Syllabus for Physics 6213
Graduate Particle Physics

Instructor:	P. Gutierrez	Office:	NH 205
Phone:	325-3961 ext. 36205	e-mail:	gut@mail.nhn.ou.edu
Lecture:	8:00 to 9:15 MW in NH 320	Office Hours:	Anytime
Web Page:	http://www.nhn.ou.edu/~gut/Phys_6213/particle.html		

- Texts: *There is no required textbook, but much of the material is in the text for Physics 5213*
  - Introduction to Elementary Particle Physics *D. Griffiths*
- References—*on reserve in the physics library*
  - Particle Physics at the new millennium *B. P. Roe*
  - Modern Elementary Particle Physics *G. Kane*
  - Quarks and Leptons *F. Halzen, A. Martin*
  - Gauge Theories of the Strong, Weak and Electromagnetic Interactions *C. Quiqq*
  - Gauge Theories of Elementary Particle Physics *Chang and Li*
  - Relativistic Quantum Mechanics *Bjorken and Drell*
  - An Introduction to Quantum Field Theory *Peskin and Schroeder*
- Grading:
  - Homework 60%.
  - Research paper 40%.
  - The current university regulations concerning incomplete (I) grades and dropping of courses will be followed.
- Homework:
  - The goal of the homework is to expand on what is covered in class and also to serve as a self test to insure that you understand the material. In addition to each student writing up the solutions, some fraction of the problems will be presented in class by a student. This will give each student 3-5 opportunities to make in class presentations. As a policy I do not accept late homework, but if you have a valid reason such as illness, please come talk to me as soon as possible.
- Prerequisites
  - You should have taken Physics 5213, and received a grade of B or better.

- Tentative Course Outline
  - The goal of this course is to provide the basic knowledge necessary to start doing research in high energy physics. The course will concentrate on the standard model, and will not discuss extensions to it. By the end of the course, you should have a basic understanding of the quark-parton model, plus and understanding of electro-weak interactions. This course will provide the basis for continued studies in high energy physics.
    - Overview of present status of particle physics.
    - Dirac equation.
    - Quantum electrodynamics.
    - Introduction to renormalization theory.
    - Deep inelastic scattering and the quark-parton model.
    - Introduction to non-abelian gauge theory.
    - Quantum Chromodynamics.
    - Introduction to Weak interactions.
    - Electro-Weak Lagrangian.
    - Higgs mechanism.
    - CP-Violation in the standard model.
- Research Paper
  - Each enrolled student will be required to write a research paper on any topic in high energy physics. The paper should include a discussion of the theory behind the subject, a discussion of the experimental data and how it supports or doesn't support the theory, and any planned future experiments. Feel free to use my lectures as starting points for either the theoretical or experimental discussions. The paper should also include a bibliography giving the sources used to put the paper together. In addition each student will be required to give a 50 minute oral presentation of their paper.

    The paper will be due the last day of classes, the presentations will be during finals week.
- Special Notice
  - *Any student in this course who has a disability that may prevent him or her from fully demonstrating her or his abilities should contact me as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunities.*