pre-requisites	**One class**
Minimum number of students	**30**
Maximum number of students	**50**

Mathematics

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

The student will be able to understand the laws mathematical equations, and apply the laws in the field of electrical circuits

1. Teaching Institution	**Technical Institution-Kut**

2. University Department/Centre	**Electric**
3. Course title/code	**Mathematics**
4. Programme(s) to which it contributes	**Technical Diploma**
5. Modes of Attendance offered	**Seminar scheduled hours (2 hours)**
6. Semester/Year	**First year/ 2023-2024**
7. Number of hours tuition (total)	**60**
8. Date of production/revision of this specification	**20/12/2023**
9. Aims of the Course	
The student will be able to: **1. understand the laws mathematical equations Statistics** **2. Apply the laws in the field of electrical circuits**	

10· Learning Outcomes, Teaching ,Learning and Assessment Methode
A- Knowledge and Understanding **A1. Introduce the students to the laws of mathematical equations** **A2. introduce students on how to apply the laws in the field of electrical circuits** **A3. introduce students to the vectors quantities** **A4. introduce students to matrixes and their types and how to use them to solve electrical issues** **A5. introduce students to the trigonometric functions and their types** **A6 . introduce students to the principles of differentiation and integration**
B. Subject-specific skills **B1 Acquire the skill to use arrays in finding and calculation values of unknowns in electrical circuits** **B-2 - to acquire the skill of using the laws of different mathematical equations** **B 3 - acquire the skill of law enforcement in solving electrical issues** **B4- acquire the skill to determine if different quantities were destined**
Teaching and Learning Methods
Labs + workshops + scientific visits

Lectures + laboratory experiments + use and touching instrumentation + scientific films
Assessment methods
Theoretical + Ppractical + Oral + Written + debate
C. Thinking Skills **C1. Homework (student exercises)** **C2. Theoretical lectures** **C3. Practical skills within the labs** **C4. Discussing in class**
Teaching and Learning Methods
Lectures + practical + scientific films + Debates
Assessment methods
Theoretical (Written) + Ppractical + Oral + debate

D. General and Transferable Skills (other skills relevant to employability and personal development) D1- use various laws mathematical equations skills D2- law enforcement skills in solving electrical issues D3- identify the different quantities skills whether they were heading D4- use matrixes in finding and calculation values of unknowns in electrical circuits skills

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	Lectures	Matrices / determinants / and their properties	Lectures	Theoretical + quiz + Oral
2	2	Lectures	Solving linear equations - the way Kramer - applications on the determinants - compensation method is used to find the value of the currents in the multi-source circuit	Lectures	Theoretical + quiz + Oral
3	2	Lectures	Vector / Vector analysis / flying and standard / Jabr Vector / calculations vector quantities in space Turi representation and directional quantities alternating, phase angle - finding outcome of flying quantities	Lectures	Theoretical + quiz + Oral
4	2	Lectures	Unit orthogonal vectors / vector / record beatings and directional / applications on Vector / magnetic flux / Maxwell / beating numerical measure of vectors using angle / numerical multiplication of vectors using the coordinates	Lectures	Theoretical + quiz + Oral
5	2	Lectures	Function / trigonometric functions and trigonometric relationships / logarithmic functions Calculate the value of the DC circuit half bridge / calculate the effective	Lectures	Theoretical + quiz + Oral

			value of the voltage / line load for the transistor		
6	2	Lectures	The exponential function / function blocks Overload / application fee exponential electric circuit of the first class, to represent the Department of candidate R-C function Aceh	Lectures	Theoretical + quiz + Oral
7	2	Lectures	limits / extremely arrest and trigonometric functions / applications on the ends	Lectures	Theoretical + quiz + Oral
8	2	Lectures	Differential / derivative / derivative algebraic functions / chain rule - building Differential / calculate the velocity and acceleration of the circle - the speed of light	Lectures	Theoretical + quiz + Oral
9	2	Lectures	With higher echelons implicit function / standard function derivative / representation system Vixiaoah the function implied	Lectures	Theoretical + quiz + Oral
10	2	Lectures	Derived trigonometric functions / logarithmic derivative / calculate the effective value of the stream function in the R-L-C circuit / gain voltages Balbal	Lectures	Theoretical + quiz + Oral
11	2	Lectures	Derivative exponential / derivative hyperbolic functions / time constant Account	Lectures	Theoretical + quiz + Oral
12	2	Lectures	Application of derivative / equivalent tangent and column / speed and acceleration / change	Lectures	Theoretical + quiz + Oral

			Change voltages and power in terms of the rate of time accounts		
13	2	Lectures	Increasing and decreasing / Great endings and micro / Points coup / Drawing Functions Drawing respond to the circle of second-class R-L-C	Lectures	Theoretical + quiz + Oral
14	2	Lectures	Vixiaoah applications and engineering General	Lectures	Theoretical + quiz + Oral
15	2	Lectures	Integration / indefinite integral / Integration arrest and logarithmic functions. Calculate the value of a widening shipment	Lectures	Theoretical + quiz + Oral
16	2	Lectures	Integration of exponential and trigonometric	Lectures	Theoretical + quiz + Oral
17	2	Lectures	Specific integration / specific integration applications / area under oriented / space between two curves / electric power accounts	Lectures	Theoretical + quiz + Oral
18	2	Lectures	rotational / curved arc length	Lectures	Theoretical + quiz + Oral
19	2	Lectures	h and engineering applications - Momentum - Momentum - moment of inertia)	Lectures	Theoretical + quiz + Oral
20	2	Lectures	eral methods of integration e compensation and retail use fractions and exponential and logarithmic ding Almkamil circuit using esistance and inductance /	Lectures	Theoretical + quiz + Oral

			sentation of circuit equations rative / amplifier circuit using integrated circuit		
21	2	Lectures	rical Methods in integration / bezoidal base / base Samsun ind the distance from the ating speed - = find the value of ffective power of the rectifier Kdarapractical examples	Lectures	Theoretical + quiz + Oral
22	2	Lectures	crete solution of differential equations and linear and terogeneous with different plications within the field of tence / circles pruning positive d negative and compound	Lectures	Theoretical + quiz + Oral
23	2	Lectures	mplex numbers / addition, traction, multiplication and n / geometric representation of he number of composite / nship electrical units preparing compound	Lectures	Theoretical + quiz + Oral
24	2	Lectures	ormula / converting capacity to t and vice versa polarity / tag ient (j) e / formula exponential rtments in the conversion / de z theory and its uses in solving plex electrical circuits / power nission accounts using the font constants lines	Lectures	Theoretical + quiz + Oral
25	2	Lectures	rs and roots / representation s drawing / find the roots of rical circuits to determine the rocessing / stellar acting and triangular	Lectures	Theoretical + quiz + Oral
26	2	Lectures	tical operations / distributions atability / histogram / curved rring / Probability and long / metic mean and the geometric – Sample	Lectures	Theoretical + quiz + Oral
27	2	Lectures	standard range / contrast and sion and relative / relationship	Lectures	Theoretical + quiz +

			en the center and moderation ein / coefficient of variation - andard variable deviation		Oral
28	2	Lectur es	ces / determinants / and their properties ng linear equations - the way amer - applications on the inants - compensation method sed to find the value of the nts in the multi-source circuit	ctures	tical + quiz + Oral
29	2	Lectur es	r / Vector analysis / flying and rd / Jabr Vector / calculations ector quantities in space	ctures	tical + quiz + Oral
30	2	Lectur es	r / Vector analysis / flying and rd / Jabr Vector / calculations ector quantities in space	ctures	tical + quiz + Oral

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	الرياضيات التطبيقية للسيد يعقوب صياغة من سلسلة شوم (حل الدوائر الكهربائية)
Special requirements (include for example workshops, periodicals, IT software, websites)	Calculus (Thomas) Laplace Transformation
Community-based facilities (include for example, guest Lectures , internship , field studies)	طرق حل المعادلات التفاضلية (للمؤلف خالد احمد السامرائي)
13. Admissions	
Pre-requisites	One class
Minimum number of students	30
Maximum number of students	50

Computer applications

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

Teaching students to enter the drawing AUTOCAD program and to identify the interface drawing and painting orders and modification

1. Teaching Institution	**Technical Institution-Kut**
2. University Department/Centre	**Electric**
3. Course title/code	**Computer applications**
4. Programme(s) to which it contributes	**Technical Diploma**
5. Modes of Attendance offered	**Seminar scheduled hours (3 hours)**
6. Semester/Year	**First year/ 2023-2024**
7. Number of hours tuition (total)	**90**
8. Date of production/revision of this specification	**18/2/2024**
9. Aims of the Course	
The aim of the article: teach students the basics of computer, operating system, the most important commands	
Teaching students to enter the drawing AUTOCAD program and to identify the interface drawing and painting orders and modification	
Access to three-dimensional drawing 3D	

Students taught the concept of viruses and methods of control

10· Learning Outcomes, Teaching ,Learning and Assessment Method
A- Knowledge and Understanding **A1. introduce students to the basics of computer, operating system, the most important commands** **A2. introduce students to enter the drawing AUTOCAD program and to identify the interface** **A3. drawing and painting orders and modification** **A4. Introduce students to the three-dimensional drawing 3D** **A5. Introduce students to the viruses and methods of control**
B. Subject-specific skills **B1 to acquire the skill of the use of computers and various programs** **B2 acquire the skill of a three-dimensional drawing** **B3 acquire some skills in AutoCAD program** **B4 acquire the skill to know the types of viruses and methods of control**
Teaching and Learning Methods
Labs + workshops + scientific visits **Lectures + laboratory experiments + use and touching instrumentation + scientific films**
Assessment methods
Theoretical + Ppractical + Oral + Written + debate
C. Thinking Skills **C1. Homework (student exercises)** **C2. Theoretical lectures** **C3. Practical skills within the labs** **C4. Discussing in class**
Teaching and Learning Methods
Lectures + practical + scientific films + Debates
Assessment methods

Theoretical (Written) + Ppractical + Oral + debate

D. General and Transferable Skills (other skills relevant to employability and personal development)
D1. Practical skills in the laboratory, workshops and laboratories
D2. Scientific films
D3- use computer skills
D4- skills in the fight against viruses
D5- use drawing program AutoCAD skills
D 6 - the skills of three-dimensional graphic design

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	Lectures + labs	Introduction to computer and their systems and benefits	Lectures + labs	Theoretical + Ppractical + Oral
2	4	Lectures + labs	Introduction to computer and their systems and benefits	Lectures + labs	Theoretical + Ppractical + Oral
3	4	Lectures + labs	Windows	Lectures + labs	Theoretical + Ppractical + Oral
4	4	Lectures + labs	Windows	Lectures + labs	Theoretical + Ppractical + Oral
5	4	Lectures + labs	My COMPUTER ، MY DOCUMENTS ، RECYCLE BIN	Lectures + labs	Theoretical + Ppractical + Oral
6	4	Lectures + labs	My COMPUTER ، MY DOCUMENTS ، RECYCLE BIN	Lectures + labs	Theoretical + Ppractical + Oral
7	4	Lectures + labs	DESKTOP BACKGROUND ، WINDOWS COLOR ، SCREEN SAVER	Lectures + labs	Theoretical + Ppractical + Oral
8	4	Lectures + labs	DESKTOP BACKGROUND ، WINDOWS COLOR ، SCREEN SAVER	Lectures + labs	Theoretical + Ppractical + Oral
9	4	Lectures + labs	CONTROL PANAL PROGRAM AND FEATURES ، ACCESSORIES CALCULATOR ،WORDPAD،WINDOSWS MEDIA PLAYER	Lectures + labs	Theoretical + Ppractical + Oral
10	4	Lectures + labs	CONTROL PANAL PROGRAM AND FEATURES ، ACCESSORIES CALCULATOR ،WORDPAD،WINDOSWS MEDIA PLAYER	Lectures + labs	Theoretical + Ppractical + Oral
11	4	Lectures + labs	AUTOCAD DRAWING LIMITS ،UNITS	Lectures + labs	Theoretical + Ppractical + Oral
12	4	Lectures + labs	OSNAP ،ORTTHO ، LWT ، OTRACK ، POLAR ، SNAP ، GRID ، DISTANCE ، AREA	Lectures + labs	Theoretical + Ppractical + Oral
13	4	Lectures + labs	VIEW :ZOOM PAN ، REGEN	Lectures + labs	Theoretical + Ppractical + Oral

