

University of California, Berkeley
Physics 226: Particle Physics Phenomenology
General Information
Fall 2016

Instructor: Prof. Marjorie Shapiro

Lecture Hours: TuTh 12:30-2PM, 385 LeConte

Discussion Section: Tu 11-12PM 397 LeConte

Office Hours: Thursday 2-3:00PM, 445 LeConte with additional hours by appointment

Email: mdshapiro@lbl.gov

Web Page: <https://bcourses.berkeley.edu/courses/1453474>

Course Description:

This class provides an introduction to particle physics phenomena. Emphasis is placed on experimental tests of particle physics theories. Topics include: overview of detectors and accelerators, quark model spectroscopy, weak decays, e^+e^- annihilation, parton model, hadron collider physics, neutrino oscillations and physics beyond the standard model.

References:

No textbook is required for the class. Slides from the lectures, along with useful references will be posed on the class web site. The following texts are useful references:

- Goldhaber and Cahn *Experimental Foundations of Particle Physics*, Cambridge University Press
- Halzen and Martin: *Quarks and Leptons: An Introductory Course in Modern Particle Physics*, Wiley & Sons (1984)
- Donoghue, Golowich & Holstein, *Dynamics of the Standard Model*, Cambridge University Press (1992)
- Perkins *Introduction to High Energy Physics* Cambridge University Press (2000)
- Thomson, *Modern Particle Physics* Cambridge University Press (2013)
- Quigg, *Gauge Theories of the Strong, Weak and Electromagnetic Interactions: Second Edition*, Addison-Wesley (2013)
- Particle Data Group Web Pages: <http://www-pdg.lbl.gov/>

Homework and Grading:

Homework assignments will be posted on the class web site. You are encouraged to work with your fellow students but you must present your own solutions. For some of the problems, you will need to have access to computational tools to perform fits and generate random numbers. You are free to use whatever software you wish. If you don't have a favorite package, consider using the ROOT interactive analysis package. This package is free and downloadable. You should be able to use root on your laptop or on PANIC. The class will have no midterm or final exam. The grade will be based on the homework.