Electrical and Electronic Engineering (English)			
Bachelor	TR-NQF-HE: Level 6	QF-EHEA: First Cycle	EQF-LLL: Level 6

Course Introduction and Application Information

Course Code:	EEE208
Course Name:	Circuit Analysis 2
Semester:	Spring
Course Credits:	ECTS: 6
Language of instruction:	English
Course Condition:	
Does the Course Require Work Experience?:	No
Type of course:	Compulsory Courses
Course Level:	Bachelor | TR-NQF-HE:6. Master`s Degree | QF-EHEA:First Cycle | EQF-LLL:6. Master`s Degree
Mode of Delivery:	Face to face
Course Coordinator:	Prof. Dr. INDRIT MYDERRİZİ
Course Lecturer(s):	SAEED HATAMZADEH
Course Assistants:	

Course Objective and Content

Course Objectives:	The goal of this course is to introduce phasors and Laplace transforms for analyzing and solving circuits in the frequency domain, to develop the ability of analyzing passive and active filters, to teach the basics of Bode diagrams.
Course Content:	Sinusoidal Steady State circuit analysis: phasors, circuit theorems and analysis methods, power calculations. Laplace Transform: definition and its application to circuit analysis. Transfer

	functions. Basic passive and active filters. Bode diagrams.

Learning Outcomes

The students who have succeeded in this course;
1) Define phasors and impedances.
2) Analyze AC Circuits in the frequency domain to determine their steady-state response.
3) Define the Laplace Transform (transformation from time to complex frequency domain)
4) Analyze electric circuits using Laplace Transform and circuit analysis methods
5) Analyze passive and active (RLC) filters using transfer functions.

Course Flow Plan

Week	Subject	Related Preparation
1)	Properties of sinusoidal signal, Sinusoidal steady state, Phasor representation.	
2)	Definitions of impedance and admittance. Analysis methods for finding the steady state solutions of AC circuits in frequency domain using phasors.	
3)	Circuit analysis application examples using phasors.	
4)	Thevenin, Superposition and Maximum Power Transfer theorems and their application examples using phasors.	
5)	Complex Power calculations.	
6)	Definition of Laplace transform. Laplace transform of commonly used input signals. Modeling circuit elements in Laplace domain and circuit analysis methods.	
7)	Application examples for Laplace domain circuit analysis.	
8)	Midterm	
9)	Transfer functions. Passive filters.	
10)	RC/RL type filter analysis.	
11)	RC/RL type filter analysis.	
12)	Active filter analysis using RLC elements and active devices.	
13)	Bode Diagram Sketching.	
14)	Introduction to basic 3-phase circuit analysis.	

Sources

Course Notes / Textbooks:	Richard C. Dorf and James A. Svoboda, Introduction to Electric Circuits, John Wiley
References:	James W. Nilsson and Susan A. Riedel, Electric Circuits, 10th Ed. Pearson/Prentice Hall

Course - Program Learning Outcome Relationship

Course Learning Outcomes	1	2	3	4	5
Program Outcomes					
1) Adequate knowledge in mathematics, science and Electrical and Electronics engineering; the ability to use theoretical and practical knowledge in these areas in complex engineering problems.		2	2		
2) Ability to identify, formulate, and solve complex electrical and electronics engineering problems; ability to select and apply appropriate analysis and modeling methods for this purpose.	2	2			
3) Ability to design a complex circuit, device or system to meet specific requirements under realistic constraints and conditions; ability to apply modern design methods for this purpose.		2	2		
4) Ability to develop, select and use modern techniques and tools necessary for the analysis and solution of complex problems encountered in electrical and electronics engineering applications; ability to use information technologies effectively.	2		2		
5) Ability to design, conduct experiments, collect data, analyze and interpret results for the study of complex engineering problems or electrical and electronics engineering research topics.	2			2	
6) Ability to work effectively within and multidisciplinary teams; individual study skills.					
7) Ability to communicate effectively orally and in writing; knowledge of at least one foreign language; ability to write effectice reports and understand written reports, to prepare design and production reports, to make effective presentations, to give and receive clear and understandable instructions.					
8) Awareness of the necessity of lifelong learning; ability to access information, to follow developments in science and technology and to renew continuously.					
9) To act in accordance with ethical principles, professional and ethical responsibility; information on the standards used in electrical and electronics engineering applications.					

Course Learning Outcomes	1	2	3	4	5
10) Information on business practices such as project management, risk management and change management; awareness of entrepreneurship and innovation; information about sustainable development.					
11) Knowledge of the effects of electrical and electronics engineering practices on health, environment and safety in the universal and social scale and the problems of the era reflected in electrical and electronics engineering; awareness of the legal consequences of electrical and electronics engineering solutions.					

Course - Learning Outcome Relationship

No Effect	1 Lowest	2 Average	3 Highest

	Program Outcomes	Level of Contribution
1)	Adequate knowledge in mathematics, science and Electrical and Electronics engineering; the ability to use theoretical and practical knowledge in these areas in complex engineering problems.	2
2)	Ability to identify, formulate, and solve complex electrical and electronics engineering problems; ability to select and apply appropriate analysis and modeling methods for this purpose.	2
3)	Ability to design a complex circuit, device or system to meet specific requirements under realistic constraints and conditions; ability to apply modern design methods for this purpose.	2
4)	Ability to develop, select and use modern techniques and tools necessary for the analysis and solution of complex problems encountered in electrical and electronics engineering applications; ability to use information technologies effectively.	2
5)	Ability to design, conduct experiments, collect data, analyze and interpret results for the study of complex engineering problems or electrical and electronics engineering research topics.	2
6)	Ability to work effectively within and multidisciplinary teams; individual study skills.	
7)	Ability to communicate effectively orally and in writing; knowledge of at least one foreign language; ability to write effectice reports and understand written reports, to prepare design and production reports, to make effective presentations, to give and receive clear and understandable instructions.	
8)	Awareness of the necessity of lifelong learning; ability to access information, to follow developments in science and technology and to renew continuously.	

9)	To act in accordance with ethical principles, professional and ethical responsibility; information on the standards used in electrical and electronics engineering applications.	
10)	Information on business practices such as project management, risk management and change management; awareness of entrepreneurship and innovation; information about sustainable development.	
11)	Knowledge of the effects of electrical and electronics engineering practices on health, environment and safety in the universal and social scale and the problems of the era reflected in electrical and electronics engineering; awareness of the legal consequences of electrical and electronics engineering solutions.	

Assessment & Grading

Semester Requirements	Number of Activities	Level of Contribution
Laboratory	7	% 20
Midterms	1	% 30
Final	1	% 50
total		**% 100**
PERCENTAGE OF SEMESTER WORK		% 50
PERCENTAGE OF FINAL WORK		% 50
total		**% 100**

Workload and ECTS Credit Calculation

Activities	Number of Activities	Preparation for the Activity	Spent for the Activity Itself	Completing the Activity Requirements	Workload
Course Hours	13	3			39
Laboratory	13	2			26
Study Hours Out of Class	13	3			39
Midterms	1	20			20
Final	1	20			20
Total Workload					**144**