14	**4**	**Lectures + labs**	**DRAW : LINE ، MULTILINE ، CONSTRUCTION LINE ، POLYLINE ، POLYGON ، RECTANGLE ، ARC ، CIRCLE ،DONUT، REVCLOUD ، SPLINE ،ELLIPS ، MACKE BLOCK ، INSERT BLOCK ، MBLOCK ، WBLOCK، HATCH، REGION**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
15	**4**	**Lectures + labs**	**DRAW : LINE ، MULTILINE ، CONSTRUCTION LINE ، POLYLINE ، POLYGON ، RECTANGLE ، ARC ، CIRCLE ،DONUT، REVCLOUD ، SPLINE ،ELLIPS ، MACKE BLOCK ، INSERT BLOCK ، MBLOCK ، WBLOCK، HATCH، REGION**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
16	**4**	**Lectures + labs**	**DRAW : LINE ، MULTILINE ، CONSTRUCTION LINE ، POLYLINE ، POLYGON ، RECTANGLE ، ARC ، CIRCLE ،DONUT، REVCLOUD ، SPLINE ،ELLIPS ، MACKE BLOCK ، INSERT BLOCK ، MBLOCK ، WBLOCK، HATCH، REGION**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
17	**4**	**Lectures + labs**	**MODIFY :ERASE ، COPY ، MIRROR ، OFFSET،ARRAY ، MOVE ، ROTATE ، SCALE ، CHAMFER ، FILLET ، STRETCH ، TRIM ، EXTEND ، BREAK ، EXPLODE**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
18	**4**	**Lectures + labs**	**MODIFY :ERASE ، COPY ، MIRROR ، OFFSET،ARRAY ، MOVE ، ROTATE ، SCALE ، CHAMFER ، FILLET ، STRETCH ، TRIM ، EXTEND ، BREAK ، EXPLODE**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
19	**4**	**Lectures + labs**	**TEXT MULTILINE TEXT ، SINGLE LINE TEXT ، STYLE DESIGN CENTER**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
20	**4**	**Lectures + labs**	**TEXT MULTILINE TEXT ، SINGLE LINE TEXT ، STYLE DESIGN CENTER**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
21	**4**	**Lectures + labs**	**MEASURE ، DIVIDE ، LINETYPE ، LINE WEIGHT ، COLOR ، PROPERTIES ، MATCH PROPERTIES ، GRIPS**	**Lectures + labs**	**Theoretical + Ppractical + Oral**

22	4	Lectures + labs	MEASURE ، DIVIDE ، LINETYPE ، LINE WEIGHT ، COLOR ، PROPERTIES ، MATCH PROPERTIES ، GRIPS	Lectures + labs	Theoretical + Ppractical + Oral
23	4	Lectures + labs	DIMENSION	Lectures + labs	Theoretical + Ppractical + Oral
24	4	Lectures + labs	ELEV و THICKNESS	Lectures + labs	Theoretical + Ppractical + Oral
25	4	Lectures + labs	3D VIEW	Lectures + labs	Theoretical + Ppractical + Oral
26	4	Lectures + labs	3D VIEW	Lectures + labs	Theoretical + Ppractical + Oral
27	4	Lectures + labs	3D VIEW	Lectures + labs	Theoretical + Ppractical + Oral
28	4	Lectures + labs	3D SURFACE and 3D SOLIDS	Lectures + labs	Theoretical + Ppractical + Oral
29	4	Lectures + labs	The concept of Computer Virus	Lectures + labs	Theoretical + Ppractical + Oral
30	4	Lectures + labs	The concept of Computer Virus	Lectures + labs	Theoretical + Ppractical + Oral

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Textbooks
Special requirements (include for example workshops, periodicals, IT software, websites)	Scientific books from libraries
Community-based facilities (include for example, guest Lectures , internship , field studies)	Various online sources
13. Admissions	

Pre-requisites	One class
Minimum number of students	30
Maximum number of students	50

Electrical engineering drawing

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

Introduce students to the importance of computers in the design and circuit design

1. Teaching Institution	Technical Institution-Kut
2. University Department/Centre	Electric
3. Course title/code	Electrical engineering drawing
4. Programme(s) to which it contributes	Technical Diploma
5. Modes of Attendance offered	Seminar scheduled hours (3 hours)
6. Semester/Year	First year/ 2023-2024
7. Number of hours tuition (total)	90
8. Date of production/revision of this specification	18/2/2024
9. Aims of the Course	

It aims to graduate cadres capable of circuit design using computer **Introduce students to the importance of computers in the design and circuit design** **The student knows how to use a computer in the ELECTRICAL INSTALLATION**
It aims to graduate students capable of circuit design using computer **Introduce students to the importance of computers in the design and circuit design** **The student knows how to use a computer in the ELECTRICAL INSTALLATION**

10· Learning Outcomes, Teaching ,Learning and Assessment Method
A- Knowledge and Understanding **A1. Introduce students to the circuit design using computer** **A2. Introduce students on how to use the computer at ELECTRICAL INSTALLATION** **A3. Introduce students to draw a circuits and run the control circuit for electric motors** **A4. Introduce students to ways of maintenance and repair of electrical equipment** **A5. Introduce students to design circuits for small building or a residential house by computer** **A6 .Introduce students to how to draw models of cable trays** **A7- Introduce students to the various theories to the study of these circuits**
B. Subject-specific skills **B 1 - Acquire the skill circuit design using computer** **B-2 - to acquire the skill of computer use in the ELECTRICAL INSTALLATION** **B 3 - acquire the skill of drawing a circle and run the control circuit for electric motors** **B 4 to acquire the skill of the work of the founding of an electric small building or a residential house by computer** **B5- acquire the skill to draw models of cable trays**
Teaching and Learning Methods

Labs + workshops + scientific visits **Lectures + laboratory experiments + use and touching instrumentation + scientific films**
Assessment methods
Theoretical + Ppractical + Oral + Written + debate
C. Thinking Skills **C1. Homework (student exercises)** **C2. Theoretical lectures** **C3. Practical skills within the labs** **C4. Discussing in class**
Teaching and Learning Methods
Lectures + practical + scientific films + Debates
Assessment methods
Theoretical (Written) + Ppractical + Oral + debate

D. General and Transferable Skills (other skills relevant to employability and personal development) **D1. Practical skills in the laboratory, workshops and laboratories** **D2. Scientific films** **D3- circuit design skills using computer** **D4- use computer skills in ELECTRICAL INSTALLATION** **D5- ways to run a circuits and circuits control of electric motors skills** **D 6 - skills work electrician establish a small building or a residential house by computer**

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	Lectures + labs	The importance of engineering drawing.	Lectures + labs	Theoretical + Ppractical + Oral
2	3	Lectures + labs	Methods of drawing a straight lines and Cartesian coordinates	Lectures + labs	Theoretical + Ppractical + Oral
3	3	Lectures + labs	(Zoom, drawing Limits, Units, Options)	Lectures + labs	Theoretical + Ppractical + Oral
4	3	Lectures + labs	SNAP, GRID, ORTHO, POLAR, OSNAP, OTRACK, DUCS, DYN, LWT))	Lectures + labs	Theoretical + Ppractical + Oral
5	3	Lectures + labs	(Rectangle, Circle, Polygon, Arc, Ellipse, Donut, Wipeout, Revision Cloud)	Lectures + labs	Theoretical + Ppractical + Oral
6	3	Lectures + labs	(Rectangle, Circle, Polygon, Arc, Ellipse, Donut, Wipeout, Revision Cloud)	Lectures + labs	Theoretical + Ppractical + Oral
7	3	Lectures + labs	(Erase, Copy, Move, Mirror, Offset, Scale, Stretch, Rotate)	Lectures + labs	Theoretical + Ppractical + Oral
8	3	Lectures + labs	Linear, Aligned, Arc Length, Radius, Diameter, Angular, Baseline, Continue, , Dimension Style…	Lectures + labs	Theoretical + Ppractical + Oral
9	3	Lectures + labs	(Properties)	Lectures + labs	Theoretical + Ppractical + Oral
10	3	Lectures + labs	(Polyline, Point, Spline, Helix, Table)	Lectures + labs	Theoretical + Ppractical + Oral
11	3	Lectures + labs	(Array, Trim, Extend, Break, Fillet, Chamfer, Explode,Align)	Lectures + labs	Theoretical + Ppractical + Oral
12	3	Lectures + labs	Single Line &Multiline Text . ,	Lectures + labs	Theoretical + Ppractical + Oral
13	3	Lectures + labs	Calculate (Area and Volume and Distance)	Lectures + labs	Theoretical + Ppractical + Oral
14	3	Lectures + labs	Hatch, Gradient	Lectures + labs	Theoretical + Ppractical +

					Oral
15	3	Lectures + labs	Layers	Lectures + labs	Theoretical + Ppractical + Oral
16	3	Lectures + labs	Layers	Lectures + labs	Theoretical + Ppractical + Oral
17	3	Lectures + labs	Blocks	Lectures + labs	Theoretical + Ppractical + Oral
18	3	Lectures + labs	Blocks	Lectures + labs	Theoretical + Ppractical + Oral
19	3	Lectures + labs	(Region, Boundary, Join)	Lectures + labs	Theoretical + Ppractical + Oral
20	3	Lectures + labs	(Box, Wedge, Cone, Sphere, Cylinder, Tours, Pyramid)	Lectures + labs	Theoretical + Ppractical + Oral
21	3	Lectures + labs	(Extrude, Press/pull, Polysolid, Union, Subtract, Intersect, Revolve, Sweep, Loft)	Lectures + labs	Theoretical + Ppractical + Oral
22	3	Lectures + labs	(Shell, Separate, Slice, Thicken)	Lectures + labs	Theoretical + Ppractical + Oral
23	3	Lectures + labs	Plane drawing	Lectures + labs	Theoretical + Ppractical + Oral
24	3	Lectures + labs	Printing	Lectures + labs	Theoretical + Ppractical + Oral
25	3	Lectures + labs	Electrical circuit drawing	Lectures + labs	Theoretical + Ppractical + Oral
26	3	Lectures + labs	Electrical and electronic circuit drawing	Lectures + labs	Theoretical + Ppractical + Oral
27	3	Lectures + labs	Electrical and electronic circuit drawing	Lectures + labs	Theoretical + Ppractical + Oral
28	3	Lectures + labs	Drawing of electrical control machine	Lectures + labs	Theoretical + Ppractical + Oral
29	3	Lectures + labs	An example for drawing the installation of small building	Lectures + labs	Theoretical + Ppractical + Oral
30	3	Lecture	Cable Trays	Lectures +	Theoretical +

		s + labs		labs	Ppractical + Oral

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	اساسيات الرسم الهندسي تأليف عبد الحميد جمعة مشروع كتاب الرسم الكهربائي تأليف هاني عزيز
Special requirements (include for example workshops, periodicals, IT software, websites)	Engineering drawing & graphic technology (by Frend) Engineering drawing technology (by A.W. Wander William)
Community-based facilities (include for example, guest Lectures , internship , field studies)	اوديل للتوصيلات الكهربائية (في الإضاءة والقوة) Engineering drawing technology (by MC Graw)

13. Admissions	
Pre-requisites	One class
Minimum number of students	30
Maximum number of students	50

Digital electronics

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

Introduce students to the electronic components and digital gates and to identify the logical numbering system 0 and 1

1. Teaching Institution	**Technical Institution-Kut**
2. University Department/Centre	**Electric**
3. Course title/code	**Digital electronics**
4. Programme(s) to which it contributes	**Technical Diploma**
5. Modes of Attendance offered	**Seminar scheduled hours (4 hours)**
6. Semester/Year	**First year/ 2020-2021**
7. Number of hours tuition (total)	**120**
8. Date of production/revision of this specification	**20/12/2020**
9. Aims of the Course	
The overall objective: introduce students to the electronic components and digital gates and to identify the logical numbering system 0 and 1 **Specific objective: The student will be able to familiarity: the electronic components of different kinds of digital - installed - properties - uses in logic circuits - applications - digital electronic circuit analysis. The student will be able to:** **1. using basic electronic devices in the lab** **2. connects digital electronic items (gates) in simple electronic circuits** **3. Know specifications and special characteristics Gate** **4. Identifying Applied circles for some of the components and implementation**	

10· Learning Outcomes, Teaching ,Learning and Assessment Methode
A- Knowledge and Understanding **A1. Introduce students to different logical electronic components** **A2. Introduce students to the various binary, eight, sixteenth and decimal numbering systems** **A3. Introduce students to use logic gates in electronic circuits** **A4. Introduce students to the logic circuits and applications analysis** **A5. Introduce students to the basic digital electronic devices in the lab** **A6 .Introduce students to connect electronic items in digital electronic circuits** **A7- Introduce students students to the specifications and special characteristics of electronic machining logical**

B. Subject-specific skills
B-1 - a process that experiments verify the theoretical side B-2 - to acquire the skill of using digital electronic components in electronic circuits B 3 - acquire the skill of the digital electronic circuit analysis and applications B4- acquire the skill of connecting electronic items in simple logical circuit B5- acquire the skill of applied design circles for some of the components and implementation
Teaching and Learning Methods
Labs + workshops + scientific visits Lectures + laboratory experiments + use and touching instrumentation + scientific films
Assessment methods
Theoretical + Ppractical + Oral + Written + debate
C. Thinking Skills C1. Homework (student exercises) C2. Theoretical lectures C3. Practical skills within the labs C4. Discussing in class
Teaching and Learning Methods
Lectures + practical + scientific films + Debates
Assessment methods
Theoretical (Written) + Ppractical + Oral + debate

D. General and Transferable Skills (other skills relevant to employability and personal development)
D1. Practical skills in the laboratory, workshops and laboratories D2. Scientific films D3. Scientific visits D4- use of electronic components in electronic circuits skills D5- skills in circuit analysis and applications D 6 - skills linked to electronic items in simple electronic circuits Applied D7- design circles for some of the components and implementation skills D8- skills of a process that achieved the theoretical side tests

11. Course Structure

Week	Hours	Os	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	s + labs	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	Lectures + labs	Theoretical + Ppractical + Oral
2	4	Lectures + labs	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 .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	Lectures + labs	Theoretical + Ppractical + Oral
3	4	Lectures + labs	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 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	Lectures + labs	Theoretical + Ppractical + Oral
4		Lectures		Lectures + labs	Theoretical + Ppractical + Oral

