Course Specification

(Bachelor)

Course Title:	Electrical Engineering 1
Course Code:	EE2301
Program:	
Department:	Electrical Engineering
College:	College of Engineering
Institution:	King Khalid University
Version:	*Course Specification Version Number*
Last Revision Date:	*Pick Revision Date.*

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (--)					
4. Course general Description:					
This course covers the fundamental knowledge of the electric circuit, introduce Basic concepts, components of Electric Circuits and explain the methodologies used to solve electrical circuits. The course provides a detailed coverage of the various topics such as Ohm's law & Kirchhoff's laws, Resistance, Inductors, Capacitors and batteries combinations, Techniques for solving DC electric circuits and AC Steady-state Analysis.					
5. Pre-requirements for this course (if any)**:**					
MATH 1311, PHYS 1414					
6. Co-requisites for this course (if any)**:**					
7. Course Main Objective(s):					
This course provides the basic concepts and theories for the analysis of electrical circuits. It offers an understanding of the methodologies used to solve electrical circuits and has expertise in the study of electrical circuits. Use Kirchhoff's laws, circuit theorems and node voltage methodology to solve DC and AC circuits and demonstrate a basic understanding of batteries, Resistors, Inductors and Capacitors and its connections.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	36

2.	**Laboratory/Studio**	24
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Identify the basic concepts, components of electric circuits and Ohm's & Kirchhoff's laws	KLO4 [7]	Classroom Laboratory Experiment Videos Discussions Self-learning	Major Exam Assignments Quizzes Lab Work Final Exam
2.0	**Skills**			
2.1	Analyze current using various DC theorems	KLO1[1]	Classroom teaching Laboratory Experiments Discussions/Presentation	Major Exam Assignments Quizzes Lab Work Final Exam
2.2	Analyze DC networks by applying various laws and theorems	KLO1[1]		
2.3	Demonstrate basic proficiency in building basic electrical circuits and operating fundamental electrical engineering equipment	KLO3[6]		
2.4	Analyze the sinusoidal electrical quantities mathematically as well as graphically in the form of waveforms/phasors and analyze the AC circuits to determine the unknown quantities.	KLO2,KLO4[2, 7]		
2.5	Connect and analyze Series and Parallel Connection of Resistors, Inductors, Capacitors and Batteries	S5[6]		
3.0	**Values, autonomy, and responsibility**			

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.1				

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction - SI units, basic concepts of charge, current, voltage, electrical active and passive elements, power, energy, electrical sources-independent and dependent voltage, and current sources.	5
2.	Fundamental concepts of electrical circuits-Ohm's Law, series and parallel circuits, node, loop, branch, mesh.	5
3.	Kirchhoff's current and voltage law, concept of open circuit and short circuit.	5
4.	VDR on No-Load operation, VDR under Load	4
5.	Star-delta transformations.	4
6.	Nodal analysis.	4
7.	Mesh analysis.	4
8.	Source transformation, superposition theorem	4
9.	Thevenin's theorem, Norton's theorem, maximum power transfer theorem.	3
10.	Series and parallel connection of Batteries.	4
11.	Determining the Internal Resistance of batteries connected in series and Parallel	4
12.	'j' operator, rectangular and polar coordinates- periodic and non-periodic waveforms-instantaneous, peak, average and rms values-ac circuit configurations, phase angle,	5
13.	Inductors and Capacitors	
14.	Phasor diagram.	5
15.	Power factor-apparent, active and reactive power	4
	Total	**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments and (or) HomeWorks and (or) Mini-Projects	4, 6, 10	20%
2.	Quizzes	5, 7, 9, 11	20%
3.	Midterm	8, 13	20%
4.	Lab work	----	
5.	Final Exam	15	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	1. Basic Engineering Circuit Analysis, J. D. Irwin, 12th edition, Macmillan, 2020
Supportive References	1. Engineering Circuit Analysis (6th), 2002, W. H. Hayt, J.E. Kemmerly, and S. Durbin. 2. Electronic Devices and Circuit Theory (7th) by R. Boylestad and L. Nashelsky. 2016
Electronic Materials	1. Lecture handouts, Videos 2. https://www.youtube.com/watch?v=ObOXn4WMDSk&list=PL08ef9eJxtJYb2TBy0jOuzQIo1TzsL0u9
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms Laboratory
Technology equipment (projector, smart board, software)	Multimedia teaching aids-Projector, Speakers
Other equipment (depending on the nature of the specialty)	Hardware equipment designed as per the course

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	course evaluation Survey (indirect)
Effectiveness of Students assessment	Faculty	CLO analysis(direct)
Quality of learning resources	Students	Survey on Learning resources (indirect)
The extent to which CLOs have been achieved	Faculty, Quality committee	CLO analysis (direct), Course Report and PLO analysis (direct) by Quality Committee
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	REVIEW BY CURRICULUM COMMITTEE APPROVAL BY QUALITY COMMITTEE

REFERENCE NO.	EE/CS/EE2301/2024
DATE	2024