هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

Course Specification
(Bachelor)

Course Title:	Fundamentals of Electric Circuits
Course Code:	EE1221
Program:	Electrical Engineering
Department:	Electrical Engineering
College:	College of Engineering
Institution:	Imam Mohamad Ibn Saud Islamic University
Version:	V5
Last Revision Date:	01-01-2025

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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: (3rd level, 2nd year)					
4. Course general Description:					
Basic laws: Ohm's, KVL, KCL. Resistive networks. Circuit analysis techniques: nodal and mesh analysis. Network theorems: Thevenin's, Norton's, source transformations, superposition, maximum power transfer. Energy storage elements. Phasor technique for steady-state sinusoidal response. Transient analysis of first-order circuits. AC Power Analysis					
5. Pre-requirements for this course (if any):					
PHYS 1118					
6. Co-requisites for this course (if any):					
MATH1116, EE 1201					
7. Course Main Objective(s):					
The Course covers a variety of Electrical Engineering Fundamentals, which makes the student understand the many forthcoming subjects in his undergraduate studies; the course covers basic fundamentals of DC circuit analysis, transient analysis and starting of AC analysis.					

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**	45
2.	**Laboratory/Studio**	-
3.	**Field**	-
4.	**Tutorial**	15
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**			
K1	Identify the electrical circuit elements and the way to calculate them.	1.1	Delivering Lectures Solve problems in groups during tutorial	Quizzes in class Midterm exam Final exam
K1	Identify the electrical circuit elements laws.	1.8	Delivering Lectures Solve problems in groups during tutorial	Quizzes in class Midterm exam Final exam
K1	Solve the electrical circuit using nodal and mesh analysis.	1.4	Delivering Lectures Solve problems in groups during tutorial	Quizzes in class Midterm exam Final exam
K1	Formulate the electrical circuits using Superposition, Source transformation, Thevenin and Norton theorems for DC circuits	1.6	Delivering Lectures Solve problems in groups during tutorial	Quizzes in class Midterm exam Final exam
K1	Formulate the electrical circuits using Superposition, Source transformation, Thevenin and Norton theorems for AC circuits	1.7	Delivering Lectures Solve problems in groups during tutorial	Quizzes in class Midterm exam Final exam
K1	Formulate the AC power analysis	1.2	Delivering Lectures Solve problems in groups during tutorial	Quizzes in class Midterm exam Final exam
2.0	**Skills**			

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
NA				
3.0	**Values, autonomy, and responsibility**			
V2	Demonstrate ethical behavior among peers, and be punctual	4.3	Active participation during the course	Lecture attendance

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Circuits • SI units • Voltage, Current, Power and Energy	4
2	Basic components and electrical circuits • Sources, • Resistance • Ohm's Law	8
3	Voltage and current laws • Nodes and Branches • Kirchhoff's Laws • Single-loop Circuit • Resistors in Series and Parallel • Voltage Division • Current division	8
4	Basic nodal and mesh analysis • Introduction • Nodal Analysis • The Supernode • Mesh Analysis • The Supermesh • Node vs. Mesh Comparison	8
5	Circuit analysis techniques • Linearity Superposition • Source Transformations • Thevenin and Norton Equivalents • Maximum Power Transfer • Delta-to-Wye Equivalent Circuits	8
6	Capacitors and inductors • Inductors • Capacitors	8

	• Series and Parallel Combination	
7	Basic RL and RC circuit • RL circuits • RC circuits • Unit-step, pulse functions. • Natural and force response Driven circuits	4
8	Sinusoidal steady-state analysis • Characteristics, • Forced Response • Complex Forcing Function • The phasor • Impedance and Admittance • Node-Voltage Mesh-Current Methods • Superposition • Source Transformations • Thevenin and Norton Equivalents	8
9	AC power analysis	4
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm 1	7th week	20%
2.	Midterm 2	13th week	20%
3.	Quizzes	During the course	7%
4.	Homework	During the Course	7%
5.	Major Quiz	During the course	3%
6.	Oral Presentation about selected topics	End of term	3%
7.	Final Exam	Final Exam week	40%
8.	Midterm 1	7th week	20%

*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. C. K. Alexander and M. N. O. Sadiku, *Fundamentals of Electric Circuits*, Sixth Edition, McGraw-Hill, 2017.

Supportive References	1- W. H. Hayt, Jr., J. E. Kemmerly, and S.M. Durbin, Engineering Circuit Analysis, McGraw-Hil, 2007, eighth edition 2- Robert L. Boylestad, *Introductory Circuit Analysis*, Eleventh Edition. 3- John O'Malley, *Schaum's Outline of Basic Circuit Analysis*, Second edition.
Electronic Materials	YouTube videos from Khan Academy
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	One classroom: fits up to 25 students with white board.
Technology equipment (projector, smart board, software)	A laptop computer connected to a projector to display PowerPoint presentations
Other equipment (depending on the nature of the specialty)	N/A

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	**Students**	**Indirect**
Effectiveness of Students assessment	**Students**	**Indirect**
Quality of learning resources	**Relevant Focus Group**	**Indirect**
The extent to which CLOs have been achieved	**Dept. Quality Committee**	**Direct**
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	