		+ labs	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		
5	4	Lectures + labs	5-Logic Families Logic Families – 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)	Lectures + labs	Theoretical + Ppractical + Oral
6	4	Lectures + labs	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	Lectures + labs	Theoretical + Ppractical + Oral
7	4	Lectures + labs	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	Lectures + labs	Theoretical + Ppractical + Oral
8	4	Lectures + labs	8-Multiplexers and Demultiplexers 8.1 Multiplexer 8.1.1 Inside the Multiplexer 8.1.2 Implementing Boolean Functions with Multiplexers 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	Lectures + labs	Theoretical + Ppractical + Oral

			8.3.1 Implementing Boolean Functions with Decoders 8.3.2 Cascading Decoder Circuits		
9	4	Lectures + labs	9-Programmable Logic Devices Fixed Logic Versus Programmable Logic 9.1.1 Advantages and Disadvantages 9.2 Programmable Logic Devices – An Overview	Lectures + labs	Theoretical + Ppractical + Oral
10	4	Lectures + labs	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	Lectures + labs	Theoretical + Ppractical + Oral
11	4	Lectures + labs	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	Lectures + labs	Theoretical + Ppractical + Oral
12	4	Lectures + labs	12-Counters and Registers 11.1 Ripple (Asynchronous) Counter 11.1.1 Propagation 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	Lectures + labs	Theoretical + Ppractical + Oral
13	4	Lectures + labs	13-Counters and Registers Synchronous (or Parallel) Counters 11.6 UP/DOWN Counters 11.7 Decade and BCD Counters 11.8 Presettable Counters	Lectures + labs	Theoretical + Ppractical + Oral
14	4	Lectures + labs	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 Conversion 12.2 D/A Converter Specifications 12.2.1 Resolution 12.2.2 Accuracy 12.2.3 Conversion Speed or Settling Time	Lectures + labs	Theoretical + Ppractical + Oral

			12.2.4 Dynamic Range		
15		Lectures + labs	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	Lectures + labs	Theoretical + Ppractical + Oral
	4				

12. Infrastructure

Required reading: · CORE TEXTS COURSE MATERIALS · OTHER	Textbooks
cial requirements (include for ple workshops, periodicals, IT software, websites)	Scientific books from libraries
Community-based facilities include for example, guest ures , internship , field studies)	Various online sources

13. Admissions	
Pre-requisites	One class
inimum number of students	30
aximum number of students	50

Safety precautions

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

s Course Specification provides a concise summary of the main features of the e and the learning outcomes that a typical student might reasonably be expected eve and demonstrate if he/she takes full advantage of the learning opportunities t are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	**Technical Institution-Kut**
2. University Department/Centre	**Electric**
3. Course title/code	**Safety precautions**
4. Programme(s) to which it contributes	**Technical Diploma**
5. Modes of Attendance offered	**Seminar scheduled hours (4 hours)**
6. Semester/Year	**First year/ 2020-2021**
7. Number of hours tuition (total)	**120**
8. Date of production/revision of this specification	**20/12/2020**
9. Aims of the Course	
Public and private goal: to provide a clear and comprehensive occupational safety and methods of image protection to prevent incidents occurring during the work and minimize	

10· Learning Outcomes, Teaching ,Learning and Assessment Method
A- Knowledge and Understanding **A1. Introduce students to the causes of injury electricity** **A2. Introduce students to the types of electrical injuries** **A3. Introduce students on how to rescue the injured electricity (to rid the patient)** **A4. Introduce students to the artificial respiration process and treatment of burns** **A5. Introduce students to the necessary guidance on occupational health and safety** **A6 .Introduce students to the buildings that must be provided with fire alarm system** **A7- Introduce students to the personal protective clothing**
B. Subject-specific skills **B-1 - a practical experiments First Aid** **B-2 - to acquire the skill of the injured relief electricity (infected rid)** **B 3 - acquire the skill of an artificial respiration process and treatment of burns** **B4- acquire a knowledge of types of alarms when danger skill** **B5- acquire the skill to give guidance on occupational health and safety**

Teaching and Learning Methods
Labs + workshops + scientific visits **Lectures + laboratory experiments + use and touching instrumentation + scientific films**
Assessment methods
Theoretical + Ppractical + Oral + Written + debate
C. Thinking Skills **C1. Homework (student exercises)** **C2. Theoretical lectures** **C3. Practical skills within the labs** **C4. Discussing in class**
Teaching and Learning Methods
Lectures + practical + scientific films + Debates
Assessment methods
Theoretical (Written) + Ppractical + Oral + debate

D. General and Transferable Skills (other skills relevant to employability and personal development) **D1- scientific films** **D2- scientific visits** **D3- infected relief electricity Skills (ridding the patient)** **D4- artificial respiration and treatment of burns practical skills** **D5- give guidance on occupational health and safety skills**

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	Lectures + labs	Infection causes electrocution	Lectures + labs	Theoretical + Ppractical + Oral
2	4	Lectures + labs	Kinds of electrical inju	Lectures + labs	Theoretical + Ppractical + Oral
3	4	Lectures + labs	Infected relief electricity - ridding the patient	Lectures + labs	Theoretical + Ppractical + Oral
4	4	Lectures + labs	Artificial respiration process - trea of burns	Lectures + labs	Theoretical + Ppractical + Oral
5	4	Lectures + labs	Monthly exam	Lectures + labs	Theoretical + Ppractical + Oral
6	4	Lectures + labs	The effects of the passage of electric current to the ground	Lectures + labs	Theoretical + Ppractical + Oral
7	4	Lectures + labs	Fire Alarm Systems - Console	Lectures + labs	Theoretical + Ppractical + Oral
8	4	Lectures + labs	Fire detectors - Heat detectors - smoke detectors	Lectures + labs	Theoretical + Ppractical + Oral
9	4	Lectures + labs	Buildings that must be provided with fire alarm system	Lectures + labs	Theoretical + Ppractical + Oral

10	**4**	**Lectures + labs**	**Monthly exam**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
11	**4**	**Lectures + labs**	**Alarm modes Almsmhah and bells and trumpets**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
12	**4**	**Lectures + labs**	**Guidance on occupational health and safety**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
13	**4**	**Lectures + labs**	**Reduce unsafe behaviors and practices**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
14	**4**	**Lectures + labs**	**Personal protective - protective equipment sight - and hearing protection**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
15	**4**	**Lectures + labs**	**Personal protective clothing**	**Lectures + labs**	**Theoretical + Ppractical + Oral**

12. Infrastructure	
Required reading: **· CORE TEXTS** **· COURSE MATERIALS** **· OTHER**	**كراسات مكتب العمل الدولي والمركز القومي للاستشارات والتطور الاداري – بغداد**
Special requirements (include for example workshops, periodicals, IT software, websites)	**موسوعة الامن الوطني/ جامعة الدول العربية**
Community-based facilities (include for example, guest Lectures , internship , field studies)	**مجموعة كتب عن الصيانة/ المركز القومي للاستشارات والتطور الاداري/ بغداد**

13. Admissions	
Pre-requisites	**One class**
Minimum number of students	**30**
Maximum number of students	**50**

Republic of Iraq
Ministry of Higher Education & Scientific Research
Supervision and Scientific Evaluation Directorate
Quality Assurance and Academic Accreditation

Academic Program Specification Form for The Academic

University: Middle Technical University
College: Technical institute-Kut
Department: Electrical Techniques
Date of Form Completion: 18 / 2 /2024

Dean 's Name	Dean 's Assistant	Head of Department
Dr. madi farhan buniya	For Scientific Affairs	Date : / / 2024
Date : / / 2024	Date : / / 2024	Signature
Signature	Signature	

Quality Assurance And University Performance Manager
Date : 18 / 2 / 2024
Signature

second stage

TEMPLATE FOR PROGRAM SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

PROGRAM SPECIFICATION

This Program Specification provides a concise summary of the main features of the program and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the programme.

1. Teaching Institution	**Technical Institution-Kut**
2. University Department/Centre	**Electric**
3. Programme Title	**Electric power branch**
4. Title of Final Award	**Technical Diploma**
5. Modes of Attendance offered	**Annual**
6. Accreditation	**ABET**
7. Other external influences	**There is a close relationship to the labor market that receives our graduates**
8. Date of production/revision of this specification	**31/8/2023**

9. Aims of the Program

The department aims to prepare and graduate students in electric power technology field who has knowledge of the maintenance and repair of electrical machinery and electrical networks.

The department also aims to prepare and graduate students who can carry out the operation and maintenance of electrical units, Power plants, transmission and distribution of electric energy.

The graduates can perform:

1- The operation and maintenance of the electrical units of power plants.

2. The operation and maintenance for the transfer and distribution of electric energy electrical appliances.

3. The maintenance of the control system of electric power.
4. laying and maintenance the ground and air cables.

10. Learning Outcomes, Teaching, Learning and Assessment Methods

B. Knowledge and Understanding

A1. Provides knowledge of maintenance and repair of electric motors and electric control devices
A2. The students are capable to maintain and repair of electric control boards
A3. The students are capable to maintain and repair of electric machines.
A4. The students are capable to lay and maintain the ground and air cables.
A5. The students are capable to use equipment, tools and various components used in the workshops
A6. The students acquire the skill and expertise in the field of various electrical maintenance work
A7 The students gain self-confidence to practice works in the electrical field
A8 the students can distinguish and recognize the various electrical and electronic components and how they are used in the construction of various departments

B. Subject-specific skills

B1 Perform experiments to verify the theoretical side
B2 Acquire the skill of designing and implementing various electrical circuits
B3 Acquire the skill to use the various electrical measurement devices
B4 Acquire the skill to use for resolving the problems of electrical circuits theories
B5 Acquire the skill of the use of electronic components in electronic circuits
B6 Acquire the skill of electronic circuit analysis and applications
B4 Acquire the skill of distinguish and recognize the various electrical and electronic components and how they are used in the construction of various departments
B5 Acquire the knowledge of maintenance and repair of electric motors and electric control devices

Teaching and Learning Methods

Labs + workshops + scientific visits

Lectures + laboratory experiments + use and touching instrumentation + scientific films

Assessment methods

Theoretical + Ppractical + Oral + Written + debate

C. Thinking Skills

C1. Homework (student exercises)
C2. Theoretical lectures
C3. Practical skills within the labs
C4. Discussing in class

Teaching and Learning Methods

Lectures + practical + scientific films + Debates

Assessment methods

Theoretical (Written) + Ppractical + Oral + debate

D. General and Transferable Skills (other skills relevant to employability and personal development) **D1. Working in the field of maintenance and repair of engines and electrical equipment** **D2. Working in the field of maintenance and repair of electrical control devices** **D3. Practicability visits** **D4. Acquire the knowledge of maintenance and repair of electronic devices**
Teaching and Learning Methods
Lectures + labs + summer training + scientific visits + debates
Assessment Methods
Theoretical & Practical

11. Program Structure				**12. Awards and Credits**
Level/Year	**Course or Module Code**	**Course or Module Title**	**Credit rating**	
First year		**Measurements and circuits**	**8**	**Diploma Degree Requires (x) credits**
		Electrical assembly	**8**	
		Electronics1	**8**	
		Laboratories	**12**	
		Mathematics	**4**	
		Computer applications	**6**	
		Electrical engineering drawing	**6**	

		Human Rights and Democracy	**4**	
		Digital electronics	**4**	
		Occupational Safety	**4**	
Second year		**Electrical machine**	**10**	
		Electrical networks	**8**	
		Power Electronics	**10**	
		Workshop maintenance	**8**	
		Electrical Installation	**4**	
		Computer applications	**6**	
		Electrical drawing	**6**	
		Programmed Logic Control (PLC)	**6**	
		The project	**4**	

13. Personal Development Planning

Get a technical diploma in electrical technology, electric power branch

14. Admission criteria .

1. Graduates of secondary schools (scientific branch) & vocational secondary schools (electricity and computers)
2. Acceptance rate of at least 60%

15. Key sources of information about the program

1. Follow-up to the latest versions of websites and public libraries
2. Access to the latest equipment and techniques in the field of work.

Curriculum Skills Map																			
please tick in the relevant boxes where individual Programme Learning Outcomes are being assessed																			
				Programme Learning Outcomes															
Year / Level	Course Code	Course Title	Core (C) Title or Option (O)	Knowledge and understanding				Subject-specific skills				Thinking Skills				General and Transferable Skills (or) Other skills relevant to employability and personal development			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
The first year		Measurements and circuits	compulsory	/		/		/		/		/		/		/		/	
		Electrical assembly	compulsory	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
		Electronics1	compulsory		/		/		/		/		/		/		/		/
		Laboratories	compulsory	/		/		/		/		/		/		/		/	
		Mathematics	compulsory	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
		Computer applications	compulsory		/		/		/		/		/		/		/		/
		Electrical engineering drawing	compulsory																
		Human Rights and Democracy	compulsory	/		/		/		/		/		/		/		/	
		Digital electronics	compulsory	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
		Occupational Safety	compulsory	/	/		/	/	/		/	/	/		/	/	/		/
The second year		Electrical machinery	compulsory	/		/		/		/		/		/		/		/	
		Electrical networks	compulsory	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
		Power Electronics	compulsory		/		/		/		/		/		/		/		/
		Workshop maintenance	compulsory	/		/		/		/		/		/		/		/	
		Electrical Installation	compulsory	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
		Computer applications	compulsory		/		/		/		/		/		/		/		/
		Electrical drawing	compulsory																
		Programmed Logic Control (PLC)	compulsory	/		/		/		/		/		/		/		/	
		The project	compulsory	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/

TEMPLATE FOR COURSE SPECIFICATION

Power electronics

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

A student will be produced to various power electronic switches

1. Teaching Institution	**Technical Institution-Kut**
2. University Department/Centre	**Electric**
3. Course title/code	**Power electronics**
4. Program(s) to which it contributes	**Technical Diploma**
5. Modes of Attendance offered	**Seminar scheduled hours (5 hours)**
6. Semester/Year	**Second year/ 2022-2023**
7. Number of hours tuition (total)	**150**
8. Date of production/revision of this specification	**18/2/2024**

9. Aims of the Course

A student will be produced to various power electronic switches
The student is prepared to study : the electronic components manufacturer of semiconductor different kinds - installed - characteristics - their use in electronic circuits - applications - their own electronic circuit components of the electronic and optical applications analysis.
The students will be introduced to the different measurement devices.

