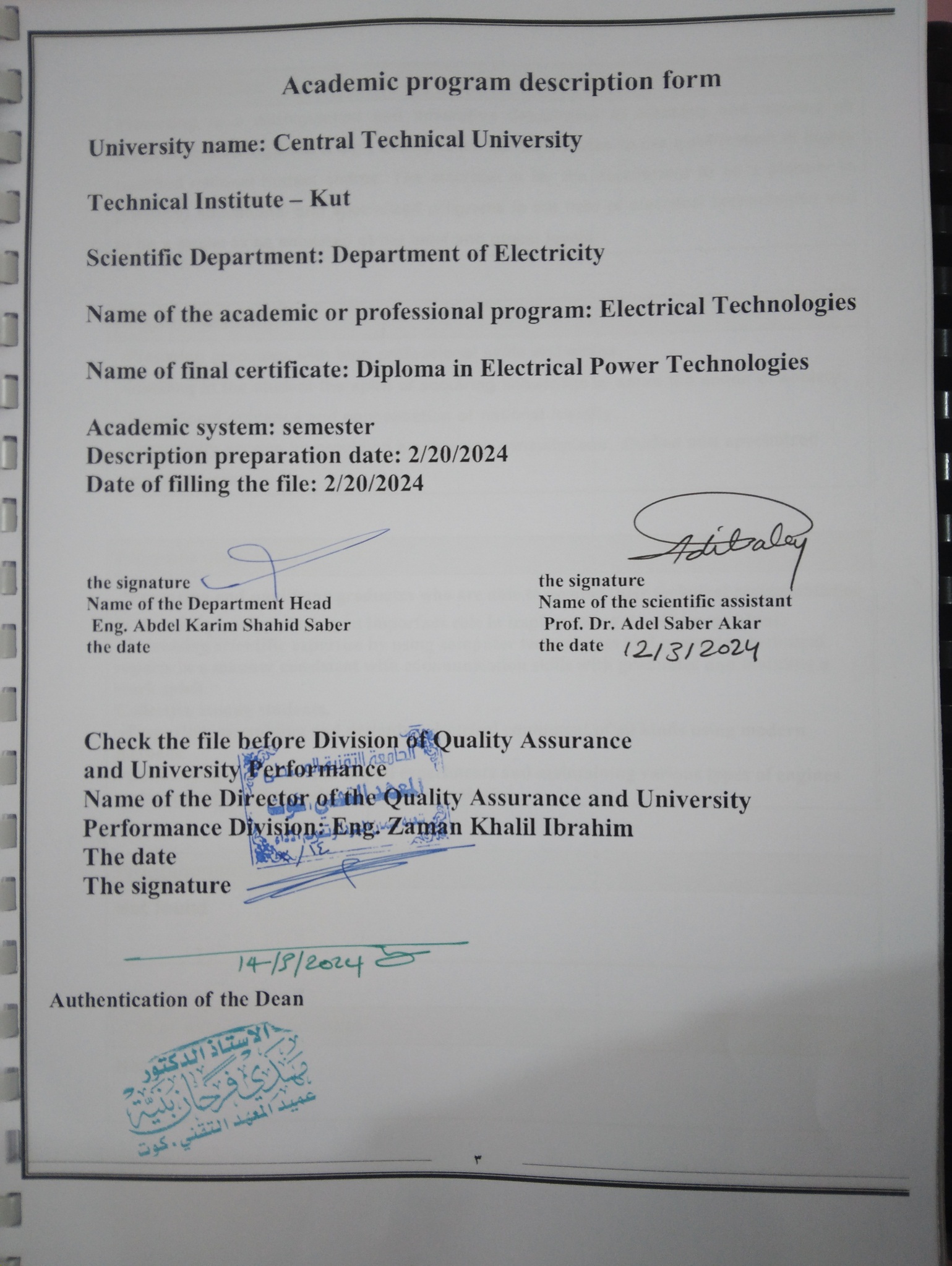
**Republic of Iraq**

**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. |

|  |  |
| --- | --- |
| Central Technical University - Technical Institute Cote | 1. Teaching Institution |
| Department of electrical techniques | 2. University Department/Centre |
| Electrical Power Branch | 3. Program Title |
| Technical Diploma | 4. Title of Final Award |
| Semester first and second for the academic year 2020-2021 | 5. Modes of Attendance offered |
| ABET | 6. Accreditation |
| The opinions of experts in the corresponding departments of foreign universities | 7. Other external influences |
| 18 / 2 /2024 | 8. Date of production/revision of this specification |
| 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 |
| 1. 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 | | | | |
| Bachelor Degree  Requires ( x ) credits | 11. Programme Structure | | | |
| Credit  Rating | Course or Module Title | Course or  Module  Code | Level/Year |
|  | 8 | **electrical Circuits and measurements** | **Elec001** | first |
| 8 | **Electrical installations** | **Elec002** | first |
| 8 | **electronic** | **Elec003** | first |
| 12 | **Maintenance lab workshop** | **Elec004** | first |
| 4 | **Mathematic** | **Elec005** | first |
| 6 | **Computer Application** | **Elec006** | first |
| 6 | **engineering drawing** | **Elec007** | first |
| 4 | **human rights** | **Elec008** | first |
| 2 | **occupational safety** | **Elec009** | first |
| 4 | **digital electronics** | **Elec010** | first |
| 2 | **English language** | **Elec011** | first |
| 10 | **Electrical machines** | **Elec012** | second |
| 8 | **electrical networks** | **Elec013** | second |
| 8 | **Manufacturing installation** | **Elec014** | second |
| 10 | **power electronic** | **Elec015** | second |
| 8 | **Maintenance lab workshop** | **Elec016** | second |
| 6 | **The computer applications** | **Elec017** | second |
| 3 | **Electrical drawing** | **Elec018** | second |
| 3 | **Programmable Logic Controller PLC** | **Elec019** | Second |
| 2 | **English language** | **Elec020** | Second |
| 4 | **research project** | **Elec021** | Second |

|  |
| --- |
| 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** | | | | | | | | | | | | | | | | | | | |
| **Program Learning Outcomes** | | | | | | | | | | | | | | | |  | | | |
| General and Transferable Skills (or) Other skills relevant to employability and personal development | | | | Thinking Skills | | | | Subject-  specific skills | | | | Knowledge and  understanding | | | | Core (C)  Title or  Option  (O**)** | Course Title | Course  Code | Year / Level |
| **D4** | **D3** | **D2** | **D1** | **C4** | **C3** | **C2** | **C1** | **B4** | **B3** | **B2** | **B1** | **A4** | **A3** | **A2** | **A1** |
|  |  |  | **/** |  |  | **/** |  |  |  | **/** |  |  |  |  | **/** | **C** | **electrical Circuits and measurements** | **Elec001** | **first** |
|  |  |  | **/** |  |  |  | **/** |  |  |  | **/** |  |  |  | **/** | **C** | **Electrical installations** | **Elec002** |
|  |  | **/** |  |  |  | **/** |  |  |  | **/** |  |  |  | **/** |  | **C** | **Electronic** | **Elec003** | **first** |
|  |  |  | **/** |  |  |  | **/** |  |  |  | **/** |  |  |  | **/** | **C** | **Maintenance lab workshop** | **Elec004** |
|  | **/** |  |  |  | **/** |  |  |  | **/** |  |  |  |  | **/** |  | **C** | **Mathematic** | **Elec005** | **first** |
|  |  | **/** |  |  |  | **/** |  |  |  | **/** |  |  |  |  | **/** | **C** | **Computer Application** | **Elec006** |
|  |  | **/** |  |  |  | **/** |  |  |  | **/** |  |  |  | **/** |  | **C** | **engineering drawing** | **Elec007** | **first** |
|  |  | **/** |  |  | **/** |  |  |  | **/** |  |  |  |  | **/** |  | **C** | **human rights** | **Elec008** |
|  |  | **/** |  |  |  | **/** |  |  | **/** |  |  |  | **/** |  |  | **C** | **occupational safety** | **Elec009** | **first** |
|  | **/** |  |  |  | **/** |  |  | **/** |  |  |  |  | **/** |  |  | **C** | **digital electronics** | **Elec010** |
|  |  | **/** |  |  |  | **/** |  |  | **/** |  |  |  |  | **/** |  | **C** | **English language** | **Elec011** | **first** |
| **/** |  |  |  |  | **/** |  |  |  | **/** |  |  | **/** |  |  |  | **C** | **Electrical machines** | **Elec012** |
| **/** |  |  |  | **/** |  |  |  |  |  | **/** |  |  | **/** |  |  | **C** | **electrical networks** | **Elec013** | **second** |
|  | **/** |  |  |  | **/** |  |  |  | **/** |  |  | **/** |  |  |  | **C** | **Manufacturing installation** | **Elec014** | **second** |
| **/** |  |  |  | **/** |  |  |  |  | **/** |  | **/** |  |  |  |  | **C** | **power electronic** | **Elec015** | **second** |
|  | **/** |  |  |  | **/** |  |  |  | **/** |  |  |  | **/** |  |  | **C** | **Maintenance lab workshop** | **Elec016** | **second** |
|  |  | **/** |  |  | **/** |  |  |  |  | **/** |  |  |  | **/** |  | **C** | **The computer applications** | **Elec017** | **second** |
| **/** |  |  |  | **/** |  |  |  | **/** |  |  |  |  | **/** |  |  | **C** | **Electrical drawing** | **Elec018** | **second** |
|  | **/** |  |  |  | **/** |  |  |  | **/** |  |  |  | **/** |  |  | **C** | **Programmable Logic Controller PLC** | **Elec019** | **second** |
| **/** |  |  |  | **/** |  |  |  | **/** |  |  |  | **/** |  |  |  | **C** | **English language** | **Elec020** | **second** |
|  | **/** |  |  |  | **/** |  |  |  | **/** |  |  |  | **/** |  |  | **C** | **research project** | **Elec021** | **second** |

