



Máster en Erasmus Mundus en Ingeniería de Membranas 69133 - Case studies of industrial applications

Guía docente para el curso 2014 - 2015

Curso: 2, Semestre: 1, Créditos: 6.0

Información básica

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Recomendaciones para cursar esta asignatura

Recommendations for taking this subject

The "*Examples of Industrial Applications*" module is obligatory and counts for 6 ECTS credits or 150 student work hours. The course is given in the first term of the academic year. As with the other modules in this Master's, this module is taught and assessed completely in English.

The objective of this module is that the students analyse and understand how Nanotechnology has real applications in our everyday lives. In order to achieve this objective, various speakers from the industrial sector will show how their companies make use of Nanotechnology in their production lines and end products.

As the whole course is taught in English, students need to have an upper-intermediate level in the language: minimum level B1 in the European Common Framework Language Reference, but preferably level B2. Level B1 is reached when the student is able to understand the main points of clear, standard-language texts when covering known matters - whether in terms of work, study or leisure; when able to cope in most situations which the student encounters during a trip to places where the language is spoken; when able to write simple, coherent texts on familiar topics or those in which the student has an interest; and when able to describe experiences, happenings, wishes and ambitions as well as briefly justify opinions or explain plans. B2 is achieved when the student is able to understand the main ideas of complex texts that deal with both specific and abstract topics, even if these are technical - though within the field of specialisation; when able to communicate with native speakers with the degree of fluency and ease such that the communication takes place without effort on either side; and when able to write clear, detailed texts on diverse subjects as well as defend a point of view on general topics - giving the pros and cons of the different options.

Actividades y fechas clave de la asignatura

Dates and key points for the subject

This module is taught in the first term in parallel with modules 2 and 3, thus the start date is around mid-October and it will last until the end of January.

The course is given in the afternoon and the calendar for classes and exam dates will be published prior to the beginning of each academic year in the web page for the Master's: www.unizar.es/nanomat

Inicio

Resultados de aprendizaje que definen la asignatura

El estudiante, para superar esta asignatura, deberá demostrar los siguientes resultados...

1:

In order to pass this subject, the students must show that they... (Passing this subject, the students achieve the following results...)

1. Identify the differential characteristics that the application of the nanoscale can give particular commercial products.
2. Identify the difficulties existing for the advances achieved in the laboratory to be put into practice.
3. List and describe products on the market (textile, motor, pharmaceutical, technological, construction, etc.) based on nanostructured materials.
4. Recognise the design factors in high tech products and the characteristics which make them successful commercially.

Introducción

Breve presentación de la asignatura

A brief introduction to the subject

In this module, different speakers from the industrial world in areas from electronic to biomedical applications will explain to the students how their companies harness nanomaterials to provide a value added to their products. This allows our students to become aware of the real, scientific, financial, social, marketing, etc. difficulties involved in launching a nanodevice or a particular application of nanostructured materials onto the market.

Contexto y competencias

Sentido, contexto, relevancia y objetivos generales de la asignatura

La asignatura y sus resultados previstos responden a los siguientes planteamientos y objetivos:

The subject and its expected results respond to the following general planning and objectives:

Through the talks given in this module, the students will become familiar with real cases of practical applications and get to know highly specialised experts, allowing them to become aware of the potential applications of Nanotechnology and also of the difficulties of getting a product into the marketplace. Likewise, they will develop the ability to communicate and interact with professionals from different disciplines. It will let them see, at first hand, important companies that might in the future be interested in contracting well-trained and highly specialised people in areas connected to Nanoscience and Nanotechnology.

Contexto y sentido de la asignatura en la titulación

Context and position of the subject in the qualification:

In this subject, it is intended that the student be able to apply the knowledge gained about Nanoscience, understanding the market possibilities, the competitive advantages of technological innovation, the real difficulties when launching a new product or setting up a company, and, definitively, broadening the horizon regarding nanotech applications. In addition, this is the beginning of leaning towards a greater degree of specialisation, once the different applications of nanomaterials have been explored.

Al superar la asignatura, el estudiante será más competente para...

1: On passing this subject, the student will be better able to:

1. Assess the importance of the nanotech product market.
2. Appreciate the potential of Nanotechnology as a horizontal discipline capable of incorporation into numerous production processes.
3. Appreciate the potential of Nanotechnology as a horizontal discipline capable of incorporation into numerous production processes.
4. Recognise the difficulties and the scientific, financial, social, marketing, etc. challenges involved in launching a nanodevice or a particular application of nanostructured materials onto the market.
5. Communicate and interact with professionals from different disciplines.

