THE UNIVERSITY OF ARIZONA

PHYS 371 – Quantum Theory – Spring 2018

MWF 11:00 - 11:50 AM, PAS 220

Class dates: January 10 – May 2 (no class on January 15 and March 5, 7, 9)

Course Description

PHYS 371 introduces the laws of quantum mechanics, which are fundamental to our understanding of nature and most current research in physics. As the first part of a two-semester course, PHYS 371 develops the mathematical formalism and applies it to exactly solvable systems.

A preliminary outline of the topics covered can be found at
http://www.physics.arizona.edu/~smeinel/PHYS371/Spring_2018/PHYS371_outline.pdf

Course Prerequisites or Co-requisites

The following are recommended:

PHYS 204 - Mathematical Techniques in Physics
PHYS 321 - Theoretical Mechanics
MATH 254 - Introduction to Ordinary Differential Equations
MATH 313 - Introduction to Linear Algebra

Instructor and Contact Information

Course web page	https://d2l.arizona.edu/d2l/home/652701
Instructor	Professor Stefan Meinel
Office	Department of Physics, PAS 420A
Office hours	You are always welcome to stop by, but to guarantee that I'm available it is best to make an appointment.
Email	smeinel@email.arizona.edu
Phone	520 621 2453
Teaching Assistant	Jingwei Liu
Email	jingweil@email.arizona.edu

Course Format

I will combine lectures (using the whiteboard) with in-class discussions of multiple-choice questions. You will answer the multiple-choice questions by holding up colored cards (I will distribute these during the first class, and you must return them at the end of the semester). In addition, there will be written in-class exams and homework problems, as detailed further below.

Required Textbook

- D. J. Griffiths, *Introduction to Quantum Mechanics* (Pearson Prentice Hall, 2nd edition). Chapters 1 - 5 of this book are relevant for this course.

Recommended Additional Textbook

- R. Shankar, *Principles of Quantum Mechanics* (Springer, 2nd edition). This book starts with a very useful mathematical introduction, and follows an axiomatic approach to quantum mechanics. The Dirac bra-ket notation is used from the beginning. A PDF of this book is available free of charge on the Springer web page at
  http://link.springer.com/book/10.1007/978-1-4757-0576-8
  when accessed from a computer connected to the U of A network.

Lecture Notes

I will provide typed lecture notes on the D2L course web page; I will update these notes after each lecture. The lecture notes are not meant to replace the use of textbooks; you should read additional material on your own.

Homework Problems

There will be approximately 12 problem sets. You should submit answers to all problems within each set, but only selected problem numbers (common for all students, but not announced prior to submission) will be graded due to limited availability of grading time. However, 1 of the n points on each set will be given based on whether you submitted work for all problems or not (this rule applies only to problem sets that are not graded in full).

The homework problems will be posted on the D2L course web page together with their due dates. You are encouraged to discuss the problems with other students, but the write-up of the solutions must be your own and represent your own understanding.

Exams

There will be four in-class written exams:

- First exam: Friday, February 23, 11:00 am - 11:50 am.
- Second exam: Friday, April 13, 11:00 am - 11:50 am.
- Assessment exam: Wednesday, May 2, 11:00 am - 11:50 am.
  This is a multiple-choice exam used by the department to assess how well the class learned the material. The results do not enter in your grade, but participation in the exam is mandatory.
- Final exam: Monday, May 7, 10:30 am - 12:30 pm.

For the first, second, and final exam, you may bring one letter-size sheet of paper with equations on one side. No other material and no electronic devices are allowed.

Students who miss exams due to illness or emergency are required to bring documentation from their health-care provider or other relevant, professional third parties.

The general regulations and schedule for final exams can be found at
https://www.registrar.arizona.edu/courses/final-examination-regulations-and-information
and
http://www.registrar.arizona.edu/schedules/finals.htm.

Honors Project

Students enrolled in the honors section of the course will be assigned an additional, longer project on an interesting advanced topic. This project will be assigned in the middle of the semester, and must be completed by April 27. The project does not enter in your grade, but satisfactory work on this project is required to pass the honors section of the course.

Grading Scale and Policies

Your overall course percentage will be calculated according to the following weighting scheme:

- Homework problems: 20%
- First written exam: 20%
- Second written exam: 20%
- Final written exam: 40%

Based on your overall percentage x, you will receive *at least* the following letter grades:

- $87.5\% \leq x$: A
- $75\% \leq x < 87.5\%$: B
- $62.5\% \leq x < 75\%$: C
- $50\% \leq x < 62.5\%$: D
- $x < 50\%$: F

(I may decide to lower the thresholds if the class average turns out to be unexpectedly low.)

The University policy regarding grades and grading systems is available at http://catalog.arizona.edu/policy/grades-and-grading-system.

Requests for incomplete (I) or withdrawal (W) must be made in accordance with University policies, which are available at http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete and http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal.

Accessibility and Accommodations

Our goal in this classroom is that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact the Disability Resource Center (520-621-3268) to establish reasonable accommodations. For additional information on the Disability Resource Center and reasonable

accommodations, please visit http://drc.arizona.edu. If you have reasonable accommodations, please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate. Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

Absence and Class Participation Policy

Participating in the course and attending lectures and other course events are vital to the learning process. As such, attendance is required at all lectures.

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop.

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, see http://policy.arizona.edu/human-resources/religious-accommodation-policy.

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See https://deanofstudents.arizona.edu/absences.

Code of Academic Integrity

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity.

UA Nondiscrimination and Anti-harassment Policy

The University is committed to creating and maintaining an environment free of discrimination; see http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy.

Threatening Behavior Policy

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students.

Additional Resources for Students

The UA Academic policies and procedures are available at http://catalog.arizona.edu/policies. Student Assistance and Advocacy information is available at http://deanofstudents.arizona.edu/student-assistance/students/student-assistance.

Subject to Change Statement

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.