

AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Advanced Topics in Mathematical Physics							
Course Code		FZK603		Couse Level		Third Cycle (Doctorate Degree)			
ECTS Credit	7	Workload	Workload 175 (Hours) Theory 3			Practice	0	Laboratory	0
Objectives of the Course		To get inform	To get information about the advanced subjects of mathematical physics.						
Course Content		Using matrices in physics. Fundamental tensor analysis. Some special PDE in physics. Variational calculus. Chaos. Green's functions.					nal		
Work Placement									
Planned Learning Activities and Teaching Methods		Methods	Explanation	(Presentat	tion), Individua	l Study, Pro	blem Solving		
Name of Lecturer(s)									

Assessment Methods and Criteria

Method	Quantity	Percentage (%)	
Midterm Examination	1	20	
Final Examination	1	30	
Quiz	2	8	
Attending Lectures	14	28	
Assignment	14	14	

Recommended or Required Reading

1	Mathematical Methods for Physicists. G.B. Arfken, H.J. Weber, F. Harris
2	Mathematical Physics. S. Hassani
3	Special functions and their applications. N. N. Lebedev
4	Mathematics of classical and quantum physics. F. W. Byron, R. W. Fuller.
5	Mathematics for Physicists. P. Dennery, A. Krzywicki.

Week	Weekly Detailed Cou	Irse Contents
1	Theoretical	Matrices and determinants
2	Theoretical	Matrices in classical and quantum mechanics
3	Theoretical	Tensor analysis
4	Theoretical	Covariant formulation of electrodynamics
5	Theoretical	Partial differential equations-PDE
6	Theoretical	The wave equation
7	Theoretical	The Scrödinger equation
8	Theoretical	The heat equation
9	Theoretical	Integral transformations
10	Theoretical	Calculus of variations-I
11	Theoretical	Calculus of variations-II
12	Theoretical	Nonlinear dynamics and chaos
13	Theoretical	Probability theory
14	Theoretical	Introduction to group theory
15	Final Exam	Final exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload		
Lecture - Theory	14	4	3	98		
Assignment	12	2	2	48		
Individual Work	4	2	1	12		
Quiz	4	1	0.5	6		
Midterm Examination	1	2	3	5		



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Final Examination	1		2	4	6
			Тс	otal Workload (Hours)	175
			[Total Workload (Hours) / 25*] = ECTS	7
*25 hour workload is accepted as 1 ECTS					

Learning Outcomes

1 Students can express the physical problems by using tensors.	
2 Partial differntial equations in physical problems can be solved by analytical or numerical techniques.	
3 Fourier and Laplace transformations can be conceived.	
4 Green's functions should be used in problems of physics.	
5 Be able to express the matrix formulation of physical problems.	
6 Fundamentals concepts of group theory are realized.	

Programme Outcomes (Physics Doctorate)

1	
2	
3	
4	
5	
6	
7	
8	

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

	L1	L2	L3	L4	L5	L6
P1	5	5	5	5	5	5
P2	5	5	4	5	4	4
P3	5	5	5	5	5	5
P4	2	2	3	4	3	3
P5	2	2	3	3	2	2
P6	4	4	3	4	4	5
P7	3	5	3	3	5	4
P8	3	3	3	3	3	3

