<table>
<tr><td>1.</td><td colspan="5">Name of Course</td><td>Electric Circuit I</td></tr>
<tr><td>2.</td><td colspan="5">Course Code</td><td>JELC1013</td></tr>
<tr><td></td><td colspan="6">JELC = the first alphabet identify the faculty within which the subject is offered., JELC = the remaining two alphabets identify the course that offers the subject, 1013 = the first digit identify level of study; in this case undergraduate level, 1013 = the second and third digits identify subject identity and 1013 = the fourth digit identify credit value or credit hours</td></tr>
<tr><td>3.</td><td colspan="5">Name(s) of academic staff</td><td>To be Assigned</td></tr>
<tr><td>4.</td><td colspan="5">Rationale for the inclusion of the course/module in the programme</td><td>Knowledge of basic Electric circuit is essential in both electrical and electronic engineering. Moreover, acquiring knowledge in electric circuit enable student to design both electrical and electronic circuits.</td></tr>
<tr><td>5.</td><td colspan="5">Semester and Year offered</td><td>Year 1, Semester 1</td></tr>
<tr><td rowspan="3">6.</td><td colspan="4">Total Student Learning Time (SLT)</td><td colspan="2">Face to Face</td><td>Total Guided and Independent Learning</td></tr>
<tr><td colspan="4" rowspan="2">L = Lecture T = Tutorial
P = Practical
IS= Independent Study</td><td>L</td><td>T</td><td>P</td><td>IS</td><td rowspan="2">Total Guided and Independent Learning = 120</td></tr>
<tr><td>42</td><td>7</td><td>6</td><td>65</td></tr>
<tr><td>7.</td><td colspan="5">Credit Value</td><td>3.0</td></tr>
<tr><td></td><td colspan="6">Lecture: 3 hours per week x 14 weeks
Tutorial: 1 hour per week x 7 weeks
Practical: 2 hours x 3 weeks</td></tr>
<tr><td>8.</td><td colspan="5">Prerequisite (if any)</td><td>None</td></tr>
<tr><td>9.</td><td colspan="6">Course Objectives
1. To equip the students with the knowledge of the electrical circuit design.

Course Learning Outcomes (CLO)
At the end of the semester students should be able to:

CLO1: To State and utilize the current-voltage relationships of resistors, capacitors, inductors, and independent and dependent current and voltage sources in solving dc circuits and calculating power and energy;
CLO2: To State Ohm’s and Kirchhoff’s laws and apply these to voltage and current division, series/parallel and Wye-Delta transformations, mesh analysis, and nodal analysis for resistive circuits;
CLO3: To State Superposition, Thevenin’s and Norton’s theorems and apply these for the analysis of dc circuits;</td></tr>
<tr><td>10.</td><td colspan="6">Transferable Skills:
This course is expected the development of the following transferable skills:
▪ An ability to manage time and task
▪ An ability to learn both independently and co—operatively;
▪ An ability to take responsibility and carry out laboratory test;
▪ An ability to take initiative and lead other;
▪ An ability to use software where relevant to the subject.</td></tr>
<tr><td>11.</td><td colspan="6">Teaching-learning and assessment strategy

A variety of learning strategies are used throughout the course, including the following
• Classroom Lesson; Lecturer and power point presentation
• Tutorial session
• Student- lecturer Discussion</td></tr>
</table>

	• Collaborative and co-operative learn; • Independent study. **Assessment:** **Course works** **40%** Assignment 5% Tutorial 5% Quizzes 5% Laboratory works 10% Test 15% **Final Examination** **60%** **Total** **100%**
12.	**Synopsis:** This course is very important course in the field of both electrical and electronic engineering; The objective of course is to provide a basic understanding of the laws of circuit theory and the behavior of circuits during steady-state and transient conditions.
13.	**Mode of Delivery:** Lectures; Tutorials; Laboratory works

14.	**Assessment Methods and Types:** **Performance Criteria :**						
	CLO-PLO	**Assessment Tool**	**1**	**2**	**3**	**4**	**5**
	Marks		**0-39**	**40-49**	**50-59**	**60-74**	**75-100**
	Grade		**(F)**	**(D,D+)**	**(C-,C,C+)**	**(B-,B,B+)**	**(A-,A,A+)**
	CLO1: To State and utilize the current-voltage relationships of resistors, capacitors, inductors, and independent and dependent current and voltage sources in solving dc circuits and calculating power and energy.	**Assignment** **Tutorials** **Lab works** **Test** **Quizzes** **Examination**	**Fail To:** - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Poor To**: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Satisfactory To**: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Good To**: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Excellent To:** - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test
	CLO2: To State Ohm's and Kirchhoff's laws and apply these to voltage and current division, series/parallel and Wye-Delta transformations, mesh analysis, and nodal analysis for resistive circuits;	**Assignment** **Tutorials** **Lab works** **Test** **Quizzes** **Examination**	**Fail To:** - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Poor To**: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Satisfactory To**: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Good To:** - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Excellent To:** - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test
	CLO3: To State Superposition, Thevenin's and Norton's theorems and apply these for the analysis of dc circuits;	**Assignment** **Tutorials** **Lab works** **Test** **Quizzes** **Examination**	**Fail To:** - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Poor To**: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Satisfactory To**: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Good To**: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Excellent To:** - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test

