



The Hashemite University
Faculty of Science
Department of Physics

Course Title:	Quantum Mechanics (II)	Course Number:	110102364
Semester:	Second	Year:	2018
Designation:	Compulsory	Prerequisite(s):	(110102261), (110102282), (110102362)
Instructor:	Dr. Gassem Alzoubi	Instructor's e-mail:	gassem@hu.edu.jo
Office Hours:	Sunday, Tuesday, Thursday Monday and Wednesday	Webpage :	http://staff.hu.edu.jo/gassem
			10:00 –11:00 Pm, Physics Building, Room # 107 11:00 – 12:00 Am

Course Description (catalog): Interaction of electrons with electromagnetic fields, operators and spin using determinants, addition of angular momentum and spin, theory of time-independent approximation methods, real hydrogen atom, atomic radiation, theory of time-dependent approximation methods, collision theory in quantum mechanics, identical particles

Textbook(s) and/or Other Supplementary Materials:

Quantum Physics, S. Gasiorowicz, 9th edition, John Wiley & Sons, 2003

Online Supplementary Materials: www.wiley.com/college/Gasiorowicz

References:

1. Introduction to Quantum Mechanics, by B. H. Bransden and C.J. Joachain, Longman Scientific & Technical, 1990
2. Introduction to Quantum Mechanics, By D.J. Griffiths, Pearson Education Inc, 2005.
3. J. J. Sakurai, *Modern Quantum Mechanics*, Addison-Wesley, 1994.
4. E. Merzbacher, Quantum Mechanics, 3rd. Edition, John Wiley and sons, 1998.

Major Topics Covered:

Topics	No. of Weeks	Contact hours*
7- Angular Momentum	3	9
8- The Schrodinger Equation in Three Dimensions and the Hydrogen Atom	3	9
9- Matrix Representation of Operators	2	6
10- Spin	2	6
11- Time-Independent Perturbation Theory	2	6
12- The Real Hydrogen Atom	3	9
Total	15	45

*Contact hours include lectures and exams

Specific Outcomes of Instruction (Course Learning Outcomes):

After completing the course, the student will be able to:

	Course Learning Outcomes (CLO)	(SO*)
CLO1.	Develop a clear understanding of basic and advanced physical phenomena of the quantum world as an integral part of the student's overall education	(a), (k), (i)
CLO2.	Use algebra, trigonometry, basic and advanced calculus, in solving problems in quantum mechanics	(a), (k)
CLO3.	Provide detailed and accurate descriptions of angular Momentum and rotation, spin, bound states, scattering, approximation methods in QM (Stationary perturbation and time dependent perturbation)	(a), (e), (k)

(SO*) = Student Outcomes Addressed by the Course.

Student Outcomes (SO) Addressed by the Course:

#	Outcomes Description	Contribution
	Applied and Natural Sciences Student Outcomes	
(a)	an ability to apply knowledge of mathematics, science, and applied sciences	H
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to formulate or design a system, process or program to meet desired needs	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify and solve applied sciences problems	L
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of solutions in a global and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice.	M
H = High, M = Medium, L = Low		

Grading Plan:

1 st Exam	30 Points	TBA
2nd Exam	30 Points	TBA
Final exam	40 Points	TBA

General Notes: **Attendance Policy:** students are expected to attend every class and arrive on time in compliance with HU regulations. In case you find yourself in a situation that prevents you from attending class or exam, you have to inform your instructor. If you miss more than 6 classes for the (Sunday, Tuesday, and Thursday model) or 4 classes for the (Monday and Wednesday Model), you cannot pass the course. Makeup excuses will be accepted only for very limited justified cases, such as illness and emergencies.

Prepared by: Dr. Gassem Alzoubi **Date:** Jan, 25, 2018