

SINGULARITY THEORY IN DIFRERANTIAL GEOMETRY

1	Course Title:	SINGULARITY THEORY IN DIFRERANTIAL GEOMETRY
2	Course Code:	MAT5422
3	Type of Course:	Optional
4	Level of Course:	Third Cycle
5	Year of Study:	1
6	Semester:	2
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:	MAT 3015 Differential Geometry I, MAT 3016 Differential Geometry II
12	Language:	Turkish
13	Mode of Delivery:	Face to face
14	Course Coordinator:	Prof. Dr. Kadri Arslan
15	Course Lecturers:	Doç. Dr. Btül 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:	653 / 5000 Translation results The aim of the course is to introduce the basic concepts of singularity theory to the student at the graduate level. Defining the concept of submanifold to the student, and to compute the singularities in surfaces and hypersurfaces. In addition, by giving the definition of contact between submanifolds, it is also to contribute to the solutions of the basic problems related to the contacts between hypersurfaces and the hyperplane and hypercapsphere. It is also to examine the applications on surfaces by giving a classification of singularities. Defining height and distance functions on submanifolds and examining their effects on surfaces and hyper surfaces.
19	Contribution of the Course to Professional Development:	It contributes to give geometric approaches for the classification of singularities with the help of the concept of singularity.
20	Learning Outcomes:	
	1	He/She defines surfaces in $\mathbb{R}^n$.
	2	He/She can establish the orthonormal frame of the surfaces in $\mathbb{R}^4$.
	3	He/ She can calculates the mean curvature of the surfaces in $\mathbb{R}^5$.
	4	He/ She can calculate the singularities of curves.
	5	He/ She can define the contact between hypersurfaces and hyperspheres.
	6	He can classify singularities.
	7	He/She can obtain the classification of critical points.
	8	He/she will have ability to build a family of functions on hypersurfaces in $\mathbb{R}^4$.
	9	He/she can determine the asymptotic directions on the surfaces.

								10	He/She can give a classification of critical points on the surfaces.									
21	Course Content:																	
	Course Content:																	
Week	Theoretical								Practice									
1	Singularity theory for curves																	
2	Surfaces in R^n																	
3	Smooth mappings																	
4	Quadratic forms																	
5	Surfaces in R^4																	
6	Surfaces in R^5																	
7	Submanifolds in Euclidean spaces																	
8	Contact between submanifolds																	
9	Contact of hypersurfaces with hyperplanes																	
10	Contact of hypersurfaces with hyperspheres																	
11	Family of functions on hypersurfaces in R^n																	
12	Family of height functions																	
13	Classification of singularities																	
14	Classification of Critical points																	
22	Textbooks, References and/or Other								1) Shyuichi Izumiva et al. - Differential Geometry from									
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								Singularity Theory I (1996)				6.00				6.00		
Homeworks								2				12.00				24.00		
TERM LEARNING ACTIVITIES						NUMBER		WEIGHT		6				0.00				
Projects								0				0.00				0.00		
Field Studies								0				0.00				0.00		
Midterm exams						0		0.00		0.00				0.00				
Quiz						0		0.00		0.00				0.00				
Others						0		0.00		0.00				0.00				
Final Exams						1		50.00		23.00				23.00				
Total Work Load																173.00		
Total work load/ 30 hr																5.77		
Contribution of Term (Year) Learning Activities to								50.00										
ECTS Credit of the Course																6.00		
Contribution of Final Exam to Success Grade								50.00										
Total								100.00										
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	0	3	0	3	0	0	4	0	2	3	0	0	0	0	0	0		

ÖK2	0	4	0	4	0	0	3	0	3	3	0	0	0	0	0	0
ÖK3	0	3	0	3	0	0	4	0	4	4	0	0	0	0	0	0
ÖK4	0	4	0	4	0	0	3	0	2	3	0	0	0	0	0	0
ÖK5	0	3	0	5	0	0	5	0	4	2	0	0	0	0	0	0
ÖK6	0	3	0	3	0	0	4	0	3	4	0	0	0	0	0	0
ÖK7	0	0	0	4	0	0	2	0	3	3	0	0	0	0	0	0
ÖK8	0	0	0	3	0	0	3	0	3	2	0	0	0	0	0	0
ÖK9	0	0	0	4	0	0	4	0	4	3	0	0	0	0	0	0
ÖK10	0	0	0	3	0	0	3	0	3	4	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			