Ministry of Higher Education and Scientific Research

Scientific Supervision and Scientific Evaluation Apparatus

Directorate of Quality Assurance and Academic Accreditation

Accreditation Department

Academic Program and Course Description Guide

Electrical Techniques Department

Introduction:

In 1989, the Department of Electrical Technology was established at the Technical Institute of Karbala, under Al-Furat Al-Awsat Technical University, to offer a diploma in Electrical Technology. The department follows an annual system over the two academic years according to the yearly curriculum. The comprehensive curriculum ensures that the diploma studies provide graduates with both theoretical foundations and practical aspects of electrical technology. The department strives to attract highly qualified academic and administrative staff to ensure the continuous development of staff skills in line with the department's achievements and to encourage scientific research work.

Established in 1989, the department includes a range of practical laboratories such as the Electrical Circuits Laboratory, Electronics Laboratory, Engineering and Electrical Drawing Laboratory, Digital Electronics Laboratory, Computer Applications Laboratory, Electrical Installations Laboratory 1, Power Electronics Laboratory, Electrical Networks Laboratory, Electrical Installations Laboratory 2, Programmable Logic Controller (PLC) Laboratory, Maintenance Workshop, and Electrical Machines Laboratory.

Concepts and Terminology:

1. Educational Institution	**Al-Furat Al-Awsat Technical University/ Technical Institute of Karbala**
2. Scientific Department / Center	**Electrical Techniques Department**
3. Name of the Academic or Professional Program	**Electrical Power**

4. Name of the Final Certificate	**Technical Diploma**
5. Study System Annual / Course-based / Other	Annual
6. Accreditation Program	**ABET**
7. Date of Description Preparation	**31/3/2024**

Course Description:

The course description provides a concise summary of the key features of the course and the expected learning outcomes that the student is expected to achieve, demonstrating whether the student has maximized the available learning opportunities. It is derived from the program description.

Program Vision:

The Department of Electrical Technology at the Technical Institute of Karbala aspires to create a technical educational system through its existing programs that meet the needs and requirements of the community and service establishments related to the specialization, contributing to the desired civil development.

Program Mission:

The department is committed to disseminating scientific and technical knowledge in the field of electrical sciences by graduating national cadres with a level of education

capable of comprehending modern technologies and supporting scientific progress to keep pace with scientific developments and advancing the following:

1. Developing future plans to enhance the educational and training curricula and graduate technical cadres in the field of electricity.
2. Engaging with the community in the industrial sector and strengthening relationships with the private sector in the fields of energy, training, and technical qualification.
3. Utilizing computer and internet technologies in education and training.
4. Focusing on scientific research among academics in the department and industrial staff to solve electrical energy problems.

Program Objectives:

1. Graduating qualified technical personnel capable of executing various electrical work tasks and conducting maintenance in various power stations.
2. Accomplishing the highest number of applied scientific research projects in collaboration with relevant ministries and departments.
3. Ensuring continuous cooperation between the department and development sectors in engineering and consulting fields.

Curriculum Structure:

The curriculum includes all the courses/subjects encompassed by the academic program according to the adopted learning system (semester-based, annual, Bologna Process), whether they are required by the ministry, university, college, or scientific department, along with the number of academic units.

Course (Department, Number, Title)	Math Physical/ Natural Sciences	Engineering Topics	General Education General Studies	Course was Offered: Year and, Semester
First year				
Electrical circuits and measurements		8		Year
Electrical installations		8		Year
Electronic		8		Year
workshops		12		Year
mathematics	4			Year
computer applications	2			Year
Engineering and electrical drawing	6			Year
Human rights and democracy			2	Year
Occupational safety			2	Semster
Digital electronics		4		Semster
English Language			2	Year

Course (Department, Number, Title)	Math Physical/ Natural Sciences	Engineering Topics	General Education General Studies	Course was Offered: Year and, Semester
Second year				
Electrical machines		**10**		Year
Power transmission networks		**8**		Year
Power electronics		**10**		Year
Maintenance Laboratory workshop		**8**		Year
Electrical installation		**8**		Year
computer applications	**2**			Year
Electrical drawing		**3**		Semester
Programmable logic control (PLC)		**3**		Semester
The project		**4**		Year
English language	**2**			Year
Crimes of the Baath Regime in Iraq			**2**	year

Academic Program Description Form

University Name: Al-Furat Al-Awsat Technical University
Faculty/Institute: Karbala Technical Institute
Scientific Department: Electrical Techniques Department
Academic or Professional Program Name: Electrical power branch
Final Certificate Name: Technical Diploma
Academic System: Annual
Description Preparation Date: 27/3/202
File Completion Date: 31/3/2024

Signature:
Head of Department Name:
lecturer Mahmood Hakim Inad

Date: 31/3/2024

Signature:
Scientific Associate Name:
Assist. prof. Dr. laith Hassan Jawad

Date: 31:3:2024

The file is checked by:
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department:
Assist. Prof. Ali Neamah Hassan
Date: 3-31-2024
Signature:

Fadhil M. Dahir
31-3-2024
Approval of the Dean

1- Program Vision:
The department aims to graduate skilled technical personnel capable of performing electrical work.

2-Program Mission:
The department is committed to disseminating scientific and technical knowledge in the field of electrical engineering to graduate national cadres with a level of education capable of understanding modern technologies and supporting scientific and technical progress to keep pace with global developments. The mission aims to achieve the following: 1. Utilizing computer and internet technologies in education and training. 2. Engaging with the community in the field of mechanical industries and devices, and strengthening the relationship with the private sector in industry, training, and technical qualification. 3. Developing future plans to enhance educational and training curricula and graduate technical cadres in the field of electricity. 4. Focusing on scientific research among academics in the department and industrial staff to solve electrical energy problems and improve production.

