

Syllabus for Particle Physics, PHYS694, Spring 2004
MW 2:30 – 3:45, room CW042

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Office hours: Mon. Wed. 11:00-12:00 or by appointment (or just stop by my office)

Particle Physicists investigate the smallest building blocks of our universe. The questions raised in this field can be pretty deep and almost philosophical and pretty exciting. In the approximately 100 years of experimental particle physics (and theoretical too) we have accumulated a vast amount of knowledge about the sub-atomic world, culminating in the Standard Model of particle physics, our current view of particle physics.

Exciting new theories like supersymmetry and strings are now being discussed and physicists are preparing new experiments to solve the deepest puzzles in particle physics.

Text: * *‘Introduction to Elementary Particles’* David Griffiths, John Wiley&Sons, ISBN0471603864
* *‘Particle Physics Booklet’* The booklet can be ordered **for free** from <http://pdg.lbl.gov>.
THIS IS ABSOLUTELY REQUIRED REFERENCE MATERIAL! The information in the booklet will be constantly used in class and is also necessary for the homework.

Alternative Reading: * *‘Introduction to High Energy Physics’* D. Perkins (4th Edition)
* *‘Quarks & Leptons’*, F. Halzen & A.D. Martin

Course Web Site: Our web site is <http://www.phys.ksu.edu/~evt/teaching/phys694.html>

Grading: The final grade will be based on homework (40%), midterm exam (30%) and final exam (30%).

Homework will be due every other week on Thursdays. Please note that you are encouraged to work on homework problems with other students, or to ask instructors for help in doing homework assignments. However, if you work with someone, please acknowledge it: put “I worked with ...”, or “I had help from ...” on your homework. This will not reduce your grade.

Midterm exam date: March 17th

Final Exam due: May 17th

The basis of determining final grades is

- A 85% of all points or more
- B 75% of all points or more
- C 65% of all points or more
- D 55% of all points or more
- F under 55% of all points

University Undergraduate Honor System

It is expected that all students will adhere to the University's undergraduate honor system. Please refer to the "Academic Dishonesty" policy in the *K-State Undergraduate Catalog* and the *Undergraduate Honor System Policy* on the KSU web page at <http://www.ksu.edu/honor/>. The honor pledge ("On my honor as a student, I have neither given nor received unauthorized aid on this academic work") must be written out and signed by the student on all exams and homework in order for the grade to be recorded.

Students with Disabilities

If you have any condition such as a physical or learning disability which will make it difficult for you to carry out the work as outlined here, or which will require academic accommodations, please notify the lecturer and contact the Disabled Students Office (Holton 202) during the first two weeks of class.

Course Outline, Phys 694 (Spring 2004)

- Jan22-Jan28** **Introduction+history** How do you produce elementary particles, how do you detect them, the beginning of particle physics, nuclear physics, the modern era.
- Feb2-Feb11** **Elementary particle dynamics & kinematics**
- Feb16-Feb25** **QFT in a nutshell & Feynman diagrams**
- Mar1-Mar15** **Symmetries & bound states**
- Mar29-Apr7** **Electrodynamics of quarks and leptons**
- Apr12-Apr21** **Quantum chromodynamics**
- Apr26-May4** **Weak interactions + the standard model**
- May10-May12** **New directions in particle physics**