

PHYSICS 726 – Introduction to Quantum Field Theory – Fall 2007

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Office hours: To be determined

Feel free to make use of my office hours as much as needed, and feel free to drop by some other time if you can't make it to office hours (leave a message on my e-mail or voice-mail if you don't find me). Especially with doing the homework, it helps to come ask questions if you get stuck!

Textbook: A. Zee, Quantum Field Theory in a Nutshell, Princeton University Press

Prerequisites: Good grasp of undergraduate, upper-division physics, specifically quantum mechanics (430/431), E&M (360/460), classical mechanics (330) and basic complex analysis (contour integration). There will be a take-home diagnostic test distributed at the first class meeting, with some simple problems on the topics needed in this course, such as contour integration, lagrangians, and four-vectors. This test is due one week later (Tuesday 9/3), and will not count toward the grade. However, I may advise students who do poorly on the test to drop the course.

Homework: There will be weekly or bi-weekly required homework assignments. The grade for the course will be based on the homework. You are encouraged to discuss the assignments with other students, and ask me as many questions as needed, but the writeup of the problems must be your own individual work. I will make solutions available.

Other recommended reading:

J. Sakurai, Advanced Quantum Mechanics

M. Peskin and D. Schroeder, An Introduction to Quantum Field Theory

F. Halzen and A. Martin, Quarks and Leptons

Aim: The goal of this course is to provide a practical introduction to modern quantum field theory through diagrammatic techniques, with a minimum of formalism. Emphasis will be on the application of quantum field theory to elementary particle physics. At the end of the course, you should be familiar with the techniques to calculate simple scattering and decay amplitudes involving relativistic particles using Feynman diagrams. If time permits, we will cover elements of renormalization.