**Electrical circuits & Measurement**

|  |
| --- |
| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

|  |
| --- |
| **A student will be produced to electrical circuits and**  **electrical measurements** |

|  |  |
| --- | --- |
| **Technical Institution-Kut** | **1. Teaching Institution** |
| **Electric/ first year** | **2. University Department/Centre** |
| **Electrical Measurement & circuits** | **3. Course title/code** |
| **Technical Diploma** | **4. Program(s) to which it contributes** |
| **Compulsory, Seminar scheduled hours (4 hours)** | **5. Modes of Attendance offered** |
| **First year/ 2020-2021** | **6. Semester/Year** |
| **120** | **7. Number of hours tuition (total)** |
| **18/2/2024** | **8. Date of production/revision of this specification** |
| **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** |
| 1. **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** | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **System units used in electricity** | **Lectures + labs** | **4** | **1** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **2** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Applications on circuit** | **Lectures + labs** | **4** | **3** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **A. Kirchhoff's laws**  **B. Maxwell with a solution examples** | **Lectures + labs** | **4** | **4** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | 1. **Thevenn theory** 2. **Norton theory** | **Lectures + labs** | **4** | **5** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Applications on Thevenn and Norton's theory** | **Lectures + labs** | **4** | **6** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Superposition theory** | **Lectures + labs** | **4** | **7** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Quantities of alternating current AC** | **Lectures + labs** | **4** | **8** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Quantities of alternating current vectors** | **Lectures + labs** | **4** | **9** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Study the effect of the alternating current circuit with R, C L**  **solution examples** | **Lectures + labs** | **4** | **10** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **The effect of AC on the circuit containing resistance and inductance with practical examples** | **Lectures + labs** | **4** | **11** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **The effect of AC on the circuit containing resistance and inductance in parallel with practical examples** | **Lectures + labs** | **4** | **12** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **The use of descriptions 1-7 (J-Operator)** | **Lectures + labs** | **4** | **13** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Resonance with solving examples** | **Lectures + labs** | **4** | **14** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Parallel resonant circuit with solution examples** | **Lectures + labs** | **4** | **15** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Application of theories such as Norton, Thvenn on AC circuits with a solution examples** | **Lectures + labs** | **4** | **16** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **The power in AC circuits** | **Lectures + labs** | **4** | **17** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Apparent power (defined) - How to draw factor triangle** | **Lectures + labs** | **4** | **18** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Theory of transfer the greatest possible power in circles AC with examples** | **Lectures + labs** | **4** | **19** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Practical ways of measuring resistors with high, medium and small values** | **Lectures + labs** | **4** | **20** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **AC circles three phases - with a solution examples** | **Lectures + labs** | **4** | **21** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Solving practical examples on AC with three phases** | **Lectures + labs** | **4** | **22** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Power measurement using Ammeter** | **Lectures + labs** | **4** | **23** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Magnetism - magnetic circuit -** | **Lectures + labs** | **4** | **24** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Solving practical examples of magnetism** | **Lectures + labs** | **4** | **25** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Self-inductance (electromagnetic induction)** | **Lectures + labs** | **4** | **26** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Curves of growth and decay of the power of the circuits - a solution examples** | **Lectures + labs** | **4** | **27** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Measurement devices include - types of measurement devices** | **Lectures + labs** | **4** | **28** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Metering device with the Iron Heart -** | **Lectures + labs** | **4** | **29** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Wattmeter devices -** | **Lectures + labs** | **4** | **30** |

|  |  |  |
| --- | --- | --- |
| **12. Infrastructure** | | |
| **مشروع كتاب الدوائر الكهربائية**  **Electrical technology (Edward Hughes)** | **Required reading:**  **· CORE TEXTS**  **· COURSE MATERIALS**  **· OTHER** | |
| **Basic circuits (A.M.F. Brooks)**  **Introduction to electric circuits (M. Romanwitz)** | **Special requirements (include for example workshops, periodicals, IT software, websites)** | |
| **Basic electrical engineering (Fitzgrald & Rlgginborthan)** | **Community-based facilities**  **(include for example, guest**  **Lectures , internship , field studies)** | |
| **13. Admissions** | | |
| **One class** | | **Pre-requisites** |
| **30** | | **Minimum number of students** |
| **50** | | **Maximum number of students** |

**Electrical installation**

|  |
| --- |
| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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

|  |  |
| --- | --- |
| **Technical Institution-Kut** | **1. Teaching Institution** |
| **Electric** | **2. University Department/Centre** |
| **Electrical installation** | **3. Course title/code** |
| **Technical Diploma** | **4. Program (s) to which it contributes** |
| **Compulsory, Seminar scheduled hours (4 hours)** | **5. Modes of Attendance offered** |
| **First year/ 2020-2021** | **6. Semester/Year** |
| **120** | **7. Number of hours tuition (total)** |
| **18/2/2024** | **8. Date of production/revision of this specification** |
| **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** |
| 1. **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** | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Classification of materials to: • electrical conducting materials  • Semiconductor • isolators Insulators** | **Lectures + labs** | **4** | **1** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Electricity principles - Voltage, current intensity,** | **Lectures + labs** | **4** | **2** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Electrical conducting materials. - Copper and Aluminum** | **Lectures + labs** | **4** | **3** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Insulation Materials - Examples of insulating materials - air, oil** | **Lectures + labs** | **4** | **4** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Magnetic properties of materials - Examples Solved** | **Lectures + labs** | **4** | **5** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Magnetic circuits - The application of Kirchhoff's laws Examples unresolved on magnetism** | **Lectures + labs** | **4** | **6** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Mechanical properties of electrical materials - Tensile, stress, elongation, flexibility, and other - Solved examples** | **Lectures + labs** | **4** | **7** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **8** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **9** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Types of switches used in electrical installations, their importance** | **Lectures + labs** | **4** | **10** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **11** |
| **Theoretical + Ppractical + Oral** | **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 -   -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** | **Lectures + labs** | **4** | **12** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **13** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **14** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **15** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **16** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **17** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **18** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **19** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **20** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **21** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Solving practical examples on AC with three phases and 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** | **Lectures + labs** | **4** | **22** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **23** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **24** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Solving practical examples of magnetism** | **Lectures + labs** | **4** | **25** |
| **Theoretical + Ppractical + Oral** | **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 includes: Linking succession of synergistic and Taaksi** | **Lectures + labs** | **4** | **26** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **27** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **28** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **TIMER - Types (mechanic - Ketrona- 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 Tosissat Testing and inspection of Installation** | **Lectures + labs** | **4** | **29** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **30** |

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

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

**Electronics1**

|  |
| --- |
| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW |

**COURSE SPECIFICATION**

|  |
| --- |
| **A student will be produced to various electronic components** |

|  |  |
| --- | --- |
| Technical Institution-Kut | 1. Teaching Institution |
| **Electric** | **2. University Department/Centre** |
| **Electronics1** | **3. Course title/code** |
| **Technical Diploma** | **4. Programme(s) to which it contributes** |
| **Compulsory, Seminar scheduled hours (4 hours)** | **5. Modes of Attendance offered** |
| **First year/ 2022-2023** | **6. Semester/Year** |
| **120** | **7. Number of hours tuition (total)** |
| **18/2/2024** | **8. Date of production/revision of this specification** |
| **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** |
| 1. **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** | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Semiconductor theory - the atomic structure - energy levels - crystals - Plug in crystals - the gap stream - how to move the gaps** | **Lectures + labs** | **4** | **1** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Vaccination - develop a positive type (P) negative crystal of the type (N) electrons stream and stream gaps - the total resistance** | **Lectures + labs** | **4** | **2** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **3** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **4** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **5** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **6** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Filters - filtration using widening - candidate (LC) candidate (RC) - constant output voltage spikes** | **Lectures + labs** | **4** | **7** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Ripple multiplier factor circles effort pruning - pruning positive - negative pruning - pruning compound** | **Lectures + labs** | **4** | **8** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **9** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **10** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **11** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **12** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **13** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Aligned transistor circuits - Base bias - bias motive** | **Lectures + labs** | **4** | **14** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Parallel resonant circuit - defined - account Bias mosque - Self-Aligned - siding background nutrition - the bias voltage divider - Practical examples** | **Lectures + labs** | **4** | **15** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Bias mosque - Self-Aligned - siding background nutrition - the bias voltage divider - Practical examples** | **Lectures + labs** | **4** | **16** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Circuit the equivalent continuous Transistors - DC load line** | **Lectures + labs** | **4** | **17** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Work - points dormancy points (Q-Point) Practical examples** | **Lectures + labs** | **4** | **18** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **19** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **20** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **21** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **he use of a transistor in the voltage regulation - an orderly succession - structured parallel source of an ongoing effort Department** | **Lectures + labs** | **4** | **22** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **23** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **24** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **25** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **26** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **A comparison of the types (FET) (FET, MOSFET) and the (BJT)** | **Lectures + labs** | **4** | **27** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Based on light-resistant (LDR) - light emitting diode - photodiode panel of seven installed applications and pieces** | **Lectures + labs** | **4** | **28** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Optical transistor - installed - work - applications - process** | **Lectures + labs** | **4** | **29** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Optical transistor - installed - work - applications – process** | **Lectures + labs** | **4** | **30** |

