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:	Second 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. 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 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 R ^ n.
	2	He/She can establish the orthonormal frame of the surfaces in R ^ 4.
	3	He/ She can calculates the mean curvature of the surfaces in 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 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 Izumiya et al. - Differential Geometry from libgen.lc Singularity Theory I (1998, Springer-Verlag Berlin He

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	12	6.00	84.00
Homeworks	2	12.00	24.00
Projects	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	23.00	23.00
Total Work Load			173.00
Total work load/ 30 hr			5.77
ECTS Credit of the Course			6.00

TERM LEARNING ACTIVITIES	NUMBER	WEIGHT
Quiz	0	0.00
Final Exam	1	50.00
Contribution of Term (Year) Learning Activities to		50.00

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	3	3	3	3	3	3	4	5	2	3	0	0	0	0	0	0

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