| CÓDE | NAME OF MODULE | TYPE |
|---|---|---|
| | INTRODUCTION TO MATERIAL SCIENCE | M |

M = mandatory
E = elective

### 3.3.1. Learning goals of the module.

*(List the specific learning goals that the current module should provide to the student; goals can focus on content, skills, or attitudes. )*

In this module we want the student to acquire a basic knowledge in materials science: a classification of materials depending on their structure and an overview and a description of thermal, mechanical optical, electric and magnetic properties of materials.
The student must learn the importance of the different types of defects which change the properties of materials, like doping of semiconductors, and the structural changes appearing when submitting the materials to pressure, temperature or composition changes.
Under the recent research results in materials science, a revision of the new methods for the design of new materials will be presented.

### 3.3.2. Methodology: learning activities and credit value of the module (ECTS).

#### 3.3.2.1. Learning activities.

*(Time required to teach the module; links to other modules included in the MSc Program and suggested chronological sequence with the latter)*

The module will take 30 hours of lectures divided into theoretical ones and others more practical or applied like seminars.

As it is a module where the student must acquire basic knowledge, it will be developed in the first half of the first course of the master. By this way the student will be capable to systematicallyapply these concepts on the development other modules in the master like:

Fundamentals of solid state physics

Low dimensional systems, and nanostructures

Fundamentals of nanoscale characterization

Nanostructural properties...

**3.3.2.2. ECTS credit value (and time)**
*1 ECTS credit = 25 hours UPV/EHU*

| TYPE OF LECTURE[1] | Theory | | Practice | | | | | | | Evaluation | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | M[2] | S | PA | PL | PO | TA | TAI | PCL | PCC | Periodic Grading | Final Grading |
| Classroom lectures | | | | | | | | | | | |
| Personal work [3] | | | | | | | | | | | |
| **TOTAL** | | | | | | | | | | | |

(1) M (standard lecture); S (seminar); PA (practical exercises in classroom); PL (practical exercises in laboratory); PO (practical exercises with computers); TA (non-industrial workshops); TAI (industrial workshops); PCL (clinical practice); PCC (field practice); the acronyms are taken from the Spanish wording.

(2) M = maximum allowed is 60% of the full classroom lectures .

(3) Personal work = time that the student would use to prepare and develop individual and group assignments.

### 3.3.2.3. Module Program.

*(Lectures)*

| | |
|---|---|
| Lecture 1 | CLASSIFICATION OF MATERIALS :STRUCTURE AND FUNDAMENTAL PROPERTIES |
| Lecture 2 | IMPERFECTIONS: DEFECTS, DISLOCATION, IMPURITIES |
| Lecture 3 | MECHANICAL PROPERTIES |
| Lecture 4 | THERMAL PROPERTIES |
| Lecture 5 | OPTICAL PROPERTIES |
| Lectura 6 | ELECTRIC PROPERTIES |
| Lectura 7 | MAGNETIC PROPERTIES |
| Lectura 8 | DIFFERENT TYPE OF MATERIALS: POLYMERS, CERAMICS, ALLOYS, NEW MATERIALS. PREPARATION TECHNIQUES |

### 3.3.2.4. Bibliography.

*(Basic and specialized bibliographies, journal references, internet addresses, etc.)*

William D. Callister , Jr., "Material Science and Engineering: An Introduction", ISBN-0471-73696-1 (Wiley).

G. Gottstein "Physical Foundations of Materials Science", ISBN 3-540-40139-3 (Springer)

### 3.3.3. Criteria and methods for evaluation and grading

*(Analysis of the methodology that will be used to evaluate the learning process of the student)*

As it is a module of fundamental and basic character for the development of the master, it will be necessary to evaluate the acquired knowledge by means of an examination which will correspond to a 50% of the final qualification. The resting 50% will be marked by the exposure of a subject related to the matter and the corresponding exposition of it.

### 3.3.4. Learning resources

The student will have free access to the libraries of the Facultad de Química of the UPV/EHU, the Centro de Física de Materiales (Centro Mixto CSIC-UPV/EHU) and to the existing computer resources.

### 3.3.5. Language and number of groups attending the module

| | |
|---|---|
| 1 | NUMBER OF GROUPS |
| x | LANGUAGE: ENGLISH |

### 3.3.6. Fields of science and technology to which the module is related

| CODE | FIELD |
|---|---|
| | PHYSICS OF CONDENSED MATTER |
| | APPLIED PHYSICS |
| | |
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### 3.3.7. Department in charge of the Program

| CODE | DEPARTMENT [1] |
|---|---|
| | DEPARTMENT OF MATERIALS PHYSICS |
| | |
| | |

### 3.3.8. Teachers in charge of the module

| DNI | Teacher UPV/EHU | Number of credits |
|---|---|---|
| 15919409M | Juan José del Val Altunas | 1.5 |
| | Julián María González Estévez | 1.5 |
| | | |
| | | |
| | | |
| | | |

| DNI | Teacher other institutions | Number of credits |
|---|---|---|
| | | |
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