Instructor:	Laurence G. Yaffe
Office:	B404
TA:	Jakub Scholtz, jscholtz@u.washington.edu, B418
Class:	**11:30–12:20 am MF** and **10:30-12:20am W**, room A114
Homework:	Approximately weekly assignments
Grading:	C/NC
Web site:	`http://courses.washington.edu/ph570/`

Syllabus:

Relativistic free fields Spinless relativistic particles and quantized scalar fields. Lorentz invariance. Spin 1/2 particles and quantized spinor fields. Dirac equation. Charge conjugation and antiparticles. Massless fermions.

Interacting fields Local interactions. Fields *vs.* particles. Spectral representations. Scattering amplitudes and cross sections. Particle production, unstable particles. $\lambda\phi^4$ and Yukawa theories.

Functional integrals and diagrammatic perturbation theory Path integrals, generating functionals, time-ordered correlation functions, Grassmann integration, Euclidean functional integrals. Saddle point expansions, Feynman rules, connected and 1PI diagrams.

Basic renormalization Ultraviolet and infrared cutoffs, physical *vs.* bare parameters, mass and coupling renormalization, renormalizable theories.

Books:

The primary textbook will be *Quantum Field Theory* by Mark Srednicki.
Other books recommended for certain topics include:

L. Brown, *Quantum Field Theory*. Good introduction to modern methods (but doesn't cover non-Abelian theories).

A. Zee, *Quantum Field Theory in a Nutshell*. Breezy presentation, not overly detailed.

M. Peskin and Schroeder, *Introduction to Quantum Field Theory*. Reasonable introduction to relativistic QFT (but bad conventions).

Itzykson & Zuber, *Quantum Field Theory*. Encyclopedic, authoritative, old-fashioned.

L. Ryder, *Quantum Field Theory*. A simplified version of Itzykson & Zuber. Watch out for various confused (& confusing) arguments.

Most of the above books are on reserve in the physics library.