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

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

**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.** |

|  |  |
| --- | --- |
| **Technical Institution-Kut** | **1. Teaching Institution** |
| **Electric** | **2. University Department/Centre** |
| **Laboratories** | **3. Course title/code** |
| **Technical Diploma** | **4. Programme(s) to which it contributes** |
| **Compulsory, Seminar scheduled hours (6 hours)** | **5. Modes of Attendance offered** |
| **First year/ 2022-2023** | **6. Semester/Year** |
| **180** | **7. Number of hours tuition (total)** |
| **18/2/2024** | **8. Date of production/revision of this specification** |
| **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 departmentsأعلى النموذج**  **أسفل النموذج** | |

|  |
| --- |
| **10· Learning Outcomes, Teaching ,Learning and Assessment Method** |
| 1. **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** | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Measuring instruments: (ruler - measuring tape - Vernier - and micrometer and how to use and maintain them** | **Lectures + labs** | **6** | **1** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Cutting Chainsaw: chainsaw and hand weapon Saw** | **Lectures + labs** | **6** | **2** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Types of drills  Exercises** | **Lectures + labs** | **6** | **3** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Practical welding workshop** | **Lectures + labs** | **6** | **4** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Practical welding workshop** | **Lectures + labs** | **6** | **5** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Practical welding workshop** | **Lectures + labs** | **6** | **6** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Practical plumbing workshop** | **Lectures + labs** | **6** | **7** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Practical plumbing workshop** | **Lectures + labs** | **6** | **8** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Practical plumbing workshop** | **Lectures + labs** | **6** | **9** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Practical turnings workshop** | **Lectures + labs** | **6** | **10** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Practical turnings workshop** | **Lectures + labs** | **6** | **11** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Practical turnings workshop** | **Lectures + labs** | **6** | **12** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Practical carpentry workshop** | **Lectures + labs** | **6** | **13** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Practical carpentry workshop** | **Lectures + labs** | **6** | **14** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Practical carpentry workshop** | **Lectures + labs** | **6** | **15** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Fundamental principles of industrial security** | **Lectures + labs** | **6** | **16** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Training on the electrical welding process** | **Lectures + labs** | **6** | **17** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Resistors types** | **Lectures + labs** | **6** | **18** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Coils types** | **Lectures + labs** | **6** | **19** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Printed boards and regular used in the construction of electronic circuits** | **Lectures + labs** | **6** | **20** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Training on work coils using different types of ways of winding** | **Lectures + labs** | **6** | **21** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Study parts of water pump air conditioner** | **Lectures + labs** | **6** | **22** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Training on the drawing engine water pump You air chilled and Rewinding + files and conducting types of tests, continuity test** | **Lectures + labs** | **6** | **23** |
| **Theoretical + Ppractical + Oral** | **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** | **6** | **24** |
| **Theoretical + Ppractical + Oral** | **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** | **6** | **25** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Study propeller parts for desktop and and re-assembled and identify the mechanical and electrical faults and how to address them** | **Lectures + labs** | **6** | **26** |
| **Theoretical + Ppractical + Oral** | **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** | **6** | **27** |
| **Theoretical + Ppractical + Oral** | **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** | **6** | **28** |
| **Theoretical + Ppractical + Oral** | **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** | **6** | **29** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Disassemble and assemble and study the parts truck batteries and handle faults expected Training oxy-acetylene welding gas and liquid** | **Lectures + labs** | **6** | **30** |

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

**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** |

|  |  |
| --- | --- |
| **Technical Institution-Kut** | **1. Teaching Institution** |
| **Electric** | **2. University Department/Centre** |
| **Mathematics** | **3. Course title/code** |
| **Technical Diploma** | **4. Programme(s) to which it contributes** |
| **Seminar scheduled hours (2 hours)** | **5. Modes of Attendance offered** |
| **First year/ 2023-2024** | **6. Semester/Year** |
| **60** | **7. Number of hours tuition (total)** |
| **20/12/2023** | **8. Date of production/revision of this specification** |
| **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** |
| 1. **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** | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| **Theoretical + quiz + Oral** | **Lectures** | **Matrices / determinants / and their properties** | **Lectures** | **2** | **1** |
| **Theoretical + quiz + Oral** | **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** | **2** | **2** |
| **Theoretical + quiz + Oral** | **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** | **2** | **3** |
| **Theoretical + quiz + Oral** | **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** | **2** | **4** |
| **Theoretical + quiz + Oral** | **Lectures** | **Function / trigonometric functions and trigonometric relationships / logarithmic functions Calculate the value of the DC circuit half bridge / calculate the effective value of the voltage / line load for the transistor** | **Lectures** | **2** | **5** |
| **Theoretical + quiz + Oral** | **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** | **2** | **6** |
| **Theoretical + quiz + Oral** | **Lectures** | **limits / extremely arrest and trigonometric functions / applications on the ends** | **Lectures** | **2** | **7** |
| **Theoretical + quiz + Oral** | **Lectures** | **Differential / derivative / derivative algebraic functions / chain rule - building Differential / calculate the velocity and acceleration of the circle - the speed of light** | **Lectures** | **2** | **8** |
| **Theoretical + quiz + Oral** | **Lectures** | **With higher echelons implicit function / standard function derivative / representation system Vixiaoah the function implied** | **Lectures** | **2** | **9** |
| **Theoretical + quiz + Oral** | **Lectures** | **Derived trigonometric functions / logarithmic derivative / calculate the effective value of the stream function in the R-L-C circuit / gain voltages Balbal** | **Lectures** | **2** | **10** |
| **Theoretical + quiz + Oral** | **Lectures** | **Derivative exponential / derivative hyperbolic functions / time constant Account** | **Lectures** | **2** | **11** |
| **Theoretical + quiz + Oral** | **Lectures** | **Application of derivative / equivalent tangent and column / speed and acceleration / change Change voltages and power in terms of the rate of time accounts** | **Lectures** | **2** | **12** |
| **Theoretical + quiz + Oral** | **Lectures** | **Increasing and decreasing / Great endings and micro / Points coup / Drawing Functions Drawing respond to the circle of second-class R-L-C** | **Lectures** | **2** | **13** |
| **Theoretical + quiz + Oral** | **Lectures** | **Vixiaoah applications and engineering General** | **Lectures** | **2** | **14** |
| **Theoretical + quiz + Oral** | **Lectures** | **Integration / indefinite integral / Integration arrest and logarithmic functions. Calculate the value of a widening shipment** | **Lectures** | **2** | **15** |
| **Theoretical + quiz + Oral** | **Lectures** | **Integration of exponential and trigonometric** | **Lectures** | **2** | **16** |
| **Theoretical + quiz + Oral** | **Lectures** | **Specific integration / specific integration applications / area under oriented / space between two curves / electric power accounts** | **Lectures** | **2** | **17** |
| **Theoretical + quiz + Oral** | **Lectures** | **Sizes rotational / curved arc length** | **Lectures** | **2** | **18** |
| **Theoretical + quiz + Oral** | **Lectures** | **Vixiaoah and engineering applications (job - Momentum - Momentum - moment of inertia)** | **Lectures** | **2** | **19** |
| **Theoretical + quiz + Oral** | **Lectures** | **General methods of integration include compensation and retail use partial fractions and exponential and logarithmic Building Almkamil circuit using resistance and inductance / representation of circuit equations integrative / amplifier circuit using integrated circuit** | **Lectures** | **2** | **20** |
| **Theoretical + quiz + Oral** | **Lectures** | **Numerical Methods in integration / trapezoidal base / base Samsun Find the distance from the accelerating speed - = find the value of the effective power of the rectifier Kdarapractical examples** | **Lectures** | **2** | **21** |
| **Theoretical + quiz + Oral** | **Lectures** | **Discrete solution of differential equations and linear and heterogeneous with different applications within the field of competence / circles pruning positive and negative and compound** | **Lectures** | **2** | **22** |
| **Theoretical + quiz + Oral** | **Lectures** | **Complex numbers / addition, subtraction, multiplication and division / geometric representation of the number of composite / relationship electrical units preparing compound** | **Lectures** | **2** | **23** |
| **Theoretical + quiz + Oral** | **Lectures** | **Polar formula / converting capacity to arrest and vice versa polarity / tag coefficient (j) e / formula exponential departments in the conversion / de Muniz theory and its uses in solving complex electrical circuits / power transmission accounts using the font constants lines** | **Lectures** | **2** | **24** |
| **Theoretical + quiz + Oral** | **Lectures** | **Powers and roots / representation roots drawing / find the roots of electrical circuits to determine the preprocessing / stellar acting and triangular** | **Lectures** | **2** | **25** |
| **Theoretical + quiz + Oral** | **Lectures** | **Statistical operations / distributions repeatability / histogram / curved Recurring / Probability and long / arithmetic mean and the geometric – Sample** | **Lectures** | **2** | **26** |
| **Theoretical + quiz + Oral** | **Lectures** | **Mean / standard range / contrast and dispersion and relative / relationship between the center and moderation and vein / coefficient of variation - standard variable deviation** | **Lectures** | **2** | **27** |
| **Theoretical + quiz + Oral** | **Lectures** | **Matrices / determinants / and their properties 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** | **2** | **28** |
| **Theoretical + quiz + Oral** | **Lectures** | **Vector / Vector analysis / flying and standard / Jabr Vector / calculations vector quantities in space** | **Lectures** | **2** | **29** |
| **Theoretical + quiz + Oral** | **Lectures** | **Vector / Vector analysis / flying and standard / Jabr Vector / calculations vector quantities in space** | **Lectures** | **2** | **30** |

