

	Ministry of Higher Education and Scientific Research - Iraq University of WARITH ALANBIYAA College of Sciences Department of Medical Physics	
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MODULE DESCRIPTOR FORM

Course Information			
Material delivery		Atomic physics essential MPH2204 study units 8 200	Article title
My theory✓ Laboratory✓ Review✓			Type of material
			Article code
			Units of matter
			Student's academic workload (hours/semester)
Fourth semester	Delivery semester	UG II	Unit level
the sciences	College	Department of Medical Physics	Scientific Department
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Ph.D	Subject Leader Qualifications	.Professor Dr	The academic title of the unit head
ali.n@uowa.edu.iq	e-mail	Ali Nazim Munif	References for the material
ahmed.mo@uowa.edu.iq	e-mail	Dr. Ahmed Moussa Jaafar Othman) Reference Name (Material
1.0	Issuing the article		Date of approval by the Scientific Committee




 أ.م.د. شيما حسيب نونل
 ٢٠٢٥ - ٢٠٢٦



Relationship with other study subjects

without	semester	without	Basic Requirements Unit
without	semester	without	Common Requirements Unit

Course objectives, learning outcomes, and guidance content

<ol style="list-style-type: none"> 1. Learn the general concepts about the atom and the laws that govern it. 2. Identifying the models that describe the structure of the atom and the components of the atom. 3. Knowing how to determine the quantum numbers of electrons in an atom. 4. Learn about the theory of disturbances at the atomic levels. 5. Studying the absorption and emission levels of atoms and identifying spontaneous emissions. 6. Studying the permitted and prohibited transitions between levels of the atom. 7. . Studying the effect of electric and magnetic fields on the atomic levels 8. And to understand the phenomenon of the Zeeman and Stark effect. 9. Studying the relationship between the spin and rotation of the electron and the interactions associated with them. 	<p>Course objectives</p>
<ol style="list-style-type: none"> 1. Developing students' skills in logical thinking and analysis. 2. Enabling students to overcome their fear of public speaking by organizing seminars related to atomic physics during the first semester in the form of groups. 3. Enabling students to search for good and valuable information by assigning them homework related to the topic. 4. To familiarize students with topics in atomic physics. 5. Enabling the student to use scientific sources by explaining how to obtain information from reliable sources. 6. Developing the student's thinking and linking of information through lectures, explanatory videos, and methods of using information from prestigious academic sources and expressing it in diverse ways. 	<p>Learning outcomes for the subject</p>

<p>7. Enabling students to create an environment of understanding and familiarity with their peers through awareness campaigns.</p> <p>8. To maximize the creator's ability to observe natural and scientific phenomena.</p>	
<p>: Theoretical lectures Learn the concepts of each theoretical lecture or group of lectures. [SSWL= 28]</p> <p>Practical lectures teach the concepts of each practical lecture or group of lectures. [SSWL= 30]</p> <p>Total hours= \sumSSWL + (Midterm exam hours + Final exam hours) Total hours = 28 + 30 + 1 + 3 = 62</p>	<p>Guidelines</p>

<p>Learning and teaching strategies</p>	
<ol style="list-style-type: none"> 1. . a lecture 2. Problem-based learning(PBL) . 3. . Peer teaching and collaborative learning 4. . Meditation practice 5. . Workshops 6. . Laboratory sessions 7. . Student groups 8. . The discussion 9. . Giving students assignments to solve problems 10.. Students are assigned to prepare reports related to the course 	<p>Strategies</p>

<p>Student's academic workload</p>			
5	Regular weekly study load for the student	75	Regular academic workload for the student during the semester
8.133	Irregular weekly study load for the student	122	Irregular student workload during the semester
197 Final = 200 3 +			The student's total academic workload during the semester

Course Material Assessment					
Learning outcomes	Specific week	the weight in) (degrees	/ Time Number of times		
3.6	3,6,9	10 % (10)	3	Tests	Formative assessment
1-8	Throughout the semester	10 % (8)	1	Project	
2,5,7	Throughout the semester	10% (7)	3	Laboratory report	
4.8	Throughout the semester	10% (7)	2	Duties	
7.8	Throughout the semester	10 % (8)	2	Reports	
	7	10% (10)	1	Midterm exam	Summary assessment
	16	50% (50)	1	Final exam	
%100			Overall assessment		

Weekly theoretical curriculum	
Introduction to Atomic Physics	Week 1
Quantum mechanical description of the hydrogen atom Angular momentum Atomic spectrum Time	Week 2
Independent noise theory microstructure	Week 3
The relationship between rotation and orbit	Week 4
relative effects	Week 5
Time-dependent noise theory The interaction of atoms with electromagnetic radiation	Week 6
Midterm exam	Week 7
Absorption and emission of radiation	Week 8
Permitted and prohibited transfers	Week 9
Spontaneous radiation of multi-electron atoms	Week 10
Atoms in a magnetic field and the Stark effect	Week 11
Zeeman effect, Zeeman effect in a weak field, and Zeeman effect in a strong field	Week 12
Hund's rules and atomic orbitals	Week 13

,Spin-orbit interactionsLS-coupling approximation and approximation jj -coupling	Week 14
Rules for selecting atoms in electric or magnetic fields	Week 15

Practical weekly curriculum	
X-ray physics X-ray attenuation	Week 1
Determining the specific charge of the electron	Week 2
Electron diffraction in a polycrystalline crystal lattice	Week 3
Study of the mercury atom spectrum	Week 4
Planck constant	Week 5
Stefan-Boltzmann Law	Week 6
Study of the Palmer series / Determination of the Rydberg constant	Week 7
Heisenberg's uncertainty principle	Week 8
Frank-Hertz's experiment with neon	Week 9
Electron diffraction in a polycrystalline crystal lattice	Week 10
Study of the mercury atom spectrum	Week 11
Planck constant	Week 12
Stefan-Boltzmann Law	Week 13
Study of the Palmer series / Determination of the Rydberg constant	Week 14

Heisenberg's uncertainty principle	Week 15
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Learning and teaching resources		
Is it available ?in the library	Required texts	
no	Atomic Physics 2010, Massachusetts, Wesley	Required texts
no	1 .Bransden and Joachain , Physics of Atoms and Molecules, Longman scientific and technical, 1983 2.Ewart, P. (2019). Atomic physics. Morgan & Claypool Publishers.	Recommended texts
	https://www.britannica.com/Science-Tech https://www.sciencedirect.com/	Websites

: Appendix

Grade chart				
Definition	% Rating	Appreciation	Degree	The group
Outstanding performance	100-90	privilege	A	Success Group (100 – 50)
Above average with some errors	89-80	very good	B	
Sound work with noticeable errors	79-70	good	C	
Fair, but with significant shortcomings	69-60	middle	D	
The work meets minimum standards	59-50	acceptable	E	
More work is needed, but the decision It can be given	49-45	Sediment (under processing	FX	sedimentation group (49 – 0)
A large amount of work is required	44 - 0	Precipitate	F	

Note: Marks with decimal places greater than 0.5 or less than the highest or lowest full mark will be rounded up (for example , a mark of 54.5 will be rounded up to 55, while a mark of will be rounded up to 54). The university has a policy of not tolerating "near-pass 54.4 failure ", so the only adjustment to the marks awarded by the original mark(s) will be the . automatic rounding described above