

Department Department of Mathematics			Academic Year 2022-2023	Date 01/12/2022	
Course Unit Code MATH3105	Course Unit Title Differential Geometry I		Semester/Year Fall / 3	Number of ECTS Credits 5	
Language of Instruction	Turkish				
Type of Course Unit	Compulsory				
Prerequisites and co-requisites	-				
Address of course	-				
Local Credit	Theoretical	Practical	Laboratory	Presentation	Project
3	2	2	-	-	-
Name of Lecturers	Associate Professor Zühal KÜÇÜKARSLAN YÜZBAŞI				
Assistants	-				

Course content	In Euclidean spaces, tangent vector, vector field, directional derivative and differential map. Complex structure of plane and curvatures of planar curves. Curves and famous Frenet formulas for them in Euclidean space. Geometrical interpretation of curvature and torsion. Osculating circle, sphere and spherical curves. Bertrand curves and involute-evolute curve pairs. Slant helices and Chen curves.
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Weekly Detailed Course Contents	
Week	Topic
1	Euclidean space, tangent space and directional derivative
2	Differential map and vector fields
3	Vector fields and co-vector fields
4	Curves and their examples, velocity vector of a curve
5	Change of parameter and length of arc
6	Planar curves and curve types
7	Space curves
8	Curvature and torsion of a curve with arbitrary parameter, geometrical interpretation of curvature and torsion
9	General application
10	Osculating circle and sphere
11	Spherical curves and Chen curves
12	General helices and slant helices
13	Bertrand and involute-evolute curve pairs
14	A brief evaluation of the course content and topics

Course Resources	<ol style="list-style-type: none"> 1. Diferensiyel Geometri (H. Hilmi HACISALİHOĞLU) 2. Diferensiyel Geometri (Arif SABUNCOĞLU) 3. Modern Differential Geometry of Curves and Surfaces with Mathematica (Alfred GRAY) 4. Elementary Differential Geometry (Andrew PRESSLEY) 5. Çözümlü diferensiyel geometri problemleri (H. Hilmi HACISALİHOĞLU) 6. Çözümlü diferensiyel geometri alıştırmaları (Arif SABUNCOĞLU)
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Assessment Methods and Criteria	In-Term studies	Quantity	Percentage (%)
	Mid-Term Exams	1	40
	Quizzes	-	-
	Assignments	-	-
	Projects	-	-
	Term assignment	-	-
	Laboratory	-	-
	Other	-	-

	Final exam	1	60
On Assessment Methods and Criteria	A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course.		

Percentage of Course Category (%)	Mathematics and Basic Sciences	100
	Computer Sciences	0
	Programming Design	0
	Social sciences	0

Course Outcome	To get planar curves meeting in many places in daily life such as an orbit of a planet (ellipse), the path of a projectile (parabola), the shape of a suspension bridge (catenary) or the path of a point on a cartwheel (cycloid). To calculate famous Frenet formulas as well as curvature and torsion. To know current issues for curves in Differential Geometry.
Aims of the course	<ol style="list-style-type: none"> To provide the basis relating to curves which are most fundamental objects in Differential Geometry. To enrich mathematical perspective of students by doing curve visualizations via computer graphics. To lead students to explore the notions in daily life corresponding to theoretical objects.
The way of processing course	Face to face

Relation of the course with program outcomes				
Learning outcomes		1	2	3
1	To have advanced theoretical and applied knowledge in a way to prioritize the scientific approach supported by textbooks containing up-to-date information in the field, application tools and other resources			
2	Adapting and transferring the knowledge gained in the field to secondary education			
3	Ability to independently carry out an advanced study in the field		X	
4	Be aware of the necessity of lifelong learning and continuously improve their professional knowledge and skills.			X
5	Using a foreign language at least at the European Language Portfolio B1 General Level, following the information in the field and being able to communicate with colleagues			
6	To be able to use information and communication technologies together with computer software at minimum advanced level of European computer license required by the field.			
7	Have the ability to make oral and written presentation in native language		X	
8	Having the ability to understand spoken English and use English at reading level			
9	To have the ability to assimilate mathematical concepts and understand the relationships between them, to recognize different aspects of the same concepts and relationships			
10	To have the ability to define and formulate the relationships between items in non-mathematical disciplines in the language of mathematics.			
11	To have the ability to use mathematical knowledge in different problems			
12	Having the ability to develop computer programs using mathematical knowledge			
Contribution of the course: 1:No 2:Partially 3:Completely				

Preparer: Associated Professor Muhittin Evren AYDIN
Preparation date: 01/12/2022