PHYSICS 461 - Spring 2014
Quantum Mechanics II

Lecturer: **Prof. Norbert Neumeister**
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E-mail: neumeist@purdue.edu
Office hours: Tuesday 2:00 – 3:00 PM (or by appointment)

Class: Lecture: Tuesday and Thursday 9:00 – 10:15 AM, Room 333 Physics

Textbook: *Introduction to Quantum Mechanics*, D.J. Griffiths, 2nd edition

Course Website: http://www.physics.purdue.edu/phys461

Grader: **Kaili Jiang**
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Office hours: Monday 1:00 pm – 3:00 pm,
Wednesday 9:45 am – 11:45 am

COURSE OVERVIEW:
This is the second part of a rigorous two semester introduction to Quantum Mechanics. The goals of this course are to teach you the basic concepts of Quantum Mechanics and to make you adept in solving relevant problems. The course covers an introduction to the definition and interpretation of the wavefunction, the solution of the time-independent Schrödinger Equation for several systems, eigenvalue problems, abstract formulation of Quantum Mechanics, the hydrogen atom, spin, two-particle systems, the WKB approximation, perturbation theory, scattering theory and relativistic Quantum Mechanics.

LECTURES:
The lecture will be used to introduce new concepts and to provide examples that help you understand how quantum mechanics works. Read the assigned text in advance of the lecture and then again afterwards for optimal comprehension. Your active participation during lectures with questions and comments is strongly encouraged. Please do not hesitate to, or be shy about, asking questions. We will follow the textbook quite closely, and you are strongly encouraged to get a copy. If you use the 1st edition instead, be aware that the numbering of problems has changed. We will not spend very much time (but more than Griffiths) on the experimental issues that led to the development of quantum mechanics.

ASSIGNMENTS:
Specific reading assignments will be given supplementing the lecture material covered in class. A tentative reading and homework assignment schedule is posted on the course website. You should read the assigned sections before attending lecture. Students who read the assigned material before class will find the lecture far more meaningful. You can always find an up-to-date version on the course website (Schedule).

HOMEWORK:
Problem solving is an essential as well as an integral part of this course; solving problems is how you will learn quantum mechanics. There will be 13 homework assignments and problem sets will be assigned each Tuesday. The homework is due and has to be brought to the lecture on Thursday of the following week. Homework grades will count approximately 30% towards your course grade. Students may discuss the problems with each other in a general way but should **not** do the homework as a group effort. No carbon copy homework sets are acceptable. Further, the problem solutions should be clearly and neatly written on one side only of standard size paper. Your fellow students should be able to read, follow and understand the solutions. The quality of the presentation counts towards the grade. The problem sets will be written in a format that has your name, PHYS 461, and the due date in the upper right hand corner of the first page and your name and PHYS 461 on each following page. The question should first be written out (if a long question, re-write it in an outlined form) and then followed by the solution. Assignments will be posted on the course web page.

1. Use 8½ by 11" paper.
2. Write only on one side of the page.
3. Number the pages.
4. Write clearly and neatly.
5. Solutions should be complete, comprehensive and clearly presented.
6. Stable pages together for hand in.
7. Remember to put your name on the front of the first page in hand in.
8. Homework is due in class on the day indicated on the problem set.
9. Please contact your instructor prior to the due date if you need an extension.

EXAMS:
There will be one midterm exam during the semester (Mar 11) and a comprehensive two-hour final exam final exam at the end of the semester. All exams are closed book and you must remember to bring your ID to the exams. Cheaters will be given an F in the course and will be reported to the Dean of Students. Information regarding the exams will be announced later.

GRADING:

Your course grade will be based on homework and exam scores, with the approximate weights:

Homework	30%
Midterm exam	30%
Final exam	40%

We will use plus-minus letter grades in the final grading of this course. The homework score will be calculated after dropping the one with the lowest score. Dropping the lowest scores usually takes care of missed assignments due to minor illness or other problems. **The exact cut- offs for letter grades will not be determined until the end of the semester.**

ABSENCES AND EXCUSED GRADES:
Homework sets are due on the dates indicated on the class calendar. Your work is due on time, with the exception of reasonable documented excuses. If you are going to miss an exam, you must notify the instructor **in advance** (preferably one week) so alternative arrangements can be made. Unexcused absences from any exam will be assigned a zero grade; Excused grades will be given only in one of the following circumstances: (1) illness; (2) personal crisis (e.g., automobile accidents, required court appearance, death of a close relative, weather conditions that make it impossible to get to the university); and (3) required attendance at an official Purdue activity (e.g. athletics). You **must** contact your lecturer as soon as possible but **before** the exam and discuss your problem. Appropriate documents (e.g., a written note from a doctor, with his/her name and phone number included) may be needed to judge the merit of the excuse. **Missing the final exam cannot be excused**.

SUPPLEMENTAL TEXTS:
Besides our textbook, the following books (not required) will be on reserve in the Physics Library. Most of them contain many solved problems:
1. C. Cohen-Tannoudji, B. Diu, F. Laloe, *Quantum Mechanics*
2. P.A.M. Dirac, *Quantum Mechanics*
3. S. Gasiorowicz, *Quantum Physics*
4. R. Shankar, *Principles of Quantum Mechanics*
5. J.J. Sakurai, *Modern Quantum Mechanics*
6. R.P. Feynman*, Lectures on Physics,* Vol. 3
7. E. Merzbacher, *Quantum Mechanics*
8. A. Messiah, *Quantum Mechanics,* Vol. 1 and 2

STUDENTS WITH DISABILITIES:
Purdue University is required to respond to the needs of the students with disabilities as outlined in both the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 through the provision of auxiliary aids and services that allow a student with a

disability to fully access and participate in the programs, services, and activities at Purdue University. It is the student's responsibility to notify the Disability Resource Center of an impairment/condition that may require accommodations and/or classroom modifications.

ACADEMIC HONESTY:
Cheating comes in many forms from cribbing some key concepts as an aid to getting someone else to sit in and take the exam for you (a ringer). Taking the pop quiz then leaving will be considered cheating. The purpose of the pop quizzes is to reward students who attend class (*i.e.* the entire class). Unfortunately, justice is blind and any incidence of academic dishonesty will be dealt with quickly and severely. Cheating compromises yourself, your classmates, and the University. If you are aware of someone who is cheating and getting away with don't hesitate to let me know. Be discrete but be confident that it is the right thing to do.

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. Here are ways to get information about changes in this course:

- Course web site: http://www.physics.purdue.edu/phys461/
- E-mail: neumeist@purdue.edu (use subject PHYS 461)
- Phone: 494-5198