MUTAH UNIVERSITY
Faculty of Engineering
Department of Electrical Engineering

Course Syllabus

Course Code	Course Name	Credits	Contact Hours
0401212	Electric Circuits (2)	3	3 T

INSTRUCTOR/COORDINATOR	
Name	Dr. Saqer S. Alja'Afreh
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Office Hours	12:30-14:00 (Mon, Wed)
Classroom Time	9:30-11:00 (Mon, Wed)

TEXTBOOK	
Title	Fundamentals of Electric Circuits
Author/Year/Edition	Charles K. Alexander, Matthew N.O. Sadiku, McGraw Hill/2012/ 5th Ed
Other Supplemental Materials	
Title	Electric Circuits Analysis
Author/Year/Edition	William Hayt and Jack Kemmerly and Jamie Phillips and Steven Durbin/ 2019/9th Edition

SPECIFIC COURSE INFORMATION
A. Brief Description of the Content of the Course (Catalog Description)
Three phase circuits and power calculations. Magnetic coupling and ideal transformer. One and two port networks transfer function and complex frequency. Resonant circuits filters types, analysis, and design, applications of Laplace and Fourier transforms in circuits.
B. Pre-requisites (P) or Co-requisites (C)
Electric Circuits (1) (0401211) **(P)**
C. Course Type (Required or Elective)
Required

SPECIFIC GOALS

A. Course Learning Objectives (CLOs)

By the end of this course, the student should be able to:
CLO1: **Analyze** three phase circuits [1]
CLO2: **Analyze** magnetically coupled AC circuits and ideal transformers circuits [1].
CLO3: **Model & Analyze** transient circuits using Laplace Transform [1].
CLO4: Mathematically **Derive** the Fourier Transform of non-periodic signals and **Analyze** Electrical circuits of non-periodic sources utilizing Fourier Transform techniques [1].
CLO5: **Derive and Classify** frequency response functions for given filters circuits [1].
CLO6: Determine resonant frequency, quality factor and bandwidth of a network, in addition to drawing Bode plots. [1]
CLO7 : **Differentiate** between one-port and two-port networks, **Calculate/Derive** the different Parameters of two-port networks and analyze the terminated and non-terminated two-port networks in different interconnections [1].

B. Student Learning Outcomes (SOs) Addressed by the Course

1	2	3	4	5	6	7
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BRIEF LIST OF TOPICS TO BE COVERED

List of Topics	No. of Weeks	Contact Hours
Chapter 12: Three-phase circuits: Balanced (Y-Y, Y, D , D-Y and D-D) connections. Power in balanced system. Unbalanced three phase system.	2	6
Chapter 13: Magnetically Coupled Circuits: Mutah Inductance. Energy in coupled circuits. Ideal Transformers.	2	6
Chapter 14: Frequency Response: Frequency Response Functions. Bode plots. Series resonance. Parallel resonance. Passive filters and active filters	2	6
Chapter 15: Introduction to the Laplace Transform: Definition of Laplace transform. Properties of Laplace transform. Inverse Laplace transform.	1	3
Chapter 16: Applications of Laplace Transform: Circuit element models. Circuit analysis. Transfer Function.	2	6
Chapter 17; The Fourier Series: Trigonometric Fourier series. Symmetry consideration. Exponential Fourier Series.	1	3
Chapter 18: The Fourier Transform: Definition of Fourier transform. Properties of Fourier transform. Circuit Applications of Fourier Transform.	2	6
Chapter 19: Two-Port Networks: Impedance parameters. Admittance parameters, Hybrid parameters. Transmission parameters. Interconnections of networks.	2	6
Total	*14*	*42*

EVALUATION

Assessment Tool	Due Date	Weight (%)

Mid Exam	According to the university calendar	30
Course Work (Homeworks, Quizzes, Projects, …etc.)	One week after being assigned	20
Final Exam	According to the university calendar	50

ABET's Students Learning Outcomes (Criterion # 3)		
	Relationship to program outcomes	
ABET 1-7		**Engineering Student Outcomes**
1	√	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2		an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3		an ability to communicate effectively with a range of audiences.
4		an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5		an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6		an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7		an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.