



**ESOGU ELECTRICAL - ELECTRONICS ENGINEERING DEPARTMENT  
COURSE INFORMATION FORM**

Course Title	Course Code
CIRCUIT ANALYSIS I	151223565

Semester in Program	Number of Course Hours per Week		ECTS
	Theory	Practice	
3	4	0	7

Course ECTS Credit Distribution				
Basic Sciences	Engineering Sciences	Design	General Education	Social
1	3	0	0	0

Language of Instruction	Course Level	Course Type
English	Undergraduate	Required

<b>Prerequisite</b>	
<b>Objectives of the Course</b>	Introducing elements of circuits. Teaching circuit analysis methods. Analyzing direct current (DC) circuits. Analysis of RL, RC, and RLC circuits.
<b>Brief Course Content</b>	Current, voltage, power, energy. Resistor. Sources. Ohm and Kirchoff's Laws, Circuit Analysis techniques (Node voltage, mesh current, Thevenin and Norton Theorems, superposition, source transformation). OPAMP, Capacitor and inductor. RL and RC circuits, Transient response. Step response. Transient and step response of RLC circuits.

Learning Outcomes of the Course	Contributed POs	Teaching Methods *	Assessment Methods **
1 Recognize basic elements in the electrical circuits	1, 2, 4a, 6a	1, 5, 10	A, B, D
2 Calculate current, voltage, power, and energy of an element in the circuit	1, 2, 4a, 6a	1, 5, 10	A, B, D
3 Apply electrical circuit analysis methods	1, 2, 4a, 6a	1, 5, 10	A, B, D
4 Analyze the transient and step responses of RL, RC, and RLC circuits	1, 2, 4a, 6a	1, 5, 10	A, B, D
5			
6			
7			
8			

\*Teaching Methods 1:Lecture, 2:Discussion, 3:Experiment, 4:Simulation, 5:Question-Answer, 6:Tutorial, 7:Observation, 8:Case Study, 9:Technical Visit, 10:Problem Solving, 11:Individual Work, 12:Team/Group Work, 13:Brain Storm, 14:Project Design / Management, 15:Report Preparation and/or Presentation

\*\*Assessment Methods A:Exam, B:Quiz, C:Oral Exam, D:Homework, E:Report, F:Article Examination, G:Presentation, I:Experimental Skill, J:Project Observation, K:Class Attendance; L:Jury Exam

<b>Main Textbook</b>	Nilsson, J. W. and S. A. Riedel, Electric Circuits, Pearson Prentice Hall Inc., 10 <sup>th</sup> Ed., 2008.
<b>Supplementary Resources</b>	1) Hayt, W. H., J. E. Kemmerly, S. M. Durbin, Engineering Circuit Analysis, Mc Graw Hill Inc., 8th Ed., 2011. 2) Dorf, R. C., J. A. Svoboda, Introduction to Electric Circuits, Wiley Inc., 7th Ed., 2006. 3) Alexander, C. K., M. N.O. Sadiku, Fundamentals of Electric Circuits, Mc Graw Hill Inc., 3rd Ed., 2008.
<b>Necessary Course Material</b>	

Course Weekly Schedule	
1	Current, voltage, power, energy definitions. Sources and resistors.
2	Ohm's law and Kirchoff Laws.
3	Basic resistor circuits, series and parallel resistors.
4	Delta-to-Y, Y-to-Delta transformations.
5	Node-voltage method, mesh-current method.
6	Thevenin and Norton theorems, maximum power transfer.
7	Superposition theorem and source transformation.
8	Mid-Term Exams
9	Inductor and Capacitor.
10	Transient response of RL and RC circuits.
11	Step response of RL and RC circuits.
12	Transient response of RLC circuits.
13	Step response of RLC circuits.
14	Complete response of RL and RC circuits. The integrating amplifier.
15	Complete response of RLC circuits. Cascaded two integrating amplifiers.
16,17	Final Exams

Calculation of Course Workload			
Activities	Count	Time (Hour)	Total Workload (Hour)
Weekly classroom time	14	4	56
Weekly study time (review, reinforcing, preparation)	14	3	42
Homework	10	3	30
Taking a quiz	2	1	2
Studying for a quiz	2	3	6
Oral exam			
Studying for an oral exam			
Report writing (Preparation and presentation time included)			
Project (Preparation and presentation time included)			
Presentation (Preparation time included)			
Mid-Term Exam	1	2	2
Studying for Mid-Term Exam	1	25	25
Final Exam	1	2	2
Studying for Final Exam	1	25	25
		<b>Total workload</b>	<b>190</b>
		<b>Total workload / 30</b>	<b>6,33</b>
		<b>Course ECTS Credit</b>	<b>7</b>

Assessment	
Activity Type	%
Mid-term	30
Quiz	20
Homework	10
<b>Final Exam</b>	40
<b>Total</b>	100

<b>COURSE CONTRIBUTION TO THE PROGRAM OUTCOMES</b> (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)		
<b>NO</b>	<b>PROGRAM OUTCOMES</b>	<b>Contribution</b>
<b>1</b>	a. Sufficient knowledge of mathematics	4
	b. Sufficient knowledge of basic sciences	4
	c. Sufficient basic engineering and Electrical-Electronics engineering knowledge	5
	d. Skill of applying all these knowledge and experience to complicated Electrical-Electronics engineering problems	5
<b>2</b>	Skill of defining, identifying, formulating and solving the complicated problems in Electrical-Electronics engineering and related areas by applying appropriate analysis and modelling methods.	5
<b>3</b>	Skill of designing a complicated process, system, equipment or product by applying modern design methods under realistic constraints and conditions.	
<b>4</b>	To analyze and solve the complicated engineering problems:	5
	a. skill of developing, selecting and applying the required techniques and devices	
	b. skill of using information technologies effectively	
<b>5</b>	To study the complicated on the complicated Electrical-Electronics engineering problems and research subjects:	
	a. skill of experimental design	
	b. skill of performing the experiments, collecting the data and analyzing and interpreting the results	
<b>6</b>	a. Skill of performing individual studies	5
	b. Skill of performing intra and interdisciplinary and multidisciplinary teamwork and studies	
<b>7</b>	a. Skill of effective oral and writing communication in Turkish	
	b. Skill of improving and using foreign language knowledge	
	c. Skill of effective reporting, understanding the reports and preparing the design and production reports	
	d. Skill of effective presentation and giving and getting clear and understandable instructions.	
<b>8</b>	Awareness of the necessity of life-long learning and skill of accessing to information and following the improvements in contemporary science and technology	
<b>9</b>	a. Awareness of necessity of behaving in accordance with the ethical principles and awareness of the importance of having professional ethical responsibilities	
	b. Knowledge about legal regulations and standards of engineering	
<b>10</b>	a. Knowledge about project management, risk management and change management	
	b. Awareness of the significance of entrepreneurship and innovation	
	c. Knowledge about sustainable development	
<b>11</b>	Knowledge about the effects of engineering applications and practices on the global and social health, ecology and safety, knowledge about the current problems in relation to the working areas of Electrical-Electronics engineering; and awareness of the legal issues resulting from engineering solutions	
<b>12</b>	Knowledge about modern problems in local and universal scale	

<b>LECTURER(S)</b>			
<b>Prepared by</b>	Prof. Dr. Osman Parlaktuna	Prof. Dr. Semih Ergin	

**Date:** 06.07.2024