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

**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** |

|  |  |
| --- | --- |
| **Technical Institution-Kut** | **1. Teaching Institution** |
| **Electric** | **2. University Department/Centre** |
| **Computer applications** | **3. Course title/code** |
| **Technical Diploma** | **4. Programme(s) to which it contributes** |
| **Seminar scheduled hours (3 hours)** | **5. Modes of Attendance offered** |
| **First year/ 2023-2024** | **6. Semester/Year** |
| **90** | **7. Number of hours tuition (total)** |
| **18/2/2024** | **8. Date of production/revision of this specification** |
| **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** |
| 1. **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** | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Introduction to computer and their systems and benefits** | **Lectures + labs** | **4** | **1** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Introduction to computer and their systems and benefits** | **Lectures + labs** | **4** | **2** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Windows** | **Lectures + labs** | **4** | **3** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Windows** | **Lectures + labs** | **4** | **4** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **My COMPUTER ، MY DOCUMENTS ، RECYCLE BIN** | **Lectures + labs** | **4** | **5** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **My COMPUTER ، MY DOCUMENTS ، RECYCLE BIN** | **Lectures + labs** | **4** | **6** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **DESKTOP BACKGROUND ، WINDOWS COLOR ، SCREEN SAVER** | **Lectures + labs** | **4** | **7** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **DESKTOP BACKGROUND ، WINDOWS COLOR ، SCREEN SAVER** | **Lectures + labs** | **4** | **8** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **CONTROL PANAL PROGRAM AND FEATURES ، ACCESSORIES CALCULATOR ، WORDPAD،WINDOSWS MEDIA PLAYER** | **Lectures + labs** | **4** | **9** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **CONTROL PANAL PROGRAM AND FEATURES ، ACCESSORIES CALCULATOR ، WORDPAD،WINDOSWS MEDIA PLAYER** | **Lectures + labs** | **4** | **10** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **AUTOCAD DRAWING LIMITS ، UNITS** | **Lectures + labs** | **4** | **11** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **OSNAP، ORTTHO ، LWT ، OTRACK ، POLAR ، SNAP ، GRID ، DISTANCE ، AREA** | **Lectures + labs** | **4** | **12** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **VIEW: ZOOM PAN ، REGEN** | **Lectures + labs** | **4** | **13** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **14** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **15** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **16** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **MODIFY: ERASE ، COPY ، MIRROR ، OFFSET،ARRAY ، MOVE ، ROTATE ، SCALE ، CHAMFER ، FILLET ، STRETCH ، TRIM ، EXTEND ، BREAK ، EXPLODE** | **Lectures + labs** | **4** | **17** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **MODIFY: ERASE ، COPY ، MIRROR ، OFFSET،ARRAY ، MOVE ، ROTATE ، SCALE ، CHAMFER ، FILLET ، STRETCH ، TRIM ، EXTEND ، BREAK ، EXPLODE** | **Lectures + labs** | **4** | **18** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **TEXT MULTILINE TEXT ، SINGLE LINE TEXT ، STYLE DESIGN CENTER** | **Lectures + labs** | **4** | **19** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **TEXT MULTILINE TEXT ، SINGLE LINE TEXT ، STYLE DESIGN CENTER** | **Lectures + labs** | **4** | **20** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **MEASURE ، DIVIDE ، LINETYPE ، LINE WEIGHT ، COLOR ، PROPERTIES ، MATCH PROPERTIES ، GRIPS** | **Lectures + labs** | **4** | **21** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **MEASURE ، DIVIDE ، LINETYPE ، LINE WEIGHT ، COLOR ، PROPERTIES ، MATCH PROPERTIES ، GRIPS** | **Lectures + labs** | **4** | **22** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **DIMENSION** | **Lectures + labs** | **4** | **23** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **ELEV و THICKNESS** | **Lectures + labs** | **4** | **24** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **3D VIEW** | **Lectures + labs** | **4** | **25** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **3D VIEW** | **Lectures + labs** | **4** | **26** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **3D VIEW** | **Lectures + labs** | **4** | **27** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **3D SURFACE and 3D SOLIDS** | **Lectures + labs** | **4** | **28** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **The concept of Computer Virus** | **Lectures + labs** | **4** | **29** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **The concept of Computer Virus** | **Lectures + labs** | **4** | **30** |

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

**Electrical engineering drawing**

|  |
| --- |
| **HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW** |

**COURSE SPECIFICATION**

|  |
| --- |
| **Introduce students to the importance of computers in the design and circuit design** |

|  |  |
| --- | --- |
| **Technical Institution-Kut** | **1. Teaching Institution** |
| **Electric** | **2. University Department/Centre** |
| **Electrical engineering drawing** | **3. Course title/code** |
| **Technical Diploma** | **4. Programme(s) to which it contributes** |
| **Seminar scheduled hours (3 hours)** | **5. Modes of Attendance offered** |
| **First year/ 2023-2024** | **6. Semester/Year** |
| **90** | **7. Number of hours tuition (total)** |
| **18/2/2024** | **8. Date of production/revision of this specification** |
| **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** |
| 1. **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** | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **The importance of engineering drawing.** | **Lectures + labs** | **3** | **1** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Methods of drawing a straight lines and Cartesian coordinates** | **Lectures + labs** | **3** | **2** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Zoom, drawing Limits, Units, Options)** | **Lectures + labs** | **3** | **3** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **SNAP, GRID, ORTHO, POLAR, OSNAP, OTRACK, DUCS, DYN, LWT))** | **Lectures + labs** | **3** | **4** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Rectangle, Circle, Polygon, Arc, Ellipse, Donut, Wipeout, Revision Cloud)** | **Lectures + labs** | **3** | **5** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Rectangle, Circle, Polygon, Arc, Ellipse, Donut, Wipeout, Revision Cloud)** | **Lectures + labs** | **3** | **6** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Erase, Copy, Move, Mirror, Offset, Scale, Stretch, Rotate)** | **Lectures + labs** | **3** | **7** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Linear, Aligned, Arc Length, Radius, Diameter, Angular, Baseline, Continue, , Dimension Style…** | **Lectures + labs** | **3** | **8** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Properties)** | **Lectures + labs** | **3** | **9** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Polyline, Point, Spline, Helix, Table)** | **Lectures + labs** | **3** | **10** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Array, Trim, Extend, Break, Fillet, Chamfer, Explode,Align)** | **Lectures + labs** | **3** | **11** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Single Line &Multiline Text , .** | **Lectures + labs** | **3** | **12** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Calculate (Area and Volume and Distance)** | **Lectures + labs** | **3** | **13** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Hatch, Gradient** | **Lectures + labs** | **3** | **14** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Layers** | **Lectures + labs** | **3** | **15** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Layers** | **Lectures + labs** | **3** | **16** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Blocks** | **Lectures + labs** | **3** | **17** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Blocks** | **Lectures + labs** | **3** | **18** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Region, Boundary, Join)** | **Lectures + labs** | **3** | **19** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Box, Wedge, Cone, Sphere, Cylinder, Tours, Pyramid)** | **Lectures + labs** | **3** | **20** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Extrude, Press/pull, Polysolid, Union, Subtract, Intersect, Revolve, Sweep, Loft )** | **Lectures + labs** | **3** | **21** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Shell, Separate, Slice, Thicken)** | **Lectures + labs** | **3** | **22** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Plane drawing** | **Lectures + labs** | **3** | **23** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Printing** | **Lectures + labs** | **3** | **24** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Electrical circuit drawing** | **Lectures + labs** | **3** | **25** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Electrical and electronic circuit drawing** | **Lectures + labs** | **3** | **26** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Electrical and electronic circuit drawing** | **Lectures + labs** | **3** | **27** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Drawing of electrical control machine** | **Lectures + labs** | **3** | **28** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **An example for drawing the installation of small building** | **Lectures + labs** | **3** | **29** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Cable Trays** | **Lectures + labs** | **3** | **30** |

|  |  |  |
| --- | --- | --- |
| **12. Infrastructure** | | |
| **اساسيات الرسم الهندسي تأليف عبد الحميد جمعة**  **مشروع كتاب الرسم الكهربائي تأليف هاني عزيز** | **Required reading:**  **· CORE TEXTS**  **· COURSE MATERIALS**  **· OTHER** | |
| **Engineering drawing & graphic technology (by Frend)**  **Engineering drawing technology (by A.W. Wander William)** | **Special requirements (include for example workshops, periodicals, IT software, websites)** | |
| **اوديل للتوصيلات الكهربائية (في الإضاءة والقوة)**  **Engineering drawing technology (by MC Graw)** | **Community-based facilities**  **(include for example, guest**  **Lectures , internship , field studies)** | |
| **13. Admissions** | | |
| **One class** | | **Pre-requisites** |
| **30** | | **Minimum number of students** |
| **50** | | **Maximum number of students** |

