



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## SYLLABUS DEL CORSO

### Fisica Teorica II

2324-1-F1701Q100

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#### Aims

Introduction to the Standard Model of Fundamental Interactions

#### Contents

The standard model of fundamental interactions

#### Detailed program

Covariant quantization of the Electromagnetic Field  
Radiative corrections of QED  
Charge, mass and WF renormalization, Ward identity  
Infrared divergence  
Regularization  
Dimensional regularization  
Anomalous magnetic moment of the electron  
The Lamb shift  
Positron decay. Application: the PET  
The weak interaction  
Four point Fermi interaction  
Parity violation and the Wu experiment  
Muon and Neutron decay  
Higher orders, non renormalizability, IVB hypothesis  
Symmetries and Gauge theories

Global and local symmetries  
Yang-Mills interaction  
U(1) gauge symmetry  
SU(2)xU(1) gauge symmetry  
A gauge theory for the weak interaction  
Glashow model  
Gauge leptons and bosons  
Spontaneous symmetry breaking  
Goldstone theorem  
Brout-Englert-Higgs phenomenon  
The electroweak lagrangian

## **Prerequisites**

Fisica Teorica I

## **Teaching form**

Lectures

## **Textbook and teaching resource**

F. Mandl, G. Shaw, Quantum Field Theory, II Ed.  
L. Maiani, Electroweak Interacions  
M.D. Schwartz, Quantum Field Theory and The Standard Model  
S. Raby, Introduction to the Standard Model and Beyond  
Chen G.B., Derbes D., Griffiths D., Hill B., Sohn R., Ting Y.S (Eds.) - Lectures of Sidney Coleman on quantum field theory; World Scientific

## **Semester**

I semester

## **Assessment method**

Oral exam on the topics of the course

## **Office hours**

On request

## **Sustainable Development Goals**

QUALITY EDUCATION

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