3-Program Objectives:

1. To prepare technical personnel in the field of electricity, equipped with both scientific and practical skills to operate and maintain electrical units in power generation, transmission, and distribution stations, as well as to maintain devices and equipment within the department and institute facilities.
2. To develop students psychologically to fulfill their roles in the field of electrical specialization.
3. To enhance the curriculum in alignment with labor market demands and provide high-quality services to the community by strengthening relationships with both the private and public sectors.

4- Program Accreditation

ABET

5- Other External Influences

Labor market and private sector

6 -Program Structure

Program Structure:	Number of Courses	Credit Units	Percentage	Notes
Institutional Requirements	**3**	**6**	**4.7%**	
College Requirements	**6**	**26**	**20.6%**	
Departmental Requirements	**13**	**94**	**74.6%**	
Summer Training	**Two months equivalent to one Academic year**	**-**	**-**	

7- Program Description			
Year	**Course Name**	**Credit Hours**	
		TH.	**Pract.**
First	Electrical Circuits and Measurements	**2**	**2**
First	Electrical Installations	**2**	**2**
First	Electronic	**2**	**2**
First	Workshop Laboratories	**-**	**6**
First	Mathematics	**2**	**-**
First	Computer Applications	**1**	**2**
First	Engineering and Electrical Drawing	**-**	**3**
First	Human Rights and Democracy	**2**	**-**
First	Occupational Safety	**2**	**-**
First	Digital Electronics	**2**	**2**
First	English Language	**1**	**-**
Second	Electrical Machines	**2**	**3**
Second	Power transmission Networks	**2**	**2**
Second	Power Electronics	**2**	**3**
Second	Maintenance Workshop	**-**	**4**
Second	Electrical Installations	**2**	**2**
Second	Computer Applications	**1**	**2**
Second	Electrical Drawing	**-**	**3**
Second	Programmable Logic Controller (PLC)	**1**	**2**
Second	Project	**-**	**2**
Second	English Language	**1**	**-**

8. Expected Learning Outcomes of the Programme	
Knowledge	
A1 - Understanding and teaching students the fundamentals of electrical theories and circuit analysis. A2 - The ability to operate and maintain electrical units in power stations. A3 - The ability to install and maintain underground and overhead cables. A4 - The ability to create electrical schematics using computer software.	
Skills	
B1 - The student's ability to implement and maintain electrical networks in residential and industrial settings.	
B2 - Equipping students with the skill to diagnose electrical faults and solve practical problems in electrical networks.	
B3 - The ability to implement electrical installations in homes and residential buildings.	
B4 - The ability to use a computer for simulating electrical circuits.	
Values	
C1 - Providing students with practical skills in labs and workshops.	
C2 - Equipping students with the ability to think critically in problem-solving.	
C3 - Guiding students to value and maintain the department and institute's property.	
C4 - Developing students' research skills on the internet.	

9. Teaching and Learning Strategies
1 - Utilising modern tools in teaching and training students. 2 - Forming discussion groups during lectures to explore study topics. 3 - Assigning students extracurricular tasks.

10. Evaluation Methods
1 - Daily examinations. 2 - Monthly and final examinations.

3 - Extracurricular assignments and weekly lab reports.

11. Faculty Members						
Faculty Preparation		**Specific Requirements/Skills (if any)**		**Specialisation**		**Academic Rank**
Instructor	**Staff**			**Specific**	**General**	
	5				**Electrical Engineering**	**Lecturer**
	4			**Communications and Electronics**	**Electrical Engineering**	**Assistant Lecturer**
	6			**Electrical Power**	**Electrical Engineering**	**Assistant Lecturer**

12. Admission Criteria
The Electrical Technology Department is subject to the central admission system of the Ministry of Higher Education and Scientific Research, where graduates from the scientific branch of secondary education are nominated, in addition to 60%.

13. Major Sources of Information about the Programme
1 - Regulations and recommendations from sectoral and joint committees. 2 - Monitoring the latest releases on websites and in public libraries. 3 - Personal experience.

14. Programme Development Plan
Continuous planning is conducted to enhance the academic and administrative journey and to overcome all difficulties and obstacles faced by the educational programme. **Procedures followed:** **1- Organising scientific conferences, seminars, and discussion forums for students.** **2- Developing faculty members and technicians by involving them in training programmes and workshops both within and outside the institute.**

Programme Skills Plan

Required Learning Outcomes of the Programme															
Values				Skills				Knowledge				**Core or Elective**	**Title**	**Course Code**	**Year / Level**
C4	**C3**	**C2**	**C1**	**B4**	**B3**	**B2**	**B1**	**A4**	**A3**	**A2**	**A1**				
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**Core**	**Power Electronics**	**KTED123**	Second Year
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**Core**	**Electrical Circuits and Measuremen**	**KTED111**	First Year

Course Description Form

1. Course Name: The Circuits and Electrical Measurements
2. Course Code: KTED111
3. Semester / Year: First and Second Semester / First Year
4. Description Preparation Date:2024/2/29
5. Available Attendance Forms: Daily mandatory attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
20 hours (60 theoretical hours + 60 practical hours)
7. Course administrator's name (mention all, if more than one name)
Name: Hiba Yassin Theban Email: hiba.theban @atu.edu.iq
8. Course Objectives

- Preparing technically qualified personnel in the field of electricity, both academically and practically, to perform operations and maintenance of electrical units in power generation, transmission, and distribution stations, as well as maintenance of devices and equipment in the department and institute facilities.
- Building and preparing the student psychologically to undertake their role in the field of electricity.
- Developing study curricula to meet the needs of the job market and provide quality services to the community by enhancing relations with private and government sectors.

