



*Course title and number*      PHYS 606: Quantum Mechanics I  
*Term*                                      Spring 2014  
*Meeting times and location*    TR 12.45-14.00, MPHY 213

### Course Description and Prerequisites

An introduction to quantum mechanics for students in physics and other fields of science and engineering.

Prerequisite: MATH 311 and MATH 412 or equivalent, PHYS 412 or equivalent, concurrent registration in PHYS 615.

### Learning Outcomes or Course Objectives

Starting from the failure of classical mechanics in the microscopic world we develop the fundamental concepts of wave mechanics. We will proceed to solve a variety of quantum mechanical problems analytically before we discuss several techniques for solving the Schrodinger equation approximately. Afterwards we will explore the abstract formulation of quantum mechanics based on Hilbert Spaces. We end with the important theory of angular momentum in quantum theory and discuss solutions of problem with spherical symmetry.

### Instructor Information

*Name*                                      Rainer J Fries  
*Telephone number*                  845-1411  
*Email address*                        [rjfries@comp.tamu.edu](mailto:rjfries@comp.tamu.edu)  
*Office hours*                            Tue, Thu 10.30 am -12 noon  
*Office location*                        MPHY 309

### Textbook and/or Resource Material

Primary textbook: Quantum Mechanics, 3<sup>rd</sup> edition by E. Merzbacher.  
You will find many other books covering the same topics e.g. Sakurai, Landau-Lifshitz Vol. III. They can be useful but are not required. Copies of the lectures will be posted online as the semester progresses.

Website: <http://cyclotron.tamu.edu/fries/teach>

### Grading Policies

The course grade will be determined from the various components of the course in the following way:

- (a) Homework (50%)
- (b) Midterm exam (20%)
- (c) Final exam (30%)

Make-up exams will only be granted in case of a university recognized absence (university business, doctor's note etc.). Make your absence known to the instructor as soon as you know about it.

### **Course Topics, Calendar of Activities, Major Assignment Dates**

Midterm Exam and Final Exam: TBD

*Tentative Schedule (chapters in Merzbacher in parentheses):*

<b>Week</b>	<b>Topic</b>
1: Jan 14	Introduction to Wave Mechanics (1, 2)
2: Jan 22	The Schrodinger Equation (3)
3: Jan 29	The Calculus of Wave Mechanics (4)
4: Feb 5	The Calculus of Wave Mechanics (4)
5: Feb 12	Simple Problems in Quantum Theory (5,6)
6: Feb 19	Approximative Methods and Perturbation Theory (7,8)
7: Feb 26	Approximative Methods and Perturbation Theory (7,8)
8: Mar 5	Quantum Theory (9,10)
9: Mar 12	<i>Spring Break</i>
10: Mar 19	Quantum Theory (9,10)
11: Mar 26	Angular Momentum (11)
12: Apr 2	Angular Momentum (11)
13: Apr 9	Spherically Symmetric Potentials (12)
14: Apr 16	Spherically Symmetric Potentials (12)
15: Apr 23	TBD

### **Americans with Disabilities Act (ADA)**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit <http://disability.tamu.edu>

### **Academic Integrity**

For additional information please visit: <http://aggiehonor.tamu.edu>

*"An Aggie does not lie, cheat, or steal, or tolerate those who do."*