

PHYSICS 541/735 – Elementary Particles

FALL 2011

Special Note Re:

No weapons are permitted in any building on the UWM campus.

Instructor: Luis Anchordoqui PHY 428 (229-2245) E-mail: anchordo@uwm.edu
Office Hours: W 9:00 – 12:00 PM

Lecture Notes: <http://arxiv.org/abs/0906.1271>

Text (required): F. Halzen and A. D. Martin, *Quarks and Leptons*, (John Wiley & Sons, 1984)

Course website: <http://www.gravity.phys.uwm.edu/~doqui>

Lectures: Tu. and Th. 12:30 – 1:45 PM, PHY 230. Lectures begin September 6, 2011.

Final Exam: (Comprehensive) Friday, **December 16, 2011 PHY 230, 12:30 -2:30 PM.**

The final is mandatory and you are responsible for making sure that you can attend at this time. Official UWM policies concerning finals are given below.

***Final Examination Policy:** One-hour final examinations in one-credit courses may be given during the last class period; two-hour final examinations in all other courses shall be given during the regular examination period. The time of a final examination for an individual or a class may be changed only with the prior approval of the dean or director. The change will involve a postponement to a later date. The Provost's Office and Classroom Assignments shall be notified of any approved changes in final examinations in order to avoid scheduling conflicts of day, hour and room.*

***Conflict:** When a departmental combined-lecture examination conflicts with another examination, it is the responsibility of the department giving the combined-lecture examination to resolve the conflict.*

***Student Responsibility for Scheduling:** Each student is responsible for arranging a study list that will permit satisfactory progress towards degree requirements and a class schedule that avoids (a) class and final exam scheduling conflicts and (b) an excessively demanding exam schedule.*

Grading: The overall course grade will be determined as follows:

PHY-541
30 % - homework assignments & quizzes
40% - midterm exams (20% each)
30% - comprehensive final exam
PHY-735
40% - homework assignments
30% - midterm exams (15% each)
30% - comprehensive final exam

Provisional Course Outline

(Please note this may be revised during the course to match coverage of material during lectures, etc.)

- 1st week:** *Variational Principle & Euler-Lagrange equation*
- 2nd week:** *Canonical Quantization & Lorentz Group*
- 3rd week:** *Relativistic Quantum Mechanics*
- 4th week:** *Perturbation Theory & Noether Theorem*
- 5th week:** *Gauge Symmetries & Higgs Mechanism*
- 6th week:** *Electrodynamics of Spinless Particles*
- 7th week:** *Electrodynamics of Spin $\frac{1}{2}$ Particles (beyond the trees \rightarrow dimensional regularization)*
- 8th week:** *Midterm-exam (October 27)*
- 9th week:** *Structure of Hadrons, Deep Inelastic Scattering, Parton Model, and Perturbative QCD*
- 10th week:** *Electroweak Theory (charged and neutral currents-radiative corrections)*
- 11th week:** *Neutrino Oscillations*
- 12th week:** *Midterm-exam (December 1)*
- 13th week:** *New Physics at the TeV-scale? What about dark matter?*