9. Teaching and Learning Strategies

Strategy	• Theoretical Lecture • Practical Lecture • Discussion among Students • Preparation of Reports and Projects related to the Lecture Material • Summer Training in Public and Private Sectors • E-Learning • Using modern methods in teaching and training students. • Forming discussion circles during lectures to discuss academic topics. • Assigning students classroom duties.

10. Course Structure:

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	4	Understanding the System of Units and Measurement Units	The system of units used in electricity and measurement units for each material (its parts and multiples) Mathematical applications for converting values using units Definition of the basic units of voltage, current, and resistance - Components of the electrical circuit - Ohm's law - Factors affecting the value of resistance - Specific resistance of conductive and insulating materials.	Lectures presented PowerPoint format	Daily, monthly, yearly exams
Second and third	8	Understanding the	Direct Current (DC) Circuits including:	Lectures presented	Daily, monthly,

		Characteristics and Applications of Series and Parallel Connections	Connecting Resistors in Series with Examples	in PowerPoint format	yearly exams
			Connecting Resistors in Parallel with Examples Top of Form		
			Mixed Connection of Resistors with Examples Top of Form		
			Star and Delta (Y / Δ) Connection of Resistors and Conversion from Each to the Other with Examples		
			_ Applications of series, parallel, mixed, star, and delta circuits		

Fourth and Fifth	8	Understanding Kirchhoff's Laws	Kirchhoff's Laws - Definition of Kirchhoff's Law for Current and Voltage with Problem Solving	Lectures presented in PowerPoint format	Daily, monthly, yearly exams
			Maxwell's Circuits with Examples Solution		
Sixth and Seventh and Eighth	12	Understanding Thévenin and Norton Theorems Top of Form	- Thévenin's Theorem - Definition of the Theorem - How to Apply it in Direct Current Circuits Top of Form	Lectures presented in PowerPoint format	Daily, monthly, yearly exams
			Applications on Thévenin's Theorem Top of Form		
		Understanding the Matching Theory Top of Form	- Norton's Theorem - Definition of the Theorem - How to Apply it in Direct Current Circuits		
			Applications on Norton's Theorem		

			Theory of Superposition - Definition of the Theory - Steps to Apply it in solving Direct Current Circuits containing more than one source - Solving Examples		
Ninth	4	Identifying AC Quantities	Definition of current source and voltage source (constant power distributor) and how to convert from one to the other - Maximum power transfer theory - Definition of the theory and derivation of its specific relationships - Application examples Top of Form	Lectures presented in PowerPoint format	Daily, monthly, yearly exams
Tenth	4	Identifying Phase Representation Top of Form	Complex Quantities - Definition - Phase and Directional Representation - Phase	Lectures presented in PowerPoint format	Daily, monthly, yearly exams

			Angle and how to find it		
Eleventh-Thirteenth	12	Identifying Iron-Hearted Measurement Devices	-Finding the resultant of complex quantities including multiplication, division, addition, and subtraction - with application examples Top of Form Measurement Devices including - Types of measurement devices - Their working principles - Moving coil measurement devices - Their construction and use in measuring voltage and current along with mentioning their advantages, disadvantages, and device diagram.	Lectures presented in PowerPoint format	Daily, monthly, yearly exams

			Iron-core Measurement Device - Its construction and how it's used in measurement - Its advantages, disadvantages, and device diagram		
Fourteenth	4	Understanding Wattmeters - Devices	Wattmeter Measurement Devices - Their construction - Device diagram - Placement in the electrical circuit for power measurement - Torque equations - Their advantages - Their disadvantages - Oscilloscope Device - Device diagram - Its installation - How to operate and use it		Daily, monthly, yearly exams

Fifteenth	4	Understanding Alternating Quantitie	An Introduction to Complex Quantities, including - Definition - Characteristics of AC current, waveform representation, and its specific relationships - Definition of Root Mean Square (RMS) value and Average value and their relationships to find the Form Factor and Crest Factor for non-sinusoidal waveforms with application examples	Lectures presented in PowerPoint format	Daily, monthly, yearly exams

Sixteenth-Seventeenth	8	Understanding Phasor Representation Top of Form	-Alternating Quantities, including - Definition - Characteristics of Alternating Current - How Alternating Current is generated, waveform representation, and its specific relationships - Definition of Root Mean Square (RMS) value and Average value and their relationships to find the Form Factor and Crest Factor for non-sinusoidal waveforms with application examples	Lectures presented in PowerPoint format	Daily, monthly, yearly exams
			The alternating vector quantities - their definition - their phase and directional representation - phase angle and how to find it		

			Finding the Resultant of Complex Quantities including multiplication, division, addition, and subtraction - with application examples		
Eighteenth -Nineteenth - Twentieth	12	Definition of Resistance, Capacitance, Inductance	Study the effect of alternating current on a circuit containing only resistance, a circuit containing only pure inductance, and a circuit containing only pure capacitance - Finding the phase angle between voltage and current for each circuit with solution examples.	Lectures presented in PowerPoint format	Daily, monthly, yearly exams

			The effect of alternating current on a circuit containing resistance and inductance in series - A circuit containing resistance and capacitance in series - A circuit containing resistance, inductance, and capacitance Top of Form		
		Understanding on	The effect of alternating current on a circuit containing resistance and inductance in parallel - A circuit containing resistance and capacitance in parallel - A circuit containing resistance, inductance, and capacitance in parallel		

