

Physics 154, Spring 1998

Instructor: Ken Intriligator
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Office hours: Thursday, 2:00-3:30.

Course Text: *Introduction to Elementary Particles*, by David Griffiths.

For complementary reading, the textbook *Quarks and Leptons* by F. Halzen and A.D. Martin is on reserve at the undergraduate library.

Course Description: This is an introduction to the "Standard Model" of the fundamental particles of nature and their interactions. The course grade will be determined on the basis of three take-home problem sets, which will serve as mini exams of the covered material.

Schedule: The course material will be organized into three parts, with a take-home problem set for each part.

Part 1 (quantum electrodynamics): General introduction (chapters 1 and 2); action principle (§ 11.1, 11.2); Dirac equation (§ 7.1, 7.2, 7.3); photon field (§ 7.4); local gauge invariance (§ 11.3); lifetimes and cross sections (§ 6.1, 6.2); Feynman diagrams (§ 7.5, 7.6, 7.8); renormalization (§ 7.9); Lamb shift (§ 5.1-5.4).

Part 2 (quantum chromodynamics): Yang-Mills theory and chromodynamics (§ 11.4, 11.5); quantum chromodynamics (chapter 9); meson and baryon spectrum (§ 4.5, 5.7-5.10).

Part 3 (weak interactions): spontaneous symmetry breaking (§ 11.7-11.9); weak interactions (chapter 10); CP violation (§ 4.6-4.9).