Course Information

COURSE INFORMATION

Course Title	Code	Semester	L+U Hour	Credits	ECTS
Introduction to Atom and Molecular Physics	FZK376.1	6. Semester	3 + 0	3.0	7.0

Prerequisites	None

Language of Instruction	English
Course Level	Bacheclor's Degree (First Cycle)
Course Type	Elective
Mode of delivery	Face to face
Course Coordinator	Assist. Prof. Dr. Mustafa KURT
Instructors	
Assistants	
Course Objectives	This course aims to Investigate the anatomy of the formation of atomic nuclei and atomic properties. determine the characteristics of different atomic models to analyze the structure of electrons surrounding the atomic nucleus. Structure of atoms and molecules, energy levels, wave functions and electromagnetic transitions to analyze conceptually.
Course Content	Classical two body problem, Atomic models, Solution of Hydrogen atom, Atomic spectroscopy, Atomic energy level scope to spectroscopy, Pauli principles and Probability of transition between atomic energy levels, Zeeman effect, Stark effect, Molecular structure, Molecular spectroscopy 1, Molecular spectroscopy 2, Ionic bounds, Spin, resonance and transition spectrum, Interaction of Light and Atomic Systems .
Course Learning Outcomes	1) Investigate to atomic models. 2) Capable of solve wave equation and determine energy level for Hydrogen atom. 3) Learn basic information about the atomic energy levels and transitions. 4) gain knowledge of atomic spectroscopy. 5) Understand the meaning of molecular spectroscopy 6) able to calculate for the atomic transition probabilities between levels. 7) able to determine the methods for the determination of Einstein coefficients. 8) learn laser theory and information about it.

WEEKLY COURSE CONTENT

Week	Topics	Teaching and Learning Methods and Techniques	Study Materials
1. Week	Classical two body problem	Face to faceLecture	
2. Week	Atomic models	Face to faceLecture	
3. Week	Solution of Hydrogen atom	Face to faceLecture	

Quick Access

Physics
- 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

4. Week	Atomic spectroscopy	Face to faceLecture	
5. Week	Atomic energy level scope to spectroscopy	Face to faceLecture	
6. Week	Pauli principles and Probability of transition between atomic energy levels	Face to faceLecture	
7. Week	Zeeman effect	Face to faceLecture	
8. Week	Stark effect	Face to faceLecture	
9. Week	Molecular structure	Face to faceLecture	
10. Week	Molecular spectroscopy 1	Face to faceLecture	
11. Week	Molecular spectroscopy 2	Face to faceLecture	
12. Week	Ionic bounds	Face to face Lecture	
13. Week	Spin, resonance and transition spectrum	Face to faceLecture	
14. Week	Interaction of Light and Atomic Systems	Face to faceLecture	
15. Week	Review	Face to faceLecture	
16. Week	Final Exam	Written ExamLecture	

RESOURCES

Recommended Sources
Atomic Physics: 8th Edition, Max Born, ISBN-13: 978-0486659848
Lecture Notes on Atomic and Molecular Physics by S. Erkoc and T. Uzer (Aug 1996) , ISBN-13: 978-9810228118
Lectures on Atomic Physics, Walter R. Johnson, ISBN-13: 978-3540680109

ASSESSMENT

Measurement and Evaluation Methods and Techniques
• Mid-term: %30 • Final exam: %50 • Quiz: %20

COURSE CATEGORY

Course Category	Percentage
Area of Specialization Courses	% 100

CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME OUTCOMES

Programme Outcomes	Contribution Level	DK1	DK2	DK3	DK4	DK5	DK6	DK7	DK8
PY1	4	4	4	4	4	4	4	4	4
PY2	3	3	3	3	3	3	3	3	3
PY3	4	4	4	4	4	4	4	4	4
PY4	5	5	5	5	5	5	5	5	5
PY5	3	3	3	3	3	3	3	3	3
PY6	4	4	4	4	4	4	4	4	4
PY7	5	5	5	5	5	5	5	5	5
PY8	2	2	2	2	2	2	2	2	2
PY9	3	3	3	3	3	3	3	3	3
PY10	2	2	2	2	2	2	2	2	2

PY11	4	4	4	4	4	4	4	4	4
PY12	4	4	4	4	4	4	4	4	4
PY13	3	3	3	3	3	3	3	3	3
PY14	2	2	2	2	2	2	2	2	2
PY15	3	3	3	3	3	3	3	3	3

*DK = Course's Contrubution.

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

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ECTS CREDITS AND COURSE WORKLOAD

Event	Quantity	Duration (Hour)	Total Workload (Hour)
Class Hours (14 weeks)	14	3	42
Presentation/Seminar	1	10	10
Final Exam Preparation	1	25	25
Mid Term Exam Preparation	1	20	20
Research&Project	1	30	30
Quiz 1	2	2	4
Assignment 1	3	5	15
Final Exam	1	3	3
Mid Term Exam 1	1	3	3
Further Study	2	10	20
		Total Workload	172
		Total Workload / 25.5 (s)	6.75
		ECTS Credit of the Course	7