		Phase Angle Top of Form			
Twenty-first - twenty-fourth	16	Recognizing Electrical Power Calculation	Power in alternating current circuits and its calculation include: Circuits containing resistance only Circuits containing inductance only Circuits containing capacitance only Circuits containing resistance, inductance, and capacitance in series and parallel Definition of active power and its calculation Reactive power and its calculation	Lectures presented in PowerPoint format	Daily, monthly, yearly exams

The twenty-fifth	4	Understanding the Calculation of Apparent Electrical Power	Apparent total power (definition) – How to draw the power triangle – Power factor – Its definition and its effect on alternating current circuits – How to improve power factor – With practical examples.	Lectures presented in PowerPoint format	Daily, monthly, yearly exams
twenty-sixth	4	Understanding Maximum Power Transfer Calculation	The theory of maximum power transfer in alternating current circuits - Derivation of its relationships - With examples	Lectures presented in PowerPoint format	Daily, monthly, yearly exams

The twenty-seventh	4	Understanding Methods for Measuring Resistances	Practical methods for measuring resistances of high, medium, and low values - Using the ohmmeter in series and parallel - Ammeter and voltmeter method - Substitution method - Using a Wheatstone bridge - Voltage divider method - Switching method - With examples solving for each method.	Lectures presented in PowerPoint format	Daily, monthly, yearly exams

twenty-eighth			Three-phase alternating current circuits - its definition and how to generate alternating current: one phase - two phases - three phases - with a drawing of each circuit, star and triangle connections in three-phase alternating current circuits.		
twenty-ninth	4	Solving practical examples about three-phase alternating current.	Solving practical examples about three-phase alternating current with delta and star connections, including balanced and unbalanced loads.	Lectures presented in PowerPoint format	Daily, monthly, yearly exams

Thirty			Methods of measuring power for three-phase loads - Wattmeter device and its connection in the circuit to measure active power - calculating reactive power and apparent power with an example solution.		
			Measuring power using a wattmeter and voltage - how to find the total power using this method and in the case of star and delta connections - using two watt meters - using three watt meters.		

11.Course Evaluation

First Semester Exams:

10 marks - Theoretical

10 marks - Practical

5 marks - Evaluation of Non-Graded Assignments and Weekly Laboratory Reports.

Second Semester Exams:

10 marks - Theoretical

10 marks - Practical

5 marks - Evaluation of Non-Graded Assignments and Weekly Laboratory Reports.

Final Exam:

40 marks - Theoretical

10 marks - Practical

12. Learning and Teaching Resources

Required textbooks (curricular books, if any	Electrical Technology (Edward Hughes)
Main references (sources)	Basic Circuits (A.M.F Brooks) Pergaman Press.
Recommended books and references (scientific journals, reports...)	Basic Electrical Engineering (Fitzgerald & Rlgginborthan (Mc – Graw – Hill
Electronic References, Websites	The source for the practical material. Basic Electrical Engineering

1. Course Name:
English language (1)
2. Course Code:
KTED1111
3. Semester / Year:
First I
4. Description Preparation Date:
28/3/2024
5. Available Attendance Forms:
Actual attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30 hour/annually – 2 units
7. Course administrator's name (mention all, if more than one name)
Name: Hayder Salah Mohammed Email: hayder.mohammed@atu.edu.iq
8. Course Objectives
To make students able to speak English (listening, speaking, reading and writing). The activities within New Headway Pre- Intermediate are designed to enable pre-intermediate students to extend their knowledge of the language and to allow them to activate what they have learnt. There is also an emphasis on increasing fluency, so that students feel able to actively participate in conversations and discussions. We hope that students will enjoy using the course and that it will give them a real sense of progression in their language learning.

9.Teaching and Learning Strategies

Using Headway will help students listen, speak, read, and write correctly using the English language. It also helps students by watching attached video clips of films or plays so that they can discuss them after watching. New Headway Pre-Intermediate, Fourth edition is a course for students who already have a solid foundation in the language. They may have recently completed an elementary course or they may be returning to language learning after a break and need to revise key language before being able to progress further. New language is introduced systematically, allowing students to extend and consolidate their knowledge of the language. Listening material is provided across three class CDs. New vocabulary is introduced regularly and this is followed by controlled practice activities, allowing students to immediately activate the language in a supported way. There are also freer practice activities where students can focus on their fluency. In the Everyday English sections, useful chunks of language are presented, which students can use in several different social contexts.

10.Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
First	1	Introduction	Give an introduction ab the syllabus and course topics, and an introduct about the English langu aspects and the need fo for the electrical techniques students	1-Method of giving lectures 2- Student groups 3- Reports and studi	1-Exams of variou types 2- Feedback from students 3-The method of expression with fa 4- Reports and stu
Second + Seventh	6	Active Voice Verb Tenses	Present, Past and Futur tenses, which each of th is divided into simple, continuous, perfect and perfect continuous tens	1-Method of giving lectures 2- Student groups 3- Reports and studi	1-Exams of variou types 2- Feedback from students

					3-The method of expression with fa 4- Reports and stu
Eighth + Ninth	2	Passive Voice Verb Tenses	Present, Past and Futu tenses, which each of th is divided into simple, continuous, perfect and perfect continuous tens	1-Method of giving lectures 2- Student groups 3- Reports and studie	1-Exams of variou types 2- Feedback from students 3-The method of expression with fa 4- Reports and stu
Tenth	1	Coordinating Conjunctions	The use of the Coordinating Conjunct in combining two independent sentences	1-Method of giving lectures 2- Student groups 3- Reports and studie	1-Exams of variou types 2- Feedback from students 3-The method of expression with fa 4- Reports and stu
Eleventh	1	Punctuation	The use of the punctua marks accurately	1-Method of giving lectures 2- Student groups 3- Reports and studie	1-Exams of variou types 2- Feedback from students 3-The method of expression with fa 4- Reports and stu
Twelfth	1	Vocabulary an pronunciation	The lightning mechani Lightning surges for testing. Switching surg test voltage characteristics. Insulati coordination.	1-Method of giving lectures 2- Student groups 3- Reports and studie	1-Exams of variou types 2- Feedback from students 3-The method of expression with fa 4- Reports and stu
Thirteen + Fifteenth	3	Writing skills	Introducing the professional writing sty and skills	1-Method of giving lectures 2- Student groups	1-Exams of variou types

