Syllabus for Particle and Nuclear Physics

PH 495/595

Course Name: Introduction to Particle and Nuclear Physics
Course Number: PH 495/595
Course Credits: 3
Prerequisites: PH 451/551

Course Catalog Description
Elementary particles and forces, nuclear structure and reactions.

Student Learning Outcomes
Students shall be able to:

- List all elementary particles in the standard model and give their quantum numbers
- Use conservation laws to determine what processes can occur, including relativistic effects
- Use Feynman diagrams to reason about branching ratios and probabilities of processes
- Describe modern accelerators and particle detectors

Graduate students shall in addition to the above be able to:

- Predict branching ratios quantitatively using Feynman diagrams
- Explain the rationale behind the design of an unfamiliar particle physics experiment when given goals of the experiment and the experiment technology

Course Content

- Tour of elementary particles
- Relativity and kinematics
- Symmetries and quarks
- Scattering and Feynman diagrams
- Quantum electro-dynamics
- Quantum chromo-dynamics
Learning resources

Required textbooks:

- *Introduction to Elementary Particles*
  by David Griffiths

Evaluation of Student Performance

Students will be graded on weekly homework as well as midterm and final exams.

Statement Regarding Students with Disabilities

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at [http://ds.oregonstate.edu](http://ds.oregonstate.edu). DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

Link to Statement of Expectations for Student Conduct

[http://oregonstate.edu/studentconduct/offenses-0](http://oregonstate.edu/studentconduct/offenses-0)