



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Lie Algebra							
Course Code		MTK622		Couse Level		Third Cycle (Doctorate Degree)			
ECTS Credit	7.5	Workload	188 (<i>Hours</i>)	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		In Group Theory, play very important role in the classification of simple groups.							
Course Content		Lie Algebras, Derivative, soluble and nilpotent Lie algebras, Semisimple Lie Algebras, Root systems.							
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	25
Final Examination	1	60
Assignment	2	15

Recommended or Required Reading

1	Introduction to Lie Algebras and Representation Theory .Springer Verlag, 1972.
2	Simple Groups Of Lie Type. John Wiley and Sons. 1972

Week	Weekly Detailed Course Contents	
1	Theoretical	Basic concepts: Definitions and first examples
2	Theoretical	Ideals and homomorphisms,
3	Theoretical	Soluble and nilpotent Lie algebras
4	Theoretical	Semisimple Lie Algebras: Theorems of Lie and Cartan
5	Theoretical	Killing form
6	Theoretical	Complete reducibility of representation
7	Theoretical	Representation of $SL(2, F)$
8	Intermediate Exam	MIDTERM EXAM
9	Theoretical	Root space and decompositons
10	Theoretical	Root systems: Axiomatics
11	Theoretical	Simple roots and Weyl group
12	Theoretical	Classification
13	Theoretical	Construction of root systems and automorphisms
14	Theoretical	Abstract theory of weights
15	Theoretical	Borel subalgebra

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	3	3	84
Assignment	2	0	21	42
Midterm Examination	1	26	2	28
Final Examination	1	32	2	34
Total Workload (Hours)				188
[Total Workload (Hours) / 25*] = ECTS				7.5

*25 hour workload is accepted as 1 ECTS

Learning Outcomes

1	Classification of Simple groups
2	Carry derivation in analysis to group theory



3	Give more information about groups
4	To be able to gain the skill of interpreting some interrelations among these concepts
5	To be able to use mathematical concepts in solving certain types of problems

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	3	3	4	4	4
P2	3	3	4	4	4
P3	4	4	4	4	4
P4	3	3	4	4	4
P5	4	4	4	4	
P6	4	4	4		
P7	2	2	3		
P8	4	4	4		
P9	3	3	3		
P10	2	2	3		
P11	4	4	4		

