Faculty: Engineering Technology	
Department: Energy	**Program: Bachelor Degree**
Academic year: 2022-2023	**Semester: 2^{st}(Fall)**

Course Plan

First: Course Information

Course No. 0906203	***Course Title:*** Electrical circuits	***Credit Hours:3***
Prerequisite: 0300122	***Section No.: 1***	***Lecture Time: 10-11,Sun,Tue,and Thu***
Type Of Course:	☐ ***Obligatory Faculty Requirement*** ***Elective*** ☐ ***University Requirement*** ☐ ***ObligatoryUniversity Requirement*** ☐ ***FacultyRequirement*** ☐ ***Course Elective SpecialtyRequirementObligatorySpecialization requirement***	
Type of Learning:	☒ ***Face-to-Face Learning*** ☐ ***BlendedLearning(2 Face-to-Face + 1Asynchronous)*** ☐ ***Online Learning (2 Synchronous+1 Asynchronous)***	

Second: Instructor's Information

Name: **Dr. Hani Attar**		***Academic Rank:*** **Assistant Professor**	
Office Number:43 l		***Ext. Number:2029***	***E-mail:*** **Hattar@zu.edu.jo**
Office Hours:	***Sunday 11-12*** ***Monday 11-12*** ***Tuesday 11-12*** ***Wednesday 11 -12*** ***Thursday 11-12***		

Third: Course Description

Basic Electric Components and Equivalent Circuit. Kirchhoffs' laws (KVL and KCL). Circuit analysis techniques: Nodal analysis, mesh analysis, superposition, source transformations. Thevenin's and Norton's theorems, maximum power transfer. Unit step response of RL and RC circuit.AC circuit introduction.Impedance and Admittance. Phasor form representation. Steady state sinusoidal circuit analysis using phasor techniques, frequency response. Apparent Power , active and reactive power, power factor, complex power. 3-phase balanced (Y-Y) and (delta-delta) connection circuits. Circuit analysis using Fourier series

Fourth: Learning Source

Main Reference:	Fundamentals of electrical circuits	
Author: Charles K. Alexander and Matthew N.O. Sadiku	***Issue No.:*** 5th	***Publication Year:*** 2001
Additional Sources&Websites:	• Engineering circuit analysis ", by William H. Hayt,, Jack E. Kemmerly and Steven M. Durbin. 8th edition •	
Teaching Type:	☒ ***Classroom*** ☐ ***Laboratory*** ☐ ***Workshop*** ☐ ***MS Teams*** ☐ ***Moodle***	

Fifth: Learning Outcomes

Course Code	***Course IntendedLearning Outcomes (CILOs)***	***Connection To Program ILOs Code***
Knowledge		
**K1	The ability to use the different circuit analysis methods: mesh current analysis and node voltage analysis.	*PK1
K2	The ability to simplify circuits using circuit theorems, such as: Thevenin and Norton theorems, super position principle, and source transformation.	PK2
K3	The ability to analyze the behavior of inductors and capacitors and the step response ofR-L and R-C circuits	PK3
Skills		
***S1	To be familial with Sinusoidal wave characteristics, connection and types, complex numbers, phasor representation and analyze frequency response of R-L, R-C and R-L-C circuits.	PS1
S2	The ability to analyze the complex power and power factor	PS2
S3	To be familiar with the basic concepts of 3-phase systems	PS3
S4	Analyze ac circuit using Fourier series.	PS4
Competencies		
****C1	To be familiar with using Ohm's law and the calculations of power, analyze series, parallel and series-parallel resistive circuits, using Kirchhoff's current and voltage laws	PC1