**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** |

|  |  |
| --- | --- |
| **Technical Institution-Kut** | **1. Teaching Institution** |
| **Electric** | **2. University Department/Centre** |
| **Digital electronics** | **3. Course title/code** |
| **Technical Diploma** | **4. Programme(s) to which it contributes** |
| **Seminar scheduled hours (4 hours)** | **5. Modes of Attendance offered** |
| **First year/ 2020-2021** | **6. Semester/Year** |
| **120** | **7. Number of hours tuition (total)** |
| **20/12/2020** | **8. Date of production/revision of this specification** |
| **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** |
| 1. **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** | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| **Theoretical + Ppractical + Oral** | **Lectures + 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** | **4** | **1** |
| **Theoretical + Ppractical + Oral** | **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**  **2.1.4 Packed and Unpacked BCD Numbers**  **2.2 Excess-3 Code**  **2.3 Gray Code**  **2.3.1 Binary–Gray Code Conversion**  **2.3.2 Gray Code–Binary Conversion**  **2.3.3 Gray Code** | | **Lectures + labs** | **4** | **2** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **3** |
| **Theoretical + Ppractical + Oral** | **Lectures + 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** | |  | | **Lectures + labs** | **4** | **4** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **5** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **6** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **7** |
| **Theoretical + Ppractical + Oral** | **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**  **8.3.1 Implementing Boolean Functions with Decoders**  **8.3.2 Cascading Decoder Circuits** | **Lectures + labs** | **4** | **8** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **9** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **10** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **11** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **12** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **13** |
| **Theoretical + Ppractical + Oral** | **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**  **12.2.4 Dynamic Range** | **Lectures + labs** | **4** | **14** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **15** |

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

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

**Safety precautions**

|  |
| --- |
| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

|  |
| --- |
| **This Course Specification provides a concise summary of the main features of the course 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 should be cross-referenced with the program specification.** |

|  |  |
| --- | --- |
| **Technical Institution-Kut** | **1. Teaching Institution** |
| **Electric** | **2. University Department/Centre** |
| **Safety precautions** | **3. Course title/code** |
| **Technical Diploma** | **4. Programme(s) to which it contributes** |
| **Seminar scheduled hours (4 hours)** | **5. Modes of Attendance offered** |
| **First year/ 2020-2021** | **6. Semester/Year** |
| **120** | **7. Number of hours tuition (total)** |
| **20/12/2020** | **8. Date of production/revision of this specification** |
| **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** |
| 1. **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** | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Infection causes electrocution** | **Lectures + labs** | **4** | **1** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | |  | | --- | | **Kinds of electrical injuries** | | **Lectures + labs** | **4** | **2** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Infected relief electricity - ridding the patient** | **Lectures + labs** | **4** | **3** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | |  | | --- | | **Artificial respiration process - treatment of burns** | |  | | **Lectures + labs** | **4** | **4** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Monthly exam** | **Lectures + labs** | **4** | **5** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **The effects of the passage of electric current to the ground** | **Lectures + labs** | **4** | **6** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Fire Alarm Systems - Console** | **Lectures + labs** | **4** | **7** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Fire detectors - Heat detectors - smoke detectors** | **Lectures + labs** | **4** | **8** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Buildings that must be provided with fire alarm system** | **Lectures + labs** | **4** | **9** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Monthly exam** | **Lectures + labs** | **4** | **10** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Alarm modes Almsmhah and bells and trumpets** | **Lectures + labs** | **4** | **11** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Guidance on occupational health and safety** | **Lectures + labs** | **4** | **12** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Reduce unsafe behaviors and practices** | **Lectures + labs** | **4** | **13** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Personal protective - protective equipment sight - and hearing protection** | **Lectures + labs** | **4** | **14** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Personal protective clothing** | **Lectures + labs** | **4** | **15** |

|  |  |  |
| --- | --- | --- |
| **12. Infrastructure** | | |
| **كراسات مكتب العمل الدولي والمركز القومي للاستشارات والتطور الاداري – بغداد** | **Required reading:**  **· CORE TEXTS**  **· COURSE MATERIALS**  **· OTHER** | |
| **موسوعة الامن الوطني/ جامعة الدول العربية** | **Special requirements (include for example workshops, periodicals, IT software, websites)** | |
| **مجموعة كتب عن الصيانة/ المركز القومي للاستشارات والتطور الاداري/ بغداد** | **Community-based facilities**  **(include for example, guest**  **Lectures , internship , field studies)** | |
| **13. Admissions** | | |
| **One class** | | **Pre-requisites** |
| **30** | | **Minimum number of students** |
| **50** | | **Maximum number of students** |

**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.** | |
| **Technical Institution-Kut** | **1. Teaching Institution** |
| **Electric** | **2. University Department/Centre** |
| **Electric power branch** | **3. Programme Title** |
| **Technical Diploma** | **4. Title of Final Award** |
| **Annual** | **5. Modes of Attendance offered** |
| **ABET** | **6. Accreditation** |
| **There is a close relationship to the labor market that receives our graduates** | **7. Other external influences** |
| **31/8/2023** | **8. Date of production/revision of this specification** |
| **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** |
| 1. **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** | | | | |
| **12. Awards and Credits** | **11. Program Structure** | | | |
| **Credit**  **rating** | **Course or Module Title** | **Course or**  **Module**  **Code** | **Level/Year** |
| **Diploma Degree**  **Requires ( x ) credits** | **8** | **Measurements and circuits** |  | **First year** |
| **8** | **Electrical assembly** |  |
|  | **8** | **Electronics1** |  |
| **12** | **Laboratories** |  |
| **4** | **Mathematics** |  |
| **6** | **Computer applications** |  |
|  | **6** | **Electrical engineering drawing** |  |
|  | **4** | **Human Rights and Democracy** |  |
|  | **4** | **Digital electronics** |  |
|  | **4** | **Occupational Safety** |  |
|  | **10** | **Electrical machine** |  | **Second year** |
|  | **8** | **Electrical networks** |  |
|  | **10** | **Power Electronics** |  |
|  | **8** | **Workshop maintenance** |  |
|  | **4** | **Electrical Installation** |  |
|  | **6** | **Computer applications** |  |
|  | **6** | **Electrical drawing** |  |
|  | **6** | **Programmed Logic Control (PLC)** |  |
|  | **4** | **The project** |  |
|  |  |  |  |

|  |
| --- |
| **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** | | | | | | | | | | | | | | | |  | | | |
| **General and Transferable Skills (or) Other skills relevant to employability and personal development** | | | | **Thinking Skills** | | | | **Subject-specific skills** | | | | **Knowledge and**  **understanding** | | | | **Core (C)**  **Title or Option**  **(O)** | **Course Title** | **Course**  **Code** | **Year / Level** |
| **D4** | **D3** | **D2** | **D1** | **C4** | **C3** | **C2** | **C1** | **B4** | **B3** | **B2** | **B1** | **A4** | **A3** | **A2** | **A1** |
|  | **/** |  | **/** |  | **/** |  | **/** |  | **/** |  | **/** |  | **/** |  | **/** | **compulsory** | **Measurements and circuits** |  | **The first year** |
| **/** | **/** | **/** | **/** | **/** | **/** | **/** | **/** | **/** | **/** | **/** | **/** | **/** | **/** | **/** | **/** | **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** | **Electrical machinery** |  | **The second year** |
| **/** | **/** | **/** | **/** | **/** | **/** | **/** | **/** | **/** | **/** | **/** | **/** | **/** | **/** | **/** | **/** | **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** |  |

**TEMPLATE FOR COURSE SPECIFICATION**

**Power electronics**

|  |
| --- |
| **HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW** |

**COURSE SPECIFICATION**

|  |
| --- |
| **A student will be produced to various power electronic switches** |

