



Code and Name: FİZ5160 GROUP THEORY IN PHYSICS

Unit: Graduate School of Natural and Applied Sciences

Detail: **Period:** 2023-2024 **Status:** Optional **Class:** 1 **Credits:** 3 0 0 3 **ECTS:** 6 **Language:** Turkish

INSTRUCTOR

Title, Name and Surname: -
Phone: -
Email: -
Social Account: -
Student Day and Time: -

COURSE ASSISTANT

Title, Name and Surname:
Phone:
Email:
Social Account:
Student Day and Time:

Lessons Weekly Program:	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			-			

Rendering: Face-to-face lessons per week 3 It will be done on an hourly basis.

Place: YY: - UE: -

Purpose: To provide the theoretical framework of group theory and to teach the techniques used in the solution of complex many-body problems encountered in physics or in the application of their solutions in simplifying their solutions.

Material: R.L. Carter, Molecular Symmetry and Group Theory, John Wiley and Sons 1998. ; Scott W.R., Group Theory, Prentice-Hall Inc. New Jersey ,(1964).; King G.W., Spectroscopy and Molecular Structure, Educational Publishing, (1969).

Student Responsibility : Conducting Research Before and After the Lecture.

Weekly Lesson Plan	Week	Topic			Method	
	1	Basic Definitions and Theorems of Group Theory			YY	
	2	Group Characteristics, Conjugated Elements and Class Structures			YY	
	3	Reducible and Non-Reducible Notations			YY	
	4	Creation of Character Tables			YY	
	5	General Applications of Group Theory in Quantum Mechanics			YY	
	6	Symmetry of Atomic and Molecular Electrons			YY	
	7	Geometric Symmetry of Atoms and Molecules and Geometric Symmetry Operations			YY	
	8	Simple Applications of Symmetry Concepts			YY	
	9	MIDTERM EXAM			YY	
	10	Methods for Identifying Molecular Point Groups			YY	
	11	Matrix Representations of Point Groups			YY	
	12	G r up Theory Application to Basic and Excited Atom, Molecular Systems			YY	
	13	Application of Group Theory for Perturbated States			YY	
	14	Group Theory Physical and Chemical Applications			YY	
Assessment and Evaluation	Method				Number	Weight
	Break Exam	Exam	Face		1	% 50
		Quiz	-		-	
		Homework	-			
		Project	-		-	-
	General Exam	Face			1	% 50
Course Outcomes:	1	Learns and applies symmetry operations.				
	2	Understands the important techniques and relationships used in the application of group theory to atomic and molecular systems.				
	3	Learn molecular symmetry and understand its applications in molecular physics.				
	4	Learns to investigate the character table.				
	5	Learns about atoms and their interactions.				

Course-Specific Explanations:

UE: Distance Education; YY: Face-to-Face Education



T.C.
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Course Syllabus Form

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