



Associate Degree Program

Specialization	Common Course
Course Number	020300111
Course Title	Electrical Circuits
Credit Hours	3
Theoretical Hours	3
Practical Hours	0

وصف المادة الدراسية:

Circuits and circuit elements. DC and AC current. Circuit variables: Voltage, Current, Energy, Power factor, Power, Active power, Reactive power, Apparent power. Connection of circuit elements: series, parallel and compound connections. Energy sources. Basic calculations: Equivalent resistance, impedance, current, voltage, power and energy calculations. KVL, KCL, Superposition principle. Resonance. Measurements of circuit variables.

أهداف المادة الدراسية:

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1. Define and study current and voltage sources.
2. Use Ohm and kirchoff's laws for analyzing DC electrical circuits.
3. Study the elements of AC circuits.
4. Study the RLC in AC circuits.

الوصف العام:

رقم الوحدة	اسم الوحدة	محتويات الوحدة	الزمن بالاسبوع
1.	Voltage, Current, and Resistance	<ul style="list-style-type: none"> ▪ Atomic Structure ▪ Electrical Charge ▪ Voltage, Current, and Resistance ▪ Voltage and Current Sources ▪ Resistors ▪ The Electric Circuit ▪ DC Circuit Measurements ▪ Electrical Safety 	2
2.	Ohm's Law, Energy and Power	<ul style="list-style-type: none"> ▪ The Relationship of Current, Voltage, and Resistance ▪ Calculating Current ▪ Calculating Voltage ▪ Calculating Resistance ▪ Energy and Power ▪ Power in an Electric Circuit ▪ Resistor Power Ratings ▪ Energy Conversion and Voltage Drop in Resistance ▪ Power Supplies 	2
3.	Series Circuits	<ul style="list-style-type: none"> ▪ Resistors in Series ▪ Current in a Series Circuit ▪ Total Series Resistance ▪ Application of Ohm's Law ▪ Voltage Sources in Series ▪ Kirchhoff's Voltage Law ▪ Voltage dividers ▪ Power in Series Circuits 	1
4.	Parallel Circuits	<ul style="list-style-type: none"> ▪ Resistors in Parallel ▪ Voltage in a Parallel Circuit ▪ Kirchhoff's Current Law ▪ Total Parallel Resistance 	1

		<ul style="list-style-type: none"> ▪ Application of Ohm's Law ▪ Current Sources in Parallel ▪ Current Dividers ▪ Power in Parallel Circuits 	
5.	Series-Parallel Circuits	<ul style="list-style-type: none"> ▪ Identifying Series-Parallel Relationships ▪ Calculations of Series-Parallel Resistive Circuits ▪ Voltage Dividers with Resistive Loads ▪ The Wheatstone Bridge ▪ The Superposition Theorem 	3
6.	Introduction to Alternating Current and Voltage	<ul style="list-style-type: none"> ▪ The Sinusoidal Waveform ▪ Sinusoidal Voltage Sources ▪ Sinusoidal Voltage and Current Values ▪ Angular Measurement of a Sine Wave ▪ The Sine Wave Formula ▪ Introduction to Phasors ▪ Analysis of AC Circuits ▪ Three-phase voltage and current ▪ Y and Δ connections ▪ Line and phase voltages and currents ▪ Power calculations in three-phase circuits ▪ Mesh method of connection loads with alternator ▪ Active, reactive and apparent power in three phase circuits <ul style="list-style-type: none"> ▪ Analysis of balanced phase circuits ▪ AC circuit measurement 	5
7.	Capacitors	<ul style="list-style-type: none"> ▪ The Basic Capacitor ▪ Types of Capacitors ▪ Series Capacitors ▪ Parallel Capacitors 	1

		<ul style="list-style-type: none">▪ Capacitors in DC Circuits▪ Capacitors in AC Circuits	
8.	Inductors	<ul style="list-style-type: none">▪ The Basic Inductor▪ Types of Inductors▪ Series and Parallel Inductors▪ Inductors in DC Circuits▪ Inductors in AC Circuits	1
9.	RLC Circuits and Resonance	<ul style="list-style-type: none">▪ RC Circuits▪ RL Circuits▪ RLC Circuits▪ Resonance circuit	2

الكتب و المراجع :
الكتاب المقرر:

1. Thomas L. Floyd “ principles of electric circuits” ,Prentice Hall, 2007, ISBN-10: 0132383519

المراجع:

1. Robert L. Boylested “introductory circuit analysis” prentice-hall Inc 1997
2. Thomas L. Floyd “ principles of electric circuits” charlese, Merrill publishing company,1981
3. Noel M. Morris and Frank W.Senior “electric circuits analysis” USA NY,1977

Associate Degree Program

Specialization	Common Course
Course Number	2020300112
Course Title	Electrical Circuits Lab
Credit Hours	1
Theoretical Hours	0
Practical Hours	3

وصف المادة الدراسية:

- ❖ DC circuit analysis, Ac circuit analysis, Resonance. Electrical measurements. The Oscilloscope and its applications in measurements.

أهداف المادة الدراسية:

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1. Measure voltages and currents to verify KVL and KCL.
2. Identify shorts and opens in a malfunctioning circuit, and define and verify the equivalent resistance of a given network
3. Measure the inductance of an inductor.
4. Measure the capacitance of a capacitor.
5. To be familiar with an AC oscilloscope measurement
6. Identify resonance circuit.

الوصف العام:

رقم الوحدة	اسم الوحدة	محتويات الوحدة	الزمن بالاسبوع
1.	Resistor and color code		2
2.	Series DC circuits		2
3.	Series and parallel DC circuits		2
4.	Superposition principles		2
5.	The Oscilloscope		3
6.	RLC components		3
7.	Resonant circuits		2

الكتب و المراجع :

الكتاب المقرر:

1. أدلة التجارب العملية الخاصة بالمختبر.

المراجع:

1. Robert L. Boylested “introductory circuit analysis” printce-hall Inc 1997
2. Thomas L. Floyd “ principles of electric circuits” charlese, Merrill publishing company,1981
3. Noel M. Morris and Frank W.Senior “electric circuits analysis” USA NY,1977