				3- Reports and studi	2- Feedback from students 3-The method of expression with fa 4- Reports and stu

11.Course Evaluation

Daily preparation	3
Daily exams	5
Extracurricular activities	2
First semester exam / theoretical - 1	20
Second semester exam / theoretical - 2	20
Final exam / theoretical	50

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Progress in English through relevant activities (Al-shrafa radi). • English Program (Ian axelesson).
Main references (sources)	Liz and John Soars, New Headway Beginner, Oxford University, 2002.
Recommended books and references (scientific journals, reports...)	UNIVERSITY PRESS
Electronic References, Websites	www.oup.com/elt

Course Description Form

1.Course Name:
Power Electronics
2.Course Code:
KTED123
3.Semester / Year:
Year
4.Description Preparation Date:
2024/03/29
5.Available Attendance Forms:
Presence
6.Number of Credit Hours (Total) / Number of Units (Total)
150urs (60 theoretical hours + 90 practical hours)
7.Course administrator's name (mention all, if more than one name)
Name: Ali Akbar Khaleel Mahmood Email: Ali.mahmood@itu.edu.iq
8.Course Objectives

This course aims to provide the trainee with the cognitive skills related to the elements of power electrons, their properties, how to operate them, and their uses in power circuits and electrical machines, such as controlled and uncontrolled unit circuits, direct current interrupters, alternating voltage governors, and inverters, in addition to how to use these circuits in the field of industry. One of the objectives of this course in the educational	• Preparing the student to recognize electronic components manufactured from semiconductor materials. • Preparing the student to learn about the analysis of electronic circuits for power electronics systems. • Identify the applied circuits of power electronics systems. • Preparing human cadres who possess technical qualifications that enable them to enter the labor market efficiently. • Preparing qualified technical personnel to study and design electronic circuits as required by the labor market, build electrical circuits, control and control the operation and manufacture of electronic devices, and convert electrical energy from one type to another according to the required study.

institutions attended by students is:	• The specialty aims to graduate competent personnel equipped with all electrical and electronic information enabling them to carry out maintenance work and operate electrical circuits based on electronic designs.

13. Teaching and Learning Strategies:

- Theoretical lecture
- Practical lecture
- Discussion with students and students among themselves
- Preparing reports and projects related to the scientific material of the lecture
- Summer training in the private and public sectors
- E-Learning
- Using modern methods in teaching and training students
- Forming discussion circles during lectures to discuss study topics
- Assigning students to class duties

14. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	Identify the basic components of power electronics circuits	Power electronic, electronic componts which used in high power control (power diodes, thyristor and power transistors) pevison of single-phase rectifier circuits by using diodes.	Lectures + Practical applications	Daily, monthly, and annual exams
2	5	Identify three-phase rectifier circuits	Three phase rectifier circuits by using diodes, output voltage waveform, diode current waveform, output voltage equation in case of resistance lode.	Lectures + Practical applications	Daily, monthly, and annual exams

3	5	Learn about the use of a transistor as a switch	Using the transistor as switch, regions of operation, transistor as a switch (cut off and saturation).	Lectures + Practical applications	Daily, monthly, and annual exams
4	5	Learn about improving the opening and closing of a transistor	Power transistor in (off)and (on) state, improvement of (off) and (on) time by using speed up capacitance, practical problems.	Lectures + Practical applications	Daily, monthly, and annual exams
5	5	Identify the bipolar transistor	Uniplolor junction transistor, construction, theoretical operation, using the transistor as relaxation oscillator practical example.	Lectures + Practical applications	Daily, monthly, and annual exams
6	5	Learn how to use an operational amplifier	operational amplifier, description of operational amplifier (op-amp) as asparate components, zero detector, comparator.	Lectures + Practical applications	Daily, monthly, and annual exams
7	5	Learn how to use an operational amplifier	The use of op-amp as actable multivibrator and a monostable multivibrator, photo conduction cells, photo diodes.	Lectures + Practical applications	Daily, monthly, and annual exams
8	5	Learn about the use of the LED electronic element	Light – emitting diodes (LED), photo transistors, the use of optical comparator in power electronic circuits.	Lectures + Practical applications	Daily, monthly, and annual exams
9	5	Learn about the use of thyristor properties	Thyristor, construction, characteristic, curves for a thyristor, thyristor conduction in forward biasing, thyristor family, thyristor representation as a double transistor circuit.	Lectures + Practical applications	Daily, monthly, and annual exams
10	5	Learn about ways to connect thyristors	Thyristor conduction methods, conduction throw the gate minimum gate current causing conduction,	Lectures +	Daily, monthly,

			conduction time, conduction due to high forward voltage rectifier (dv/dt)	Practical applications	and annual exams
11	5	Learn about Dayak and Trayak	DIAC, TRIAC characteristics, practical applications, thyristor, triggering methods, triggering on DC and AC current, pulse triggering types	Lectures + Practical applications	Daily, monthly, and annual exams
12	5	Learn about the methods of thyristor switching	thyristor triggering circuit, DC and AC triggering circuits.	Lectures + Practical applications	Daily, monthly, annual exams
13	5	Learn about mug pulse circuits	Pulse current triggering circuit, relaxation oscillator, zero detector, comparator with a stable and monostable multivibrators (operational amplifiers and timer).	Lectures + Practical applications	Daily, monthly, and annual exams
14	5	Learn about thyristor applications	Thyristor general application introductory, AC to DC inverter DC to AC inverter, DC to DC inverter, AC to AC inverter, phase controlled halfwave rectifier with resistance and indctormce load output current and voltage waveform , output voltage equations	Lectures + Practical applications	Daily, monthly, and annual exams
15	5	Identify the semi-controlled thyristor rectifier	Half controller full wave rectifier fully controlled, resistance and inductance load , generated wave forms, output voltage equation for free wheeling diode.	Lectures + Practical applications	Daily, monthly, and annual exams

