UAB
Universitat Autònoma de Barcelona

Materials Science and Technology

Code: 106814
ECTS Credits: 6

2024/2025

Degree	Type	Year
2504602 Nanoscience and Nanotechnology	OB	2

Contact

Name: Gemma Garcia Alonso

Email: gemma.garcia@uab.cat

Teachers

Alberto Quintana Puebla

Eva Maria Pellicer Vila

Roger De Paz Castany

Teaching groups languages

You can view this information at the end of this document.

Prerequisites

NONE

Objectives and Contextualisation

- Describe how the interrelation between structure, processing and properties determines the applications of the different types of materials.
- Relate the development of materials and materials science to the construction of today's society, with special emphasis on economic-social and environmental aspects.

Learning Outcomes

1. CM16 (Competence) Use knowledge of physics to solve problems on the nanoscale.
2. CM17 (Competence) Propose solutions to problems in the field of nanotechnology relating the performance of materials and devices with their manufacturing processes.
3. KM27 (Knowledge) Describe the thermodynamics and kinetics laws and methods involved in diffusion, transformation, nucleation and growth.
4. SM24 (Skill) Analyse the relationship between microstructure, processing and the properties of functional materials, which makes it possible to predict their use.

5. SM24 (Skill) Analyse the relationship between microstructure, processing and the properties of functional materials, which makes it possible to predict their use.
6. SM28 (Skill) Gather, summarise and present results and conclusions of scientific publications.
7. SM28 (Skill) Gather, summarise and present results and conclusions of scientific publications.

Content

BLOCK I. INTRODUCTION
Topic 1. Materials and society

BLOCK II. FUNDAMENTALS
. Topic 2. Crystal structures
. Topic 3. Foundations of classical thermodynamics
. Topic 4. Thermodynamics of phase equilibrium
. Topic 5. Transformation kinetics: thermal treatment

BLOCK III. FUNCTIONAL MATERIALS
. Topic 6. Metallic materials
. Topic 7. Ceramic materials
. Topic 8. Polymers and composite materials

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Exercices	12	0.48	CM16, CM16
theory	32	1.28	CM17, KM27, SM24, CM17
Type: Supervised			
Practices	8	0.32	CM17, KM27, SM24, SM28, CM17
Type: Autonomous			
Group work	30	1.2	CM17, SM24, SM28, CM17
Individual work	59	2.36	CM16, CM17, KM27, SM24, SM28, CM16

- Theoretical classes for the presentation of each topic (objectives, contents, texts or complementary videos of the subject available in the Moodle classroom).
- Resolution of demonstration exercises in the classroom
- Autonomous learning through reading texts and articles
- Cooperative learning through group work
- Autonomous work through reading and analysis of proposed texts and realization of works or exercises.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Aula Moodle tests	0	3	0.12	CM17, SM24
First evaluation	35	3	0.12	CM16, CM17, KM27, SM24
Group work memoire	30	0	0	CM17, KM27, SM24, SM28
second evaluation	35	3	0.12	CM16, CM17, KM27, SM24

The evaluation of the subject will be carried out continuously and consists of:

- 2 partial exams of knowledge with a weight of 35% each
- 1 group work with a weight of 30% of the final grade
- Various compulsory knowledge tests, available in the moodle classroom and that must be carried out within the deadlines provided to opt for continuous evaluation.

In the moodles classroom of the subject, the deadlines for each evidence and each activity or work group will be described.

To pass the subject it will be necessary:

- Have done the tests and other deliveries available in the moodle classroom
- Have submitted the written work in group
- Have done both partials
- Obtain a minimum grade of 3.5 in the average of the two partials
- Obtain a minimum grade of 5 in the continuous evaluation.

Students who have taken part in the single assessment modality must do so within the agreed deadlines:

- A global exam equivalent to the two partials with a weight of 70%
- An individual research work on a global subject of the subject with a weight of 20%
- Delivery of a video presentation of the work with a weight of 10%
- Carry out the tests or deliveries available in the moodle classroom on the date agreed by the single assessment.

To pass the subject in single evaluation it will be necessary:

- Have done the tests and other deliveries available in the moodle classroom
- Have submitted the written work and the presentation video
- Obtain a minimum grade of 3.5 in the global exam
- Obtain a minimum grade of 5 in the evaluation of the subject.

IMPORTANT: In order to pass the subject it will be necessary to have a global grade equal to or greater than 5.0. When the evaluation is not passed, but a minimum of 3.5 is obtained in the overall of the subject, you will have the right to a written recovery test on the whole syllabus that will allow you to pass the subject with a maximum grade of 5 out of 10.

Bibliography

Ciencia e Ingeniería de Materiales, Callister, William D ; Rethwisch, David G, 2019

https://ebookcentral.proquest.com/lib/uab/detail.action?pq-origsite=primo&docID=6798944

Materials: Engineering, science, processing and design, Ashby, Michael F ; Shercliff, Hugh ; Cebon, David, 2007

https://ebookcentral.proquest.com/lib/uab/detail.action?pq-origsite=primo&docID=287960

Software

Language list

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	1	Catalan	first semester	afternoon
(PAUL) Classroom practices	2	Catalan	first semester	afternoon
(PLAB) Practical laboratories	1	Catalan	first semester	morning-mixed
(PLAB) Practical laboratories	2	Catalan	first semester	morning-mixed
(PLAB) Practical laboratories	3	Catalan	first semester	morning-mixed
(TE) Theory	1	Catalan	first semester	afternoon