AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Point Groups and Applications								
Course Code	KİM533		Couse Level	Second Cycle (Master's Degree)					
ECTS Credit	6	Workload	150 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	The concept of symmetry, explaining of symmetry elements and symmetry operations, to determine the point groups based on the principles of group theory, reducible representations and character tables, teaching of molecular vibrations, molecular orbitals and energy diagrams and electronic situations and issues of selection rules.								
Course Content	Determine the point group of the molecule by applying the concept of symmetry to the molecules, determine of chirality, symmetry properties of molecular vibrations and molecular orbitals, type of hybridazition and spectroscopic transitions.								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Discussion, Problem Solving								
Name of Lecturer(s)									

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	20
Final Examination	1	60
Quiz	4	10
Assignment	4	10

Recommended or Required Reading	
1	Cemal Kaya, Duran Karakaş, Moleküler Simetri, Palme yayınevi, 2009-Ankara.
2	F.A. Cotton, “Chemical Applications of Group Theory”, Wiley -Interscience.

Week	Weekly Detailed Course Contents	
1	Theoretical	Introduction to symmetry: the concept of symmetry, symmetry terms.
2	Theoretical	VSEPR model, formulas and isomerism
3	Theoretical	Symmetry elements and symmetry operations
4	Theoretical	Point groups
5	Theoretical	Chiral molecules and optical activity
6	Theoretical	Irreducible representations
7	Theoretical	Character tables
8	Preparation Work	General review on topics
	Intermediate Exam	Midterm Exam
9	Theoretical	Basic types of vibration modes and symmetry
10	Theoretical	Infrared and Raman activity
11	Theoretical	Linear combination of atomic orbitals (LCAO) approach
12	Theoretical	Molecular orbitals
13	Theoretical	Creation of the molecular orbital energy diagram with the character tables.
14	Theoretical	Molecular orbital energy diagram
15	Theoretical	Electronic states and selection rules
16	Preparation Work	General review on topics
	Final Exam	Final Exam

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	0	3	42
Assignment	4	6	0	24
Reading	1	0	30	30
Quiz	4	4	1	20

Midterm Examination	1	10	2	12
Final Examination	1	20	2	22
			Total Workload (Hours)	150
			[Total Workload (Hours) / 25*] = **ECTS**	6
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	to be able to recognize the molecular structure, Lewis structure and resonance.
2	to be able to apply symmetry elements and symmetry operations to any molecule.
3	to be able to analyse the classification of point groups.
4	to be able to set up the creation of the character table.
5	to be able to determine whether the molecule is chiral or not.
6	to be able to identify IR and Raman spectrums according to the point groups.
7	to be able to define the type of hybridization of the molecule.
8	to be able to apply the Crystal Field Theory to the molecule and tell splitting depending on the geometry .
9	to be able to draw a diagram of the molecular orbital energy of the molecule.
10	to be able to compose atomic terms and recognize the rules regarding selection of spectroscopic transitions.

Programme Outcomes *(Chemistry Master)*	
1	To be able to gain proficiency in depths and analysis by statistical methods in the same or a related area depending on the undergraduate competence,.
2	To be able to use the knowledge of his/her field and the skills to solve problems and/or applications in interdisciplinary research.
3	To be able to adopt to evaluate the information and skill his/her field by critical approach.
4	To be able to evaluate the effect of important persons, case and fact on his/her field applications.
5	To be able to gain the ability to discuss write and orally present to a group of literate listener.
6	To be able to communicate orally and written in a foreign language at least at European language B2 level.
7	To be able to use computer programs related to his/her field and have skills for informatics communication.
8	To be able to be careful in protecting social, scientific and cultural ethics in collection data, application and presentation.
9	To be able to develop strategic, political and application plans in his/her field and may evaluate the outcomes in quality periods.

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	L7	L8	L9	L10
P1	5	5	5	5	5	5	5	5	5	5
P2	5	5	5	5	5	5	5	5	5	4
P3	5	5	5	5	5	5	5	5	5	5
P5	3	3	3	3	3	3	3	3	3	3
P9	4	4	4	4	4	4	4	4	4	4