Importancia de los resultados de aprendizaje que se obtienen en la asignatura:

The results of the learning process for this subject are important because:

Through this module students will become much more aware of the reality of the discipline they are studying. Herein, students receive a description of the market prior to the insertion of a nanotech product, identifying the opportunity, designing the product or process, technological and commercial implementation. In other words, they see how science and industry have been able to apply the knowledge, tools, and resources studied in the previous modules to real problems. It is hoped the study of all these cases (10 case studies are expected to be studied from different areas: pharmaceutical industry, motor, textile, cosmetics, biotechnology, sensor manufacturing) will allow them to set themselves new challenges and develop innovative ideas.

Evaluación

Actividades de evaluación

El estudiante deberá demostrar que ha alcanzado los resultados de aprendizaje previstos mediante las siguientes actividades de evaluación

- 1:**
The student must show the expected results of the learning process through the following assessment methods:

CONTINUOUS ASSESSMENT

1. For students choosing continuous assessment:

Given the theory classes and the talks from business leaders in the sector, each student will set out a case study for which a written report must be presented. This describes the implementation process for a product in the market, evaluating not just the scientific difficulties and limitations but also the technological, financial and social concerns for this implementation, and the contribution of new ideas. The report must be a maximum of 30 pages long and be in English. The originality of the topic chosen, the review of the state of the art in the area (including patents) and the identification of the niche market will be assessed. At the same time, the technological viability of the proposed idea will be assessed and the consideration given to the main factors here, including cost estimation, availability of raw materials, viability of proposed processes, etc. Lastly, this work will be publicly presented before a tribunal consisting of three lecturers from the subject. The presentation will last a maximum of 15 minutes and will be followed by a debate with the tribunal. The final mark encompasses the quality of the written report (40%) and its defence (40%) before a tribunal of three lecturers from the subject. The remaining 20% for this module is scored between 1 and 10 and is on questions regarding the content of the talks given during the classes.

HYBRID AND OTHER SITTINGS

Hybrid students coming to other sittings or wishing to increase their mark must also present a report where they describe the implementation process for a product in the market, evaluating not just the scientific difficulties and limitations but also the technological, financial and social concerns for this implementation, and the contribution of new ideas. The report must be a maximum of 30 pages long and be in English. The originality and viability of the topic chosen will be assessed along with the scientific and technological ideas that support it. Lastly, this work will be publicly presented before a tribunal consisting of three lecturers from the subject. The presentation will last a maximum of 15 minutes and will be followed by a debate with the tribunal. The final mark will value the written report (35%) and its defence (35%). The remaining 30% for this module for the hybrid students consists in writing a report that reviews the applications of nanoscience and nanotechnology in various sectors in industry. The report will make mention of specific applications and real products on the market, patent review, etc. The report will be a minimum of 20 and a maximum of 30 pages long. Special value is placed on sufficient detail of the various applications being obtained and the different industrial sectors being perfectly represented in the applications described.

Actividades y recursos

Presentación metodológica general

El proceso de aprendizaje que se ha diseñado para esta asignatura se basa en lo siguiente:

The learning process created for this subject is based on:

Provide students with real cases of application of nanotech devices in the market through guest talks from specialists at the highest level in their fields. Through critical analysis of these case studies, the students appreciate the advantages, limitations and difficulties in the use of nanotechnology in the chemical, textile, motor, construction, etc. industries.

Actividades de aprendizaje programadas (Se incluye programa)

El programa que se ofrece al estudiante para ayudarle a lograr los resultados previstos comprende las siguientes actividades...

1:
The programme offered to the student to help achieve the expected results contains the following activities:

1. Guest speakers: talks lasting - depending on the topic - one to three 50 minute sessions.
2. The module coordinator will tutor and supervise the "case study" for which each student will prepare a report.

Planificación y calendario

Calendario de sesiones presenciales y presentación de trabajos

Class calendar and work presentation

This calendar will be published at the beginning of each academic year in the web page for the Master's: www.unizar.es/nanomat. The classes will take place in the afternoon.

Referencias bibliográficas de la bibliografía recomendada