16	5	Identify the fully controlled thyristor rectifier	Regenerating fully controlled inverters, examples, DC motor speed control.	Lectures + Practical applications	Daily, monthly, and annual exams
17	5	Identify the three-phase thyristor inverter	Three face inverters, output voltage wave form with, triggering pulses and equations.	Lectures + Practical applications	Daily, monthly, and annual exams
18	5	Identify thyristor protection circuits	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 + Practical applications	Daily, monthly, and annual exams
19	5	Identify thyristor suppression circuits	DC to AC inverters methods of forcing the thyristor to get off.	Lectures + Practical applications	Daily, monthly, and annual exams
20	5	Identify series and parallel thyristor inverter circuits	Parallel and series inverter, single and three phase, control methods in charging frequency and voltage, output wave forms.	Lectures + Practical applications	Daily, monthly, and annual exams
21	5	Identify series and parallel thyristor inverter circuits	Inverter application, emergency power supply, single phase DC motor speed control.	Lectures + Practical applications	Daily, monthly, and annual exams
22	5	Learn about ways to control motors	Three phase motor control by using a constant ratio of variation frequency and voltage.	Lectures + Practical applications	Daily, monthly, and annual exams

23	5	Identify thyristor circuits	Choppers, DC to DC inverter frequency constant, line constant	Lectures + Practical applications	Daily, monthly, and annual exams
24	5	Identify the types of clips	Types of choppers, DC motor speed control.	Lectures + Practical applications	Daily, monthly, and annual exams
25	5	Learn about voltage regulators	AC to AC inverter, single phase voltage regulator, three phase voltage regulator	Lectures + Practical applications	Daily, monthly, and annual exams
26	5	Learn about methods of controlling single-phase and three-phase motors	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 + Practical applications	Daily, monthly, and annual exams
27	5	Learn about frequency modulator circuits	Cyclic inverter, AC to DC cyclic inverter, DC to DC cyclic inverter.	Lectures + Practical applications	Daily, monthly, and annual exams
28	5	Identify circuits of inverters, structure diagrams	AC to AC cyclic inverter control block diagram.	Lectures + Practical applications	Daily, monthly, and annual exams
29	5	Learn about PWM	Using amplitude modulation for speed control.	Lectures +	Daily, monthly,

				Practical applications	and annual exams
30	5	Identify the unipolar transistor	Using polar transistor for AC motor speed control .	Lectures + Practical applications	Daily, monthly, and annual exams

15. Course Evaluation

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

16. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	• Electrical Technology (Edward Hughes) • Basic Circuits (A.M.F Brooks) Pergaman Press. • Introduction to Electric circuits (M. Romanwitz) John Willy • Basic Electrical Engineering (Fitzgerald & Rlgginborthan) Mc – Graw – Hill • المصدر للمادة العملية • Electrical Technology (Edward Huges) • Basic Electrical Engineering • الكترونيات في خدمة التطبيقات الكهربائية ترجمة الدكتور سمير رستم • Power electronics handbook, Third edition, Muhammad H. Rashid, Elsevier,2011.

	• دليل المهندس والفني في العناصر الكهربائية والالكترونية، محمد قاسم، شعاع للنشر والعلوم، 2012. • Power Electronics Basics, YuriyRozanov, Sergey E. Ryvkin, EvgenyChaplygin, Pavel Voronin, CRC Press, 2015 • Introduction to Power Electronics, Paul H. Chappell, Artech House, 2014.
Recommended books and references (scientific journals, reports…)	• مشروع كتاب الدوائر والقياسات • مبادئ علم الهندسة الكهربائية / دكتور محمد زكي – دكتور مظفر النعمة • ملزمة الدوائر والقياسات العملي • Advanced industrial electronics by morris • Thyristor engineering by B.B. berde الكترونيات القدرة (تأليف الدكتور مظفر أنور النعمة)
Electronic References, Websites	• Various Internet sources

Course Description Form

1. Course Name :
English language (2)
2. Course Code:
KTED130
3. Semester / Year:
Second II
4. Description Preparation Date:
18/2/2024
5. Available Attendance Forms:
Actual attendance
6. Number of Credit Hours (Total) / Number of Units (Total):
60 hour/annually - 2 units
7. Course administrator's name:
Name: HUSSEIN HAMID NEAMAH ; Email: hussein.neamah@atu.edu.iq
8. Course Objectives
To make students able to speak English (listening, speaking, reading and writing).The activities within New Headway Pre- Intermediate are designed to enable pre-intermediate students to extend their knowledge of the language and to allow them to activate what they have learnt. There is also an emphasis on increasing fluency, so that students feel able to actively participate in conversations and discussions. We hope that students will enjoy using the course and that it will give them a real sense of progression in their language learning.
9. Teaching and Learning Strategies
Using Headway will help students listen, speak, read, and write correctly using the English language. It also helps students by watching attached video clips of films or plays so that they

