Module (Course Syllabus) Catalogue

2022-2023

College/ Institute	**Erbil Technology College**	
Department	**Information and Communication Technology Engineering ICTE**	
Module Name	**Electrical Circuits**	
Module Code	**ELC301**	
Degree	**Technical Diploma** ☐ **Bachelor** ☐ **High Diploma** ☐ **Master** ☐ **PhD** √	
Semester	**3rd Semester**	
Qualification		
Scientific Title	**Assistant Professor**	
ECTS (Credits)	**6**	
Module type	**Prerequisite** ☐ **Core** √ **Assist.** ☐	
Weekly hours	**4**	
Weekly hours (Theory)	**(2)hr Class**	**(3)hr Workload**
Weekly hours (Practical)	**(2)hr Class**	**(1)hr Workload**
Number of Weeks	**12**	
Lecturer (Theory)	**Ilham Kadhim Onees**	
E-Mail & Mobile NO.	**ilham.onees@epu.edu.iq**	
Lecturer (Practical)	**Ilham Kadhim Onees**	
E-Mail & Mobile NO.	**ilham.onees@epu.edu.iq**	
Websites		

Course Book

Course Description	This course is a study of the fundamentals of alternating current (AC) including single phase and three phase circuit analysis techniques. Also is study the most important theories by reasonably brief outline of essential information, definitions, formula, and procedures with solved examples and unsolved ones for homework.
Course objectives	This subject is very important for the students to let them identifying the fundamental concepts, the electric circuits the measurements that are the basic for studying and understanding all other subjects in both levels even in their career. The objective for the two term courses is to teach the students: - • The principles, which describes the operation of AC circuits, sine wave, and types of connections of A.C. electric circuits. • The most important theories by reasonably brief outline of essential information, definitions, formula, procedures with solved examples and unsolved ones for homework. • At the end of the course the student will have sufficient knowledge about different measurements and calculations which they need.

<table>
<tr>
<td>Student's obligation</td>
<td>Respect
A student has an obligation to exhibit honesty and to respect the ethical standards of the profession in carrying out his/her academic assignments. Without limiting the application of this principle.
Attendance
The student's absence must not exceed 10%. In the event that this percentage is exceeded, the student is considered to have failed in this module.
Questions
Asking questions about unclear material is an important part of the classroom experience. It is not uncommon for students to have similar difficulties, so speaking up will help everyone understand the discussed information. Teachers can also benefit from a student’s questions. By finding out what subjects are hard to understand, instructors can adjust their lectures to clear up confusing topics.
Assignment
A student must submit the assignment on Moodle app. every week and also write a report about what he/she was studied in the laboratory</td>
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<td>Required Learning Materials</td>
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<td>Evaluation</td>
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<table>
<tr><th colspan="2">Task</th><th>Weight (Marks)</th><th>Due Week</th><th>Relevant Learning Outcome</th></tr>
<tr><td colspan="2">Paper Review</td><td></td><td></td><td></td></tr>
<tr><td rowspan="6">Assignments</td><td>Homework</td><td>5%</td><td></td><td></td></tr>
<tr><td>Class Activity</td><td>2%</td><td></td><td></td></tr>
<tr><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Seminar</td><td>10%</td><td></td><td></td></tr>
<tr><td>Essay</td><td></td><td></td><td></td></tr>
<tr><td>Project</td><td></td><td></td><td></td></tr>
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	Quiz	8%		
	Lab.	10%		
	Midterm Exam	25%		
	Final Exam	40%		
	Total	100%		
Specific learning outcome:	After successful completion of the course student will be able to: ➢ Explains the basic definitions. ➢ Connect the electrical circuits in different types. ➢ Make the measurements and the calculation for the circuits. ➢ Using the equations to find the currents, voltages and the resistance for the circuits.			
Course References:	1. Fundamental of electric circuits, Charles K. Alexander and Mathew N. O. Sadiku. 2- Principles of electric circuits, electron flow version, Sixth edition, Floyd. 3- Basic electrical engineering. Third edition. K. Rajput. 4- Electronic devices and circuit theory, Tenth edition, Robert L. Boylestad and Louis Nashelsky. 5- Internet			

Course topics (Theory)	**Week**	**Learning Outcome**
Introduction, Basic Concepts and Systems of Units	1 & 2	
Ohm's Law and Power equations	3	
Voltage Divider Rule & Current Divider Rule	4	

Connection of resistances in Series, Parallel and complex Circuits	5	
Resistances in Star and Delta Connections	6	
Kirchhoff's Laws (KCL & KVL)	7	
Network Theorems (Thevenin theorem)	8	
Norton theorem	9	
Superposition theorem	10	
AC Fundamentals Principle of generating an alternating voltage Cycle, Time period, Frequency, Amplitude, Phase and Phase difference, Average value, R.M.S. value,	11	
Ohms Law in AC Circuits	12	
Practical Topics	**Week**	**Learning Outcome**
Measurement instruments.	1	
Ohm's law.	2	
Series connection of resistors.	3	
Parallel connection of resistors.	4	
Negative temperature coefficient (NTC).	5	
Positive temperature coefficient (PTC).	6	
Voltage divider under no load. Voltage divider under load.	7	
Voltage-dependent resistor (VDR).	8	
(Light dependent resistor LDR).	9	
Capacitor in a DC Circuit	10	
Characteristic of an incandescent lamp	11	

Questions Example Design

Q1/Choose the correct answer **(Write the equation if you need)** 30 Mark

1- The peak value of a sine wave is 200 V. Its V rms value is……………………….

