INTRODUCTION TO DIFFERENTIABLE MANIFOLDS

1	Course Title:	INTRODUCTION TO DIFFERENTIABLE MANIFOLDS
2	Course Code:	MAT4036
3	Type of Course:	Optional
4	Level of Course:	First Cycle
5	Year of Study:	4
6	Semester:	8
7	ECTS Credits Allocated:	6.00
8	Theoretical (hour/week):	3.00
9	Practice (hour/week):	0.00
10	Laboratory (hour/week):	0
11	Prerequisites:	There are no prerequisites.
12	Language:	Turkish
13	Mode of Delivery:	Face to face
14	Course Coordinator:	Prof. Dr. CENGIZHAN MURATHAN
15	Course Lecturers:	Prof.Dr.Esen İyigün
16	Contact information of the Course Coordinator:	Prof.Dr.Esen İYİGÜN e-posta: esen@uludag.edu.tr telefon: 0.224.2941766 adres: Uludağ Üniversitesi, Fen-Edebiyat Fakültesi, Matematik Bölümü, 16059, Görükle Kampüsü, Bursa
17	Website:	
18	Objective of the Course:	In classical analysis we are traditionally concerned with real-valued functions in the number space Rn.In order to be able to define continuous function between more general sets it is necessary to give these sets a topological structure.They then become topological spaces.The idea can be taken a stage further.To define a differentiable function between two general sets we give these sets what is called a differentiable structure.They then become differentiable manifolds.This generalization of a differentiable function is the elementary starting point for some far-reaching extensions of classical mathematics, both in analysis and geometry, and it has many applications.
19	Contribution of the Course to Professional Development:	Knows the differentiable structures and gains knowledge about their basic properties.
20	Learning Outcomes:	

	1	Learns set, function, continuous functions, topological space concepts and some special topolojical space.
	2	Learns differentiable manifold, differentiable function and differential varieties.
	3	To obtain information on Grassman manifolds.
	4	Learns manifolds structure on a topolojical space and their properties.
	5	Understands partitions of unity, partial differentiation, tangent vector and derived linear function concept.
	6	Learns the inverse function theorem and their application and also Leibniz’s formula.
	7	Learns immersions, submanifolds and submersions concepts.
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21	Course Content:		
	Course Content:		
Week	Theoretical	Practice	
1	Sets and functions, Continuous functions		
2	Topological spaces, Some special topolojical spaces		
3	Differentiable manifolds		
4	Differentiable functions		
5	The induced topology on a manifold, Differentiable varieties		
6	Grassmann manifolds		
7	Manifold structure on a topological space		
8	Midterm Exam + Repeating courses		
9	Properties of the induced topology		
10	Partitions of unity, Partial differentiation		
11	Tangent vectors, Derived linear functions		
12	The inverse function theorem, Leibniz's Formula		
13	Immersions, General properties of immersions		
14	Submanifolds, Submersions		

Activites		Number	Duration (hour)	Total Work Load (hour)
23	Assesment			
Theoretical		14	3.00	42.00
Practicals/Labs		0	0.00	0.00
Self study and preperation		14	4.00	56.00
Midterm Exam	1	40.00		
Homeworks		0	0.00	0.00
Projects		0	0.00	0.00
Home work-project	0	0.00		
Field Studies		0	0.00	0.00
Midterm exams		1	30.00	30.00
Total	2	100.00		
Others		0	0.00	0.00
Final Exams		1	52.00	52.00
Total Work Load				180.00
Total work load/ 30 hr		100.00		6.00
ECTS Credit of the Course				6.00

Measurement and Evaluation Techniques Used in the Course	The system of relative evaluation is applied
24	**ECTS / WORK LOAD TABLE**

25	**CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS**															
	PQ1	**PQ2**	**PQ3**	**PQ4**	**PQ5**	**PQ6**	**PQ7**	**PQ8**	**PQ9**	**PQ10**	**PQ11**	**PQ12**	**PQ13**	**PQ14**	**PQ15**	**PQ16**
ÖK1	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK2	0	0	0	4	3	0	0	0	0	0	0	0	0	0	0	0
ÖK3	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0

ÖK4	4	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0
ÖK5	0	4	0	0	3	0	0	0	0	0	0	0	0	0	0	0
ÖK6	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0
ÖK7	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0

LO: Learning Objectives PQ: Program Qualifications					
Contribution Level:	**1 very low**	**2 low**	**3 Medium**	**4 High**	**5 Very High**