UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Mathematical Methods for Physics

2223-1-F1701Q098

Aims

Group theory and its applications to theoretical physics.

Contents

Lie groups, Lie algebras; their representations.

Detailed program

- Definition of group; subgroups, homomorphisms, representations.
- Finite groups. Lie groups. Lie algebras. Examples of Lie groups: orthogonal, unitary, Lorentz, Poincaré.
- Classification of Lie algebras. Semisimple algebras. Root systems. Dynkin diagrams. Classification of representations.

Prerequisites

Undergraduate degree in math or physics

Teaching form

Lessons (6 CFU), This course will be taught in English.

During the Covid-19 emergency the lectures will be delivered in streaming on the Webex platform. They will be recorded and will appear on the e-learning page on the scheduled day.

Textbook and teaching resource

Group Theory:

Wu-Ki Tung, *Group Theory in Physics*
Georgi, *Lie Algebras in Particle Physics.*
Fulton-Harris, *Representation theory*, Springer.

Gilmore, *Lie Groups Lie Algebras and some of their applications,* Dover.
Gilmore, *Lie Groups, Physics and Geometry*, Cambridge.
Cornwell, *Group Theory in Physics*, Academic Press.

Other books (some available as pdf on the library webpage) :

Semester

First semester

Assessment method

Oral exam. Open questions on the course's topics.

During the Covid-19 emergency exams will be online. Dates and instructions to participate as spectators will be posted on the e-learning page.

Office hours

By appointment, by sending an e-mail to mattia.bruno@unimib.it

Sustainable Development Goals

QUALITY EDUCATION