UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

# COURSE SYLLABUS

## Solid State Physics

**2526-1-F1703Q049**

### Aims

Introduction of fundamental concepts in Solid State Physics. The aim is to provide the conceptual tools and the notions that are particularly useful to the students undertaking a path in Solid State Physics, digital technologies (ICT) and quantum technologies (QT).

### Contents

Structural, electronic and vibrational properties of solids, addressed both from a phenomenological and theoretical point of view.

### Detailed program

1. Crystal lattices and reciprocal lattices,
2. Band structure in solids,
3. Semiclassical electron dynamics,
4. Classical and Quantum harmonic crystal,
5. Optical and Transport properties of Solids
6. Superconductors
7. Heterostructures, quantum nanostructures

### Prerequisites

Classical mechanics and electromagnetism, basic quantum mechanics

## Teaching form

The teaching will be of type "erogativa", carried out in the context of frontal lessons with blackboard and slides: 21 2-hour lessons held in presence mode.

## Textbook and teaching resource

- N.W. Ashcroft & N.D. Mermin, “Solid State Physics”
- Harald Ibach & Hans Lüth, "Solid-State Physics: An Introduction to Principles of Materials Science"
- G. Grosso & G. Pastori Parravicini "Solid State Physics"
- P. G. de Gennes, "Superconductivity of Metals and Alloys"
- John H. Davies, "The Physics of Low-Dimensional Semiconductors: An Introduction"
  Copies of the slides used during lectures

## Semester

I Semester

## Assessment method

The students' knowledge will be assessed through an oral test. The interview will focus on the topics covered in class. The understanding of the topics and the skills acquired will be evaluated.

## Office hours

at the end of the lessons or by appointment

## Sustainable Development Goals

INDUSTRY, INNOVATION AND INFRASTRUCTURE