

## Course Specification

**Bachelor of Electronic and Electrical Engineering with Honours**  
**School of Engineering and Technology, Sunway University, Malaysia**



### Section 1: Course Summary

Course Name	Electrical Circuits
Course Code	ETL1013
Lecturer(s)	Ir. Dr. Matthew Teow
Category	Core
Semester/Year Offered	Semester 2 / Year 1
SLT Credit Hours	3
Pre-requisite (if any)	None
Synopsis	This course introduces the fundamentals of electrical circuit theorems, network configuration, and analysis techniques for DC, AC, and resonance circuits.
Transferable Skills	Analytical Skills, Problem-Solving and Scientific Skills
Delivery Method	Lectures, Tutorials, and Laboratory Practices

### Section 2: Course Outcomes

Mapping of the Course Outcomes (CO) to Programme Outcomes (PO), Knowledge Profile (WK), Complex Problem Solving (WP), and Complex Engineering Activities (EA).

At the end of this course, the student will be able to:

Course Outcome (CO)	
CO1	<b>Describe</b> the relationship between resistance, voltage, and current in electrical circuits.
CO2	<b>Apply</b> circuit theorems and analysis techniques to DC circuits.
CO3	<b>Apply</b> circuit theorems and analysis techniques to AC circuits.
CO4	<b>Analyze</b> RLC circuits and resonance.

Note: LD/BT = Learning Domain/Bloom's Taxonomy

Mapping of the Course Outcomes (CO) to Programme Outcomes (PO), and Programme Educational Objectives (PEO). Relational Indicator is "X".

CO	PO												PEO		
	1	2	3	4	5	6	7	8	9	10	11	12	PEO1	PEO2	PEO3
CO1	X												X		
CO2		X											X		
CO3					X									X	
CO4		X											X		

### Section 3: Teaching-Learning Assessment Strategy

Mapping of the Assessment Components and Assessment Methods to the Course Outcomes (CO). Relational Indicator is "X".

Assessment Components	Assessment Methods	Weightage (%)	CO1	CO2	CO3	CO4
Written Assessment	Test(s)	10	X			
	Final Examination	60	X	X	X	X
Assignment	Assignment(s)	20				X
Laboratory (Graded)	Open-ended Experiment 1	5		X		
	Open-ended Experiment 2	5			X	

Mapping of the Teaching-Learning Activities and Assessment components to the Programme Outcomes (PO).

Programme Outcomes (PO)	Teaching-Learning Activities	Assessment Components
PO1	Lectures, Tutorials, Laboratory Practices	Final Examination
PO2	Lectures, Tutorials, Laboratory Practices	Test, Assignment, Final Examination, Open-ended Experiments
PO5	Lectures, Tutorials, Laboratory Practices	Test, Final Examination, Open-ended Experiments

#### Section 4: Teaching Plan and Student Learning Time (SLT)

Summary of total Student Learning Time (SLT).

SLT Components: L = Lecture T = Tutorial P = Practical A = Assessment O = Others	Face to Face					Independent Learning
	L	T	P	A	O	IL
	28	14	14	3	0	61
Total SLT Hours	120					
Credit Hours	3					

Teaching Plan and Student Learning Time (SLT).

Teaching-Learning Plan: Course Topic and Outline	Student Learning Time (SLT)						Topic SLT
	L	T	P	A	O	IL	
<b>Basic Concepts of Electric Circuits</b> <ul style="list-style-type: none"> <li>Introduction to electric circuits</li> <li>Electric current</li> <li>Electric voltage</li> <li>Resistance and Ohm's Law</li> <li>Reference direction of voltage and current</li> </ul>	3	1	1			2	7
<b>Basic Laws of Electric Circuits</b> <ul style="list-style-type: none"> <li>Power and energy</li> <li>Kirchhoff's voltage law</li> <li>Kirchhoff's current law</li> <li>Voltage source and current source</li> </ul>	2	1	1			3	7
<b>Series-Parallel Resistive Circuits</b> <ul style="list-style-type: none"> <li>Series resistive circuit and voltage divider rule</li> <li>Parallel resistive circuit and current divider rule</li> <li>Series-parallel resistive circuits</li> </ul>	2	1	1			3	7
<b>Methods of DC Circuits Analysis</b> <ul style="list-style-type: none"> <li>Voltage source, current source and their equivalent conversions</li> <li>Branch current analysis</li> </ul>	3	2	2			3	10
<b>The Network Theorems</b> <ul style="list-style-type: none"> <li>Superposition theorem</li> <li>Thevenin's theorem</li> <li>Norton's theorem</li> </ul>	3	1	1			3	8
<b>Capacitors and Inductors</b> <ul style="list-style-type: none"> <li>Capacitors</li> <li>Capacitors in series and parallel</li> <li>Inductors</li> </ul>	3	1	1			2	7

<ul style="list-style-type: none"> <li>Inductors in series and parallel</li> </ul>							
<b>Transients Analysis of Circuits</b> <ul style="list-style-type: none"> <li>The first-order circuit and its transient response</li> <li>The transient response of an RC circuit</li> <li>The transient response of an RL circuit</li> </ul>	3	2	2			3	10
<b>Fundamental of AC Circuits</b> <ul style="list-style-type: none"> <li>Introduction of alternating current (AC)</li> <li>Sinusoidal AC quantity</li> <li>Phasors</li> <li>Resistor, capacitors, inductors in sinusoidal AC circuits</li> </ul>	3	1	1			3	8
<b>Methods of AC Circuit Analysis</b> <ul style="list-style-type: none"> <li>Impedance and admittance</li> <li>Impedance in series and parallel</li> </ul>	3	2	2			3	10
<b>RLC Circuits and Resonance</b> <ul style="list-style-type: none"> <li>Series resonance</li> <li>Bandwidth and selectivity</li> </ul>	3	2	2			3	10
Laboratory (2 Graded Reports with 1000 words each)						10	10
Assignment (2000 words)						10	10
Test				1		3	4
Final Examination				2		10	12
Sub-total for each SLT components	28	14	14	3		61	120
Total SLT Hours (15 Weeks)	120						
SLT Credit Hours	3						

References:

Main Reference	Robert L. Boylestad, Introductory Circuit Analysis, 13rd Edition, 2015, Pearson.
Additional References	James W. Nilsson, Electric Circuits, 10th Edition, 2014, Pearson.