Module (Course Syllabus) Catalogue

2022-2023

College/ Institute	**Erbil Technology Institute**	
Department	**Department of Electricity**	
Module Name	**DC Electrical Circuit**	
Module Code	**DEC202**	
Semester	**2**	
Credits	**6**	
Module type	**Core**	
Weekly hours	**2**	**2**
Weekly hours (Theory)	**(2)hr Class**	**(87)hr Workload**
Weekly hours (Practical)	**(2)hr Class**	**(58)hr Workload**
Lecturer (Theory)	**Truska Khalid M. Salih**	
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Lecturer (Practical)	**Truska Khalid M. Salih**	
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Course Book

Course Description	This course is a study of the fundamentals of direct current including Ohm's law, Kirchhoff's laws and circuit analysis techniques. Also is study Superposition theory, Thevevine theory, Norton theory and its application in direct electric current circuits, with solved examples & homework.
Course objectives	This subject is very important for the first & second year students of electrical power department to let them identifying the fundamental concepts, the electrical circuits the measurements which 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:- • How to (state the basic and recognize derived) SI units with understanding the prefixes denoting multiplications and division to perform simple calculations of these units with concentrating on the most important electrical quantities related to their study. • The principles which describes the operation of DC circuits, the common electrical circuit diagram symbols, types of connections of electrical 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.
Student's obligation	**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 every week and also write a report about what he/she was studied in the laboratory
Assessment scheme	16% Mid Term (Theory and practical) 4% Quiz 40% Assignment (report, paper, homework, seminar...) 25% final practical 15% final theory
Specific learning outcome:	After successful completion of the course student will be able to 1. Students will be able to explain how electric current flows in a circuit and how to do report, 2. Students will be able to wire a basic circuit, 3. explain the theoretical principles essential for understanding the operation of electrical circuits, 4. be able to connection different types of electrical circuits, 5. Be able to determine the voltage, current or resistance for a component using Ohm's Law, 6. Students will be able to explain the difference between series and parallel connections, 7. Students will be able to explain the difference between star and delta connections, 8. Be able to apply Kirchhoff's voltage law to a closed loop of a DC circuit,

	9. Be able to understand the depth of static and time-varying electromagnetic field is governed by Maxwell's equations, 10. Be able to transform source from voltage to current and vice versa, 11. Apply the Maximum Power Transfer theorem to solve appropriate problems, 12. Be able to solve a multiple source circuit using the superposition method, 13. Be able to use Thevenin's circuit to determine load resistance for maximum power transfer, 14. Be able to use Norton circuit to determine load resistance for maximum power transfer.
Course References:	1.Electrical Technology (Edward Hughes). 2-Basic circuits (A .M. F. Brooks) Pergaman Press. 3-Introduction to electric circuits (M.Romanwitz) John Willy. 4-Basic Electrical Engineering (Fitzgerald & Rlgginborthan) M.C. – Graw – Hill. 5-Electrical technology (.B L. THERAJA). 7- Any book about Electrical Circuit.

Course topics (Theory)	**Week**	**Learning Outcome**
System International Units, symbols, multiples and submultiples, arithmetic applications to convert values by using units, definition of basic Units for voltage, current and resistance. Components of electrical circuit, with solved examples & homework.	1	1 &3
Types of electrical circuit connections, resistances, factors effecting resistance value, specific resistance for conducting materials & insulators. Temperature effect on resistance with solved examples & homework. Definition of energy, power and coast in circuits.	2	4
Ohms law, with solved examples & homework. Direct current circuits, series connection of resistances, voltage divider rule with solved examples & homework.	3	5

Parallel connection of resistances, current divider rule, compound connection, examples for different connection of resistances with solved examples & homework.	4	6
Star- delta of resistances and the transformation for both of them with solved examples & homework.	5	7
Kirchhoff's laws and its applications with solved examples & homework.	6	8
Maxwell's theorem with solved examples & homework.	7	9
Source transformation from voltage to current, current to voltage, with solved examples & homework.	8	10
Maximum power transfer theory with solved examples & homework.	9	11
Superposition theory and its application for circuits having more than one source with solved examples & homework.	10	12
Thevevine theory and its application in direct electric current circuits, with solved examples & homework.	11	13
Norton theory and its application in direct electric current circuits, with solved examples & homework.	12	14
Practical Topics	**Week**	**Learning Outcome**
Identify the lab devices and explain how to do reports.	1	1
Resistor Colour Code experiment.	2	2&3
Temperature coefficient experiment.	3	3
Applying Ohm's Law experiment.	4	5

