Course Information PHY 511 - Fall 20012

Physics 511 (Quantum Mechanics I) is a graduate level course on Quantum Mechanics. A brief outline is provided below.

1. **Lecture:** TuTh 9:50-11:20
   Instructor: T. Schaefer, Office C-135, Phone 632-4489
   email: Thomas.Schaefer@sunysb.edu
   Office hours: Tu. 11:30-1:00 and by appointment
   TA: Zhenguo Wang (zwang@grad.physics.sunysb.edu).

2. **Homework:** Most tuesdays a set of homework problems will be assigned. (You can also check the website.) The homework is due tuesday the following week.

3. **Exams:** There will be one midterm exam and a final on dates to be announced during the lecture.

4. **Grade:** Your final grade will be determined by weighting the various portions of the course as follows:

Midterm:	20%
Final Exam :	40%
Homework:	40%

5. **More Information:** Additional information related to the course may or may not be available at
   `http://tonic.physics.sunysb.edu/~ thomas/teaching` .

6. **Textbook:** (not required, but strongly recommended) R. Shankar Principles of Quantum Mechanics. Supplemental references

   - L. D. Landau, E. M. Lifshitz, Quantum Mechanics
   - J. J. Sakurai, Advanced Quantum Mechanics
   - R. P. Feynman, A. R. Hibbs, Quantum Mechanics abd Path Integrals

   Some supplemental material will be handed out in class or posted on the website.

7. **Rough outline:** (subject to random changes and to spillover into PHY 512):

   - Mathematical Methods
     Hilbert spaces, linear operators, ...
   - Quantum Mechanics: The Postulates
     Review of classical mechanics, quantum mechanics: the postulates, Schrödinger equation, discussion (Measurements, etc.), classical limit.
   - Problems in one Dimension
     Free particle, scattering and tunneling, harmonic oscillator
   - Path Integrals
     Path integral formulation, harmonic oscillator, numerical methods, Feynman diagrams.
   - Symmetries and Angular Momentum
     Rotational invariance, the eigenvalue problem for L^2, L_z, hydrogen Atom, spin, addition of angular momenta.
   - Perturbation Theory
     Time independent, time dependent perturbation theory, Feynman diagrams, WKB approximation.