Physics 551
Advanced Quantum Mechanics

Course Description

This course examines wave packets and free particle motion, double minimum potential, piecewise constant potentials, scattering, spin, approximation methods, dynamics, matrix theory, and the Dirac electron theory. Vector calculus, linear vector spaces, and matrices are heavily used. This course carries four semester hours credit.

Course Prerequisites

- Graduate standing
- Introductory Quantum Mechanics (PHY 431)

Specific Course Requirements

Textbook Requirements

See current semester textbook list at http://www.physics.sfasu.edu/docs/books.pdf

Course Objectives

The primary objective of this course is to provide a solid foundation for the basic fundamentals of quantum mechanics. The graduate students enrolled in the course will be required to work out advanced quantum mechanics problems in all homework assignments.

Student Learning Outcomes

By the end of the course, a successful student will be able to:

- Describe physical applications of quantum mechanics.
- Examine the behavior of systems and, through the application of physical laws, make quantitative judgments of future behavior based upon the boundary conditions which exist.
- Develop the facility for solving quantum physics problems in closed form where possible and, when not possible, through the use of perturbation theory as well as other approximate methods.

Course Content

Advanced study of the concepts of quantum theory and the solutions to selected boundary value problems using wave mechanics, Dirac's vector spaces, and various approximation methods when a closed solution is not possible.

Course Assessment

The course assessment may use any or all of the following evaluation tools: exam scores, classroom participation, homework average, quizzes, and team projects.