



ESOGU ELECTRICAL-ELECTRONICS ENGINEERING DEPARTMENT  
COURSE INFORMATION FORM

Course Title	Course Code
CALCULUS I	151221202

Semester in Program	Number of Course Hours per Week		ECTS Credit
	Theory	Practice	
1	4	0	5

Course ECTS Credit Distribution				
Basic Sciences	Engineering Sciences	Design	General Education	Social
5	0	0	0	0

Language of Instruction	Course Level	Course Type
English	Undergraduate	Required

<b>Prerequisite</b>	-
<b>Objectives of the Course</b>	Teaching students the basic concepts, theorems of calculus and provide them the ability to solve mathematical problems.
<b>Brief Course Content</b>	Functions. Limits and continuity. Differentiation. Applications of derivatives. Integration. Techniques of integration. Application of integration.

Learning Outcomes of the Course	Contributed POs	Teaching Methods *	Assessment Methods **
1 Solving limit problems.	1a	1, 10	A, B
2 Defining differentiation.	1a	1, 10	A, B
3 Applying derivatives to certain problems.	1a	1, 10	A, B
4 Defining integration.	1a	1, 10	A, B
5 Solving definite integrals.	1a	1, 10	A, B
6 Applying integration to certain problems.	1a	1, 10	A, B
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>	J. R. Hass, C. E. Heil, M. D. Weir, P. Bogacki, Thomas' Calculus, Pearson, 15th ed., 2023.
<b>Supplementary Resources</b>	- J. Stewart, D. K. Clegg, S. Watson, Calculus, Cengage Learning; 9th ed, 2020. - Abdülkadir Özdeğer ve Nursun Özdeğer, Çözümlü Analiz Problemleri Cilt I, İTÜ Fen Fakültesi Yayınları, 1996. - Ahmet A. Karadeniz, Yüksek Matematik Cilt: 1, Çağlayan Kitabevi, 2011. - Ahmet A. Karadeniz, Yüksek Matematik Cilt: 2, Çağlayan Kitabevi, 2007.
<b>Necessary Course Material</b>	-

Course Weekly Schedule	
1	Functions and their graphs. Shifting and scaling.
2	Trigonometric functions. Exponential functions. Inverse functions. Natural logarithm.
3	Limits. Types of limits.
4	Types of limits. Continuity of a function.
5	Differentiation. Tangents and derivative at a point. Differentiation rules.
6	Derivatives of certain functions. Chain rule. Implicit differentiation.
7	Extreme values of a function. Mean value theorem.
8	Mid-Term Exams
9	Antiderivatives. Integration. Definite integrals and their properties.
10	Areas under the graphs. Average value of a continuous function.
11	Indefinite integrals and substitution method. Areas between curves.
12	Volumes using cross-sections. Volumes by disks for rotation. Solids of revolution.
13	Volumes using cylindrical shells. Arc length. Areas of surfaces of revolution.
14	Techniques of integration. Integration by parts. Trigonometric integrals.
15	Integration of rational functions by partial fractions. Heaviside method.
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	4	56
Homework	0	0	0
Taking a quiz	2	1	2
Studying for a quiz	2	5	10
Oral exam	0	0	0
Studying for an oral exam	0	0	0
Report writing (Preparation and presentation time included)	0	0	0
Project (Preparation and presentation time included)	0	0	0
Presentation (Preparation time included)	0	0	0
Mid-Term Exam	1	2	2
Studying for Mid-Term Exam	1	16	16
Final Exam	1	2	2
Studying for Final Exam	1	16	16
		<b>Total workload</b>	<b>160</b>
		<b>Total workload / 30</b>	<b>5.3333</b>
		<b>Course ECTS Credit</b>	<b>5</b>

Assessment	
Activity Type	%
Mid-term	35
Quiz	20
<b>Final Exam</b>	45
<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	5	
	b. Sufficient knowledge of basic sciences	1	
	c. Sufficient basic engineering and Electrical-Electronics engineering knowledge	1	
	d. Skill of applying all these knowledge and experience to complicated Electrical-Electronics engineering problems	1	
<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.	1	
<b>3</b>	Skill of designing a complicated process, system, equipment or product by applying modern design methods under realistic constraints and conditions.	1	
<b>4</b>	To analyze and solve the complicated engineering problems:	1	
	a. skill of developing, selecting and applying the required techniques and devices	1	
<b>5</b>	b. skill of using information technologies effectively	1	
	To study the complicated on the complicated Electrical-Electronics engineering problems and research subjects:	1	
<b>6</b>	a. skill of experimental design	1	
	b. skill of performing the experiments, collecting the data and analyzing and interpreting the results	1	
<b>7</b>	a. Skill of performing individual studies	1	
	b. Skill of performing intra and interdisciplinary and multidisciplinary teamwork and studies	1	
	c. Skill of effective oral and writing communication in Turkish and English	1	
	d. Skill of improving and using foreign language knowledge	1	
<b>8</b>	c. Skill of effective reporting, understanding the reports and preparing the design and production reports	1	
	d. Skill of effective presentation and giving and getting clear and understandable instructions.	1	
	<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	1
	<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	1
b. Knowledge about legal regulations and standards of engineering		1	
<b>10</b>	a. Knowledge about project management, risk management and change management	1	
	b. Awareness of the significance of entrepreneurship and innovation	1	
	c. Knowledge about sustainable development	1	
<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	1	
<b>12</b>	Knowledge about modern problems in local and universal scale	1	

<b>INSTRUCTORS</b>				
<b>Prepared by</b>	Özge YANAZ ÇINAR			

**Date:** 06.07.2024