PHY 7400, 7410 – Quantum Mechanics I, II

Lecturer: Tom Cormier
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Text: **Quantum Mechanics Volume I and II**
Cohen-Tannoudji, Diu and Laloe, Wiley-VCH Publishing Co.

Course Material:

1. The origins of Quantum Physics, Bell theorm
2. Wave particle duality and Wave Mechanics
3. Linear Vector Spaces, Stern Gerlach Filters, Polarized Photons
4. Axiomatic development of Quantum Mechanics
5. Two level systems: spin ½, isospin, neutral kaon systems, NH_4 maser
6. Applications: harmonic oscillator,
7. Angular momentum in quantum mechanics
8. Central potential problems, hydrogen atom
9. Electron spin formalism, finite rotations
10. Identical particle symmetries
11. Addition of angular momentum, many electron atoms
12. Approximation methods
13. Applications: The fine- and hyper-fine structure of Hydrogen
14. Approximation methods in time dependent problems
15. Scattering theory

Supplementary Material: Selected applications drawn from particle, nuclear, and atomic and molecular physics, entanglement and measurement theory, laser cooling and complex systems will be included throughout the course as time permits

Homework: Assigned weekly. Group effort is allowed. It is assumed that students will read the text material as some of the more elementary topics may not be explicitly covered in lecture.

Grades: Homework 10% (assigned ~ weekly, nominally one problem graded)
Midterm 40% (in-class & take-home)
Final 50% (in-class & take-home)

Final Exam Scheduled as Posted