PHY 511
Nuclear Physics

Course Description

This course examines the experiments and theory that provides insight into the physics of the atomic nucleus and particle physics. The interplay of theoretical and empirical modeling of sub-atomic particles expands the student's understanding of the fundamental forces, relativity, quantum mechanics, and the environments influencing sub-atomic particles. This course carries four semester hours of 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 This course relies heavily on experimental particle physics literature to augment textual material to examine developments in nuclear and high energy physics by utilizing the student's command of classical and relativistic quantum physics.

Course Objectives

- To study the nucleus and other sub-atomic particles
- To examine the theory and the experimental observations related to sub-atomic particles
- To apply classical, relativistic, and quantum physics to examine and understand the processes and machines which produce and detect sub-atomic particles

Student Learning Outcomes

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

- Identify properties of the nucleus and other sub-atomic particles.
- Sketch the theory and the experimental observations related to subatomic particles.
- Apply classical, relativistic, and quantum physics to examine and understand the processes and machines which produce and detect subatomic particles.

Course Content

Advanced study of the characteristics of nuclei, nuclear models, radiation processes, and nuclear interactions. The introduction to classical and relativistic particle physics, including accelerators, detection processes, and the standard model for particles.

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.