The student will be able to:

1. use basic power electronic devices in the lab

2 . connect electronic items in power electronic circuits

3. Know specifications and special characteristics of power electronic machining

4. Identify and apply circuits for some of the components and implementation

The students will achieve the theoretical experiments on DC and AC circuits, and also train to use of electrical appliances for various laboratory measurements

10· Learning Outcomes, Teaching ,Learning and Assessment Method

B- Knowledge and Understanding

A1. Introduce students to electrical circuits

A2. Introduce students to various electronic switches

A3. Introduce students to the power electronics systems

A4. Introduce students on how to build the Power Electronics Systems

A5. Introduce students to the electronic circuit analysis and applications

A6 .Introduce students to the basic electronic devices in the lab

A7- Introduce students to connect the electronic components in the circuit and power electronics systems

A8- Introduce students to the specifications and special characteristics of power electronics systems

A9- train students in order to use of electrical appliances for various laboratory measurements

A10- introduce students to the various protection circuits

B. Subject-specific skills

B1 Perform experiments to verify the theoretical side

B2 Acquire the skill of designing and implementing various power electronic circuits

B3 Acquire the skill to use the various electrical measurement devices

B4 Acquire the skill of using electronic switches in building power electronics systems

B5 Acquire the skill of electronics circuit analysis capability

B6 Acquire the skill of design power electronics systems

Teaching and Learning Methods

Labs + workshops + scientific visits

Lectures + laboratory experiments + use and touching instrumentation + scientific films

Assessment methods

Theoretical + Ppractical + Oral + Written + debate

C. Thinking Skills

C1. Homework (student exercises)

C2. Theoretical lectures

C3. Practical skills within the labs

C4. Discussing in class

Teaching and Learning Methods

_____Lectures + practical + scientific films + Debates

Assessment methods

Theoretical (Written) + Ppractical + Oral + debates

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Practical skills in the laboratory, workshops and laboratories

D2. Scientific films

D3. Scientific visits

D4. Mathematical skills and the ability to use scientific theories in electrical measurements and calculations

D4- skills of using of electronic switches in power electronics systems

D5- skills in circuit analysis and applications

D7- skills of performing experiments that achieve the theoretical side

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	5	Lectures + labs	Power electronic ,electronic components which used in high power control(power diodes, thyristor and power transistors) prevision of single phase rectifier circuits by using diodes.	Lectures + labs	Theoretical + Ppractical + Oral
2	5	Lectures + labs	Three phase rectifier circuits by using diodes, output voltage waveform, diode current waveform, output voltage equation in case of resistance lode.	Lectures + labs	Theoretical + Ppractical + Oral
3	5	Lectures + labs	Using the transistor as switch, regions of operation, transistor as a switch(cut off and saturation)	Lectures + labs	Theoretical + Ppractical + Oral
4	5	Lectures + labs	Power transistor in (off)and (on)state, improvement of(off)and(on)time by using speed up capacitance, practical problems.	Lectures + labs	Theoretical + Ppractical + Oral
5	5	Lectures + labs	Unipolar junction transistor , construction , theoretical operation , using the transistor as relaxation oscillator practical example	Lectures + labs	Theoretical + Ppractical + Oral
6	5	Lectures + labs	operational amplifier , description of operational amplifier (op-amp) as asparate components , zero detector , comparator	Lectures + labs	Theoretical + Ppractical + Oral
7	5	Lectures + labs	The use of op-amp as astable multivibrator and a monostable multivibrator , photo conduction cells , photo diodes	Lectures + labs	Theoretical + Ppractical + Oral
8	5	Lectures + labs	Light – emitting diodes (LED), photo transistors , the use of optical comparator in power Electronic circuits	Lectures + labs	Theoretical + Ppractical + Oral
9	5	Lectures + labs	Thyristor , construction , characteristic , curves for a thyristor , thyristor conduction in forward biasing , thyristor family , thyristor representation as a double transistor circuit.	Lectures + labs	Theoretical + Ppractical + Oral
10	5	Lectures + labs	Thyristor conduction methods , conduction throw the gate minimum gate current causing conduction , conduction time , conduction due to high forward voltage rectifire (dv/dt)	Lectures + labs	Theoretical + Ppractical + Oral
11	5	Lectures + labs	DIAC , TRIAC characteristics , practical applications , thyristor ,triggering methods , triggering on DC and AC current , pluse triggering types	Lectures + labs	Theoretical + Ppractical + Oral
12	5	Lectures + labs	thyristor triggering circuit , DC and AC triggering circuits	Lectures + labs	Theoretical + Ppractical + Oral
13	5	Lectures + labs	Pluse current triggering circuit , relaxation oscillator ,zero detector , comparator with astable and monostable multivibrators(operational amplifiers and	Lectures + labs	Theoretical + Ppractical + Oral

			timer)		
14	5	Lectures + labs	Thyristor general application introductory , AC to DC inverter DC to AC inverter , DC to DC inverter , AC to AC inverter , phase controlled half wave rectifier with resistance and inductance load output current and voltage waveform , output voltage equations	Lectures + labs	Theoretical + Ppractical + Oral
15	5	Lectures + labs	Half controller full wave rectifier fully controlled ,resistance and inductance load , generated wave forms , output voltage equation for freewheeling diode.	Lectures + labs	Theoretical + Ppractical + Oral
16	5	Lectures + labs	Regenerating fully controlled inverters , examples , DC motor speed control	Lectures + labs	Theoretical + Ppractical + Oral
17	5	Lectures + labs	Three face inverters , out put voltage wave form with ,triggering pulses and equations	Lectures + labs	Theoretical + Ppractical + Oral
18	5	Lectures + labs	Thyristor protection from the high rate change in current and voltage , protection from the transient change in source voltage , fully protection circuit from all possible faults due to current and voltage.	Lectures + labs	Theoretical + Ppractical + Oral
19	5	Lectures + labs	DC to AC inverters methods of forcing the thyristor to get off	Lectures + labs	Theoretical + Ppractical + Oral
20	5	Lectures + labs	Parallel and senies inverter , single and three phase , control methods in charging frequency and voltage , out put wave forms1	Lectures + labs	Theoretical + Ppractical + Oral
21	5	Lectures + labs	Inverter application , emergency power supply , single phase DC motor speed control	Lectures + labs	Theoretical + Ppractical + Oral
22	5	Lectures + labs	Three phase motor control by using a constant ratio of variation frequency and voltage	Lectures + labs	Theoretical + Ppractical + Oral
23	5	Lectures + labs	Choppers , DC to DC inverter frequency constant , line constant	Lectures + labs	Theoretical + Ppractical + Oral
24	5	Lectures + labs	Types of choppers , DC motor speed control	Lectures + labs	Theoretical + Ppractical + Oral
25	5	Lectures + labs	AC to AC inverter , single phase voltage regulator , three phase voltage regulator	Lectures + labs	Theoretical + Ppractical + Oral
26	5	Lectures + labs	General application on single and three induction motor speed control due to the change in stat or voltage , using the closed loop feedback circuit to control the slippery rings of AC motor	Lectures + labs	Theoretical + Ppractical + Oral
27	5	Lectures + labs	Cyclic inverter , AC to DC cyclic inverter , DC to DC cyclic inverter	Lectures + labs	Theoretical + Ppractical + Oral
28	5	Lectures + labs	AC to AC cyclic inverter control block diagram	Lectures + labs	Theoretical + Ppractical + Oral

29	**5**	**Lectures + labs**	**Using amplitude modulation for speed control**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
30	**5**	**Lectures + labs**	**Using polar transistor for AC motor speed control**	**Lectures + labs**	**Theoretical + Ppractical + Oral**

12. Infrastructure	
Required reading: **· CORE TEXTS** **· COURSE MATERIALS** **· OTHER**	• **الكراس المختبري** • **الكترونيات القدرة تاليف ضياء ضاحي ويوسف ابراهيم**
Special requirements (include for example workshops, periodicals, IT software, websites)	• **الالكترونيات في خدمة التطبيقات الكهربائية ترجمة د. سمير رستم**
Community-based facilities (include for example, guest Lectures , internship , field studies)	• **Advanced industrial electronics by morris** • **Thyristor engineering by B.B. berde** • الكترونيات القدرة (تاليف الدكتور مظفر انور النعمة)

13. Admissions	
Pre-requisites	**One class**
Minimum number of students	**30**
Maximum number of students	**50**

TEMPLATE FOR COURSE SPECIFICATION

Electrical machines

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

The student will be able to test AC and DC machines, to be able to choose the right machine required

1. Teaching Institution	**Technical Institution-Kut**
2. University Department/Centre	**Electric**
3. Course title/code	**Electrical machine**
4. Program(s) to which it contributes	**Technical Diploma**
5. Modes of Attendance offered	**Seminar scheduled hours (5 hours)**
6. Semester/Year	**Second year/ 2022-2023**
7. Number of hours tuition (total)	**150**
8. Date of production/revision of this specification	**18/2/2024**
9. Aims of the Course	
The overall objective: introduce students to the parts of electrical machinery.	
Specific objective: The student will be able to: **1. understand the theory of working of DC and AC machines.** **2. operate electric machines.** **3. identify the parts of electrical machines and transformers.**	
The student will be able to test the AC and DC machines, and also to be able to choose the right machine required	

10· Learning Outcomes, Teaching ,Learning and Assessment Method

C- Knowledge and Understanding

A1. Introduce students to the parts of electrical machinery
A2. Introduce students to the theory of work of DC and AC machines
A3. Introduce students to the operation of electrical machines
A4. Introduce students to the parts of electrical machines and transformers
A5. Introduce students to the basic devices and equipment at the laboratory
A6 .Introduce students to conduct practical tests for AC and DC machines
A7- training students to measure the efficiency of electrical machines so they can choose the appropriate machine required for the specific application
A9- train students in order to use of electrical appliances for various laboratory measurements
A10- introduce students to the various protection circuits

B. Subject-specific skills

B1 Perform experiments to verify the theoretical side
B2 Acquire the skill of the operation of electric machines
B3 Acquire the skill to analysis the working of DC and AC machines
B4 Acquire the skill of conducting practical tests for AC and DC machines
B5 Acquire the skill of electronics circuit analysis capability
B6 acquire the skill of measuring the efficiency of the electrical machine so can choose the appropriate machine required in specific application

Teaching and Learning Methods

Labs + workshops + scientific visits

Lectures + laboratory experiments + use and touching instrumentation + scientific films

Assessment methods

Theoretical + Ppractical + Oral + Written + debate

C. Thinking Skills

C1. Homework (student exercises)
C2. Theoretical lectures
C3. Practical skills within the labs
C4. Discussing in class

Teaching and Learning Methods

Lectures + practical + scientific films + Debates

Assessment methods

Theoretical (Written) + Ppractical + Oral + debates

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Practical skills in the laboratory, workshops and laboratories

D2. Scientific films

D3. Scientific visits

D4- skills of performing experiments that achieve the theoretical side

D5- operate electrical machinery skills

D 6 - skills of analysis the work theory of DC and AC machines

D7- skills conduct practical tests for AC and DC machines and continuous

D8- measure the efficiency of the electrical machine skills so it can choose the appropriate machine required for the applications

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	5	Lectures + labs	Magnetic circuits	Lectures + labs	Theoretical + Ppractical + Oral
2	5	Lectures + labs	The basic principles of the DC machines, and the main parts of these machines	Lectures + labs	Theoretical + Ppractical + Oral
3	5	Lectures + labs	Types of DC machines	Lectures + labs	Theoretical + Ppractical + Oral
4	5	Lectures + labs	Electromotive force – the factors effect on the electromotive force	Lectures + labs	Theoretical + Ppractical + Oral
5	5	Lectures + labs	Study of the magnetization curve	Lectures + labs	Theoretical + Ppractical + Oral
6	5	Lectures + labs	Study of the properties of loaded of all types of DC machines	Lectures + labs	Theoretical + Ppractical + Oral
7	5	Lectures + labs	DC motors Inverse electromotive force Theory	Lectures + labs	Theoretical + Ppractical + Oral
8	5	Lectures + labs	Momentum, momentum on the product	Lectures + labs	Theoretical + Ppractical + Oral
9	5	Lectures + labs	General characteristics of the speed and torque of machines	Lectures + labs	Theoretical + Ppractical + Oral
10	5	Lectures + labs	Speed control of DC machines	Lectures + labs	Theoretical + Ppractical + Oral
11	5	Lectures + labs	Machine test	Lectures + labs	Theoretical + Ppractical + Oral
12	5	Lectures + labs	Electrical transformer	Lectures + labs	Theoretical + Ppractical + Oral
13	5	Lectures + labs	Open circuit test, How to calculate the value of the test of equivalent circuit components	Lectures + labs	Theoretical + Ppractical + Oral
14	5	Lectures + labs	Self-converter – exercises Current and voltage transformer, practical uses	Lectures + labs	Theoretical + Ppractical + Oral
15	5	Lectures + labs	Three phase transformers	Lectures + labs	Theoretical + Ppractical + Oral
16	5	Lectures + labs	Three-phase induction motors	Lectures + labs	Theoretical + Ppractical + Oral