(A) 127.4 V (B) 141.4 V (C) 282.8 V (D) 100 V

2- The more cycles completed in one second, the …………………
(A) Higher the frequency (B) Medium the frequency
(C) Lower the frequency (D) none of them

3- The power of a 900 Ω resistance and 300 v lamp is……………….

(A) 9000 w (B) 100 w (C) 300 w (D) 900 w

4- The amount of charge flowing through a cross-sectional area of a wire per unit of time is called……………………….
(A) Voltage (B) Current (C) Power (D) resistance

5- An voltmeter connected in parallel with three resistors reads a voltage of 3 V. What is the voltage flowing through resistor R3?
(A) 1.5 V (B) 9 V (C) 3 V (D) 1 V

6- The reciprocal of resistivity called………………………………..

(A) Power (B) Conductance (C) Conductivity (D) Cross section area

7- The angle of 135° in radians is……………………
(A) $\pi/2$ (B) 2π (C) $3\pi/2$ (D) $3\pi/4$

8- In a parallel circuit if one of the light bulbs burns out, the rest

A) Stop the flow of electricity C) will go out
B) Can still light up D) of the light bulbs burn out also

9- What happens to the current in series circuit if the resistance is doubled?
(A)It becomes half its original value (C) It becomes zero

(B) It becomes doubled its original value (D) It becomes infinity

10- The prefix giga is …………………

(A) 10^{-9} (B) 10^{6} (C) 10^{12} (D) 10^{9}

Q2/ Find the current flowing in the 40Ω, R3.for the Figure 1 using KCL and KVL.

20 Mark

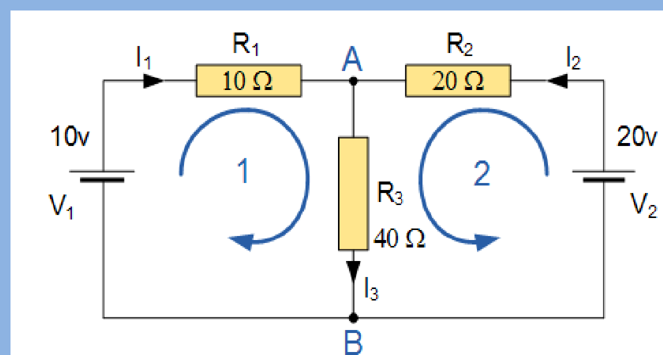

Figure 1

Q3/A) for the figure 2, calculate the current (I) drawn from the battery.

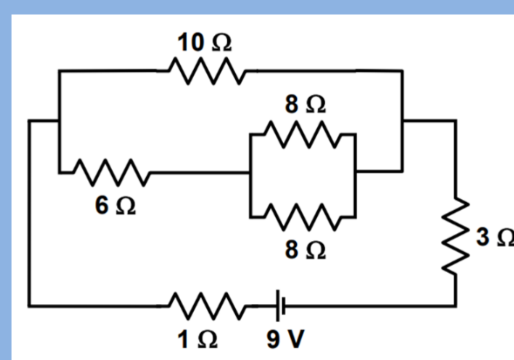

Figure 2

15 Mark

Q3/B) A platinum resistance thermometer has R_0 = 40 Ω at T_0=30 °C. α For Pt is $3.92\times10^{-3}(°C)^{-1}$. At which point R increases to 94.6Ω. <u>What is the melting point?</u>

15 Mark

Q4/ Find the equivalent circuit for the figure 3 by using Norton's theorem.

20 Mark

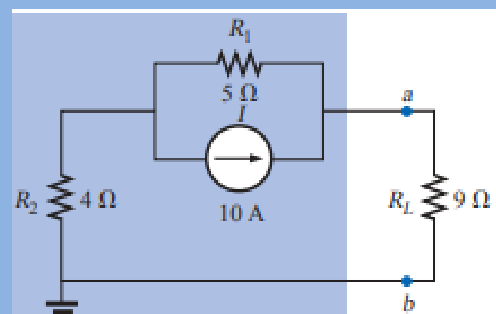

Figure 3

Extra notes:

External Evaluator:

This course book has to be reviewed and signed by a peer. The peer approves the contents of the course book by writing the following sentences:

- This course book is written according to the university template.
- The course teacher put all necessary information in the course book.
- The course teacher follows the syllabus in writing the course book.

Peer reviewer name: Sevan H. Ali