Physics 330 – Quantum Field Theory
General Information

course meeting:	MW, 9:30 - 10:45 am, Hewlett 102 discussion section: Thursday, 6:30 pm, Varian 355
Professor:	Michael E. Peskin SLAC, Central Lab R322 926-3250 Varian 372 (Mondays) 736-0326 mpeskin@slac.stanford.edu
TA:	Alexander Giryavets Varian 361, 724-6746 giryav@stanford.edu
Textbook:	Peskin and Schroeder, An Introduction to Quantum Field Theory
Useful references:	Brown, Quantum Field Theory Berestetskii, Lifshitz and Pitaevskii, Quantum Electrodynamics Ryder, Quantum Field Theory Weinberg, The Quantum Theory of Fields Zee, Quantum Field Theory in a Nutshell
Web page:	`http://www.slac.stanford.edu/~mpeskin/Physics330/`
Final:	take-home examination, due Dec. 16.

Syllabus

1. The Free Scalar Field
2. The Dirac Field
3. Perturbation Theory
4. Elementary Processes of Quantum Electrodynamics (QED)
5. Finite Radiative Corrections of QED
6. Infinite Radiative Corrections of QED

Plan for Physics 330-331-332

Physics 330

1. The Free Scalar Field
2. The Dirac Field
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Physics 331

1. Functional Integrals and Field Quantization
2. Non-Abelian Gauge Theories
3. Asymptotic Freedom
4. Quantum Chromodynamics (QCD)
5. Spontaneous Symmetry Breaking
6. Gauge Theories with Spontaneous Symmetry Breaking
7. The Glashow-Weinberg-Salam Model of Weak Interactions

Physics 332

1. Theory of Renormalization
2. Renormalization of Theories with Spontaneous Symmetry Breaking
3. The Renormalization Group
4. Renormalization Group and Scalar Field Theories
5. Renormalization Group and QCD
6. Operator Product Expansion in QCD
7. Perturbation Theory Anomalies
8. Elements of Non-Perturbative QCD