



T.C.

ESKİŞEHİR OSMANGAZİ ÜNİVERSİTESİ

FACULTY OF SCIENCES

MATHEMATICS AND COMPUTER SCIENCES DEPARTMENT



COURSE INFORMATION FORM

Course Name	Course Code
Differential Geometry	821615002

Semester	Number of Course Hours per Week		Credit	ECTS
	Theory	Practice		
5	3	0	-	5

Course Category (Credit)				
Basic Sciences	Engineering Sciences	Design	General Education	Social
X				

Course Language	Course Level	Course Type
Turkish	Undergraduate	Compulsory

Prerequisite(s) if any	
Objectives of the Course	The main of the course is to introduce the concepts and techniques involved in the basic topics listed in this lecture and to develop skills in applying those concepts and techniques to the solution of problems
Short Course Content	Affine Space, Euclidean Space, Topological Manifolds, Differentiable Manifolds, Tangent Vectors and Tangent Spaces, Direction Derivative and Covariant Derivative, Lie Operator, Cotangent Vectors of Euclidean Space, Cotangent Spaces, Differential of a Map, Theory of Curves, Parameter Change, Serret-Frenet Vectors, Osculating Hyperplanes of a Curve, Curvatures, Centers and Spheres of Curvature, Special Curves Pairs and Characterizations, Involute and Evolute, Spherical Indicators of a Curve, Hypersurfaces, Gaussian Map on Surfaces, Fundamental Forms, Algebraic Invariants of the Shape Operator, Principal Curvatures, Gaussian and Mean Curvature, Gauss Equation, Riemann Curvature Tensor

Learning Outcomes of the Course	Contributed PO(s)	Teaching Methods *	Measuring Methods **
1 Have sufficient knowledge in Complex Analysis subjects.	1,2	1,2	A
2 Learn the similarities and differences between Real Analysis and Complex Analysis	1,2	1,2	A
3 Develops ability to analyze and solve problems encountered	3,4,5,9	2,10	A
4 Analytical thinking skills develop and the ability to make individual and independent decisions develops.	3,4,5,9	10,11	A
5 The ability to analyze and interpret data, apply interpretation to other data, and apply this information in a computer environment develops.	13	10,11	A
6			
7			
8			

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

****Measuring 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

Main Textbook	Ekici, C. 2021, Eğrilerin ve Yüzeylerin Diferensiyel Geometrisi, ESOĞÜ Yayınları.
Supporting References	1- Hacısalihoğlu, H. H., 2004, Diferensiyel Geometri, Cilt I-II, Ankara. 2- Sabuncuoğlu. A., 2006, Diferensiyel Geometri, Ankara. 3- Özdemir, M., 2020, Diferansiyel Geometri, Altın Nokta Yayınevi, İzmir. 4- Yüce, S., 2017, Öklid uzayında diferansiyel geometri, Pegem Yayıncılık, Ankara.
Necessary Course Material	

Course Schedule	
1	Affine Space, Euclidean Space
2	Topological Manifolds, Differentiable Manifolds
3	Tangent Vectors and Tangent Spaces, Direction Derivative and Covariant Derivative
4	Lie Operator, Cotangent Vectors of Euclidean Space, Cotangent Spaces
5	Differential of a Map
6	Theory of Curves, Parameter Change
7	Theory of Curves Serret-Frenet Vectors, Osculating Hyperplanes of a Curve, Problem Solving
8	Mid-Term Exam
9	Curvatures, Centers and Spheres of Curvature,
10	Special Curves Pairs and Characterizations, Involute and Evolute
11	Spherical Indicators of a Curve, Hypersurfaces
12	Gaussian Map on Surfaces and Shape Operator
13	Fundamental Forms and Algebraic Invariants of the Shape Operator
14	Principal Curvatures, Gaussian and Mean Curvature, Gauss Equation, Riemann Curvature Tensor
15	Problem solving
16,17	Final Exam

Calculation of Course Workload			
Activities	Number	Time (Hour)	Total Workload (Hour)
Course Time (number of course hours per week)	14	3	42
Classroom Studying Time (review, reinforcing, prestudy,...)	14	3	42
Homework			
Quiz Exam			
Studying for Quiz Exam			
Oral exam			
Studying for Oral Exam			
Report (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	20	20
Final Exam	1	2	2
Studying for Final Exam	1	30	30
		Total workload	
		Total workload / 30	
		Course ECTS Credit	5

Evaluation	
Activity Type	%
Mid-term	40
Quiz	
Homework	
Bir öge seçin.	
Bir öge seçin.	
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	The ability to apply knowledges of Mathematics and Computer Sciences,	4
2	To have sufficient theoretical and practical knowledge of Mathematics at international level,	5
3	The ability of describing, modelling and solving of mathematical problems at Mathematics and related subjects,	5
4	The skill to solve and design a problem process in accordance with a defined target,	5
5	Skills to analyze data, interpret and apply to other datum and using these data on computer,	4
6	The skill to use the modern techniques and computational tools needed for mathematical applications,	3
7	The skill to make team work within the discipline and interdisciplinary,	2
8	The ability to improve oneself by following the developments on other modern, scientific and technological subjects as well as Mathematics and Computer Sciences,	2
9	The skill to communicate orally and in written way, in a clear and concise manner by having individual work skills and ability to independently decide and analytical thinking,	4
10	The skill to have professional and ethical responsibility,	2
11	The skill to have consciousness for quality issues and scientific research,	2
12	The skill to be sensitive to environmental issues related with problems and development of living area and consistent in the social relations,	1
13	Ability to solve problems in the working life faced to find an appropriate algoritms via mathematical modeling and to write computer programs,	4
14	The skill to developed design of software systems at different complex levels,	1
15	The credence of necessity of life-long learning and ability to apply the formation long-life learning.	2

LECTUTER(S)				
Prepared by	Prof. Dr. Cumali EKİCİ			
Signature(s)				

Date:10.07.2024