|  |  |
| --- | --- |
| **Technical Institution-Kut** | **1. Teaching Institution** |
| **Electric** | **2. University Department/Centre** |
| **Power electronics** | **3. Course title/code** |
| **Technical Diploma** | **4. Program(s) to which it contributes** |
| **Seminar scheduled hours (5 hours)** | **5. Modes of Attendance offered** |
| **Second year/ 2022-2023** | **6. Semester/Year** |
| **150** | **7. Number of hours tuition (total)** |
| **18/2/2024** | **8. Date of production/revision of this specification** |
| **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** |
| 1. **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** | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| **Theoretical + Ppractical + Oral** | **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** | **5** | **1** |
| **Theoretical + Ppractical + Oral** | **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** | **5** | **2** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Using the transistor as switch, regions of operation, transistor as a switch(cut off and saturation)** | **Lectures + labs** | **5** | **3** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Power transistor in (off)and (on)state, improvement of(off)and(on)time by using speed up capacitance, practical problems.** | **Lectures + labs** | **5** | **4** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Unipolar junction transistor , construction , theoretical operation , using the transistor as relaxation oscillator practical example** | **Lectures + labs** | **5** | **5** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **operational amplifier , description of operational amplifier (op-amp) as asparate components , zero detector , comparator** | **Lectures + labs** | **5** | **6** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **The use of op-amp as astable multivibrator and a monostable multivibrator , photo conduction cells , photo diodes** | **Lectures + labs** | **5** | **7** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Light – emitting diodes (LED), photo transistors , the use of optical comparator in power Electronic circuits** | **Lectures + labs** | **5** | **8** |
| **Theoretical + Ppractical + Oral** | **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** | **5** | **9** |
| **Theoretical + Ppractical + Oral** | **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** | **5** | **10** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **DIAC , TRIAC characteristics , practical applications , thyristor ,triggering methods , triggering on DC and AC current , pluse triggering types** | **Lectures + labs** | **5** | **11** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **thyristor triggering circuit , DC and AC triggering circuits** | **Lectures + labs** | **5** | **12** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Pluse current triggering circuit , relaxation oscillator ,zero detector , comparator with astable and monostable multivibrators(operational amplifiers and timer)** | **Lectures + labs** | **5** | **13** |
| **Theoretical + Ppractical + Oral** | **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** | **5** | **14** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Half controller full wave rectifier fully controlled ,resistance and inductance load , generated wave forms , output voltage equation for freewheeling diode.** | **Lectures + labs** | **5** | **15** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Regenerating fully controlled inverters , examples , DC motor speed control** | **Lectures + labs** | **5** | **16** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Three face inverters , out put voltage wave form with ,triggering pulses and equations** | **Lectures + labs** | **5** | **17** |
| **Theoretical + Ppractical + Oral** | **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** | **5** | **18** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **DC to AC inverters methods of forcing the thyristor to get off** | **Lectures + labs** | **5** | **19** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Parallel and senies inverter , single and three phase , control methods in charging frequency and voltage , out put wave forms1** | **Lectures + labs** | **5** | **20** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Inverter application , emergency power supply , single phase DC motor speed control** | **Lectures + labs** | **5** | **21** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Three phase motor control by using a constant ratio of variation frequency and voltage** | **Lectures + labs** | **5** | **22** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Choppers , DC to DC inverter frequency constant , line constant** | **Lectures + labs** | **5** | **23** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Types of choppers , DC motor speed control** | **Lectures + labs** | **5** | **24** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **AC to AC inverter , single phase voltage regulator , three phase voltage regulator** | **Lectures + labs** | **5** | **25** |
| **Theoretical + Ppractical + Oral** | **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** | **5** | **26** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Cyclic inverter , AC to DC cyclic inverter , DC to DC cyclic inverter** | **Lectures + labs** | **5** | **27** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **AC to AC cyclic inverter control block diagram** | **Lectures + labs** | **5** | **28** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Using amplitude modulation for speed control** | **Lectures + labs** | **5** | **29** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Using polar transistor for AC motor speed control** | **Lectures + labs** | **5** | **30** |

|  |  |  |
| --- | --- | --- |
| **12. Infrastructure** | | |
| * **الكراس المختبري** * **الكترونيات القدرة تاليف ضياء ضاحي ويوسف ابراهيم** | **Required reading:**  **· CORE TEXTS**  **· COURSE MATERIALS**  **· OTHER** | |
| * **الالكترونيات في خدمة التطبيقات الكهربائية ترجمة د. سمير رستم** | **Special requirements (include for example workshops, periodicals, IT software, websites)** | |
| * **Advanced industrial electronics by morris** * **Thyristor engineering by B.B. berde** * **الكترونيات القدرة (تاليف الدكتور مظفر انور النعمة)** | **Community-based facilities**  **(include for example, guest**  **Lectures , internship , field studies)** | |
| **13. Admissions** | | |
| **One class** | | **Pre-requisites** |
| **30** | | **Minimum number of students** |
| **50** | | **Maximum number of students** |

**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** |

|  |  |
| --- | --- |
| **Technical Institution-Kut** | **1. Teaching Institution** |
| **Electric** | **2. University Department/Centre** |
| **Electrical machine** | **3. Course title/code** |
| **Technical Diploma** | **4. Program(s) to which it contributes** |
| **Seminar scheduled hours (5 hours)** | **5. Modes of Attendance offered** |
| **Second year/ 2022-2023** | **6. Semester/Year** |
| **150** | **7. Number of hours tuition (total)** |
| **18/2/2024** | **8. Date of production/revision of this specification** |
| **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** |
| 1. **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** | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Magnetic circuits** | **Lectures + labs** | **5** | **1** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **The basic principles of the DC machines, and the main parts of these machines** | **Lectures + labs** | **5** | **2** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Types of DC machines** | **Lectures + labs** | **5** | **3** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Electromotive force – the factors effect on the electromotive force** | **Lectures + labs** | **5** | **4** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Study of the magnetization curve** | **Lectures + labs** | **5** | **5** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Study of the properties of loaded of all types of DC machines** | **Lectures + labs** | **5** | **6** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **DC motors  Inverse electromotive force Theory** | **Lectures + labs** | **5** | **7** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Momentum, momentum on the product** | **Lectures + labs** | **5** | **8** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **General characteristics of the speed and torque of machines** | **Lectures + labs** | **5** | **9** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Speed control of DC machines** | **Lectures + labs** | **5** | **10** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Machine test** | **Lectures + labs** | **5** | **11** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Electrical transformer** | **Lectures + labs** | **5** | **12** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Open circuit test, How to calculate the value of the test of equivalent circuit components** | **Lectures + labs** | **5** | **13** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Self-converter – exercises**  **Current and voltage transformer, practical uses** | **Lectures + labs** | **5** | **14** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Three phase transformers** | **Lectures + labs** | **5** | **15** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Three-phase induction motors** | **Lectures + labs** | **5** | **16** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Machine types, squirrel cage motors - sliding rings engines Comparison between them**  **- the uses of each type** | **Lectures + labs** | **5** | **17** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Methods of Control of starting induction motors** | **Lectures + labs** | **5** | **18** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **The relationship between the torque and power factor - the relationship between the torque and sliding** | **Lectures + labs** | **5** | **19** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Reverse rotation of three-phase induction motors,**  **-ways of stop induction motors** | **Lectures + labs** | **5** | **20** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Single-phase induction motors** | **Lectures + labs** | **5** | **21** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Synchronous generators** | **Lectures + labs** | **5** | **22** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Comparison between DC and AC generators** | **Lectures + labs** | **5** | **23** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Synchronous motors** | **Lectures + labs** | **5** | **24** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **AC to AC inverter , single phase voltage regulator , three phase voltage regulator** | **Lectures + labs** | **5** | **25** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **General Engine - composition and properties and uses** | **Lectures + labs** | **5** | **26** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Control machines, kinds, installed and the theory of work** | **Lectures + labs** | **5** | **27** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Step engines** | **Lectures + labs** | **5** | **28** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Tacos generators** | **Lectures + labs** | **5** | **29** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Linear motors - types of linear motors** | **Lectures + labs** | **5** | **30** |

|  |  |  |
| --- | --- | --- |
| **12. Infrastructure** | | |
| **المكائن الكهربائية تأليف دكتور محمد زكي محمد خضر/ جامعة الموصل**  **الملزمة المنهجية (مشروع كتاب)**  **Text book of electrical technology by B.L. Theraga** | **Required reading:**  **· CORE TEXTS**  **· COURSE MATERIALS**  **· OTHER** | |
| **المكائن الكهربائية تاليف سلطان حسين و محمد السيد راغب** | **Special requirements (include for example workshops, periodicals, IT software, websites)** | |
| **Electrical machine direct and alternating current by siskind** | **Community-based facilities**  **(include for example, guest**  **Lectures , internship , field studies)** | |
| **13. Admissions** | | |
| **One class** | | **Pre-requisites** |
| **30** | | **Minimum number of students** |
| **50** | | **Maximum number of students** |

**TEMPLATE FOR COURSE SPECIFICATION**

**PLC**

|  |
| --- |
| **HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW** |

**COURSE SPECIFICATION**

|  |
| --- |
| **Introduce students to Programmable Logic Control PLC** |

|  |  |
| --- | --- |
| **Technical Institution-Kut** | **1. Teaching Institution** |
| **Electric** | **2. University Department/Centre** |
| **PLC** | **3. Course title/code** |
| **Technical Diploma** | **4. Programme(s) to which it contributes** |
| **Seminar scheduled hours (3 hours)** | **5. Modes of Attendance offered** |
| **Second year/ 2022-2023** | **6. Semester/Year** |
| **90** | **7. Number of hours tuition (total)** |
| **18/2/2024** | **8. Date of production/revision of this specification** |
| **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 |
| 1. 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** | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **1** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **2** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **3** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **4** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **5** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Configuring the PLC Memory—I/O Addressing**  **5-6 Summary of Memory, Scanning, and I/O Interaction**  **5-7 Memory Considerations.** | **Lectures + labs** | **4** | **6** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **7** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **8** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **9** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **10** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **11** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **12** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **13** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **PLC System Documentation**  **14-1 Introduction to Documentation**  **142 Steps for Documentation**  **14-3 PLC Documentation Systems 14-4 Conclusion .** | **Lectures + labs** | **4** | **14** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **15** |

