UAB
Universitat Autònoma de Barcelona

Materials Science and Technology

Code: 106814
ECTS Credits: 6

2025/2026

Degree	Type	Year
Nanoscience and Nanotechnology	OB	2

Contact

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Teachers

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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. 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. Crystalline solids and defects
. 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	
theory	32	1.28	
Type: Supervised			
Practices	8	0.32	
Type: Autonomous			
Group work	30	1.2	
Individual work	59	2.36	

- 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	
First evaluation	40	3	0.12	CM16, CM17, KM27, SM24
Group work memoire	20	0	0	CM17, SM24, SM28
second evaluation	400	3	0.12	CM16, CM17, KM27, SM24

CONTINUOUS ASSESSMENT

The assessment of the course will be carried out continuously and consists of:

- 2 partial knowledge exams, each worth 40% of the final grade
- 1 group project, worth 20% of the final grade
- Several mandatory knowledge quizzes available on the Moodle platform, which must be completed within the established deadlines in order to qualify for continuous assessment

The Moodle course page will specify the deadlines for each piece of evidence and each activity or group project.

To pass the course, students must:

- Complete the quizzes and other submissions available on Moodle
- Submit the written group project
- Take both partial exams
- Obtain a minimum average score of 4.5 out of 10 on the two partial exams
- Obtain a minimum score of 5 out of 10 in the overall continuous assessment

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SINGLE ASSESSMENT

Students who opt for the single assessment modality must complete the following within the agreed deadlines:

- A comprehensive exam equivalent to the two partial exams, worth 70%
- An individual research project on a global topic related to the course, worth 15%
- An individual assignment based on readings of scientific papers, worth 15%
- Complete the quizzes or submissions available on Moodle on the date set for the single assessment

To pass the course under the single assessment modality, students must:

- Complete the quizzes and other submissions available on Moodle
- Submit the written assignments
- Obtain a minimum score of 4.5 out of 10 on the comprehensive exam
- Obtain a minimum score of 5 out of 10 in the overall course assessment

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REQUIREMENTS FOR THE EXTRAORDINARY EXAM

- To pass the course, students must achieve an overall grade equal to or higher than 5.0. If the course is not passed but the overall grade is at least 3.5, students will be entitled to take a written resit exam covering the entire syllabus. This exam will allow them to pass the course with a maximum grade of 5 out of 10.

- For students under continuous assessment, if one of the partial exams is passed with a grade of 5/10 or higher, they may take the resit exam only for the failed part.

PLAGIARISM OR FRAUDULENT CONDUCT

If a student commits any irregularity that could significantly affect the grade of an assessment activity, that activity will be graded with a 0, regardless of any disciplinary proceedings that may be initiated. If multiple irregularities are detected within the same course, the final grade for the course will be 0.

ARTIFICIAL INTELLIGENCE (AI)

The use of Artificial Intelligence (AI) technologies is permitted in this course as an integral part of the development of assignments, provided that the final result reflects a significant contribution from the student in terms of analysis and personal reflection. The student must:
(i) identify which parts were generated using AI;
(ii) specify the tools used; and
(iii) include a critical reflection on how these tools influenced the process and the final outcome of the activity.

Failure to disclose the use of AI in an assessed activity will be considered academic dishonesty and will result in a grade of 0 for the activity, with no possibility of resubmission, or more severe penalties in serious cases.

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

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

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