17	**5**	**Lectures + labs**	**Machine types, squirrel cage motors - sliding rings engines Comparison between them - the uses of each type**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
18	**5**	**Lectures + labs**	**Methods of Control of starting induction motors**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
19	**5**	**Lectures + labs**	**The relationship between the torque and power factor - the relationship between the torque and sliding**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
20	**5**	**Lectures + labs**	**Reverse rotation of three-phase induction motors, -ways of stop induction motors**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
21	**5**	**Lectures + labs**	**Single-phase induction motors**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
22	**5**	**Lectures + labs**	**Synchronous generators**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
23	**5**	**Lectures + labs**	**Comparison between DC and AC generators**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
24	**5**	**Lectures + labs**	**Synchronous motors**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
25	**5**	**Lectures + labs**	**AC to AC inverter , single phase voltage regulator , three phase voltage regulator**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
26	**5**	**Lectures + labs**	**General Engine - composition and properties and uses**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
27	**5**	**Lectures + labs**	**Control machines, kinds, installed and the theory of work**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
28	**5**	**Lectures + labs**	**Step engines**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
29	**5**	**Lectures + labs**	**Tacos generators**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
30	**5**	**Lectures + labs**	**Linear motors - types of linear motors**	**Lectures + labs**	**Theoretical + Ppractical + Oral**

12. Infrastructure	
Required reading: **· CORE TEXTS** **· COURSE MATERIALS** **· OTHER**	**المكائن الكهربائية تأليف دكتور محمد زكي محمد خضر/ جامعة الموصل** **الملزمة المنهجية (مشروع كتاب)** **Text book of electrical technology by B.L. Theraja**
Special requirements (include for example workshops, periodicals, IT software, websites)	**المكائن الكهربائية تاليف سلطان حسين و محمد السيد راغب**
Community-based facilities (include for example, guest Lectures , internship , field studies)	**Electrical machine direct and alternating current by siskind**

13. Admissions	
Pre-requisites	**One class**
Minimum number of students	**30**
Maximum number of students	**50**

TEMPLATE FOR COURSE SPECIFICATION

PLC

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

Introduce students to Programmable Logic Control PLC

1. Teaching Institution	**Technical Institution-Kut**
2. University Department/Centre	**Electric**
3. Course title/code	**PLC**
4. Programme(s) to which it contributes	**Technical Diploma**
5. Modes of Attendance offered	**Seminar scheduled hours (3 hours)**
6. Semester/Year	**Second year/ 2022-2023**
7. Number of hours tuition (total)	**90**
8. Date of production/revision of this specification	**18/2/2024**
9. Aims of the Course	
Introduce students to PLC	
Introduce students to PLCs Versus Other Types of Controls	
Introduce students to Binary Codes	

Introduce students on how to build the Power Electronics Systems
Introduce students to Principles of Boolean Algebra and Logic the electronic circuit analysis

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Knowledge and Understanding

A1. Introduce students to PLC
A2. Introduce students to PLCs Versus Other Types of Controls
A3. Introduce students to Binary Codes
A4. Introduce students on how to build the Power Electronics Systems
A5. Introduce students to Principles of Boolean Algebra and Logic the electronic circuit analysis and applications
A6 .Introduce students to PLC Circuits and Logic Contact Symbology
A7- Introduce students to Error Checking and Diagnostics
A8- Introduce students to The Analog Input/Output System
A9- train students in order to use of electrical appliances for various laboratory measurements
A10- introduce students to the various protection circuits

B. Subject-specific skills

B1 Perform experiments to verify the theoretical side
B2 Acquire the skill of 4I/O Installation, Wiring, and Precautions
B3 Acquire the skill to use the various electrical measurement devices
B4 Acquire the skill of using electronic switches in building power electronics systems
B5 Acquire the skill of Memory Organization and I/O Interaction
B6 Acquire the skill of The Discrete Input/Output System

Teaching and Learning Methods

Labs + workshops + scientific visits

Lectures + laboratory experiments + use and touching instrumentation + scientific films

Assessment methods

Theoretical + Ppractical + Oral + Written + debate

C. Thinking Skills

C1. Homework (student exercises)
C2. Theoretical lectures
C3. Practical skills within the labs
C4. Discussing in class

Teaching and Learning Methods

Lectures + practical + scientific films + Debates

Assessment methods

Theoretical (Written) + Ppractical + Oral + debate

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Practical skills in the laboratory, workshops and laboratories

D2. Scientific films

D3. Scientific visits

D4. Mathematical skills and the ability to use scientific theories in electrical measurements and calculations

D4- skills of 4I/O Installation, Wiring, and Precautions

D5- skills in circuit analysis and applications

D7- skills of performing experiments that achieve the theoretical side

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	Lectures + labs	Chapter 1 Introduction to Programmable Controllers 1-1 Definition 1-2 A Historical Background 1-3 Principles of Operation 1-4 PLCs Versus Other Types of Controls . 1-5 PLC Product Application Ranges . 1-6 Ladder Diagrams and the PLC 1-7 Advantages of PLCs	Lectures + labs	Theoretical + Ppractical + Oral
2	4	Lectures + labs	Number Systems and Codes 2-1 Number Systems 2-2 Number Conversions 2-3 One's and Two's Complement 2-4 Binary Codes 2-5 Register Word Formats ..	Lectures + labs	Theoretical + Ppractical + Oral
3	4	Lectures + labs	Chapter 3 Logic Concepts 3-1 The Binary Concept 3-2 Logic Functions 3-3 Principles of Boolean Algebra and Logic 3-4 PLC Circuits and Logic Contact Symbology	Lectures + labs	Theoretical + Ppractical + Oral
4	4	Lectures + labs	Processors, the Power Supply, and Programming Devices 4-1 Introduction 4-2 Processors 4-3 Processor Scan 4-4 Error Checking and Diagnostics 4-5 The System Power Supply 4-6 Programming Devices	Lectures + labs	Theoretical + Ppractical + Oral
5	4	Lectures + labs	The Memory System and I/O Interaction 5-1 Memory Overview 5-2 Memory Types 5-3 Memory Structure and Capacity 5-4 Memory Organization and I/O Interaction	Lectures + labs	Theoretical + Ppractical + Oral
6	4	Lectures + labs	Configuring the PLC Memory—I/O Addressing 5-6 Summary of Memory, Scanning, and I/O Interaction	Lectures + labs	Theoretical + Ppractical + Oral

			5-7 Memory Considerations.		
7	4	Lectures + labs	The Discrete Input/Output System 7-1 Introduction to Discrete I/O Systems 7-2 I/O Rack Enclosures and Table Mapping 7-3 Remote I/O Systems . 7-4 PLC Instructions for Discrete Inputs 7-5 Types of Discrete Inputs .	Lectures + labs	Theoretical + Ppractical + Oral
8	4	Lectures + labs	PLC Instructions for Discrete Outputs 8-1 Discrete Outputs 8-2 Discrete Bypass/Control Stations8-3 Interpreting I/O Specifications 8-4 Summary of Discrete I/O	Lectures + labs	Theoretical + Ppractical + Oral
9	4	Lectures + labs	The Analog Input/Output System 9-1 Overview of Analog Input Signals 9-2 Instructions for Analog Input Modules . 9-3 Analog Input Data Representation . 9-4 Analog Input Data Handling 9-5 Analog Input Connections . 9-6 Overview of Analog Output Signals	Lectures + labs	Theoretical + Ppractical + Oral
10	4	Lectures + labs	Instructions for Analog Output Modules 10-8 Analog Output Data Representation 10-9 Analog Output Data Handling 10-10 Analog Output Connections 10.11 Analog Output Bypass/Control Stations	Lectures + labs	Theoretical + Ppractical + Oral
11	4	Lectures + labs	Special Function I/O and Serial Communication Interfacing 11-1 Introduction to Special I/O Modules 11-2 Special Discrete Interfaces 11.3Special Analog, Temperature, and PID Interfaces 11-4 Positioning Interfaces . 115ASCII, Computer, and Network Interfaces 11-6 Fuzzy Logic Interfaces .. 8-7 Peripheral Interfacing	Lectures + labs	Theoretical + Ppractical + Oral
12	4	Lectures + labs	Programming Languages 12.1 Introduction to Programming Languages 12-2 Types of PLC Languages . 12-3 Ladder Diagram Format 12-4 Ladder Relay Instructions 12-5 Ladder Relay Programming 12-6 Timers and Counters 12-7 Timer Instructions	Lectures + labs	Theoretical + Ppractical + Oral

13	**4**	**Lectures + labs**	**Counter Instructions 13-9 Program/Flow Control Instructions 13-10 Arithmetic Instructions 13-11 Data Manipulation Instructions . 13-12 Data Transfer Instructions . 13-13 Special Function Instructions 13.14 Network Communication Instructions 13-15 Boolean Mne.**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
14	**4**	**Lectures + labs**	**PLC System Documentation 14-1 Introduction to Documentation 142 Steps for Documentation 14-3 PLC Documentation Systems 14-4 Conclusion .**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
15	**4**	**Lectures + labs**	**PLC Start-Up and Maintenance 15-1 PLC System Layout 15.2 Power Requirements and Safety Circuitry 15.3Noise, Heat, and Voltage Considerations 15.4I/O Installation, Wiring, and Precautions**	**Lectures + labs**	**Theoretical + Ppractical + Oral**

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	**Textbooks**
Special requirements (include for example workshops, periodicals, IT software, websites)	**Scientific books from libraries**
Community-based facilities (include for example, guest Lectures , internship , field studies)	**Various online sources**
13. Admissions	
Pre-requisites	**One class**
Minimum number of students	**30**
Maximum number of students	**50**

TEMPLATE FOR COURSE SPECIFICATION

Electrical installation

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

Introduce students to the various industrial Installation systems

1. Teaching Institution	**Technical Institution-Kut**
2. University Department/Centre	**Electric**
3. Course title/code	**Electrical installation**
4. Program(s) to which it contributes	**Technical Diploma**
5. Modes of Attendance offered	**Seminar scheduled hours (4 hours)**
6. Semester/Year	**Second year/ 2022-2023**
7. Number of hours tuition (total)	**120**
8. Date of production/revision of this specification	**20/12/2023**
9. Aims of the Course	
A student will be produced to the various electrical industrial INSTALLATION systems.	
The student will be able to identify the materials and electrical wiring systems used in factories, homes, and the establishment and installation of electrical machinery and methods of control and protection of the different loads incorporation.	
The student will be able to see the process of electrical lighting as well as how to establish and installation of electrical machinery.	
The students will achieve the theoretical experiments on DC and AC circuits, and also train to use of electrical appliances for various laboratory measurements	

10· Learning Outcomes, Teaching ,Learning and Assessment Method

B- Knowledge and Understanding

A1. Introduce students to the various systems ELECTRICAL INSTALLATION
A2. Introduce students to electrical material
A3. Introduce students to the wiring used in laboratories and houses systems
A4. Introduce students to ways of maintenance and repair of electrical equipment
A5. Introduce students to the methods of the establishment and installation of electrical machinery
A6 .Introduce students the methods of control and protection of the different loads incorporation
A7- Introduce students to the various theories to the study of these circuits
A8- Introduce students to the measurement devices
A9- train students in order to use of electrical appliances for various laboratory measurements
A10- training students practical electric (lighting) as well as how to establish and installation of electrical machinery.

