PHY 6400 **Quantum Physics I** **Winter 2012**

Instructor: Zhi-Feng Huang, 356 Physics Building
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Office hours: Mon & Wed 3:00pm – 4:00pm, or by appointment

Lecture time and location: M W F 1:55pm – 2:50pm, 177 Physics Building

Prerequisite: PHY 3300, PHY 5100, MAT 2150

Textbook: "Introduction to Quantum Mechanics", 2nd edition, by D. J. Griffiths, Prentice Hall

Supplementary/References: "Quantum Physics", 3rd edition, by S. Gasiorowicz, Wiley;
"Principles of Quantum Mechanics", 2nd edition, by R. Shankar, Springer.

Homework: Posted in Blackboard course website; Due 1 week after assigned.
Late solutions will NOT be accepted; The lowest homework score will be dropped. You must show your own work and solution steps to receive credits, although group discussions are allowed. Any copy from other sources (such as from other students, internet, or elsewhere) is prohibited and will be given 0 credit.

Exams: Two midterm exams: to be announced at least 1 week in advance (NO make-up exams);
Final exam (Cumulative): April 25 (Wednesday), 1:20pm – 3:50pm.

Grading:

1st exam:	25%
2nd exam:	25%
Final exam:	35%
Homework:	15%

A: 90 – 100%; A-: 85 – 89%
B+: 80 – 84%; B: 75 – 79%; B-: 70 – 74%
C+: 65 – 69%; C: 60 – 64%; C-: 55 – 59%
D+: 50 – 54%; D: 45 – 49%; D-: 40 – 44%
F: 0 – 39%

Course content

This course provides an introduction to Quantum Mechanics, including wave functions, notions of operators and their eigenfunctions, quantization rules, solution of Schrödinger equation in one and three dimensions, the hydrogen atom, angular momentum, spin, bosons, fermions, and time-independent perturbation theory. Detailed topics include:

- The Schrödinger equation; Superposition principle; Probability and probability density; Probability current; Normalization; Position and momentum; Commutator.
- Time-independent Schrödinger equation; One-dimensional potentials (Infinitely deep and finite square wells, harmonic oscillator, delta function); Free particle; Wave packet; Bound and scattering states; One-dimensional scattering and tunneling.
- Hermitian operators; Eigenfunctions and eigenvalues; Uncertainty principle.
- Quantum mechanics in three dimensions; Separation of variables; Degeneracy; The Hydrogen atom.
- Angular momentum and Spin; Bosons and Fermions; Symmetry of the wave function.
- Time-independent perturbation theory.

Additional resources and help

Student Disability Services: If you have a documented disability that requires accommodations, you will need to register with Student Disability Services (SDS) for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-577-3365 (TDD only). Once you have your accommodations in place, I will be glad to meet with you privately during my office hours to discuss your special needs. Student Disability Services' mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University.

Please be aware that a delay in getting SDS accommodation letters for the current semester may hinder the availability or facilitation of those accommodations in a timely manner. Therefore, it is in your best interest to get your accommodation letters as early in the semester as possible.