*** P: Program, **K: knowledge, ***S: skills, ****C: competencies**

Sixth: Course Structure

Lecture Date	Intended Teaching Outcomes(ILOs)	Topics	Teaching Procedures*	TeachingMethods***	References***
5/3/2023	0	Ohm's law, DC power calculation, series, parallel and series-parallel resistive circuits, Kirchhoff's current and voltage laws	General discussions	Discussion and problem Solving	Energy Engineering
7/3/2023	1	Ohm's law, DC power calculation, series, parallel and series-parallel resistive circuits, Kirchhoff's current and voltage laws	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
9/3/2023	1	Ohm's law, DC power calculation, series, parallel and series-parallel resistive circuits, Kirchhoff's current and voltage laws	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
12/3/2023	1	Circuits analysis methods : Nodal and mesh analysis	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
14/3/2023	2	Circuits analysis methods : Nodal and mesh analysis	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
16/3/2023	1 & 2	Circuits analysis methods : Nodal and mesh analysis	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
19/3/2023	3	Circuit theorems: Thevenin's , Norton's , source transformation , super position theorems and maximum power transfere	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
21/3/2023	3	Circuit theorems: Thevenin's , Norton's , source transformation , super position theorems and maximum power transfere	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
23/3/2023	3	Circuit theorems: Thevenin's , Norton's , source transformation , super position theorems and maximum power transfere	General discussions	Discussion and problem Solving	Energy Engineering

26/3/2023	3	Inductors , capacitors , step response of R	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
28/3/2023	3	Inductors , capacitors , step response of R	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
30/3/2023	4	Inductors , capacitors , step response of R	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
2/4/2023	3 & 4	Inductors , capacitors step response of R	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
4/4/2023	3 & 4	Introduction to AC circuits, phasor representation, and steady state AC circuit analysis	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
6/4/2023	4	Introduction to AC circuits, phasor representation, and steady state AC circuit analysis	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
9/4/2023	5	Introduction to AC circuits, phasor representation, and steady state AC circuit analysis	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
11/4/2023	5	Introduction to AC circuits, phasor representation, and steady state AC circuit analysis	General discussions	Discussion and problem Solving	Energy Engineering
13/4/2023	5	AC power analysis: average power, apparent power, reactive power, complex power and power factor	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
16/4/2023	5	AC power analysis: average power, apparent power, reactive power, complex power and power factor	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
18/4/2023	5	AC power analysis: average power, apparent power, reactive power, complex power and power factor	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering

20/4/2023	4	AC power analysis: average power, apparent power, reactive power, complex power and power factor	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
27/4/2023	3 & 4	phase balanced circuits: Y	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
30/4/2023	6	phase balanced circuits: Y	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
2/5/2023	4	phase balanced circuits: Y	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
4/5/2023	3 & 4	phase balanced circuits: Y	General discussions	Discussion and problem Solving	Energy Engineering
7/5/2023	3 & 4	phase balanced circuits: Y	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
9/5/2023	4	phase balanced circuits: Y	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
11/5/2023	6	phase balanced circuits: Y	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
14/5/2023	4	phase balanced circuits: Y	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
16/5/2023	6	phase balanced circuits: Y	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
18/5/2023	4	AC circuit analysis using Fourier series	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
21/5/2023	7	AC circuit analysis using Fourier series	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
23/5/2023	8 , 9 , 10	AC circuit analysis using Fourier series	General discussions	Discussion and problem Solving	Energy Engineering
28/5/2023	8 , 9 , 10	AC circuit analysis using Fourier series	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
30/5/2023	8 , 9 , 10	AC circuit analysis using Fourier series	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
1/6/2023	8 , 9 , 10	AC circuit analysis using Fourier series	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
4/6/2023	10	AC circuit analysis using Fourier series	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
6/6/2023	10	AC circuit analysis using Fourier series	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering

* Learning procedures: (Face-to-Face, synchronous, asynchronous). * * Teaching methods: (Lecture, video…..). ** * Reference: (Pages of the book, recorded lecture, video….).

Seventh: Assessment methods

Methods	Grade	Date	Platform	CLO'S
First Exam	20	Fixed by the Department	Classroom	
Second Exam	20	Fixed by the Department	Classroom	
Assign, Quizzes &Participation	10	During Semester	Classroom+Moodle	
Final Exam	50	Fixed by the Department	Classroom	

Eighth: Course Policies

- All course policies are applied on all teaching patterns (online, blended, and face-to-face Learning) as follows:
  a. Punctuality.
  b. Participation and interaction.
  c. Attendance and exams.
- Academic integrity: (cheating and plagiarism are prohibited).

Approved by:	Name	Date	Signature
Head of Department	Dr. Ayman Amer	5/3/2023	
Faculty Dean	Prof .Taiseer Alghanim	5/3/2023