

# MATERIALS ENGINEERING AND NANOTECHNOLOGY (LM56)

(Lecce - Università degli Studi)

## Teaching PHYSICS OF MATTER MOD. I (Int)

GenCod A003097

Owner professor ELEONORA ALFINITO

**Teaching in italian** PHYSICS OF MATTER Course year 1  
MOD. I C.I.

**Teaching** PHYSICS OF MATTER MOD. I (Int) **Language** INGLESE

**SSD code** FIS/03

**Curriculum** PERCORSO COMUNE

**Reference course** MATERIALS  
ENGINEERING AND

**Course type** Laurea Magistrale

**Location** Lecce

**Credits** 6.0

**Semester**

**Teaching hours** Ore-Attivita-frontale:  
54.0

**Exam type** Orale

**For enrolled in** 2017/2018

**Assessment**

**Taught in** 2017/2018

**Course timetable**

<https://easyroom.unisalento.it/Orario>

### BRIEF COURSE DESCRIPTION

This is a course in theory and models in physics of matter; it aims to furnish some basic knowledge concerning quantum physics of atoms, molecules and solids.

### REQUIREMENTS

Sufficiency in calculus, probability theory, linear algebra, electromagnetism

### COURSE AIMS

Learning Outcomes; after the course the student should be able to

\*Solve basic problems in special relativity

\*Solve basic problems in quantum mechanics

\*Be able to recognize the validity range of classical mechanics and use, whenever necessary, the achievement of modern physics

### ASSESSMENT TYPE

**test:**

Physics of matter I is only the first modulus of the complete course named Physics of matter.

There a single final exam which includes the contents of modulus I and modulus II

The exam consists of two cascaded parts:

the first part is written test (duration: two hours and a half); the student is asked to solve exercises ; it is aimed to verify to what extent the student has gained the ability to apply theory to solve simple case studies;

the second part is an oral test aimed to determine to what extent the student has gained an overall knowledge of the main topics of the course.

### OTHER USEFUL INFORMATION

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## FULL SYLLABUS

Introduction: Physics and technology from the end of 1800 to today (3 hours). Mechanical and electromagnetic waves (2 hours). Special relativity (5 hours). Elements of probability and the Maxwell distribution (5 hours). The quantum nature of light (5 hours). Atomic models and the matter wave (5 hours). Quantum mechanics in one dimension (12 hours). The angular momentum (5 hours). The hydrogen atom, eigenvalues and eigenfunctions (3 hours). Quantum statistics (2 hours). Multielectron atoms (2 hours). Introduction to molecules (5 hours).

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## REFERENCE TEXT BOOKS

- [1] R. Eisberg, R. Resnick, "Quantum Physics", J. Wiley and Sons.
- [2] R.A. Serway, C. J. Moses, C. A. Mojer, "Modern Physics", Saunders College
- [3] M. Born, "Atomic Physics", Dover Books on Physics
- [4] R. Gautreau, W. Savin, "Schaum's Theory and Problems in Modern Physics"