

Course Syllabus

1	Course title	Quantum Mechanics	
2	Course number	0332361	
3	Credit hours	3	
	Contact hours (theory, practical)	3,0	
4	Prerequisites/corequisites	261	
5	Program title	B.Sc.	
6	Program code		
7	Awarding institution	University Of Jordan	
8	School	Faculty of Science	
9	Department	Department of Physics	
10	Course level	3	
11	Year of study and semester(s)	2022-2023 Spring	
12	Other department(s) involved in teaching the course		
13	Main teaching language		
14	Delivery method	<input checked="" type="checkbox"/> Face to face learning <input type="checkbox"/> Blended <input type="checkbox"/> Fully online	
15	Online platforms(s)	<input type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....	
16	Issuing/Revision Date	March 12, 2023	

17 Course Coordinator:

Name: Riad Shaltaf	Contact hours: Monday-Wednesday 11:00-12:30
Office number: 112	Phone number: 22067
Email:r.shaltaf@ju.edu.jo	

**18 Other instructors:**

Name:

Office number:

Phone number:

Email:

Contact hours:

Name:

Office number:

Phone number:

Email:

Contact hours:

19 Course Description:

As stated in the approved study plan.

20 Course aims and outcomes:

A- Aims:

This course covers the basis of quantum physics. It introduces wave mechanics, Schrödinger's equation in a single and three dimensions.

B- Students Learning Outcomes (SLOs):

For purposes of mapping the course SLOs to the physics program SLOs, at the successful completion of the physics program, graduates are expected to be able to:

1. An ability to identify, formulate, and solve broadly defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipline.
2. An ability to formulate or design a system, process, procedure or program to meet desired needs.
3. An ability to develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgment to draw conclusions.
4. An ability to communicate effectively with a range of audiences.
5. An ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.
6. An ability to function effectively in teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.

Upon successful completion of this course, students will be able to:

Course SLOs \ Program SLOs	SLO (1)	SLO (2)	SLO (3)	SLO (4)	SLO (5)	SLO (6)	SLO (7)	SLO (8)	SLO (9)
1. should be able to evaluate the probability, expectation values and standard deviation using a given form of a wave function	✓	✓							
2. Should be able to use Schrodinger equation and mathematical techniques to derive related properties and theorems	✓	✓							
3. Solve time independent Schrodinger equation for different forms of potentials such as : infinite and finite potential wells, SHO, free particle and Dirac delta potentials	✓	✓							
4. Should be able to explain and give examples of stationary states, bound and scattering states	✓	✓							
5. Should be able to solve Eigen value problems for discrete and continuous spectra and to construct uncertainty formula for different operators	✓	✓							
6. Get familiar with Dirac notation ket, bra and changing bases	✓	✓							
7. Solve Schrodinger equation in 3 dimensions for different potential forms including H atom	✓	✓							

21. Topic Outline and Schedule:

Week	Lecture	Topic	Intended Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
1	1.1	The wave function and statistical interpretation	1,2	Face To Face	Microsoft Teams	Synchronous	Quiz Midterm Final Exam	Griffiths, D. J and Schroeter D.F, Introduction to Quantum Mechanics. (Third edition, Cambridge university press, 2018).
	1.2							
2	2.1							
	2.2							
	2.3							
3	3.1							
	3.2							
	3.3							
4	4.1	Time independent Schrödinger equation	1-4					
	4.2							
	4.3							
5	5.1							
	5.2							
	5.3							
6	6.1							
	6.2							
	6.3							
7	7.1							
	7.2							
	7.3							
8	8.1							
	8.2							
	8.3							
9	9.1							
	9.2							

	9.3							
10	10.1							
	10.2							
	10.3							
11	11.1	Formalism	1,5-6					
	11.2							
	11.3							
12	12.1	QM in three dimensions /spherical coordinates and Hydrogen atom	1,3,7					
	12.2							
	12.3							
13	13.1							
	13.2							
	13.3							
14	14.1							
	14.2							
	14.3							

22 Evaluation Methods:

Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
Quiz	20%	1.1-2.2 From Text book	1-3	7 th week	Paper Quiz
Second Midterm	30%	2.3-3.6 From Text book	3,4,5,6	11 th week	Paper Exam
Final Exam	50%	All materials will be included	1-7		Paper Exam



23 Course Requirements

(e.g: students should have a computer, internet connection, webcam, account on a specific software/platform...etc):

Internet connection

24 Course Policies:

A- Attendance policies:

Students are expected to attend all class sessions. If a student cannot attend a class session, the teacher must be notified prior to that. For the university's rules and regulations, the student's total absences must not exceed 15 % of the total class hours. Please refer to the University of Jordan student Handbook for further explanation.

B- Absences from exams and handing in assignments on time:

- a. Failure in attending a course exam other than the final exam will result in zero mark unless the student provides an official acceptable excuse to the instructor who approves a make up exam.
- b. Failure in attending the final exam will result in zero mark unless the student presents an official acceptable excuse to the Dean of his/her faculty who approves an incomplete exam, normally scheduled to be conducted during the first two weeks of the successive semester.

C- Health and safety procedures:

We don't have any policy at the moment considering the safety procedures, nevertheless, the instructor in each session has to give a general safety instructions for the student.

D- Honesty policy regarding cheating, plagiarism, misbehavior:

Cheating, plagiarism, misbehavior are attempts to gain marks dishonestly and includes; but not limited to:

- Copying from another student's work.
- Using materials not authorized by the institute.
- Collaborating with another student during a test, without permission.
- Knowingly using, buying, selling, or stealing the contents of a test.
- Plagiarism which means presenting another person's work or ideas as one's own, without attribution.
- Using any media (including mobiles) during the exam.

E- Grading policy:

Grades will be awarded based on the statistical distribution of marks out of 100%

F- Available university services that support achievement in the course:

- Faculty members website
- E-Learning website



Teams

25 References:

A- Required book(s), assigned reading and audio-visuals:

Griffiths, D. J and Schroeter D.F, Introduction to Quantum Mechanics.

(Third edition, Cambridge university press, 2018).

B- Recommended books, materials, and media:

26 Additional information:

Name of Course Coordinator: Riad Shaltaf	-Signature: -----	Date: March 13, 2023
Head of Curriculum Committee/Department: -----	Signature: -----	---
Head of Department: -----	Signature: -----	-
Head of Curriculum Committee/Faculty: -----	Signature: -----	-
Dean: -----	Signature: -----	