B. Subject-specific skills

B1 Perform experiments to verify the theoretical side
B2 Acquire the skill of designing and implementing various electrical circuits
B3 Acquire the skill to use the various electrical measurement devices
B4 Acquire the skill to use for resolving the problems of electrical circuits theories
B 5 - acquire skill in various ELECTRICAL INSTALLATION
B 6 - acquire the skill of wiring used in factories and homes
B7 acquire the skill of the establishment and installation of electrical machinery
B8 acquire the skill of the design and implementation of methods of control and protection of the different loads incorporation

Teaching and Learning Methods

Labs + workshops + scientific visits

Lectures + laboratory experiments + use and touching instrumentation + scientific films

Assessment methods

Theoretical + Ppractical + Oral + Written + debate

C. Thinking Skills

C1. Homework (student exercises)
C2. Theoretical lectures
C3. Practical skills within the labs
C4. Discussing in class

Teaching and Learning Methods

Lectures + practical + scientific films + Debates

Assessment methods

Theoretical (Written) + Ppractical + Oral + debate

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Practical skills in the laboratory, workshops and laboratories

D2. Scientific films

D3. Scientific visits

D4.Mathematical skills and the ability to use scientific theories in electrical measurements and calculations

D5 skills designing and implementing ways to control and protection of the different loads incorporation

D6 skills in different ELECTRICAL INSTALLATION

D7 skills wiring used in factories and homes

D8 establishment and installation of electrical machinery skills

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	Lectures + labs	Overview of the vocabulary of the curriculum material and scientific sources of textbooks and help Classification of materials to: • electrical conducting materials • Semiconductor • isolators Insulators	Lectures + labs	Theoretical + Ppractical + Oral
2	4	Lectures + labs	Electricity principles - Voltage, current intensity, the intensity of electric current (amps), factors affecting the intensity of electric current, resistance factors affecting the resistance. Electrical circuit components - Source, types of electrical outlet Sockets, wire types, all kinds of electrical loads - Keys and types and protective equipment, junction boxes - Light bulbs, types and their uses	Lectures + labs	Theoretical + Ppractical + Oral
3	4	Lectures + labs	Electrical conducting materials. - Copper - the electrical properties of copper - the mechanical properties of copper - Aluminum electrical properties of aluminum - the mechanical properties of aluminum - Their advantages and their use in the field of electricity - High alloy resistance - properties that make them good elements in electrical applications	Lectures + labs	Theoretical + Ppractical + Oral
4	4	Lectures + labs	Insulation Materials - Examples of insulating materials - air, oil properties and uses - Properties of insulating materials for the bear temperatures - Solid insulating material (cotton, paper, asbestos, glass fabric, tissue and industrial films, mica, and other materials), permittivity (dielectric constant) laws and examples of unresolved	Lectures + labs	Theoretical + Ppractical + Oral
5	4	Lectures + labs	Magnetic properties of materials - Magnetic force, the types of magnetic materials, the terminology associated with them - the magnetic properties - laws related to magnetism - Examples Solved	Lectures + labs	Theoretical + Ppractical + Oral
6	4	Lectures + labs	Magnetic circuits - The application of Kirchhoff's laws on them. - Examples unresolved on magnetism	Lectures + labs	Theoretical + Ppractical + Oral
7	4	Lectures + labs	Mechanical properties of electrical materials - Tensile, stress, elongation, flexibility, and other - Solved examples	Lectures + labs	Theoretical + Ppractical + Oral

8	**4**	**Lectures + labs**	**The stages of the electric power** **- Power generation (brief summary of the types of power plants)** **- Power transmission (the systems used, the advantages and disadvantages)** **- Substations and lowering the crane and stings** **- Distribution of electric power (systems used) of various kinds**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
9	**4**	**Lectures + labs**	**Raw principles on how the consumer from secondary processing plant and materials to the consumer and that type** **- Distribution panels for domestic and industrial (installation and link)** **- How to feed electricity to a large building with an example so** **- Electrical transformers used Capacity (KVA) and sites used in the electrical grid** **- Schemes and examples Solved**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
10	**4**	**Lectures + labs**	**Types of keys used in electrical installations, their importance** **Traditional key ((Toggle Switch –** **(unipolar, with two routes, Central,** **(bipolar, three-pole** **(Key compressor (Push button switch –** **(Other (from the most recently used –** **- Drawing circuitry containing these keys in full circles**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
11	**4**	**Lectures + labs**	**Protection devices used in the ELECTRICAL INSTALLATION (fuses)** **- Definition (smelter, rated current, a stream smelting, fusion laboratories, the current and projected stream cutting, melting time, the time of the electric arc time total operating time)** **- Types of fuses with the advantages and disadvantages of each, how to choose**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
12	**4**	**Lectures + labs**	**Breakers session Circuit Breakers** **With the composition and the principle of his work (Magnetic Circuit Breakers) - magnetic circuit breakers** **With the principle of his work (Magnetic and Thermal Circuit Breakers) thermal circuit breakers and magnetic -** **-(Miniature Circuit Breaker) MCB installation and wiring** **- Boycotted the session with a ground leakage (Earth leakage circuit breaker) ELCB installation and theory work** **- How to distribute the loads inside the building through a distribution board used and account cutter Capacity**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
13	**4**	**Lectures + labs**	**Electrical wiring systems Electrical Wiring Systems** **- Non-conductor system isolated B.B, rubber packing strong T.R.S system** **- Insulated conductors PayPal system (P.V.C), insulated conductors PayPal system (P.C.P), wiring system within the plastics and preparing the necessary pipes**	**Lectures + labs**	**Theoretical + Ppractical + Oral**

			Therefore, wires and cables in the work numbering, taking into account the wire colors at Launch		
14	4	Lectures + labs	Household electric INSTALLATION Types of household electrical – INSTALLATION advantages and disadvantages of each, safety conditions, cost, durability and required general appearance and shape of the founding Tools used in household – INSTALLATION - The establishment of laboratories and workshops and calculate cost	Lectures + labs	Theoretical + Ppractical + Oral
15	4	Lectures + labs	Grounding Components (soil and – ground Earth resistance Earth resistance and resistance quality of the land of Earth Resistivity, grounding electrodes Grounding Electrode, connectivity and (networking equipment Bonding Different ways to reduce the grounding – resistance Reduce Resistance Grounding Devices and equipment which must be – Devices must be grounding The importance of a good grounding – The Importance of Grounding - The difference between the system grounded and non-grounded, measurement methods Grounding Measuring	Lectures + labs	Theoretical + Ppractical + Oral
16	4	Lectures + labs	Lightning Lighting Rod Thunderbolt, the importance of a – lightning rod, lightning rod components - What's important when lightning rod equipment and structures that must be protected from lightning design	Lectures + labs	Theoretical + Ppractical + Oral
17	4	Lectures + labs	Electric shock Definition, causes and the relationship – of the amount of voltage and current shock and the path of the power and intensity of the current through the body, the current passage of time, the causes of electric shock General rules for the safety of shock – and procedures for post-traumatic stress Factors upon which the effect of electric – current in the body - Preventive measures that can be taken to protect against electrical hazards	Lectures + labs	Theoretical + Ppractical + Oral
18	4	Lectures + labs	Protection from leakage complacent - Circuit breaker against ground leakage Earth leakage current circuit breaker - Voltage categorically against ground leakage Earth leakage voltage circuit breaker - Places the installation of protection against leakage breakers (ElCB) :, determine cutter capacity by pregnancy	Lectures + labs	Theoretical + Ppractical + Oral

19	**4**	**Lectures + labs**	**Electrical power measuring device single-phase and triple eccentric Single and three phase kwh meter)) - Work and linkage theory (wiring) and installation and how to read, the installation of the meter - The means of adjusting the counter when errors (speed - crawl - a light load) - Intelligent counter - its components and the method of linking and read it**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
20	**4**	**Lectures + labs**	**Inspection and testing of electrical INSTALLATION domestic and industrial executed Examination of the investigation for the – Arctic, insulation resistance test, test continuity ringed circle How to find a fault in the feeder cables – for electric installation (cutting - seek - (fuels - Locate ground holidays in connectors with loop Mori**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
21	**4**	**Lectures + labs**	**AC circuit phases - define how to generate AC single phase - two phases - three phases - with the draw each wiring circuit thanks starburst and triangular in circles AC three phase and special relations to calculate current and voltage line and phase omnipotence and the ability of the line - phase capability - features each linking when used in loads balanced and unbalanced with a solution examples**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
22	**4**	**Lectures + labs**	**Solving practical examples on AC with three phases triangular and starburst with loads balanced and unbalanced Methods of measurement capability for loads with three phases – wattmeter device linked to how the department to measure the effective - the ability and calculation ability is effective with the virtual and the ability to solve Example**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
23	**4**	**Lectures + labs**	**Power measurement using and effort - how to find the total power in this way in the case of stellar plug and triangulation - using - use three watts**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
24	**4**	**Lectures + labs**	**Magnetism - magnetic circuit - Introduction to magnetic north and south pole - types of magnetic materials - the basic qualities of the materials, magnetic and defined and includes a magnetic field - magnetic flux - the driving force of magnetism - the density of magnetic flux and the factors that affect the magnetic flux - permeability and magnetic circuits and the application of Kirchhoff's laws on her**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
25	**4**	**Lectures + labs**	**Solving practical examples of magnetism**	**Lectures + labs**	**Theoretical + Ppractical + Oral**

26	**4**	**Lectures + labs**	**Self-inductance of the file (electromagnetic induction) - definition - special relations to find a self-inductance of the file - the mutual inductance between the two files - and relationships to create mutual inductance and quality by linking the two files**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
27	**4**	**Lectures + labs**	**Curves of growth and decay of the power of the circle Hittite - Explain this circuit and its impact in the DC - public relations for the growth and decay of power in the file - the current fee fixed time and expense - to solve examples Charge and discharge capacitors and includes the use of the widening circles in the DC public relations for loading and unloading intensive and drawing power - time constant effect with his account - a solution examples**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
28	**4**	**Lectures + labs**	**- Thermal supervisor against overcurrent (installation - working theory - Adjust codified power - uses)** **- Overcurrent protection reverse chronological Inverse - Time Over regime current Relaying - Example solution**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
29	**4**	**Lectures + labs**	**TIMER** **- Types (mechanic - programmed) - Theory - timekeeping - follow-ups of low-voltage** **- Types of temporary supervisor in terms of function - types of temporary supervisor in terms of structure** **- Applications in circles ELECTRICAL INSTALLATION** **Inspection and testing of electrical installation Testing and inspection of Installation**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
30	**4**	**Lectures + labs**	**Test Devices** **(resistance scale), bell or battery-powered lamps system, emitter device, Ground Tester** **Test types –** **Polar test, test the quality of the ground system, wire insulator resistance test, test the continuity of the background circuit**	**Lectures + labs**	**Theoretical + Ppractical + Oral**

12. Infrastructure	
Required reading: · **CORE TEXTS** · **COURSE MATERIALS** · **OTHER**	ملزمة التأسيسات الصناعية
Special requirements (include for example workshops, periodicals, IT software, websites)	مشروع كتاب التأسيسات الصناعية
Community-based facilities (include for example, guest Lectures , internship , field studies)	**Electrical installation technology (by Thompson)** **Electrical installation technology (by Michael Neidle)** **Practice on low voltage switch gears (by Siemense Publication)**

13. Admissions	
Pre-requisites	**One class**
Minimum number of students	**30**
Maximum number of students	**50**

Laboratories

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

Training students on various electrical maintenance work

1. Teaching Institution	**Technical Institution-Kut**
2. University Department/Centre	**Electric**

3. Course title/code	**Workshops**
4. Program(s) to which it contributes	**Technical Diploma**
5. Modes of Attendance offered	**Seminar scheduled hours (4 hours)**
6. Semester/Year	**Second year/ 2020-2021**
7. Number of hours tuition (total)	**120**
8. Date of production/revision of this specification	**20/12/2020**

9. Aims of the Course

The student will be able to:

1. **Re-install of electrical machines**
2. **Test the electrical machines after wrapped**
3. **distinguish between the electrical machines and improve choice**

Students will also be able to:

1. **Use equipment, tools and various components in the workshops**
2. **acquire the skill in the field of various electrical maintenance work**
3. **gaining self-confidence to practice works in electrical trace faults and learn how to repair machines**
4. **distinguish and recognize the various electrical and electronic components and how they are used in the construction of various departments**

10· Learning Outcomes, Teaching ,Learning and Assessment Method

B- Knowledge and Understanding

A1. Introduce students to the manual skills in the use of hand tools and measuring devices and machines

A2. introduce students to the refrigerator works properly and how to use the tools of measurement and rasps and cutting

A3. introduce students and trained in welding on a different number, tools and equipment

A4. introduce students and trained in various turnings machines

A5. introduce students to use the number of tools and tools and measuring instruments used and identify the different Woodworking Machinery

A6 . introduce students to the electrical works of art tracking malfunctions and learn how to repair

A7 introduce students to the various electrical and electronic components and how they are used in the construction of various circles.

O8- Introduce students to the measurement devices

O9- train students in order to use of electrical appliances for various laboratory measurements

B. Subject-specific skills

B1 Conduct their own experiments in the use of hand tools and measuring devices and machines run

B-2 - to acquire the skill of the refrigerator to use tools properly

B 3 - acquire the skill of welding on a different number, tools and equipment for

B4- acquire the skill to use the various turning machines

B5- acquire the skill of using a number carpentry

B6- acquire the skill of various electrical maintenance work

B7- acquire trace faults and how to repair skill

Teaching and Learning Methods

Labs + workshops + scientific visits

Lectures + laboratory experiments + use and touching instrumentation + scientific films

Assessment methods

Theoretical + Ppractical + Oral + Written + debate

C. Thinking Skills

C1. Homework (student exercises)
C2. Theoretical lectures
C3. Practical skills within the labs
C4. Discussing in class

Teaching and Learning Methods

Lectures + practical + scientific films + Debates

Assessment methods

Theoretical (Written) + Ppractical + Oral + debate

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Practical skills in the laboratory, workshops and laboratories
D2. Scientific films
D3. Scientific visits
D4 The use of various electrical components Skills
D5- skills in the use of welding machines and turnings, plumbing, carpentry and refrigerator optimally
D 6 - skills trace faults and repair
D7- various electrical maintenance work skills
D8- skills of a process that achieved the theoretical side tests

