UAB
Universitat Autònoma de Barcelona

Nanoscience and Society

Code: 106836
ECTS Credits: 6

2024/2025

Degree	Type	Year
2504602 Nanoscience and Nanotechnology	OB	2

Contact

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Teachers

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Teaching groups languages

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Prerequisites

There are not any prerequisites.

Objectives and Contextualisation

This subject provides students with a general overview of nanotechnology, beyond the scientific content developed during the degree. The main goal is to offer a cross-training which will allow students to identify what are the fields of application of nanotechnology, its impact on society, and what will our society look like in the near future. This will enable students to uncover areas in which a nanotechnologist can have a place but have so far been unknown. The subject is organized into five units: 1) Nanotechnology in perspective. 2) Nanotechnology in Europe, Asia and the United States. 3) Scientific and technological development of nanotechnology. 4) Nanotechnology in Spain and Catalonia. 5) Ethical and social aspects. The idea is to explore beyond the science itself so that, after the multiple possibilities nanotechnology fits into society and labour market are disclosed, students become aware that greatest potential for labour market integration happens when the scientific training acquired during the degree couples to transferable skills.

Learning Outcomes

1. CM28 (Competence) Assess the socio-economic and environmental impact of nanotechnologies.
2. CM28 (Competence) Assess the socio-economic and environmental impact of nanotechnologies.
3. CM29 (Competence) Assess sex and gender inequalities in terms of both access to and the application of nanotechnology.

4. KM48 (Knowledge) Recognise the impact of nanoscience and nanotechnology on society from an interdisciplinary point of view.
5. KM50 (Knowledge) Identify the ethical principles and legislative standards involved in marketing new products based on nanotechnology and their experimental validation.
6. KM51 (Knowledge) Describe the fundamental aspects involved in managing and protecting the knowledge of scientific results.
7. SM41 (Skill) Analyse the risks to the environment associated with handling and using products derived from nanotechnology.
8. SM41 (Skill) Analyse the risks to the environment associated with handling and using products derived from nanotechnology.
9. SM42 (Skill) Use tools from the fields of journalism and information to synthesise, critically analyse and communicate research results and current issues on science and society.
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Content

1. Nanotechnology in perspective:

Social perception of nanotechnology
Top 10 emerging technologies in the last five years
Knowledge economy
Hype Cycle
Evolution of nanotechnology in recent years
Investment in nanotechnology

2. Nanotechnology in Europe, Asia and the United States:

EU framework programs: evolution
Horizon 2020 and Horizon Europe
KETs (*Key Enabling Technology*)
Technology Readiness Level (TRL)
Nanotechnology as a KET
The race to lead nanotechnology research: China and the United States
The NNI (*National Nanotechnology Initiative*)

3. Scientific and technological development of nanotechnology:

Scientific production: scientific publications and citations. *Publish or perish*
Intellectual protection. Patents
Entrepreneurship. Spin-off versus start-up
Venture capital

4. Nanotechnology in Spain and Catalonia:

The NanoSpain network
National companies in the sector
CERCA centers
ICREA program

5. Ethical and social aspects:

REACH regulation in nanotechnology
Risk management in nanotechnology. The FDA and the EMEA.
Ethics and nanotechnology
Lessons from history

Dissemination of science. Citizen science.
Gender perspective and dimension in science in general and nanoscience in particular

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
In-class exercises and case studies	12	0.48	CM28, CM29, KM50, SM41
Lectures	30	1.2	CM28, CM29, KM48, KM50, KM51, SM41
Oral presentation	15	0.6	CM28, CM29, KM48, KM50, KM51, SM41, SM42
Seminars	20	0.8	CM28, CM29, KM48, KM50, KM51, SM41
Type: Supervised			
Mentoring	18	0.72	CM28, CM29, KM48, KM50, KM51, SM41
Type: Autonomous			
Estudi	25	1	CM28, CM29, KM48, KM50, KM51, SM41
Problem solving	5	0.2	CM28, KM50, KM51
Reading articles	5	0.2	CM28, CM29, KM48, KM50, KM51, SM41

Lectures

The teacher will introduce and develop the theoretical contents of the subject using ppt. Supporting material will be delivered to students.

Classroom debates (forums) and exercises

Debates and exercises (in the broadest sense of the word) will serve to consolidate and see how the knowledge acquired during theory classes is put into practice. They will be intercalated with the theory classes to reinforce specific aspects or at the end the thematic units. The debates will be carried out under the guidance of the teacher and with the proactive participation of the students.

Seminars

Seminars will be given by renowned experts in specific areas of nanoscience and nanotechnology to tackle social aspects of nanotechnology. Students are encouraged to actively participate in these sessions, so that they can address the speaker any question they consider appropriate and relevant, in order to trigger a forum around the nano world, ranging from its applications to social and ethical implications.

Group presentations

Oral presentations in small groups will be given at the end of the semester, covering topics from the contents of the subject and beyond.

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
Essays on manuscript / newspaper article	15	4	0.16	SM42
Exams	50	10	0.4	CM28, CM29, KM48, KM50, KM51, SM41
Oral group presentación	35	6	0.24	CM28, CM29, KM48, KM50, KM51, SM41, SM42

Essay/s: the student will have to demonstrate critical thinking regarding the contents of the reading material (15% of the mark).

Group oral presentations: they represent 35% of the final mark and will be held by the end of the semester. Oral presentations will be followed by a discussion with the classmates. They are compulsory, as well as attendance at the presentations delivered by the other students. The technical and formal quality of the presentation as well as the answers given during the discussion phase will be considered.

Two exams covering the theory content of the subject and the aspects addressed during the practical sessions and seminars. They account for 50% of the final mark.

Attendance at seminars delivered by experts in the field is also mandatory.

The proactive attitude in the classroom will be taken into account for the final grade of the subject.

Re-assessment for this subject requires the student must previously have done a minimum of two-thirds of the course-assessment items.

In order to pass the course, you must have an overall grade equal to or higher than 5.0. If you fail, but you get a minimum of 3.5 overall in the subject, you will have the right to a written makeup test covering the entire contents of the subject that will allow you to pass with a maximum mark of 5 over 10.

Bibliography

There is not a dedicated textbook. Relevant works in the field will be indicated in the ppt slides and lecture notes given by the teacher.

Software

Not applicable.

Language list

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	1	Catalan	second semester	morning-mixed
(PAUL) Classroom practices	2	Catalan	second semester	morning-mixed
(TE) Theory	1	Catalan	second semester	morning-mixed