ESOGU METALLURGY AND MATERIALS ENGINEERING DEPARTMENT

COURSE INFORMATION FORM

Course Name	Course Code
Calculus II	151912193

Semester	Weekly Course Period		Credit	ECTS
	Theory	Practice		
2	4	0	4	5

Course Catagory (credit distribution)				
Maths and Basic Sciences	Engineering Sciences	Engineering Design	General Education	Social Sciences
✓				

Course Language	Course Level	Course Type
Turkish	Undergraduate	Compulsory

Prerequieite(s)	
Course Objectives	To introduce multivariable functions and multiple integrals and to teach the calculation of areas and volumes with their help.
Course Description	Sequences and series, vector valued functions, multivariable functions, multiple integrals and their applications

	Course Outcomes	Contributed program outcomes	Education Methods*	Assessment Methods **
1	Solves multivariable function, limit, continuity and derivative problems.	1a	1,5	A
2	Knows the relationship between perpendicular, polar, cylindrical and spherical coordinates, and the concepts of area and volume elements and uses them in practice.	1a	1,5	A
3	Combines the distribution of physical quantities with the concepts of scalar and vector fields.	1a	1,5	A
4	Physically interprets mathematical definitions of scalar and vector fields.	1a	1,5	A
5	Gains skills in the mathematical structure, physical equivalents and solutions of multiple integrals.	1a	1,5	A
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Textbook	Balcı, M., 2010, Genel Matematik 2, Balcı Yayınları, Ankara.
Other References	1. Koçak, M, Genel Matematik, "Diferensiyel ve İntegral Hesap". 2. Balcı, M., 2009, Genel Matematik Problemleri 2, Balcı Yayınları, Ankara.
Tools and Equipment Required	

COURSE SYLLABUS	
1	Sequences and series
2	Vector functions
3	Functions of several variables, limits and continuities of them
4	Partial derivatives and chain rules
5	Derivative of implicit functions and Directional derivative
6	Double integrals and region transformations
7	Review
8	**MIDTERM**
9	Finding volumes and areas by double integration
10	Finding volumes and areas by double integration
11	Finding mass and center of gravity by double integration
12	Calculating the volume and moment of inertia of a solid of revolution with double integrals
13	Triple integrals and region transformations
14	Applications of triple integrals (calculation of volume, mass, moment of inertia)
15	Applications of triple integrals (calculation of volume, mass, moment of inertia)
16,17	**FINAL EXAM**

Calculation of Course Workload			
Activities	**Number**	**Duration (hr)**	**Total Workload (hr)**
Course Duration (total weekly course hours)	14	4	56
Class Study time (revision, reinforcement, pre-study,….)	14	3	42
Homework			
Quiz			
Quiz preparation			
Oral Exam			
Oral Exam prep			
Report (including preparation and presentation time)			
Project (including preparation and presentation time)			
Presentation (including preparation time)			
Midterm	1	1.5	1.5
Midterm Exam preparation	1	20	20
Semester final exam	1	1.5	1.5
Final exam preparation	1	20	20
	Total workload		141
	Total workload / 30		4.47
	Course ECTS Credits		5

Assessment	
Semester activities	**%**
Midterm	40
Quiz	
Homework	
Semester final exam	60
Total	100

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (PO) (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)		
NO	**PROGRAM OUTCOME**	**Contribution**
1	To possess sufficient knowledge in mathematics, science, and engineering subjects related to Metallurgical and Materials Engineering; the ability to apply theoretical and practical knowledge in these areas to model and solve engineering problems.	5
2	The ability to identify, define, formulate, and solve complex engineering problems by selecting and applying appropriate analysis and modeling methods.	2
3	The ability to design a complex system, process, device, or product under realistic constraints and conditions to meet specific requirements by applying modern design methods.	2
4	The ability to develop, select, and use modern techniques and tools necessary for engineering applications encountered as a Metallurgical and Materials Engineer; the ability to effectively use information technology.	3
5	The ability to design experiments, conduct experiments, collect data, analyze results, and interpret findings for the investigation of engineering problems.	2
6	The ability to work effectively individually, as well as within disciplinary and interdisciplinary teams.	2
7	The ability to communicate effectively in Turkish, both verbally and in writing; knowledge of at least one foreign language.	2
8	The awareness of the necessity for lifelong learning; the ability to access information, follow developments in science and technology, and continuously renew oneself.	2
9	Awareness of professional and ethical responsibility.	2
10	Knowledge about business practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and sustainable development.	2
11	Knowledge about the universal and societal impacts of engineering applications on health, environment, and safety; awareness of the legal consequences of engineering solutions.	3
12	Awareness of quality consciousness and sustainability in material selection, product development, and production processes in engineering applications; awareness of quality control.	3
13	The ability to confidently approach problems encountered in engineering applications.	2

INSTRUCTOR(S)				
Instructor(s)				
Signature				

17/7/2024