can discuss them after watching. New Headway Pre-Intermediate, Fourth edition is a course for students who already have a solid foundation in the language. They may have recently completed an elementary course or they may be returning to language learning after a break and need to revise key language before being able to progress further. New language is introduced systematically, allowing students to extend and consolidate their knowledge of the language. Listening material is provided across three class CDs. New vocabulary is introduced regularly and this is followed by controlled practice activities, allowing students to immediately activate the language in a supported way. There are also freer practice activities where students can focus on their fluency. In the Everyday English sections, useful chunks of language are presented, which students can use in several different social contexts.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First + second	2	The theme of this first unit is getting to know people. It provides gene revision of key tenses and question forms, and Granted the opportunity to assess new students' strengths and weaknesses. All tword • Social expressions verb forms covered are dealt with in greater depth i later units of the course.	**Getting to know you** • Questions • Tense revision • Right word, wrong	1-Method of giving lectures 2- Student groups 3- Reports and studies	1-Exams of various types 2- Feedback from students 3-The method of expression with faces 4- Reports and studies
		The theme of this unit is happiness and things you like doing. This provides ample opportunity for students to			

Third + Fourth	2	personalize the key language. The main grammar focus is on present tenses, and have and have got in contrast. Skills work includes integrated reading and speaking, and listening and speaking practice. The Everyday English section introduces and practices ways of keeping a conversation going. The Writing syllabus continues with a focus on style and synonyms in a task based on writing a postcard.	**Whatever makes you happy.** • Present tenses • have/have got • Things I like doing • Making conversation	1-Method of giving lectures 2- Student groups 3- Reports and studies	1-Exams of various types 2- Feedback from students 3-The method of expression with faces 4- Reports and studies
Fifth + Sixth	2	The theme of this unit is telling stories. The Past Simple is revised and the Past Continuous introduced in the context of the story of an adventurer, and there are a number of news stories to contextualize and practice the m language. The Listening and speaking sect focuses on radio	**What's in the news?** • Past Simple and Continuous • Adverbs • Saying when	1-Method of giving lectures 2- Student groups 3- Reports and studies	1-Exams of various types 2- Feedback from students 3-The method of expression with faces 4- Reports and studies

		news, and the Reading and speaking has a human interest story that achieved worldwide coverage on the Internet. The Vocabulary section focuses on adverbs and their position in a sentence, both adverbs of manner that end in -Iy, and other adver The Everyday English section d with time expressions - saying dates using the correct preposition. T Writing section consolidates the tenses and use of adverbs in a story-building task.			
		The theme of this unit is food, drink, and eating out. In the opening section, expressions quantity are introduced in the context of a couple with an unusual diet. I separate presentation about a man who lived to a great age, there is revision and extension of the use of articles			

Seventh + eighth	2	in English. The Reading and speaking is about three unusual places to eat. The Vocabulary and listening covers parities (a loaf of. .. , a piece of ... , etc.) and includes six conversations s in different shops. The Everyday English has a focus on requests and offers made at a din party and in other contexts. The Writing syllabus continues with practice of linking words in an email-writing task.	**Eat, drink, and be merry** •Expressing quantity. •something/no one ... • Articles • A piece of ... •Can you come for dinner?	1-Method of giving lectures 2- Student groups 3- Reports and studies	1-Exams of various types 2- Feedback from students 3-The method of expression with faces 4- Reports and studies
		The themes of hopes, ambitions, and plans provide the context for the presentation practice of verb patterns and ways of talking about the future. Going to, will, and the Present Continuous for future are contrasted. The skills practice includes a Listening an speaking section on being 20-something, and a Reading and speaking section			

Ninth + Tenth	2	on a girl who has hope for the future. Everyday English practices the language of expressing doubt and certainty. The Writing syllabus continues with a section on writing to prep a talk on 'my dreams for the future'.	**Looking forward** •Verb patterns • Future forms • Phrasal verbs •Expressing doubt and certainty	1-Method of giving lectures 2- Student groups 3- Reports and studies	1-Exams of various types 2- Feedback from students 3-The method of expression with faces 4- Reports and studies
Elevent + twelfth	2	The theme of this unit is describing people and places. This provides a useful context to practice the grammar for this unit - What ... like?, and comparatives and superlatives. T text in the Reading and speaking section describes the multicultural diversity of London. In the Listening and speaking section, three people talk about who they most resemble in their family. The Everyday Engl syllabus continues with the language for talking about what's on in a cit) and the Writing	**The way I see it** •What ... like? • Comparatives and superlatives • Synonyms and antonyms	1-Method of giving lectures 2- Student groups 3- Reports and studies	1-Exams of various types 2- Feedback from students 3-The method of expression with faces 4- Reports and studies

		section practices relative pronou in the context of describing you hometown.	•What~ on?		
Thirtee + **Fourtee** **h**	2	The theme of living history provides an ideal context for the presentation and practice of the Present Perfect Because it shows how the past links with the present. The first grammar presentation highlights the 'unfinished past' use of the Present Perfect. The second highlights the 'experienc use of the Present Perfect. The theme living history is carried through the skills practice with Reading section on living in a stately home, and a Listening and speaking section on researching your family histo Vocabulary practice is on the use of suffixes in word formation and the Everyda English section is on the use of question tags when asking for agreement. The Writing syllabus continues with	**Living history** •Present Perfect • for and since • ever and never • Word formation •Agree with me!	1-Method of giving lectures 2- Student groups 3- Reports and studies	1-Exams of various types 2- Feedback from students 3-The method of expression with faces 4- Reports and studies

		writing a biography of a famous person.			
Fifteent + Sixteent	2	This unit looks at aspects of ger from a range of perspectives and introduces the functional langua of obligation and advice. The first presentation focuses on have to/ don't have to and the second presents shou and must. Skills practice is provided in the form a Listening and speaking section a female heptathlete, and a Reading and speaking section on two families with ver different profiles. Vocabulary practice is on things to wear, and the Everyday English section focuses on the functional langu used at the doctor's. Writing practice is provided with a section on formal letters and emails.	**Girls and boys** • have to/don't have to • should/must • things to wear • at the doctor's	1-Method of giving lectures 2- Student groups 3- Reports and studies	1-Exams of various types 2- Feedback from students 3-The method of expression with faces 4- Reports and studies
		This unit looks at the theme of storytelling in different genres. Both grammar sections use adaptations of			