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	Lectures + labs	Installation of DC machines	Lectures + labs	Theoretical + Ppractical + Oral
2	4	Lectures + labs	How to clean the surface of the units - Install carbon brushes - the applied position of the carbon brushes	Lectures + labs	Theoretical + Ppractical + Oral
3	4	Lectures + labs	Communication and test pieces and insulation	Lectures + labs	Theoretical + Ppractical + Oral
4	4	Lectures + labs	Member of the DC generator output prepare and compile information	Lectures + labs	Theoretical + Ppractical + Oral
5	4	Lectures + labs	Balearic insulation - drying - Connecting final parties - the final selection of a member of production	Lectures + labs	Theoretical + Ppractical + Oral
6	4	Lectures + labs	Field winding	Lectures + labs	Theoretical + Ppractical + Oral
7	4	Lectures + labs	Work winding and install the unilateral-polar - complete testing of the machine	Lectures + labs	Theoretical + Ppractical + Oral
8	4	Lectures + labs	Work winding and install the unilateral-polar - complete testing of the machine	Lectures + labs	Theoretical + Ppractical + Oral
9	4	Lectures + labs	Communicate and be connected parties - polarity test - continuity test	Lectures + labs	Theoretical + Ppractical + Oral
10	4	Lectures + labs	The study of the three phase transformers	Lectures + labs	Theoretical + Ppractical + Oral
11	4	Lectures + labs	Processing and cutting the iron sheets and assembled heart - wrapped winding	Lectures + labs	Theoretical + Ppractical + Oral
12	4	Lectures + labs	Polarity test, continuity test and Testing Ground leakage	Lectures + labs	Theoretical + Ppractical + Oral
13	4	Lectures + labs	Deductive motors (induction) Rewinding hard Lists of three-phase induction motor windings and the squirrel cage	Lectures + labs	Theoretical + Ppractical + Oral
14	4	Lectures + labs	Rewinding and connecting the outskirts of windings and continuity test	Lectures + labs	Theoretical + Ppractical + Oral
15	4	Lectures + labs	Choose the contract files - choosing isolation and measured - choose Ground leakage of the engine	Lectures + labs	Theoretical + Ppractical + Oral
16	4	Lectures + labs	Engine assembly and testing of the engine when the allotted - Pregnancy study phase commencement of tripartite engines	Lectures + labs	Theoretical + Ppractical + Oral

			Tawar - direct method - a way of self-Engine		
17	4	Lectures + labs	Protection of induction Motor, and the use of timers devices	Lectures + labs	Theoretical + Ppractical + Oral
18	4	Lectures + labs	change linked to the ultimate engine of the parties of the star to trigonometric Engine originally worked Y - Δ and note the current differences and determination in both cases	Lectures + labs	Theoretical + Ppractical + Oral
19	4	Lectures + labs	Induction motors with a single-phase, a feasibility study for various types of single-phase induction motors - Installation of engines - Engine is intense - the engine is split-phase	Lectures + labs	Theoretical + Ppractical + Oral
20	4	Lectures + labs	A split-phase motor winding and make the necessary ways and it has regular maintenance tests - faults and methods of treatment - the opposite direction of rotation of the engine	Lectures + labs	Theoretical + Ppractical + Oral
21	4	Lectures + labs	Drawing windings of a split-phase motor	Lectures + labs	Theoretical + Ppractical + Oral
22	4	Lectures + labs	Rewinding motor with various shaded of poles	Lectures + labs	Theoretical + Ppractical + Oral
23	4	Lectures + labs	Continuity - Polar test - Test short-circuit Ground	Lectures + labs	Theoretical + Ppractical + Oral
24	4	Lectures + labs	Electrical and mechanical faults and methods of treatment	Lectures + labs	Theoretical + Ppractical + Oral
25	4	Lectures + labs	Electrical and mechanical faults and methods of treatment	Lectures + labs	Theoretical + Ppractical + Oral
26	4	Lectures + labs	Rewinding the motors with a condenser, make it necessary tests	Lectures + labs	Theoretical + Ppractical + Oral
27	4	Lectures + labs	rewinding fan motors and make the necessary tests	Lectures + labs	Theoretical + Ppractical + Oral
28	4	Lectures + labs	Maintenance of household appliances – refrigerator, mechanical and electrical faults and methods of treatment	Lectures + labs	Theoretical + Ppractical + Oral
29	4	Lectures + labs	Maintenance Household appliances: Frozen, domestic air conditioner, mechanical and electrical faults and methods of periodic maintenance	Lectures + labs	Theoretical + Ppractical + Oral
30	4	Lectures + labs	Maintenance of household appliances – wash machine- electrical faults and methods periodic maintenance	Lectures + labs	Theoretical + Ppractical + Oral

12. Infrastructure	
Required reading: · **CORE TEXTS** · **COURSE MATERIALS** · **OTHER**	**Textbooks**
Special requirements (include for example workshops, periodicals, IT software, websites)	**Scientific books from libraries**
Community-based facilities (include for example, guest Lectures , internship , field studies)	**Various online sources**
13. Admissions	
Pre-requisites	**One class**
Minimum number of students	**30**
Maximum number of students	**50**

Electrical networks

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

Introduce students into the parts and electrical systems

1. Teaching Institution	**Technical Institution-Kut**
2. University Department/Centre	**Electric**
3. Course title/code	**Electrical networks**

4. Program(s) to which it contributes	**Technical Diploma**
5. Modes of Attendance offered	**Seminar scheduled hours (4 hours)**
6. Semester/Year	**Second year/ 2021-2023**
7. Number of hours tuition (total)	**120**
8. Date of production/revision of this specification	**20/12/2023**

9. Aims of the Course

Introduce students into the parts and electrical systems

Introduce students into methods of power generation

Introduce students on how to the power transmission

Introduce students on how to the power distribution

Introduce students to the methods of maintenance of the electrical system

Introduce students into ways of improving the power factor

Introduce students to the principles of protection, and uses of protective relays and breaker in the electric power system and measurement devices

10· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Knowledge and Understanding

A1. Introduce students into the parts and electrical systems

A2. Introduce students into methods of power generation

A3. Introduce students on how to the power transmission

A4. Introduce students on how to the power distribution

A5 Introduce students to the methods of maintenance of the electrical system

A6 Introduce students into ways of improving the power factor

A7 Introduce students to the principles of protection, and uses of protective relays and breaker in the electric power system and measurement devices

B. Subject-specific skills

B1. Introduce students into the parts and electrical systems

B2. Introduce students into methods of power generation

B3. Introduce students on how to the power transmission

B4. Introduce students on how to the power distribution

B5 Introduce students to the methods of maintenance of the electrical system

B6 Introduce students into ways of improving the power factor

B7 Introduce students to the principles of protection, and uses of protective

relays and breaker in the electric power system and measurement devices

Teaching and Learning Methods

Labs + workshops + scientific visits

Lectures + laboratory experiments + use and touching instrumentation + scientific films

Assessment methods

Theoretical + Ppractical + Oral + Written + debate

C. Thinking Skills

C1. Homework (student exercises)
C2. Theoretical lectures
C3. Practical skills within the labs
C4. Discussing in class

Teaching and Learning Methods

Lectures + practical + scientific films + Debates

Assessment methods

Theoretical (Written) + Ppractical + Oral + debate

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Practical skills in the laboratory, workshops and laboratories
D2. Scientific films
D3. Scientific visits
D4 The use of various electrical components Skills
D5- skills in the maintain and repair of electrical network
D 6 - skills trace faults and repair
D7- various electrical maintenance work skills
D8- skills of a process that achieved the theoretical side tests

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	Lectures + labs	How to electric power generation, the development of energy, electric power system in generation to consumption, standard efforts	Lectures + labs	Theoretical + Ppractical + Oral
2	4	Lectures + labs	How to electric power generation, the development of energy, electric power system in generation to consumption, standard efforts	Lectures + labs	Theoretical + Ppractical + Oral
3	4	Lectures + labs	Hydro power plants, thermal	Lectures + labs	Theoretical + Ppractical + Oral
4	4	Lectures + labs	Gas power plants and an idea of some other stations such as diesel	Lectures + labs	Theoretical + Ppractical + Oral
5	4	Lectures + labs	Vertical bars system (B.B) and plans to transformer stations inside and outside the buildings	Lectures + labs	Theoretical + Ppractical + Oral
6	4	Lectures + labs	Overhead lines, uses, dividing lines to short-medium-long	Lectures + labs	Theoretical + Ppractical + Oral
7	4	Lectures + labs	Overhead lines-mechanical calculations	Lectures + labs	Theoretical + Ppractical + Oral
8	4	Lectures + labs	The basic elements of the aerodynamic lines	Lectures + labs	Theoretical + Ppractical + Oral
9	4	Lectures + labs	Calculation capacity of the system of unilateral, trio of three wires	Lectures + labs	Theoretical + Ppractical + Oral
10	4	Lectures + labs	solve a variety of issues for the seventh and eighth week	Lectures + labs	Theoretical + Ppractical + Oral
11	4	Lectures + labs	Solve the short lines and includes representation electrical efficiency as a circle Account	Lectures + labs	Theoretical + Ppractical + Oral
12	4	Lectures + labs	Coatings pneumatic transport lines, types, forms, installed	Lectures + labs	Theoretical + Ppractical + Oral
13	4	Lectures + labs	Ground cables-components-divided-over cables	Lectures + labs	Theoretical + Ppractical + Oral
14	4	Lectures + labs	Calculate the inductance and capacitance to ground cables monounsaturated and triple pole	Lectures + labs	Theoretical + Ppractical + Oral
15	4	Lectures + labs	Cables included in the effort, expense and loss in his corner insulators collapse of winning cables	Lectures + labs	Theoretical + Ppractical + Oral
16	4	Lectures + labs	Cabling effort ultra-components-types	Lectures + labs	Theoretical + Ppractical + Oral

17	**4**	**Lectures + labs**	**Distribution networks and dispensers DC that feed by feed -alta feed from both sides. AC dispensers that feed unilaterally**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
18	**4**	**Lectures + labs**	**Spreaders of all kinds-ringed comparison between the different spreaders**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
19	**4**	**Lectures + labs**	**Solving a variety of examples from the sixteenth and seventeenth week**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
20	**4**	**Lectures + labs**	**Terms stability of synchronous generators with the network-curved pregnancy how synchronous generators in parallel with each other and with the network's capacity**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
21	**4**	**Lectures + labs**	**Ways to improve the power factor**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
22	**4**	**Lectures + labs**	**Types of errors in electrical networks**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
23	**4**	**Lectures + labs**	**Protection principles**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
24	**4**	**Lectures + labs**	**Follow-ups (relays) , divided by its theory**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
25	**4**	**Lectures + labs**	**How to protect transmission lines airways**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
26	**4**	**Lectures + labs**	**Differential Protection**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
27	**4**	**Lectures + labs**	**– Differential Protection – Digital Protection – Reverse Power Protection**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
28	**4**	**Lectures + labs**	**- Differential Protection – Digital Protection – Reverse Power Protection**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
29	**4**	**Lectures + labs**	**Percentage Reactance**	**Lectures + labs**	**Theoretical + Ppractical + Oral**
30	**4**	**Lectures + labs**	**Percentage Reactance**	**Lectures + labs**	**Theoretical + Ppractical + Oral**

12. Infrastructure	
Required reading: · **CORE TEXTS** · **COURSE MATERIALS** · **OTHER**	**المازمة النظرية لمادة الشبكات الكهربائية التي اعدت من قبل المعهد التكنولوجيا بغداد** **The transmission and distribution of electrical power (by H. Cotton and H. Barber)**
Special requirements (include for example workshops, periodicals, IT software, websites)	**A course in electrical power by M.I Soni and P.V. Gupta** **A course in transmission and distribution by S.K. Giradhar and GC Garg**
Community-based facilities (include for example, guest Lectures , internship , field studies)	**Science and reactor fundamentals electrical CNSC technical training group**

13. Admissions	
Pre-requisites	**One class**
Minimum number of students	**30**
Maximum number of students	**50**

Computer applications

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

Teaching students to enter the editing program and to identify the interface drawing and painting orders and modification

1. Teaching Institution	**Technical Institution-Kut**
2. University Department/Centre	**Electric**

3. Course title/code	**Computer applications**
4. Programme(s) to which it contributes	**Technical Diploma**
5. Modes of Attendance offered	**Seminar scheduled hours (3 hours)**
6. Semester/Year	**Second year/ 2022-2023**
7. Number of hours tuition (total)	**90**
8. Date of production/revision of this specification	**20/12/2023**

9. Aims of the Course

The aim of the article: teach students the basics of computer, operating system, the most important commands

Teaching students to enter the drawing AUTOCAD program and to identify the interface drawing and painting orders and modification

Access to three-dimensional drawing 3D

Students taught the concept of viruses and methods of control

10· Learning Outcomes, Teaching ,Learning and Assessment Method

B- Knowledge and Understanding

A1. introduce students to the basics of computer, operating system, the most important commands
A2. introduce students to enter the drawing AUTOCAD program and to identify the interface
A3. drawing and painting orders and modification
A4. Introduce students to the three-dimensional drawing 3D
A5. Introduce students to the viruses and methods of control

B. Subject-specific skills

B1 to acquire the skill of the use of computers and various programs
B2 acquire the skill of a three-dimensional drawing
B3 acquire some skills in AutoCAD program
B4 acquire the skill to know the types of viruses and methods of control

Teaching and Learning Methods

Labs + workshops + scientific visits

Lectures + laboratory experiments + use and touching instrumentation + scientific films

Assessment methods

Theoretical + Ppractical + Oral + Written + debate

C. Thinking Skills

C1. Homework (student exercises)
C2. Theoretical lectures
C3. Practical skills within the labs
C4. Discussing in class

Teaching and Learning Methods

Lectures + practical + scientific films + Debates

Assessment methods

Theoretical (Written) + Ppractical + Oral + debate

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Practical skills in the laboratory, workshops and laboratories
D2. Scientific films
D3- use computer skills
D4- skills in the fight against viruses
D5- use drawing program word skills
D 6 - the skills of three-dimensional graphic design

