Kırıkkale University

GRADUATE SCHOOL OF NATURAL APPLIED SCIENCES
Mathematics (Master) (With Thesis)

MAT8027	Advanced Differential Geometry-1				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
1	MAT8027	Advanced Differential Geometry-1	3	3	7

Mode of Delivery:
Face to Face
Language of Instruction:
Türkish
Level of Course Unit:
Master's Degree
Work Placement(s):
No
Department / Program:
Mathematics (Master) (With Thesis)
Type of Course Unit:
Elective
Objectives of the Course:
The Advanced Differential Geometry-I course aims to give the forming fundamental knowledge for the studies of graduate students who study at metric geometry branch.
Teaching Methods and Techniques:
Differentiable manifolds, Riemannian manifolds, vector fields, one forms, tensor fields and notion of connection
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. Mehmet Yıldırım
Assistants:

Recommended or Required Reading

Resources	1.	William M. Boothby, Introduction to Differentiable Manifolds and Riemannian Geometry, Academic Press, 1975.,2. H. Hilmi Hacısalihoğlu ve N. Ekmekci, T
	1.	Manfredo P. do Carmo, Riemannian Geometry, Bırkhauser, Boston, 1990.

4 ödev
1 arasınav 1 yarıyıl sonu sınavı

Course Category

Mathmatics and Basic Sciences	:		Education	:	
Engineering	:		Science	:	
Engineering Design	:		Health	:	
Social Sciences	:		Field	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Differentiable manifolds		
2	Notions of immersion and imbedding		
3	Tangent spaces and tangent bundles		
4	Vector fields and 1- forms		
5	Inner product spaces and multi-linear functions		
6	Differentiations of vector fields along a curve in Rn		
7	Tensor field and metric tensor		
8	Midterm		
9	Riemannian metric and Riemannian manifold		
10	Affine connections		
11	Riemannian connection		
12	Differentiation on Riemannian manifolds		
13	Riemannian manifolds as a metric space and partitions of unity		
14	Riemannian manifold as a metric space and partition of unity		
15	Geodesics on Riemannian manifolds		

Course Learning Outcomes

No	Learning Outcomes
C01	He/she knows inner product spaces and multi-linear functions
C02	He/she defines Riemannian manifolds
C03	He/she finds geodesics.
C04	He/she learns affine and Riemannian connection

Program Learning Outcomes

No	Learning Outcome
P03	Define a problem and propose a solution for it, and to solve the problem, evaluate the results and apply them if it is necessary in his/her areas of expertise.
P08	Produce solution and to take responsibility and to develop new strategic approaches in situations which are not predicted in his/her areas of expertise.
P04	Transfer systematically the current developments, his/her studies to other people as verbal or written form confidently.
P09	Follow scientific, social, and ethical values and to teach and to control them in the step of data collection, evaluation and announcement of them.
P05	Develop new strategic approach and produce solutions by taking responsibility in unexpected and complicated situations in his/her area of practice.
P01	Evaluate the fundamental notions, theories and data with academic methods. Determining and analyzing the encountered problems and subjects, exchanging of ideas, improving suggestions propp
P10	Apply the digested knowledge and problem solving ability in the collaborations between different groups.
P02	Expand knowledge by scientific methods and use them with scientific, social and ethical responsibility.
P07	Have oral or written communication ability in one of the common foreign languages ("European Language Portfolio Global Scale", Level B2).
P06	Develop strategic, political and practice plans and evaluate the results by considering the quality process in his/her area of expertise.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	16	3	48
Hours for off-the-c.r.stud	16	3	48
Assignments	3	15	45
Presentation	1	20	20
Mid-terms	1	20	20
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	30	30
Total Work Load			**211**
ECTS Credit of the Course			**7**

Contribution of Learning Outcomes to Programme Outcomes

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	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10
All	5	4	5	5	4	4	3	2	3	5
C01	5	4	5	5	4	4	3	2	3	5
C02	5	4	5	5	4	4	3	2	3	5
C03	5	4	5	5	4	4	3	2	3	5
C04	5	4	5	5	4	4	3	2	3	5