



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Quantum Field Theory I

2122-1-F1701Q135

Aims

Become familiar with some of the main tools for the study of Quantum Field Theories (QFT): the functional approach, the perturbative expansion, regularization and renormalization of UV divergences, renormalization group.

Contents

Functional approach to QFT. The self-interacting scalar theory with quartic potential. Perturbative renormalization. Renormalization group. UV and IR fixed points. Renormalization group flows.

Detailed program

Path integral in Quantum Mechanics. _____

Path integral in QFT, functional calculus. The path integral for the free scalar theory. _____

Analogy between Statistical Mechanics and QFT. The effective action. _____

Superficial degree of divergence. Various regularization methods, cutoff and dimensional regularizations. _____

Prerequisites

General Relativity, Theoretical Physics I and II.

Teaching form

Frontal lectures

Textbook and teaching resource

M.E. Peskin, D.V. Schroeder, An introduction to Quantum Field Theory

P. Ramond, Field Theory : A Modern Primer, 2nd Edition

M. Srednicki, Quantum Field Theory

S. Weinberg, The Quantum Theory of Fields I, II

Semester

Second semester

Assessment method

Oral exam

Office hours

By appointment, sending an e-mail to silvia.penati@unimib.it
