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 MOD. I C.I.

Course year 1

Teaching PHYSICS OF MATTER MOD. I (Int)

Language ENGLISH

SSD code FIS/03

Curriculum PERCORSO COMUNE

Reference course MATERIALS ENGINEERING AND

Location Lecce

Course type Laurea Magistrale

Semester

Credits 6.0

Exam type Oral

Teaching hours Front activity hours: 54.0

Assessment

For enrolled in 2019/2020

Course timetable https://easyroom.unisalento.it/Orario

Taught in 2019/2020

BRIEF COURSE DESCRIPTION

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

REQUIREMENTS

Sufficiency in calculus, probability theory, linear algebra, electromagnetism

COURSE AIMS

Knowledge and understanding

The course provides a basis and an opportunity for originality in developing or applying ideas in a material physics research context .

Applying knowledge and understanding:

The course provides abilities in problem solving applied in new or unfamiliar environments within classical and quantum physics contexts .

Making judgements:

The course gives the ability to integrate knowledge and handle complexity, and formulate judgements with incomplete data to discriminate between the classical and quantum regime, to evaluate the appropriate set of approximations to be used.

Communication

Students have to be able to communicate their conclusions and rationale to specialist , by using a technical language based on formulas and theorems, and non-specialist audiences by using a narrative language based on elementary concepts.

Learning skills

Students are trained to develop creative thinking, critical spirit, and autonomy , by using as a knowledge technique examples and counter-examples. The theoretical approach of the course is a good tool to improve their ability of abstraction

TEACHING METHODOLOGY	teacher-led discussion and assignments
ASSESSMENT TYPE	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	This is a course in theory and models in physics of matter; it aims to furnish some basic knolwedge concerning quantum physics of atoms, molecules and solids.
FULL SYLLABUS	Introduction: Physics and tecnology 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 (3hours). Quantum statistics (2 hours). Multielectron atoms (2hours). Introduction to molecules (5 hours).
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 Problema in Modern Physics”