AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Differentiable Manifolds I								
Course Code	MTK515		Couse Level	Second Cycle (Master's Degree)					
ECTS Credit	8	Workload	200 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	The main goal of this course is to provide knowledge of manifolds, tensors and differential forms and to use this knowledge.								
Course Content	Definition of manifold, Construct the topology of a manifolds, Definition of the tangent vectors, Differentiable maps between manifolds, the Riemannian metric and Riemannian manifold, the Lie Bracket, Solve the problems about what he has, Observe the Koszul Formulas, tensors and tensor fields, derivation on the tensor field, spaces of constant curvature, Ricci tensor and scalar curvature								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Discussion, Individual Study, Problem Solving								
Name of Lecturer(s)	Lec. Sibel KOÇER								

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	30
Final Examination	1	50
Assignment	1	20

Recommended or Required Reading	
1	Boothby,William M. An İntroduction to Differentiable Manifolds and Riemannian Geometry. Academic Press,New York,1975

Week	Weekly Detailed Course Contents	
1	Theoretical	Defining manifold
2	Theoretical	Constructing the topology of a manifolds
	Preparation Work	Solving the problems and examples
3	Theoretical	Defining the tangent vectors
	Preparation Work	Solving the problems and examples
4	Preparation Work	Solving the problems and examples
5	Theoretical	Defining the Riemannian metric and Riemannian manifold
	Preparation Work	Solving the problems and examples
6	Theoretical	Define the Lie Bracket
	Preparation Work	Solve the problems and examples
8	Theoretical	Solve the problems about what he has
	Preparation Work	Solve the problems and examples
9	Theoretical	Observe the Koszul Formulas
	Preparation Work	Solve the problems and examples
10	Theoretical	Define tensors and tensor fields
	Preparation Work	Solve the problems and examples
11	Intermediate Exam	Midterms
12	Theoretical	Take derivative on the tensor field
	Preparation Work	Solve the problems and examples
13	Theoretical	Define spaces of constant curvature
	Preparation Work	Solve the problems and examples
14	Theoretical	Ricci tensor and scalar curvature
	Preparation Work	Solve the problems and examples
15	Theoretical	Solve the problems about what he has
16	Final Exam	Final exam

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	3	3	84
Assignment	2	10	3	26
Midterm Examination	1	36	2	38
Final Examination	1	50	2	52
			Total Workload (Hours)	200
			[Total Workload (Hours) / 25*] = **ECTS**	8
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	To be able to define differentiable manifold
2	To be able to write differentiable maps between manifolds
3	To be able to define the Riemannian metric and Riemannian manifold
4	To be able to define the Lie Bracket
5	To be able to take derivative on the tensor field
6	To be able to define spaces of constant curvature
7	To be able to define the Ricci tensor and scalar curvature

Programme Outcomes *(Mathematics Master)*	
1	To be able to have an adequate theoretical and practical domain knowledge.
2	To be able to comprehend the interdisciplinary interaction associated with Mathematics.
3	To be able to use theoretical and practical domain knowledge gained in the field of Mathematics.
4	To be able to interpret knowledge from different disciplines integrating knowledge in the field of mathematics and produce new information.
5	To be able to define, analyse, model and to solve the problems by scientific methods in Mathematics.
6	To be able to conduct a math related specialistic study independently.
7	To be able to develop new strategic approaches to solve problems occurred in unforeseen and complex math-related applications by taking responsibility.
8	To be able to lead in situations that require solving problems related to the mathematics.
9	To be able to criticize his/her knowledge and skills acquired in the field mathematics.
10	To be able to transfer his/her ideas and suggestions for solutions to problems by supporting quantitative or qualitative data verbally and in writing.
11	To be able to communicate both orally and written in a foreign language.
12	To be able to use computer hardware and information technologies with software required by Mathematics.
13	To be able to contribute to the solution of the social, scientific, cultural and ethical problems related to the Mathematics, and being able to support the development of social, scientific, cultural and ethical values.
14	To be able to develop mathematics-related strategies, policies and operational plans, and to evaluate the results obtained within the framework of quality processes.
15	To be able to use his/her knowledge in the field of mathematics and practical problem-solving skills in interdisciplinary studies.

Contribution of Learning Outcomes to Programme Outcomes *1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High*

	L1	L2	L3	L4	L5	L6	L7
P1	5	5	5	5	5	5	5
P2	1	1	1	1	1	1	1
P3	5	5	5	5	5	5	5
P4	1	1	1	1	1	1	1
P6	1	1	1	1	1	1	1
P9	3	3	3	3	3	3	3
P15	4	4	4	4	4	4	4