Resistances in series experiment.	5	5
Resistances in parallel experiment.	6	6
Compound (mixed) resistances connection experiment.	7	4&5&6
Star Delta Transformation experiment.	8	7
Proving Kirchhoff's current (KCL) & Kirchhoff's voltage law (KVL) experiment.	9	8
Maximum power transfer theory's experiment.	10	11
Super position theory's experiment.	11	12
Proving Thevenin's and Norton theory experiment.	12	13&14
Questions Example Design		

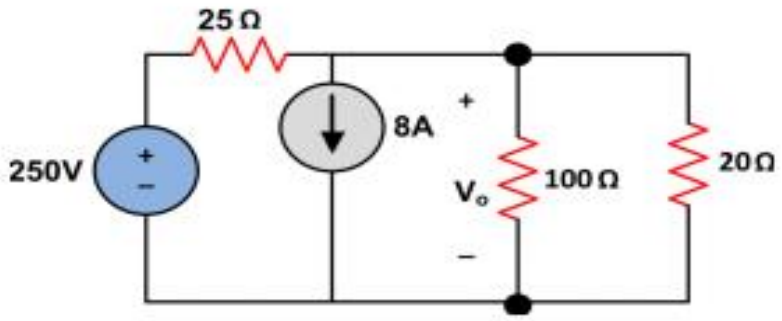
Ministry of Higher Education
& Scientific Research
Erbil Polytechnic University
Erbil Technology College
Dept. of Electricity

EPU

Academic year: 2020 – 2021
Final / 2nd Semester-1st Trial

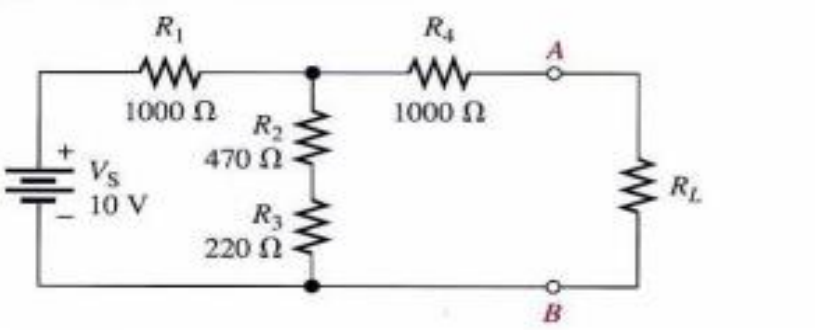
Class: First
Subject: D.C. Electrical Circuit
Time: 2 Hours
Date: /5/2021
Code: **DEC202**

Q1/ Find Vo using source transformation.



25Mark

Q2/ Find the Thevenin's equivalent circuit between A and B for the circuit below:



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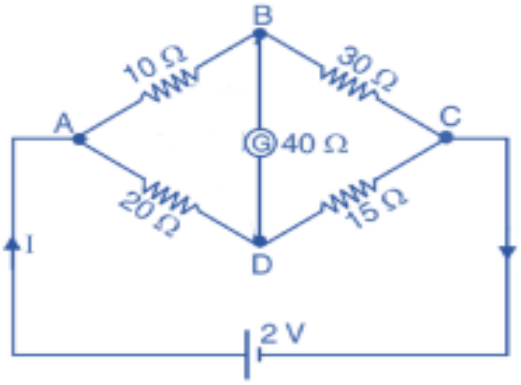
Q3/ Use delta/star transformation to find equivalent resistance across AC.



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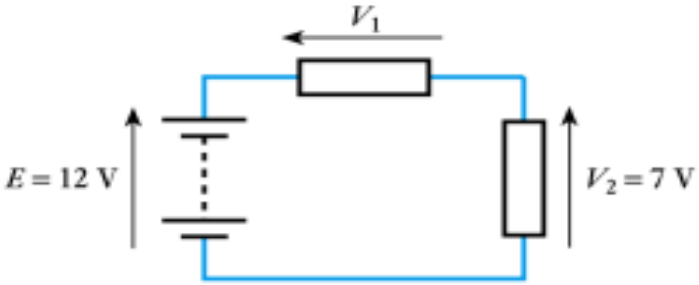
Q4/ Answer the following questions:

1. Find the current I through a resistor of resistance R=5Ω if the voltage across the resistor is 4V.
2. Find the conductance of a conductor of resistance 10 MΩ.
3. Find V1 using Kirchhoff's Voltage Law (KVL).



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Good Luck

Lecturer
Truska Kh. Muhammad

External Evaluator