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	Lectures + labs	Introduction to computer and their systems and benefits	Lectures + labs	Theoretical + Ppractical + Oral
2	4	Lectures + labs	Introduction to computer and their systems and benefits	Lectures + labs	Theoretical + Ppractical + Oral
3	4	Lectures + labs	Windows	Lectures + labs	Theoretical + Ppractical + Oral
4	4	Lectures + labs	Windows	Lectures + labs	Theoretical + Ppractical + Oral
5	4	Lectures + labs	My COMPUTER ، MY DOCUMENTS ، RECYCLE BIN	Lectures + labs	Theoretical + Ppractical + Oral
6	4	Lectures + labs	My COMPUTER ، MY DOCUMENTS ، RECYCLE BIN	Lectures + labs	Theoretical + Ppractical + Oral
7	4	Lectures + labs	DESKTOP BACKGROUND ، WINDOWS COLOR ، SCREEN SAVER	Lectures + labs	Theoretical + Ppractical + Oral
8	4	Lectures + labs	DESKTOP BACKGROUND ، WINDOWS COLOR ، SCREEN SAVER	Lectures + labs	Theoretical + Ppractical + Oral
9	4	Lectures + labs	CONTROL PANAL PROGRAM AND FEATURES ، ACCESSORIES CALCULATOR ، WORDPAD،WINDOSWS MEDIA PLAYER	Lectures + labs	Theoretical + Ppractical + Oral
10	4	Lectures + labs	CONTROL PANAL PROGRAM AND FEATURES ، ACCESSORIES CALCULATOR ، WORDPAD،WINDOSWS MEDIA PLAYER	Lectures + labs	Theoretical + Ppractical + Oral
11	4	Lectures + labs	AUTOCAD DRAWING LIMITS ، UNITS	Lectures + labs	Theoretical + Ppractical + Oral
12	4	Lectures + labs	OSNAP ،ORTTHO ، LWT ، OTRACK ، POLAR ، SNAP ، GRID ، DISTANCE ، AREA	Lectures + labs	Theoretical + Ppractical + Oral
13	4	Lectures + labs	VIEW :ZOOM PAN ، REGEN	Lectures + labs	Theoretical + Ppractical + Oral
14	4	Lectures + labs	DRAW : LINE ، MULTILINE ،	Lectures + labs	Theoretical + Ppractical + Oral

			CONSTRUCTION LINE ، POLYLINE ، POLYGON ، RECTANGLE ، ARC ، CIRCLE، DONUT، REVCLOUD ، SPLINE ، ELLIPS ، MACKE BLOCK ، INSERT BLOCK ، MBLOCK ، WBLOCK، HATCH ،REGION		
15	4	Lectures + labs	DRAW : LINE ، MULTILINE ، CONSTRUCTION LINE ، POLYLINE ، POLYGON ، RECTANGLE ، ARC ، CIRCLE، DONUT، REVCLOUD ، SPLINE ، ELLIPS ، MACKE BLOCK ، INSERT BLOCK ، MBLOCK ، WBLOCK، HATCH ،REGION	Lectures + labs	Theoretical + Ppractical + Oral
16	4	Lectures + labs	DRAW : LINE ، MULTILINE ، CONSTRUCTION LINE ، POLYLINE ، POLYGON ، RECTANGLE ، ARC ، CIRCLE، DONUT، REVCLOUD ، SPLINE ، ELLIPS ، MACKE BLOCK ، INSERT BLOCK ، MBLOCK ، WBLOCK، HATCH ،REGION	Lectures + labs	Theoretical + Ppractical + Oral
17	4	Lectures + labs	MODIFY :ERASE ، COPY ، MIRROR ، OFFSET،ARRAY ، MOVE ، ROTATE ، SCALE ، CHAMFER ، FILLET ، STRETCH ،TRIM ، EXTEND ، BREAK ، EXPLODE	Lectures + labs	Theoretical + Ppractical + Oral
18	4	Lectures + labs	MODIFY :ERASE ، COPY ، MIRROR ، OFFSET،ARRAY ، MOVE ، ROTATE ، SCALE ، CHAMFER ، FILLET ، STRETCH ،TRIM ، EXTEND ، BREAK ، EXPLODE	Lectures + labs	Theoretical + Ppractical + Oral
19	4	Lectures + labs	TEXT MULTILINE TEXT ، SINGLE LINE TEXT ، STYLE DESIGN CENTER	Lectures + labs	Theoretical + Ppractical + Oral
20	4	Lectures + labs	TEXT MULTILINE TEXT ، SINGLE LINE TEXT ، STYLE DESIGN CENTER	Lectures + labs	Theoretical + Ppractical + Oral
21	4	Lectures + labs	MEASURE ، DIVIDE ، LINETYPE ، LINE WEIGHT ، COLOR ، PROPERTIES ، MATCH PROPERTIES ، GRIPS	Lectures + labs	Theoretical + Ppractical + Oral
22	4	Lectures + labs	MEASURE ، DIVIDE ، LINETYPE ، LINE WEIGHT ، COLOR ، PROPERTIES ، MATCH PROPERTIES ، GRIPS	Lectures + labs	Theoretical + Ppractical + Oral
23	4	Lectures + labs	DIMENSION	Lectures + labs	Theoretical + Ppractical + Oral
24	4	Lecture	ELEV و THICKNESS	Lectures	Theoretical +

		s + labs		+ labs	Ppractical + Oral
25	4	Lectures + labs	3D VIEW	Lectures + labs	Theoretical + Ppractical + Oral
26	4	Lectures + labs	3D VIEW	Lectures + labs	Theoretical + Ppractical + Oral
27	4	Lectures + labs	3D VIEW	Lectures + labs	Theoretical + Ppractical + Oral
28	4	Lectures + labs	3D SURFACE and 3D SOLIDS	Lectures + labs	Theoretical + Ppractical + Oral
29	4	Lectures + labs	The concept of Computer Virus	Lectures + labs	Theoretical + Ppractical + Oral
30	4	Lectures + labs	The concept of Computer Virus	Lectures + labs	Theoretical + Ppractical + Oral

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Textbooks
Special requirements (include for example workshops, periodicals, IT software, websites)	Scientific books from libraries
Community-based facilities (include for example, guest Lectures , internship , field studies)	Various online sources
13. Admissions	
Pre-requisites	One class
Minimum number of students	30
Maximum number of students	50

Electrical engineering drawing

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

Introduce students to the importance of computers in the design and circuit design

1. Teaching Institution	**Technical Institution-Kut**
2. University Department/Centre	**Electric**
3. Course title/code	**Electrical engineering drawing**
4. Program(s) to which it contributes	**Technical Diploma**
5. Modes of Attendance offered	**Seminar scheduled hours (3 hours)**
6. Semester/Year	**Second year/ 2022-2023**
7. Number of hours tuition (total)	**90**
8. Date of production/revision of this specification	**20/12/2023**
9. Aims of the Course	
It aims to graduate cadres capable of circuit design using computer **Introduce students to the importance of computers in the design and circuit design** **The student knows how to use a computer in the ELECTRICAL INSTALLATION**	
It aims to graduate students capable of circuit design using computer **Introduce students to the importance of computers in the design and circuit design** **The student knows how to use a computer in the ELECTRICAL INSTALLATION**	

10· Learning Outcomes, Teaching ,Learning and Assessment Method

B- Knowledge and Understanding

A1. Introduce students to the circuit design using computer
A2. Introduce students on how to use the computer at ELECTRICAL INSTALLATION
A3. Introduce students to draw a circuits and run the control circuit for electric motors
A4. Introduce students to ways of maintenance and repair of electrical equipment
A5. Introduce students to design circuits for small building or a residential house by computer
A6 .Introduce students to how to draw models of cable trays
A7- Introduce students to the various theories to the study of these circuits

B. Subject-specific skills

B 1 - Acquire the skill circuit design using computer
B-2 - to acquire the skill of computer use in the ELECTRICAL INSTALLATION
B 3 - acquire the skill of drawing a circle and run the control circuit for electric motors
B 4 to acquire the skill of the work of the founding of an electric small building or a residential house by computer
B5- acquire the skill to draw models of cable trays

Teaching and Learning Methods

Labs + workshops + scientific visits

Lectures + laboratory experiments + use and touching instrumentation + scientific films

Assessment methods

Theoretical + Ppractical + Oral + Written + debate

C. Thinking Skills

C1. Homework (student exercises)
C2. Theoretical lectures
C3. Practical skills within the labs
C4. Discussing in class

Teaching and Learning Methods

Lectures + practical + scientific films + Debates

Assessment methods

Theoretical (Written) + Ppractical + Oral + debate

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Practical skills in the laboratory, workshops and laboratories

D2. Scientific films

D3- circuit design skills using computer

D4- use computer skills in ELECTRICAL INSTALLATION

D5- ways to run a circuits and circuits control of electric motors skills

D 6 - skills work electrician establish a small building or a residential house by computer

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	Lectures + labs	The importance of engineering drawing.	Lectures + labs	Theoretical + Ppractical + Oral
2	3	Lectures + labs	Methods of drawing a straight lines and Cartesian coordinates	Lectures + labs	Theoretical + Ppractical + Oral
3	3	Lectures + labs	(Zoom, drawing Limits, Units, Options)	Lectures + labs	Theoretical + Ppractical + Oral
4	3	Lectures + labs	SNAP, GRID, ORTHO, POLAR, OSNAP, OTRACK, DUCS, DYN, LWT))	Lectures + labs	Theoretical + Ppractical + Oral
5	3	Lectures + labs	(Rectangle, Circle, Polygon, Arc, Ellipse, Donut, Wipeout, Revision Cloud)	Lectures + labs	Theoretical + Ppractical + Oral
6	3	Lectures + labs	(Rectangle, Circle, Polygon, Arc, Ellipse, Donut, Wipeout, Revision Cloud)	Lectures + labs	Theoretical + Ppractical + Oral
7	3	Lectures + labs	(Erase, Copy, Move, Mirror, Offset, Scale, Stretch, Rotate)	Lectures + labs	Theoretical + Ppractical + Oral
8	3	Lectures + labs	Linear, Aligned, Arc Length, Radius, Diameter, Angular, Baseline, Continue, , Dimension Style…	Lectures + labs	Theoretical + Ppractical + Oral
9	3	Lectures + labs	(Properties)	Lectures + labs	Theoretical + Ppractical + Oral
10	3	Lectures + labs	(Polyline, Point, Spline, Helix, Table)	Lectures + labs	Theoretical + Ppractical + Oral
11	3	Lectures + labs	(Array, Trim, Extend, Break, Fillet, Chamfer, Explode,Align)	Lectures + labs	Theoretical + Ppractical + Oral
12	3	Lectures + labs	Single Line &Multiline Text . ,	Lectures + labs	Theoretical + Ppractical + Oral
13	3	Lectures + labs	Calculate (Area and Volume and Distance)	Lectures + labs	Theoretical + Ppractical + Oral
14	3	Lectures + labs	Hatch, Gradient	Lectures + labs	Theoretical + Ppractical + Oral
15	3	Lectures + labs	Layers	Lectures + labs	Theoretical + Ppractical + Oral
16	3	Lecture	Layers	Lectures	Theoretical +

		s + labs		+ labs	Ppractical + Oral
17	3	Lectures + labs	Blocks	Lectures + labs	Theoretical + Ppractical + Oral
18	3	Lectures + labs	Blocks	Lectures + labs	Theoretical + Ppractical + Oral
19	3	Lectures + labs	(Region, Boundary, Join)	Lectures + labs	Theoretical + Ppractical + Oral
20	3	Lectures + labs	(Box, Wedge, Cone, Sphere, Cylinder, Tours, Pyramid)	Lectures + labs	Theoretical + Ppractical + Oral
21	3	Lectures + labs	(Extrude, Press/pull, Polysolid, Union, Subtract, Intersect, Revolve, Sweep, Loft)	Lectures + labs	Theoretical + Ppractical + Oral
22	3	Lectures + labs	(Shell, Separate, Slice, Thicken)	Lectures + labs	Theoretical + Ppractical + Oral
23	3	Lectures + labs	Plane drawing	Lectures + labs	Theoretical + Ppractical + Oral
24	3	Lectures + labs	Printing	Lectures + labs	Theoretical + Ppractical + Oral
25	3	Lectures + labs	Electrical circuit drawing	Lectures + labs	Theoretical + Ppractical + Oral
26	3	Lectures + labs	Electrical and electronic circuit drawing	Lectures + labs	Theoretical + Ppractical + Oral
27	3	Lectures + labs	Electrical and electronic circuit drawing	Lectures + labs	Theoretical + Ppractical + Oral
28	3	Lectures + labs	Drawing of electrical control machine	Lectures + labs	Theoretical + Ppractical + Oral
29	3	Lectures + labs	An example for drawing the installation of small building	Lectures + labs	Theoretical + Ppractical + Oral
30	3	Lectures + labs	Cable Trays	Lectures + labs	Theoretical + Ppractical + Oral

12. Infrastructure	
Required reading: · **CORE TEXTS** · **COURSE MATERIALS** · **OTHER**	اساسيات الرسم الهندسي تأليف عبد الحميد جمعة مشروع كتاب الرسم الكهربائي تأليف هاني عزيز
Special requirements (include for example workshops, periodicals, IT software, websites)	**Engineering drawing & graphic technology (by Frend)** **Engineering drawing technology (by A.W. Wander William)**
Community-based facilities (include for example, guest Lectures , internship , field studies)	اوديل للتوصيلات الكهربائية (في الإضاءة والقوة) **Engineering drawing technology (by MC Graw)**

13. Admissions	
Pre-requisites	**One class**
Minimum number of students	**30**
Maximum number of students	**50**