ÇANKAYA UNIVERSITY
Faculty of Arts and Sciences
Course Definition Form

Part I. Basic Course Information

Department Name	MATHEMATICS					**Dept. Numeric Code**	27
Course Code	MATH476	**Number of Weekly Lecture Hours**	3	**Number of Weekly Lab/Tutorial Hours**	0	**Number of Credit Hours**	3
Course Web Site	http://math476.cankaya.edu.tr					**ECTS Credit**	05

Course Name *This information will appear in the printed catalogs and on the web online catalog.*	
English Name	Differential Geometry
Turkish Name	Diferensiyel Geometri

Course Description
Provide a brief overview of what is covered during the semester. This information will appear in the printed catalogs and on the web online catalog. Maximum 60 words.

Curves in R^3, the local theory of curves parametrized by arc length, Frenet-Serret formulas,curvature and torsion. Regular surfaces, the tangent plane, the differential of a map, diffeomorphism, the first fundamental form, Gauss map, the second fundamental form, normal curvature, principal curvature, Gauss map in local coordinates.

Prerequisites (if any) *Give course codes and check all that are applicable.*	1st	2nd	3rd	4th
	☐ Consent of the Instructor	☐ Senior Standing	☐ Give others, if any.	
Co-requisites (if any)	1st	2nd	3rd	4th
Course Type *Check all that are applicable*	☒ Must course for dept. ☐ Must course for other dept.(s) ☐ Elective course for dept. ☐ Elective course for other dept.(s)			

Course Classification *Give the appropriate percentage for each category.*					
Category	Mathematics & Natural Sciences	Engineering & Architectural Sciences			
Percentage	90	10			

Part II. Detailed Course Information

Course Objectives
Maximum 100 words.

The purposes of the course are

1. to analyze curves parametrized by arclength locally
2. to study global properties of plane curves
3. to analyze regular surfaces
4. to study diffeormorhisms between regular surfaces
5. to study points on a surface by considering Gaussian curvature and mean curvature
6. to classify surfaces with respect to orientability

Learning Outcomes
Explain the learning outcomes of the course. Maximum 10 items.

The students will be able to

1. classify curves parametrized by arclength by calculating curvature and torsion
2. to classify surfaces with respect to regularity
3. to classify surfaces with respect to orientation
4. calculate Gaussian curvature and mean curvature in terms ofl coefficients of first and second fundamental forms
5. classify a point on a given surface by calculating Gaussian curvature and mean curvature

Textbook(s)
List the textbook(s), if any, and other related main course material.

Author(s)	Title	Publisher	Publication Year	ISBN
Manfredo P. Do Carmo,	Differential Geometry of Curves and Surfaces	Prentice Hall	1976	978-0132125895

Reference Books
List, ifany,otherreference books to be used as supplementary material.

Author(s)	Title	Publisher	Publication Year	ISBN
Barrett O'Neill	Elementary Differential Geometry	Academic Press	2006	978-0120887354
Ethan D. Bloch	A First Course in Geometric Topology and Differential Geometry	Birkhäuser	1997	978-0817638405

Teaching Policy
Explain how you will organize the course (lectures, laboratories, tutorials, studio work, seminars, etc.)

3 hours of lecturing per week. Attendance is compulsory.

Laboratory/Studio Work
Give the number of laboratory/studio hours required per week, if any, to do supervised laboratory/studio work and list the names of the laboratories/studios in which these sessions will be conducted.

Computer Usage *Briefly describe the computer usage and the hardware/software requirements for the course.*

Course Outline *List the weekly topics to be covered.*	
Week	Topic(s)
1	Parametrized Curves
2	Regular Curves, Arc Length
3	The Local Theory of Curves Parametrized by Arc Length
4	Global Properties of Plane Curves
5	Regular Surfaces, Inverse Images of Regular Values
6	Change of Parameters; Differentiable Functions on Surfaces
7	Diffeomorphism
8	The Tangent Plane and the Differential of a Map
9	The First Fundamental Form; Area
10	Orientation of Surfaces
11	The Definition of Gauss Map and It's Fundamental Properties
12	The Gauss Map and The Second Fundamental form
13	The Gauss map in local coordinates
14	Continuation to the Gauss map in local coordinates

Grading Policy
List the assessment tools and their percentages that may give an idea about their relative importance to the end-of-semester grade.

Assessment Tool	Quantity	Percentage	Assessment Tool	Quantity	Percentage	Assessment Tool	Quantity	Percentage
Homework			Case Study			Attendance		
Quiz(es)	5	10	Lab Work			Field Study		
Midterm Exam	2	50	Classroom Participation			Project		
Term Paper			Oral Presentation			Final Exam	1	40

ECTS Workload
List all the activities considered under the ECTS.

Activity	Quantity	Duration (hours)	Total Workload (hours)
Attending Lectures (*weekly basis*)	14	3	42
Attending Labs/Recitations (*weekly basis*)			
Compilation and finalization of course/lecture notes (*weekly basis*)	14	0.5	7
Collection and selection of relevant material (*once*)	1	10	10
Self study of relevant material (*weekly basis*)	14	0.5	7
Take-home assignments			
Preparation for quizzes	5	3	15
Preparation for mid-term exams (*including the duration of the exams*)	2	12	24
Preparation of term paper/case-study report (*including oral presentation*)			
Preparation of term project/field study report (*including oral presentation*)			
Preparation for final exam (*including the duration of the exam*)	1	20	20
		TOTAL WORKLOAD / 25	125/25
		ECTS Credit	**5**

Total Workloads are calculated automatically by formulas. To update all the formulas in the document firstpressCTRL+Aandthenpress F9.

Program Qualifications vs. Learning Outcomes *Consider the program qualifications given below as determined in terms of learning outcomes and acquisition of capabilities for all the courses in the curriculum. Look at the learning outcomes of this course given above. Relate these two using the Likert Scale by marking with X in one of the five choices at the right.*

No	Program Qualifications	Contribution				
		0	1	2	3	4
1	Adequate knowledge in mathematics; ability to use applied and theoretical information in these areas to solve pure and applied mathematical problems.					X
2	Ability to use modern computational tools to analyze an abstract or real life problem				X	
3	Adequate knowledge in theoretical and historical background in mathematics				X	
4	Ability to work individually and in teams efficiently, ability to collaborate effectively in teams to analyze complex systems from intra-disciplinary and multi-disciplinary areas				X	
5	Ability to communicate effectively in English about technical subjects, both orally and in writing				X	
6	Ability to use, develop and implement new experiments and algorithms to solve scientific, engineering and financial problems				X	
7	Ability to analyze a mathematical problem using both analytical and numerical methods; use and compare theoretical and simulational methods to gain deeper insight				X	
8	Ability to report the findings, conclusions and interpretations related to a project in the area of pure and applied mathematics, ability to write technical reports, to prepare and conduct effective presentations				X	
9	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to keep continuous self improvement				X	
10	Awareness of professional and ethical responsibility issues and their legal consequences					X

Scale for contribution to a qualification: **0**-none, **1**-little, **2**-moderate, **3**-considerable, **4**-highest