ADVENCED DIFFERANTIAL GEOMETRY

1	Course Title:	ADVENCED DIFFERANTIAL GEOMETRY
2	Course Code:	MAT6303
3	Type of Course:	Optional
4	Level of Course:	Third Cycle
5	Year of Study:	2
6	Semester:	3
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:	
12	Language:	Turkish
13	Mode of Delivery:	Face to face
14	Course Coordinator:	Prof. Dr. Kadri Arslan
15	Course Lecturers:	Doç. Dr. Betül BULCA
16	Contact information of the Course Coordinator:	arslan@uludag.edu.tr (0 224) 294 17 75 Bursa Uludağ Üniversitesi, Fen-Edebiyat Fakültesi, Matematik Bölümü
17	Website:	
18	Objective of the Course:	The aim of this course is to introduce the concept of manifold and give definitions of immersion and submersion. also operations on manifolds and Lie algebra concepts are given.
19	Contribution of the Course to Professional Development:	It contributes to carrying the concepts in differential geometry to higher dimensions and applying the concept of submanifold.
20	Learning Outcomes:	
	1	Knows the definition of differentiable manifolds and interprets examples of immersions
	2	Knows the physics applications of Vector Fields and Flows.
	3	Make calculations about Lie Subgroups and Homogeneous Spaces.
	4	Can give examples by expressing vector bundles
	5	Interprets the results about Differential Forms
	6	Can perform integral calculations on manifolds.
	7	Can understand how De Rham cohomology is expressed
	8	Can understand conclusions about cohomology with compact supports and Poincar´e duality.
	9	Interpret the De Rham cohomology concepts of compact manifolds.

	10	Can make calculations about pseudo Riemann metrics and Levi Civita covariant derivative.

21	Course Content:

Course Content:

Week	Theoretical	Practice
1	Differentiable Manifolds .	
2	Submersions and Immersions	
3	Vector Fields and Flows	
4	Lie Groups I	
5	Lie Groups II. Lie Subgroups and Homogeneous Spaces	
6	Vector Bundles	
7	Differential Forms	
8	Integration on Manifolds	
9	De Rham cohomology	
10	Cohomology with compact supports and Poincar´e duality	
11	De Rham cohomology of compact manifolds	
12	Lie groups III. Analysis on Lie groups	
13	Pseudo Riemann metrics and the Levi Civita	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	5.00	70.00
Homeworks	2	20.00	40.00
Midterm Exam	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	0	0.00	0.00
Others	0	0.00	0.00
Final Exams	1	25.00	25.00
Total Work Load			177.00
Total work load/ 30 hr			5.90
ECTS Credit of the Course			6.00

22	Textbooks, References and/or Other Material
	Michor P.W. - Topics in Differential Geometry (2006) -
23	Assessment
TERM LEARNING ACTIVITIES	**NUMBE** **WEIGHT**
Midterm Exam	0 0.00
Home Work/Project	2 50.00
Final	1 100.00
Total	100.00
Success Grade	
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	4	3	0	4	0	4	0	0	0	0	0	0
ÖK2	4	4	0	0	3	3	0	4	0	4	0	0	0	0	0	0

ÖK3	0	0	3	0	3	4	0	3	0	4	0	0	0	0	0	0
ÖK4	0	0	0	0	3	3	0	2	0	2	0	0	0	0	0	0
ÖK5	0	0	3	0	3	3	0	3	0	3	0	0	0	0	0	0
ÖK6	0	0	3	0	4	4	0	4	0	0	0	0	0	0	0	0
ÖK7	0	0	0	0	3	3	0	3	0	3	0	0	0	0	0	0
ÖK8	0	0	0	0	2	4	0	4	0	3	0	0	0	0	0	0
ÖK9	0	0	0	0	3	3	0	3	0	3	0	0	0	0	0	0
ÖK10	0	0	0	0	3	3	0	2	0	2	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**