AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title		Semi-Riemannian Geometry							
Course Code		MTK633		Couse Level		Third Cycle (Doctorate Degree)			
ECTS Credit	7.5	Workload	189 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		The main goal is this course to provide a working knowledge of Semi-Riemannian Geometry.							
Course Content		Symmetric bilinear form and scalar producs, The Levi-Civita connections, Geodesics and exponential maps, Tensor derivation, Ricci and scalar curvature							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Discussion, Individual Study, Problem Solving					
Name of Lecturer(s)									

Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	40
Final Examination	1	40
Quiz	1	10
Assignment	2	10

Recommended or Required Reading

1	Semi-Riemannian Geometry with Application to Relativity, O'Neill,B., Academic Press.Inc.New York 1983

Week	Weekly Detailed Course Contents	
1	Theoretical	Symmetric bilinear form and scalar producs
2	Theoretical	Isometry
3	Theoretical	The Levi-Civita connections
4	Theoretical	Geodesics
5	Theoretical	Exponential maps
6	Theoretical	Curvature
8	Theoretical	Semi-Riemannian surfaces
9	Theoretical	Metric contraction
10	Theoretical	Tensor derivation
11	Intermediate Exam	Midterm exam
12	Theoretical	Ricci and scalar curvature
13	Theoretical	Differential operator
14	Theoretical	Solve the problem about what he has learned
15	Final Exam	Final exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	3	3	84
Assignment	2	0	20	40
Quiz	1	10	1	11
Midterm Examination	1	20	2	22
Final Examination	1	30	2	32
			Total Workload (Hours)	189
		[Total Workload (Hours) / 25*] = **ECTS**		7.5

25 hour workload is accepted as 1 ECTS

Learning Outcomes

1	To learn symmetric bilinear form and scalar products
2	To learn the Levi-Civita connection

3	To learn geodesics and exponential maps
4	To learn tensor derivation
5	To learn Ricci and scalar curvature

Programme Outcomes *(Mathematics Doctorate)*

1	To be able to develop the current and advanced knowledge of mathematics domain to expertise level by an original idea or research, based on the level of its knowledge at the graduate level, and to be able to reach original definitions that will bring innovation to Mathematics.
2	To be able to comprehend the interdisciplinary interaction associated with Mathematics.
3	To be able to use and evaluate the new knowledge in the field of Mathematics with a systematic approach.
4	To be able to develop an idea, a method, a design or an application that will bring innovation to Mathematics, to use well known ideas, methods, designs or applications on a different research area, or to search, comprehend, design, adapt and apply an original subject matter.
5	To be able to criticize, analyze, synthesize and evaluate new and complex ideas.
6	To be able have high-level skills in research methods related to studies on Mathematics.
7	To be able to expand the frontiers knowledge in the field of Mathematics via generating or interpreting an original study, or publishing at least a scientific paper in national/international refereed journals.
8	To be capable of leadership in the positions that require the analyses of problems related to the field of Mathematics.
9	To be able to defend his/her original ideas among the experts in the discussion of math related issues, and to be able to communicate effectively to show his/her competence in the field of Mathematics.
10	To be able to contribute to the solution of the social, scientific, cultural and ethical problems related to the Mathematics, and to be able to support the development of social, scientific, cultural and ethical values.
11	To be able to have both oral and written communication using a foreign language.

Contribution of Learning Outcomes to Programme Outcomes *1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High*

	L1	L2	L3	L4	L5
P1	5	5	5	5	5
P2	5	5	5	5	5
P3	5	5	5	5	5
P4	5	5	5	5	5
P5	5	5	5	5	5
P7	5	5	5	5	5
P8	5	5	5	5	5
P9	3	3	3	3	3
P10	5	5	5	5	5
P11	4	4	4	4	4