

<b>Department</b> Department of Mathematics			<b>Academic Year</b> 2022-2023	<b>Date</b> 01/12/2022	
<b>Course Unit Code</b> MATH4107	<b>Course Unit Title</b> Differential Geometry III		<b>Semester/Year</b> Fall / 4	<b>Number of ECTS Credits</b> 5	
<b>Language of Instruction</b>	Turkish				
<b>Type of Course Unit</b>	Elective				
<b>Prerequisites and co-requisites</b>	-				
<b>Address of course</b>	-				
<b>Local Credit</b>	<b>Theoretical</b>	<b>Practical</b>	<b>Laboratory</b>	<b>Presentation</b>	<b>Project</b>
4	4	0	-	-	-
<b>Name of Lecturers</b>	Associate Professor Muhittin Evren AYDIN				
<b>Assistants</b>	-				

<b>Course content</b>	Tensors. Manifolds. Affine and Levi-Civita connections. Geodesics. Ricci and scalar curvatures. Gradient, divergens, Hessian and Laplacian operators. Integration on manifolds.
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Weekly Detailed Course Contents	
Week	Topic
1	Linear maps and tensors
2	Topological manifolds
3	Differentiable manifolds
4	Tangent vectors and differential maps
5	Affine connection on manifolds
6	Curvature tensors. First and second Bianchi identities
7	Exterior derivative. Lie derivative
8	Cartan's structure equations
9	General application
10	Riemannian manifolds: Riemannian metric
11	Christoffel symbols and geodesics
12	Curvatures and differentiable operators
13	Integration on manifolds
14	A brief evaluation of the course content and topics

<b>Course Resources</b>	<ol style="list-style-type: none"> <li>1. Manifoldların Diferensiyel Geometrisi (Bayram ŞAHİN)</li> <li>2. Diferensiyel Geometri II. ve III. Cilt (H. Hilmi HACISALİHOĞLU)</li> <li>3. Tensör Geometri (H. Hilmi HACISALİHOĞLU)</li> <li>4. Elementary Differential Geometry (Andrew PRESSLEY)</li> <li>5. Çözümlü diferensiyel geometri problemleri (H. Hilmi HACISALİHOĞLU)</li> <li>6. Çözümlü diferensiyel geometri alıştırma (Arif SABUNCOĞLU)</li> </ol>
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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
<b>On Assessment</b>	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		

<b>Methods and Criteria</b>	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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<b>Percentage of Course Category (%)</b>	<b>Mathematics and Basic Sciences</b>	100
	<b>Computer Sciences</b>	0
	<b>Programming Design</b>	0
	<b>Social sciences</b>	0

<b>Course Outcome</b>	To recognize manifolds. To calculate derivatives of functions and vector fields on manifolds. To define metric on manifolds. To derive geodesics and curvature. To calculate integral on manifolds.
<b>Aims of the course</b>	<ol style="list-style-type: none"> <li>To recognize fundamentals of manifolds which are more general case of surfaces.</li> <li>To calculate differential and integral on manifolds.</li> <li>To interpret manifolds in terms of curvatures.</li> </ol>
<b>The way of processing course</b>	Face to face

<b>Relation of the course with program outcomes</b>				
Learning outcomes		1	2	3
<b>1</b>	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		X	
<b>2</b>	Adapting and transferring the knowledge gained in the field to secondary education		X	
<b>3</b>	Ability to independently carry out an advanced study in the field			
<b>4</b>	Be aware of the necessity of lifelong learning and continuously improve their professional knowledge and skills.			X
<b>5</b>	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			
<b>6</b>	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.			
<b>7</b>	Have the ability to make oral and written presentation in native language			
<b>8</b>	Having the ability to understand spoken English and use English at reading level			
<b>9</b>	To have the ability to assimilate mathematical concepts and understand the relationships between them, to recognize different aspects of the same concepts and relationships			
<b>10</b>	To have the ability to define and formulate the relationships between items in non-mathematical disciplines in the language of mathematics.			
<b>11</b>	To have the ability to use mathematical knowledge in different problems			
<b>12</b>	Having the ability to develop computer programs using mathematical knowledge			
<b>Contribution of the course: 1:No 2:Partially 3:Completely</b>				

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