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

**TEMPLATE FOR COURSE SPECIFICATION**

**Electrical installation**

|  |
| --- |
| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

|  |
| --- |
| **Introduce students to the various industrial Installation systems** |

|  |  |
| --- | --- |
| **Technical Institution-Kut** | **1. Teaching Institution** |
| **Electric** | **2. University Department/Centre** |
| **Electrical installation** | **3. Course title/code** |
| **Technical Diploma** | **4. Program(s) to which it contributes** |
| **Seminar scheduled hours (4 hours)** | **5. Modes of Attendance offered** |
| **Second year/ 2022-2023** | **6. Semester/Year** |
| **120** | **7. Number of hours tuition (total)** |
| **20/12/2023** | **8. Date of production/revision of this specification** |
| **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** |
| 1. **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** | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **1** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **2** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **3** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **4** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **5** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Magnetic circuits - The application of Kirchhoff's laws on them. - Examples unresolved on magnetism** | **Lectures + labs** | **4** | **6** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Mechanical properties of electrical materials - Tensile, stress, elongation, flexibility, and other - Solved examples** | **Lectures + labs** | **4** | **7** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **8** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **9** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **10** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **11** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **12** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **13** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **14** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **15** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **16** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **17** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **18** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **19** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **20** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **21** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **22** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **23** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **24** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Solving practical examples of magnetism** | **Lectures + labs** | **4** | **25** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **26** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **27** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **28** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **29** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **30** |

|  |  |  |
| --- | --- | --- |
| **12. Infrastructure** | | |
| **ملزمة التأسيسات الصناعية** | **Required reading:**  **· CORE TEXTS**  **· COURSE MATERIALS**  **· OTHER** | |
| **مشروع كتاب التأسيسات الصناعية** | **Special requirements (include for example workshops, periodicals, IT software, websites)** | |
| **Electrical installation technology (by Thompson)**  **Electrical installation technology (by Michael Neidle)**  **Practice on low voltage switch gears (by Siemense Publication)** | **Community-based facilities**  **(include for example, guest**  **Lectures , internship , field studies)** | |
| **13. Admissions** | | |
| **One class** | | **Pre-requisites** |
| **30** | | **Minimum number of students** |
| **50** | | **Maximum number of students** |

**Laboratories**

|  |
| --- |
| **HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW** |

**COURSE SPECIFICATION**

|  |
| --- |
| **Training students on various electrical maintenance work** |

|  |  |
| --- | --- |
| **Technical Institution-Kut** | **1. Teaching Institution** |
| **Electric** | **2. University Department/Centre** |
| **Workshops** | **3. Course title/code** |
| **Technical Diploma** | **4. Program(s) to which it contributes** |
| **Seminar scheduled hours (4 hours)** | **5. Modes of Attendance offered** |
| **Second year/ 2020-2021** | **6. Semester/Year** |
| **120** | **7. Number of hours tuition (total)** |
| **20/12/2020** | **8. Date of production/revision of this specification** |
| **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 departmentsأسفل النموذج** | |

|  |
| --- |
| **10· Learning Outcomes, Teaching ,Learning and Assessment Method** |
| 1. **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** | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Installation of DC machines** | **Lectures + labs** | **4** | **1** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **How to clean the surface of the units - Install carbon brushes - the applied position of the carbon brushes** | **Lectures + labs** | **4** | **2** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Communication and test pieces and insulation** | **Lectures + labs** | **4** | **3** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Member of the DC generator output**  **prepare and compile information** | **Lectures + labs** | **4** | **4** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Balearic insulation - drying - Connecting final parties - the final selection of a member of production** | **Lectures + labs** | **4** | **5** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Field winding** | **Lectures + labs** | **4** | **6** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Work winding and install the unilateral-polar - complete testing of the machine** | **Lectures + labs** | **4** | **7** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Work winding and install the unilateral-polar - complete testing of the machine** | **Lectures + labs** | **4** | **8** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Communicate and be connected parties - polarity test - continuity test** | **Lectures + labs** | **4** | **9** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **The study of the three phase transformers** | **Lectures + labs** | **4** | **10** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Processing and cutting the iron sheets and assembled heart - wrapped winding** | **Lectures + labs** | **4** | **11** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Polarity test, continuity test and Testing Ground leakage** | **Lectures + labs** | **4** | **12** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Deductive motors (induction) Rewinding hard Lists of three-phase induction motor windings and the squirrel cage** | **Lectures + labs** | **4** | **13** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Rewinding and connecting the outskirts of windings and continuity test** | **Lectures + labs** | **4** | **14** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Choose the contract files - choosing isolation and measured - choose Ground leakage of the engine** | **Lectures + labs** | **4** | **15** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Engine assembly and testing of the engine when the allotted - Pregnancy study phase commencement of tripartite engines Tawar - direct method - a way of self-Engine** | **Lectures + labs** | **4** | **16** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Protection of induction Motor, and the use of timers devices** | **Lectures + labs** | **4** | **17** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **18** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **19** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **20** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Drawing windings of a split-phase motor** | **Lectures + labs** | **4** | **21** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Rewinding motor with various shaded of poles** | **Lectures + labs** | **4** | **22** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Continuity - Polar test - Test short-circuit Ground** | **Lectures + labs** | **4** | **23** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Electrical and mechanical faults and methods of treatment** | **Lectures + labs** | **4** | **24** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Electrical and mechanical faults and methods of treatment** | **Lectures + labs** | **4** | **25** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Rewinding the motors with a condenser, make it necessary tests** | **Lectures + labs** | **4** | **26** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **rewinding fan motors and make the necessary tests** | **Lectures + labs** | **4** | **27** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Maintenance of household appliances – refrigerator, mechanical and electrical faults and methods of treatment** | **Lectures + labs** | **4** | **28** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Maintenance Household appliances: Frozen, domestic air conditioner, mechanical and electrical faults and methods of periodic maintenance** | **Lectures + labs** | **4** | **29** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Maintenance of household appliances –wash machine- electrical faults and methods periodic maintenance** | **Lectures + labs** | **4** | **30** |

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

**Electrical networks**

|  |
| --- |
| **HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW** |

**COURSE SPECIFICATION**

|  |
| --- |
| **Introduce students into the parts and electrical systems** |

|  |  |
| --- | --- |
| **Technical Institution-Kut** | **1. Teaching Institution** |
| **Electric** | **2. University Department/Centre** |
| **Electrical networks** | **3. Course title/code** |
| **Technical Diploma** | **4. Program(s) to which it contributes** |
| **Seminar scheduled hours (4 hours)** | **5. Modes of Attendance offered** |
| **Second year/ 2021-2023** | **6. Semester/Year** |
| **120** | **7. Number of hours tuition (total)** |
| **20/12/2023** | **8. Date of production/revision of this specification** |
| **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** |
| 1. **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** | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **How to electric power generation, the development of energy, electric power system in generation to consumption, standard efforts** | **Lectures + labs** | **4** | **1** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **How to electric power generation, the development of energy, electric power system in generation to consumption, standard efforts** | **Lectures + labs** | **4** | **2** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Hydro power plants, thermal** | **Lectures + labs** | **4** | **3** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Gas power plants and an idea of some other stations such as diesel** | **Lectures + labs** | **4** | **4** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Vertical bars system (B.B) and plans to transformer stations inside and outside the buildings** | **Lectures + labs** | **4** | **5** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Overhead lines, uses, dividing lines to short-medium-long** | **Lectures + labs** | **4** | **6** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Overhead lines-mechanical calculations** | **Lectures + labs** | **4** | **7** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **The basic elements of the aerodynamic lines** | **Lectures + labs** | **4** | **8** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Calculation capacity of the system of unilateral, trio of three wires** | **Lectures + labs** | **4** | **9** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **solve a variety of issues for the seventh and eighth week** | **Lectures + labs** | **4** | **10** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Solve the short lines and includes representation electrical efficiency as a circle Account** | **Lectures + labs** | **4** | **11** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Coatings pneumatic transport lines, types, forms, installed** | **Lectures + labs** | **4** | **12** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Ground cables-components-divided-over cables** | **Lectures + labs** | **4** | **13** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Calculate the inductance and capacitance to ground cables monounsaturated and triple pole** | **Lectures + labs** | **4** | **14** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Cables included in the effort, expense and loss in his corner insulators collapse of winning cables** | **Lectures + labs** | **4** | **15** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Cabling effort ultra-components-types** | **Lectures + labs** | **4** | **16** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Distribution networks and dispensers DC that feed by feed -alta feed from both sides. AC dispensers that feed unilaterally** | **Lectures + labs** | **4** | **17** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Spreaders of all kinds-ringed comparison between the different spreaders** | **Lectures + labs** | **4** | **18** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Solving a variety of examples from the sixteenth and seventeenth week** | **Lectures + labs** | **4** | **19** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **20** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Ways to improve the power factor** | **Lectures + labs** | **4** | **21** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Types of errors in electrical networks** | **Lectures + labs** | **4** | **22** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Protection principles** | **Lectures + labs** | **4** | **23** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Follow-ups (relays) , divided by its theory** | **Lectures + labs** | **4** | **24** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **How to protect transmission lines airways** | **Lectures + labs** | **4** | **25** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Differential Protection** | **Lectures + labs** | **4** | **26** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **- Differential Protection**  **- Digital Protection**  **- Reverse Power Protection** | **Lectures + labs** | **4** | **27** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **- Differential Protection**  **- Digital Protection**  **- Reverse Power Protection** | **Lectures + labs** | **4** | **28** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Percentage Reactance** | **Lectures + labs** | **4** | **29** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Percentage Reactance** | **Lectures + labs** | **4** | **30** |

|  |  |  |
| --- | --- | --- |
| **12. Infrastructure** | | |
| **الملزمة النظرية لمادة الشبكات الكهربائية التي اعدت من قبل المعهد التكنولوجيا بغداد**  **The transmission and distribution of electrical power (by H. Cotton and H. Barber)** | **Required reading:**  **· CORE TEXTS**  **· COURSE MATERIALS**  **· OTHER** | |
| **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** | **Special requirements (include for example workshops, periodicals, IT software, websites)** | |
| **Science and reactor fundamentals electrical CNSC technical training group** | **Community-based facilities**  **(include for example, guest**  **Lectures , internship , field studies)** | |
| **13. Admissions** | | |
| **One class** | | **Pre-requisites** |
| **30** | | **Minimum number of students** |
| **50** | | **Maximum number of students** |