Seventeh + Eightee	2	a fable by Aesop to contextualiz the target language of narrative ten and the Past Perfect, and conjunctions of time, result. reason, and contrast. Skills practice is in the form of a Listening and speaking section on two classic writers, and a Reading and speaking section with a picture story of The Stran Case of Or Jekyll and Mr Hyde. Vocabulary practice is on adjectives that describe feelings and the Everyday English focus on exclamations with so and such. The Writing sectio carries through the theme of sto with tasks to help students write review of a book or film.	**Time for a story** •Past Perfect and narrative tenses • Joining sentences Feelings • Exclamations	1-Method of giving lectures 2- Student groups 3- Reports and studies	1-Exams of various types 2- Feedback from students 3-The method of expression with faces 4- Reports and studies
		The themes of this unit are communication and technology. The story of the development of the mobile phone is used to			

nineteen + Twenty	2	contextualize and practice passi The Vocabulary syllabus contin with a focus on collocation. The Reading and speaking secti carries through the theme with article about five firsts on the Internet. In the Listening and speaking section, a man complains about aspects of modern life. Everyday English practices usef telephone language, and the Writing section focuses on plann and linking ideas in a pros and cons essay.	**Our interactive world** •Passives • Compound nouns • Words that go together • On the phone	1-Method of giving lectures 2- Student groups 3- Reports and studies	1-Exams of various types 2- Feedback from students 3-The method of expression with faces 4- Reports and studies
		The overall theme of this unit is life's ups and downs. The story of an extraordinary mu teacher provides the context for contrasting the Present Perfect Simple and Present Perfect Continuous. Tense practice is also provided in an information gap on the singer Charlotte Church. Listening and speaking gives further consolidation of the main tenses with a focus on two friends who haven't met since school.			

Twenty-One + Twenty-two	2	Reading and speaking has a focus on four generations of the Getty family. The Vocabulary and listening an Everyday English sections are linked by practicing the vocabul of birth, marriage, and death, and the language of giving good and bad news. The Writing section focuses on filling in forms	**Life's what you make it!** •Present Perfect Continuous • Tense Review • Birth, marriage, and death Good news, bad news	1-Method of giving lectures 2- Student groups 3- Reports and studies	1-Exams of various types 2- Feedback from students 3-The method of expression with faces 4- Reports and studies
Twenty-		The theme of this unit is thinking about the future and what will might happen. This provides the context for the two grammar presentations, starting with the first conditional and might, and moving on to the second conditional. In the Listening and speaking section, two people speculate about changes they face in their lives. The Reading and speaking section focuses on the wonders of the Universe. The Vocabulary section focuses on prepositions, and			

Three + Twenty-four	2	Everyday English practices the language of saying thank you a goodbye. The Writing syllabus concludes with a focus on note-taking.	**Just wondering ...** •If + will/might/would conditionals • Prepositions Thank you and goodbye!	1-Method of giving lectures 2- Student groups 3- Reports and studies	1-Exams of various types 2- Feedback from students 3-The method of expression with faces 4- Reports and studies
Twenty-Five + Twenty-six	2	You are part of the editorial tean a newspaper. Choose the four stories that you think are the m important. In groups of four, discuss which are the four top stories for tomorrow's newspape Choose the top headline for the front page. Compare your front page headli with other editorial teams. Give reasons for your choices.	**What's Important to me?** • Think about your past, present, or future and wri note for each • Spot the difference •Today's top headlines	1-Method of giving lectures 2- Student groups 3- Reports and studie	1-Exams of various types 2- Feedback from students 3-The method of expressior with faces 4- Reports and studies
Twenty-Seven + twenty eighth	2	This focus of this stage is common collocations o noun + preposition. Pre-teach/check recipe, central heati damage l'dcemrd3/, butterflies, a cure. Elicit the answer to number 1 as an exam Give students time to complete the sentences, then check the answ As an extension, you could get students to use three or four of the collocations in a seri of sentences or a short	**Snakes and ladders** •Phrasal verbs pair-up •What's it like? •How long have you ... ?	1-Method of giving lectures 2- Student groups 3- Reports and studie	1-Exams of various types 2- Feedback from students 3-The method of expressior with faces 4- Reports and studies

Twenty Nine + Thirty	2	Cognitive outcomes Elicit the opening line of each conversatic (see Answers below). Tell stude that there are a different number of lines in each conversation. Give them time to do the ordering task, either working in groups or moving round the class in a mingle.	**Passives quiz** •Present Perfect picture race •Thank you and goodbye	1-Method of giving lectures 2- Student groups 3- Reports and studies	1-Exams of various types 2- Feedback from students 3-The method of expression with faces 4- Reports and studies

11. Course Evaluation

Daily preparation	3
Daily exams	5
Extracurricular activities	2
First semester exam / theoretical - 1	20
Second semester exam / theoretical - 2	20
Final exam / theoretical	50

12. Learning and Teaching Resources

New Headway

Fourth edition

Pre-Intermediate Student's Book

Liz and John Soars Amanda Maris

with Teacher's Resource Disc

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