15. **Mapping of the Programme Objectives to the Programme Learning Outcomes**

Programme Learning Outcomes (PLO) / Programme Objectives (PO)	**PLO1:** Ability to acquire and apply knowledge of science and engineering fundamentals.	**PLO2** Acquired in-depth technical competence in electronic engineering discipline	**PLO3:** Ability to undertake problem identification, formulation and solution;	**PLO4:** Ability to utilise systems approach to design and evaluate operational performance.	**PLO5:** Understanding of the principles of design for sustainable development;	**PLO6:** Understanding of professional and ethical responsibilities and commitment to them.	**PLO7:** Ability to communicate effectively, not only with engineers but also with the community at large.	**PLO8:** Ability to function effectively as an individual and in a group with the capacity to be a leader or manager;	**PLO9:** Understanding of the social, cultural, global and environmental responsibilities of a professional engineer	**PLO10:** Recognising the need to undertake lifelong learning, and possessing/acquiring the capacity to do so	**PLO11:** Ability become entrepreneur
PEO1: To produce graduates with excellent knowledge and competency in Electrical and Electronic Engineering;	✓	✓		✓	✓						
PEO2: To produce graduates with professional, generic attributes to meet the present and future global demands.											
PEO3: To produce graduates with Islamic humanistic values and reinvention skills to meet the requirement of a dynamic environment. These skills include Civil Intelligence, Moral Intelligence, Self-Reliance and Communication Skills**;**											

16. **Mapping of the course Learning Outcome to the Programme Outcome**

Programme Learning Outcomes (PLO) / Course Learning Outcome (CLO)	**PLO1:** Ability to acquire and apply knowledge of science and engineering fundamentals.	**PLO2** Acquired in-depth technical competence in electronic engineering discipline	**PLO3:** Ability to undertake problem identification, formulation and solution;	**PLO4:** Ability to utilise systems approach to design and evaluate operational performance.	**PLO5:** Understanding of the principles of design for sustainable development;	**PLO6:** Understanding of professional and ethical responsibilities and commitment to them.	**PLO7:** Ability to communicate effectively, not only with engineers but also with the community at large.	**PLO8:** Ability to function effectively as an individual and in a group with the capacity to be a leader or manager;	**PLO9:** Understanding of the social, cultural, global and environmental responsibilities of a professional engineer	**PLO10:** Recognising the need to undertake lifelong learning, and possessing/acquiring the capacity to do so	**PLO11:** Ability become entrepreneur
CLO1: To State and utilize the current-voltage relationships of resistors, capacitors, inductors, and independent and dependent current and voltage sources in solving dc circuits and calculating power and energy.	✓	✓		✓	✓						
CLO2: To State Ohm's and Kirchhoff's laws and apply these to voltage and current division, series/parallel and Wye-Delta transformations, mesh analysis, and nodal analysis for resistive circuits;	✓	✓		✓	✓						
CLO3: To State Superposition, Thevenin's and Norton's theorems and apply these for the analysis of dc circuits;	✓	✓		✓	✓						

17.	Content outline of the course/module and the SLT per topic						
	Details		**SLT (Hour)**				
			L	**T**	**P**	**IS**	**Total**
	Topic 1	**Introduction** Circuit Elements and Basis Laws **Electric quantities**: • Charges, • Voltage, • Current, • Power, • Energy	6	-	-	10	**16**
	Topic 2	**Voltage and current sources**: • Resistor, • Inductor and capacitor. • Ohm's Law • Kirchhoff's current and voltage Laws, • Thevenin's and Norton equivalents, • Superposition, • Reciprocity, • Maximum power transfer theorem	6	1	-	10	**17**
	Topic 3	**Signal and Waveforms** **Signal waveforms**: • D.C, • Step, • Impulse, • Square pulse, • Sinusoidal, • Triangular, • Exponential. • General description of signals: time constant, rms value, duty cycle, crest factor, form factor	6	1	-	10	**17**
	Topic4	**General description of signals:** • Time constant, • Rms value, • Duty cycle, • Crest factor, • Form factor.	6	1	-	10	**17**

	Topic 5	**Sinusoidal Steady State Analysis:** • Effective alternating current. • A.C. behavior in R, L and C elements. • Phasor analysis with complex algebra, • Two terminal networks - impedance, • Admittance and their real and imaginary parts. **Resonance:** • Series and parallel resonance, • Half power points, • Bandwidth, Q-factors. **Power:** • Instantaneous, • Average, • Power factor, • Active • Reactive, • Complex, • Apparent.	9	2	-	13	**24**
	Topic 6	**Transient Analysis :** • Analysis of first order LR and RC circuits subjected to excitation of d.c. • Square pulse, sinusoidal sources and exponential sources. • Interpretation of complementary function and particular integral. • Analysis of second order RLC circuit subjected to step input and sinusoidal input **Network Analysis :** • Elementary network topology, • Network constraints, • Network equilibrium equations. • Nodal and mesh network analysis.	9	2	-	12	**23**
	Practical	1. Ohm's Law verification 2. Kirchhoff's current and voltage Laws 3. Two terminal networks - impedance	-	-	6	-	**6**
	Total SLT (Hour)		**42**	**7**	**6**	**65**	**120**
18.	**Main references supporting the course** 1. C.K. Alexander and M.N.O. Sadiku, "Fundamentals of Electric Circuits", 3rd ed., McGraw-Hill, 2006						
	Additional references supporting the course 1. J. Nilsson and S. Riedel, "Electric Circuits", 10th ed., Prentice-Hall, 2008 2. R. C. Dorf and J. A. Svoboda, "Introduction to Electric Circuits", 6th ed., John Wiley, 2008						
19.	**Other additional information** All materials will be available to the students in the library.						