Instructor: Dr. Alan R. Denton, South Engineering 214
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Meetings:  TTh 2:00-3:15 p.m.  Office Hours:  MW 1:30-3:00 p.m.
South Engineering 221 (or by arrangement)

Goal: Develop conceptual and technical mastery of fundamental principles and practical methods of modern quantum mechanics and applications to a variety of physical systems.

Preparation: Basic knowledge of classical mechanics, modern physics, and mathematical methods (differential equations, Fourier transforms, etc.). Prereq: PHYS 252, MATH 266.

Classes: Interactive meetings, emphasizing discussion and hands-on problem solving.

Student Responsibilities: Attend all classes. Read assigned material in advance. Come prepared for discussion. Be curious; ask questions. Complete assignments on time.


Evaluation: Homework Assignments (20%), 3 Exams (10%, 20%, 40%), Classroom Participation – attendance and problem solving (10%)

Homework and Lateness: Group discussion of homework is strongly encouraged, but written solutions must be your own. Late work will be accepted with a 25% penalty/day until next class. Thereafter no late assignments can be accepted.

Grading:  A: 90-100%, B: 75-89%, C: 60-74%, D: 50-59%, F: < 50%

Bulletin Description: Operators, one-dimensional wells and barriers, Schrödinger equation, uncertainty, duality, Born interpretation, unstable states, bosons and fermions, central force problems, angular momentum, spin.

Major Topics

• Wavefunction: Schrödinger Equation, Probability, Uncertainty Principle
• Time-Independent Schrödinger Equation:
  Stationary States, Eigenvalues, Simple (Square-Well, Harmonic) Potentials
• Formalism: Hilbert Space, Observables, Eigenfunctions
• QM in 3D: Spherical Coordinates, Hydrogen Atom, Angular Momentum, Spin
• Identical Particles: Fermions, Bosons, Two-Particle Systems, Atoms, Solids
• Interpretations of QM: EPR Paradox, Bell’s Theorem, Schrödinger’s Cat, etc.

All work in this course must be completed in a manner consistent with NDSU University Senate Policy, section 335: Code of Academic Responsibility and Conduct:
http://www.ndsu.nodak.edu/policy/335.htm

Any students with disabilities who need accommodation in this course are encouraged to speak with the instructor as soon as possible to make appropriate arrangements.