



Çanakkale Onsekiz Mart University

Education Information System

[DEGREE PROGRAMMES](#)
[BOLOGNA](#)
[THE INSTITUTION](#)
[INFO FOR STUDENTS](#)

You are here : [Home](#) [Master's Degree& Doctorate Degree](#) [Physics \(Master\)](#) [Group Theory And Applications In Physics II](#) **Course Information**

Course Information

COURSE INFORMATION

Course Title	Code	Semester	L+U Hour	Credits	ECTS
Group Theory And Applications In Physics II	FZ5012		3 + 0	3.0	7.5

Prerequisites	None
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Language of Instruction	Turkish
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Course Level	Second Cycle
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Course Type	Elective
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Mode of delivery	Face to face
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Course Coordinator	Prof. Dr. İsmail TARHAN
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Instructors	Prof. Dr. İhsan YILMAZ
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Assistants	
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Course Objectives	The main objective of this course is to provide information on reducible representations, irreducible representations of point groups, the great orthogonality theorem, projection operators and their properties, constructions of character tables, importance of representation theory in quantum mechanics, selection rules, applications of group theory to molecules, infrared and Raman spectra, hybrid orbitals, s-p bonds.
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Course Content	The main topics of the course are reducible representations, irreducible representations of point groups, the great orthogonality theorem, applications of the great orthogonality theorem, theory of the projection operators, applications of the projection operators, constructions of character tables, properties of character tables, importance of representation theory in quantum mechanics, selection rules, applications of group theory to atoms, applications of group theory to molecules, infrared and Raman spectra, hybrid orbitals, s-p bonds.
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Course Learning Outcomes	<ol style="list-style-type: none"> 1) Write the some physical properties of system without solving the wave equation 2) Apply the group theory to atoms and molecules 3) Analyze Infrared and Raman spectra. 4) Explain properties of character tables 5) Write selection rules
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WEEKLY COURSE CONTENT

Week	Topics	Teaching and Learning Methods and Techniques	Study Materials
1. Week	Reducible representations	Oral and written expression	
2. Week	Irreducible representations of point groups	Oral and written expression	

Quick Access

Physics (Master)

- Qualification Awarded
- Level of Qualification
- Qualification Requirements and Regulations
- Specific Admission Requirements
- Recognition of Prior Learning
- Profile of the Program
- Program Key Learning Outcomes
- Occupational Profile of Graduates
- Access to Further Studies
- Course Structure & Credits
- Exam Regulations & Assessment & Grading
- Graduation Requirements
- Mode of Study
- Programme Director(or Equivalent)
- Evaluation Questionnaire
- TYYÇ

Course Information

- Course Information
- Weekly Course Content
- Resources
- Course Category
- CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME OUTCOMES
- ECTS credits and course workload

3. Week	The great orthogonality theorem	Oral and written expression	
4. Week	Applications of the great orthogonality theorem	Oral and written expression	
5. Week	Theory of the Projection operators	Oral and written expression	
6. Week	Applications of the Projection operators	Oral and written expression	
7. Week	Constructions of character tables	Oral and written expression	
8. Week	Mid-term Exam	Written Exam	
9. Week	Properties of character tables	Oral and written expression	
10. Week	Selection rules	Oral and written expression	
11. Week	Applications of group theory to atoms	Oral and written expression	
12. Week	Applications of group theory to molecules	Oral and written expression	
13. Week	Infrared and Raman Spectra	Oral and written expression	
14. Week	Infrared and Raman Spectra	Oral and written expression	
15. Week	Hybrid orbitals, S-p bonds.	Oral and written expression	
16. Week	Final Exam	Written Exam	

RESOURCES

Recommended Sources
Chemical Applications of Group Theory, F. Albert Cotton, Wiley SE.
Group theory and Quantum mechanics, M. Tinkham
Group theory, Eugene P. Wigner, Academic Press 5th. Ed.
Group theory and Chemistry, David BISHOP, Clarendon press-Oxford

ASSESSMENT

Measurement and Evaluation Methods and Techniques
Mid-term exam + Assignment + Research & Project and Presentation 40%, Final Exam 60%

COURSE CATEGORY

Course Category	Percentage
Support Courses	% 100

CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME OUTCOMES

Programme Outcomes	Contribution Level	DK1	DK2	DK3	DK4	DK5
<u>PY1</u>	4	4	4	3	4	4
<u>PY2</u>	5	5	5	5	4	4
<u>PY3</u>	4	4	4	4	3	3
<u>PY4</u>	4	5	5	4	4	4

<u>PY5</u>	4	4	4	4	3	4
<u>PY6</u>	5	5	3	5	5	4
<u>PY7</u>	4	5	4	4	4	3
<u>PY8</u>	4	4	3	3	4	4
<u>PY9</u>	5	4	5	4	5	5
<u>PY10</u>	3	3	2	2	3	3
<u>PY11</u>	5	5	5	4	4	5
<u>PY12</u>	3	2	2	3	3	3
<u>PY13</u>	4	4	4	4	5	3
<u>PY14</u>	4	4	4	4	4	4
<u>PY15</u>	4	3	3	4	4	4

*DK = Course's Contribution.

	0	1	2	3	4	5
Level of contribution	None	Very Low	Low	Fair	High	Very High

ECTS CREDITS AND COURSE WORKLOAD

Event	Quantity	Duration (Hour)	Total Workload (Hour)
Final Exam	1	3	3
Final Exam Preparation	1	12	12
Mid Term Exam Preparation	1	8	8
Preliminary Study	10	3	30
Assignment 1	8	5	40
Application/Practice	8	3	24
Further Study	10	3	30
Mid Term Exam 1	1	3	3
Class Hours (14 weeks)	14	3	42
Total Workload			192
Total Workload / 25.5 (s)			7.53
ECTS Credit of the Course			8