

Department Department of Mathematics			Academic Year 2022-2023	Date 01/12/2022	
Course Unit Code MATH4117	Course Unit Title Tensor Geometry		Semester/Year Fall / 4	Number of ECTS Credits 3	
Language of Instruction	Turkish				
Type of Course Unit	Elective				
Prerequisites and co-requisites	-				
Address of course	-				
Local Credit	Theoretical	Practical	Laboratory	Presentation	Project
2	2	0	-	-	-
Name of Lecturers	Associated Professor Muhittin EVREN AYDIN				
Assistants	-				

Course content	Vector spaces and their duals. Tensors and operations among them. Exterior and covariant derivatives of tensors. Tensoral integral. Cartan's structure equations. Gauss-Bonnet Theorem for surfaces.
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Weekly Detailed Course Contents	
Week	Topic
1	Vector spaces and linear maps
2	Covariant and contravariant tensors
3	Exterior product and its properties, contraction operator
4	Exterior derivative and properties
5	Covariant derivatives of tensors
6	Line integrals of differential forms
7	Poincare's theorem for 1-forms
8	Structure equations of Euclidean space
9	General application
10	Cartan theorems
11	Structure equations for surfaces
12	Structure equations for surfaces
13	Gauss-Bonnet's theorem
14	A brief evaluation of the course content and topics

Course Resources	1. Manifoldların Diferensiyel Geometrisi (Bayram ŞAHİN) 2. Tensör Geometri (H. Hilmi HACISALİHOĞLU) 3. Differential Forms and Applications (Manfredo P. do Carmo)
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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	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		

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

Course Outcome	To recognize tensoral algebra. To do operation among tensors. To identify Cartan's theorems which are important results of modern Differential geometry. To know Gauss-bonnet's Theorem.
Aims of the course	To analyse and to operate among tensors which are one of the most important objects of differential geometry and theoretical physics.
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.			
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			
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		X	
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		X	
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