**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** |

|  |  |
| --- | --- |
| **Technical Institution-Kut** | **1. Teaching Institution** |
| **Electric** | **2. University Department/Centre** |
| **Computer applications** | **3. Course title/code** |
| **Technical Diploma** | **4. Programme(s) to which it contributes** |
| **Seminar scheduled hours (3 hours)** | **5. Modes of Attendance offered** |
| **Second year/ 2022-2023** | **6. Semester/Year** |
| **90** | **7. Number of hours tuition (total)** |
| **20/12/2023** | **8. Date of production/revision of this specification** |
| **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 |
| 1. 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** | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Introduction to computer and their systems and benefits** | **Lectures + labs** | **4** | **1** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Introduction to computer and their systems and benefits** | **Lectures + labs** | **4** | **2** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Windows** | **Lectures + labs** | **4** | **3** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Windows** | **Lectures + labs** | **4** | **4** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **My COMPUTER ، MY DOCUMENTS ، RECYCLE BIN** | **Lectures + labs** | **4** | **5** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **My COMPUTER ، MY DOCUMENTS ، RECYCLE BIN** | **Lectures + labs** | **4** | **6** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **DESKTOP BACKGROUND ، WINDOWS COLOR ، SCREEN SAVER** | **Lectures + labs** | **4** | **7** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **DESKTOP BACKGROUND ، WINDOWS COLOR ، SCREEN SAVER** | **Lectures + labs** | **4** | **8** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **CONTROL PANAL PROGRAM AND FEATURES ، ACCESSORIES CALCULATOR ، WORDPAD،WINDOSWS MEDIA PLAYER** | **Lectures + labs** | **4** | **9** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **CONTROL PANAL PROGRAM AND FEATURES ، ACCESSORIES CALCULATOR ، WORDPAD،WINDOSWS MEDIA PLAYER** | **Lectures + labs** | **4** | **10** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **AUTOCAD DRAWING LIMITS ، UNITS** | **Lectures + labs** | **4** | **11** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **OSNAP، ORTTHO ، LWT ، OTRACK ، POLAR ، SNAP ، GRID ، DISTANCE ، AREA** | **Lectures + labs** | **4** | **12** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **VIEW: ZOOM PAN ، REGEN** | **Lectures + labs** | **4** | **13** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **14** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **15** |
| **Theoretical + Ppractical + Oral** | **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** | **4** | **16** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **MODIFY: ERASE ، COPY ، MIRROR ، OFFSET،ARRAY ، MOVE ، ROTATE ، SCALE ، CHAMFER ، FILLET ، STRETCH ، TRIM ، EXTEND ، BREAK ، EXPLODE** | **Lectures + labs** | **4** | **17** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **MODIFY: ERASE ، COPY ، MIRROR ، OFFSET،ARRAY ، MOVE ، ROTATE ، SCALE ، CHAMFER ، FILLET ، STRETCH ، TRIM ، EXTEND ، BREAK ، EXPLODE** | **Lectures + labs** | **4** | **18** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **TEXT MULTILINE TEXT ، SINGLE LINE TEXT ، STYLE DESIGN CENTER** | **Lectures + labs** | **4** | **19** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **TEXT MULTILINE TEXT ، SINGLE LINE TEXT ، STYLE DESIGN CENTER** | **Lectures + labs** | **4** | **20** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **MEASURE ، DIVIDE ، LINETYPE ، LINE WEIGHT ، COLOR ، PROPERTIES ، MATCH PROPERTIES ، GRIPS** | **Lectures + labs** | **4** | **21** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **MEASURE ، DIVIDE ، LINETYPE ، LINE WEIGHT ، COLOR ، PROPERTIES ، MATCH PROPERTIES ، GRIPS** | **Lectures + labs** | **4** | **22** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **DIMENSION** | **Lectures + labs** | **4** | **23** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **ELEV و THICKNESS** | **Lectures + labs** | **4** | **24** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **3D VIEW** | **Lectures + labs** | **4** | **25** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **3D VIEW** | **Lectures + labs** | **4** | **26** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **3D VIEW** | **Lectures + labs** | **4** | **27** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **3D SURFACE and 3D SOLIDS** | **Lectures + labs** | **4** | **28** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **The concept of Computer Virus** | **Lectures + labs** | **4** | **29** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **The concept of Computer Virus** | **Lectures + labs** | **4** | **30** |

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

**Electrical engineering drawing**

|  |
| --- |
| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

|  |
| --- |
| **Introduce students to the importance of computers in the design and circuit design** |

|  |  |
| --- | --- |
| **Technical Institution-Kut** | **1. Teaching Institution** |
| **Electric** | **2. University Department/Centre** |
| **Electrical engineering drawing** | **3. Course title/code** |
| **Technical Diploma** | **4. Program(s) to which it contributes** |
| **Seminar scheduled hours (3 hours)** | **5. Modes of Attendance offered** |
| **Second year/ 2022-2023** | **6. Semester/Year** |
| **90** | **7. Number of hours tuition (total)** |
| **20/12/2023** | **8. Date of production/revision of this specification** |
| **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** |
| 1. **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** | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **The importance of engineering drawing.** | **Lectures + labs** | **3** | **1** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Methods of drawing a straight lines and Cartesian coordinates** | **Lectures + labs** | **3** | **2** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Zoom, drawing Limits, Units, Options)** | **Lectures + labs** | **3** | **3** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **SNAP, GRID, ORTHO, POLAR, OSNAP, OTRACK, DUCS, DYN, LWT))** | **Lectures + labs** | **3** | **4** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Rectangle, Circle, Polygon, Arc, Ellipse, Donut, Wipeout, Revision Cloud)** | **Lectures + labs** | **3** | **5** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Rectangle, Circle, Polygon, Arc, Ellipse, Donut, Wipeout, Revision Cloud)** | **Lectures + labs** | **3** | **6** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Erase, Copy, Move, Mirror, Offset, Scale, Stretch, Rotate)** | **Lectures + labs** | **3** | **7** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Linear, Aligned, Arc Length, Radius, Diameter, Angular, Baseline, Continue, , Dimension Style…** | **Lectures + labs** | **3** | **8** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Properties)** | **Lectures + labs** | **3** | **9** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Polyline, Point, Spline, Helix, Table)** | **Lectures + labs** | **3** | **10** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Array, Trim, Extend, Break, Fillet, Chamfer, Explode,Align)** | **Lectures + labs** | **3** | **11** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Single Line &Multiline Text , .** | **Lectures + labs** | **3** | **12** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Calculate (Area and Volume and Distance)** | **Lectures + labs** | **3** | **13** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Hatch, Gradient** | **Lectures + labs** | **3** | **14** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Layers** | **Lectures + labs** | **3** | **15** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Layers** | **Lectures + labs** | **3** | **16** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Blocks** | **Lectures + labs** | **3** | **17** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Blocks** | **Lectures + labs** | **3** | **18** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Region, Boundary, Join)** | **Lectures + labs** | **3** | **19** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Box, Wedge, Cone, Sphere, Cylinder, Tours, Pyramid)** | **Lectures + labs** | **3** | **20** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Extrude, Press/pull, Polysolid, Union, Subtract, Intersect, Revolve, Sweep, Loft )** | **Lectures + labs** | **3** | **21** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **(Shell, Separate, Slice, Thicken)** | **Lectures + labs** | **3** | **22** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Plane drawing** | **Lectures + labs** | **3** | **23** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Printing** | **Lectures + labs** | **3** | **24** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Electrical circuit drawing** | **Lectures + labs** | **3** | **25** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Electrical and electronic circuit drawing** | **Lectures + labs** | **3** | **26** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Electrical and electronic circuit drawing** | **Lectures + labs** | **3** | **27** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Drawing of electrical control machine** | **Lectures + labs** | **3** | **28** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **An example for drawing the installation of small building** | **Lectures + labs** | **3** | **29** |
| **Theoretical + Ppractical + Oral** | **Lectures + labs** | **Cable Trays** | **Lectures + labs** | **3** | **30** |

|  |  |  |
| --- | --- | --- |
| **12. Infrastructure** | | |
| **اساسيات الرسم الهندسي تأليف عبد الحميد جمعة**  **مشروع كتاب الرسم الكهربائي تأليف هاني عزيز** | **Required reading:**  **· CORE TEXTS**  **· COURSE MATERIALS**  **· OTHER** | |
| **Engineering drawing & graphic technology (by Frend)**  **Engineering drawing technology (by A.W. Wander William)** | **Special requirements (include for example workshops, periodicals, IT software, websites)** | |
| **اوديل للتوصيلات الكهربائية (في الإضاءة والقوة)**  **Engineering drawing technology (by MC Graw)** | **Community-based facilities**  **(include for example, guest**  **Lectures , internship , field studies)** | |
| **13. Admissions** | | |
| **One class** | | **Pre-requisites** |
| **30** | | **Minimum number of students** |
| **50** | | **Maximum number of students** |