Oakland University *College of Arts & Sciences* *Department of Physics*

PHY 4720, Quantum Mechanics I
4 Credit Hours
Winter 2021

Instructor: Eugene Surdutovich **E-mail:** surdutov@oakland.edu
Class meets: MWF 10:40 – 11:47pm on Zoom **Office hours:** upon request

Text: R. Shankar, *Principles of quantum mechanics, 2nd ed.*
Additional texts: D. Griffiths, *Introduction to Quantum Mechanics*, H. Ohanian, *Principles of Quantum Mechanics*, R. Feynman, *Lectures on Physics, volume III.*

Grading:

Exam 1		**25%**
Exam 2		**25%**
Final Exam		**30%**
Homework		**20%**
Total		**100%**

Grading Scale:

A	**96-100**
A-	**90-95**
B+	**85-89**
B	**80-84**
B-	**75-79**
C+	**70-74**
C	**65-69**
C-	**60-64**
D+	**55-59**
D	**50-54**
F	**< 50**

PHY-4720 **Tentative Course Schedule** **Winter 2021**

Week	Day	Date	Lecture Topics	Chapters
	W	1/6	Introduction	3
	F	1/8	More introduction	3
2	M	1/11	More introduction	2
	W	1/13	Postulates and some math	1, 4
	F	1/15	Postulates and some math	1, 4
3	M	1/18	Martin Luther King's Day – no class	
	W	1/20	Postulates and some math	1, 4
	F	1/22	Postulates and some math	1, 4
4	M	1/25	Postulates and some math	1, 4
	W	1/27	Postulates and some math	1, 4
	F	1/29	Postulates and some math	1, 4
5	M	2/1	1-D problems	5
	W	2/3	1-D problems	5
	F	2/5	Exam 1	
6	M	2/8	1-D problems	5
	W	2/10	1-D problems	5
	F	2/12	1-D problems, Classical limit	5, 6
7	M	2/15	Simple Harmonic Oscillator	7
	W	2/17	Simple Harmonic Oscillator	7
	F	2/19	Simple Harmonic Oscillator	7

8		2/20-2/28	Winter recess – no classes	
9	M	3/1	Heisenberg Uncertainty Relations	9
	W	3/3	Heisenberg Uncertainty Relations	9
	F	3/5	Heisenberg Uncertainty Relations	9
10	M	3/8	Identical Particles	10
	W	3/10	Identical Particles	10
	F	3/12	Identical Particles	10
11	M	3/15	Symmetries	11
	W	3/17	Symmetries	11
	F	3/19	Exam 2	
12	M	3/22	Angular momentum	12
	W	3/24	Angular momentum	12
	F	3/26	Angular momentum	12
13	M	3/29	Hydrogen atom	13
	W	3/31	Hydrogen atom	13
	F	4/2	Hydrogen atom	13
14	M	4/5	Periodic table	13
	W	4/7	Spin	14
	F	4/9	Spin	14
15	M	4/12	Spin	14
	W	4/14	Spin	14
	F	4/16	Spin	14
16	M	4/19	Review	
17	M	4/26	12:00 – 3:00 p.m. Final Exam, cumulative	

Goals

Present the main ideas of quantum mechanics: its origin, concepts of wave function and state, investigate time-independent Schrödinger equation in one and three dimensions. Study potential wells, simple harmonic oscillator and hydrogen atom systems. Investigate concepts of spin and identical particles.

Mathematical formalism will be adequately presented.

The level will correspond to the level of problems at Physics GRE and some PhD qualifying exams.