

# Máster en Materiales Nanoestructurados para Aplicaciones Nanotecnológicas

## 66115 - Multidisciplinary joint educational project

Course 2015 - 2016

Curso: 1, Semestre: 2, Créditos: 5.0

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### Basic information

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#### Teachers

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#### Recommendations to attend this course

The "Multidisciplinary Joint Educational Project" is an optional module equivalent to 5 ECTS credits or 125 student work hours.

The objective of this module is to introduce the student in a multidisciplinary research team, composed by scientists of at least two different disciplines.

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.

**Additional information about this master (grants, events, etc.) can be found on the web site:**

**[www.unizar.es/nanomat](http://www.unizar.es/nanomat). Also examples of proposed Multidisciplinary Joint Educational Projects for the year 2014-15**

## Course Schedule and Deadlines

This module will be done during the second semester, preferably in the mornings to avoid interferences with the lectures in the core modules.

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## Home

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### Learning outcomes that define this course

**The student, in order to pass the course, will have to show her/his competence in the following skills:**

- 1:** Are able to understand and resume the state of the art in a multidisciplinary research line.
- 2:** Are capable of finding hot topics in the proposed research line and propose new ideas to achieve progress beyond the state of the art.
- 3:** Have skill at oral and written communication, circulating the ideas, results and interaction with colleagues, supervisors, and professionals from other disciplines.

## Introduction

### Brief presentation of the course

The students develop a scientific report that includes: a review of the state of the art, approach to the problem under study, proposal of new ideas, and interpretation of some preliminary experiments. This work will be supervised by researchers from at least two different disciplines.

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## Competences

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### General aims of the course

**The expected results of the course respond to the following general aims**

This module allows students to gain a significant level of specialisation in the topic area chosen and become even more aware that Nanoscience and Nanotechnology are interdisciplinary disciplines that require the collaboration of chemists, physicists, engineers, biochemists, etc. to progress beyond the state of the art. In addition, the students will gain experience in their ability to self-teach; to face different and unknown problems; interaction with other researchers to increase their ability to work in a team; take decisions; increase their ability to communicate their ideas and results via the creation of a scientific report, etc.

### Context/Importance of the course for the master degree

This module represents a practical application of the other modules in the course to a real problem where the student - always under supervision of at least two tutors - faces the task of writing a report on the state of the art on a certain multidisciplinary research line, propose new ideas to achieve progress beyond the state of the art, and, if possible, do some preliminary experiments to probe his/her hypothesis. To achieve the above, the student will make use of the theoretical knowledge, attitudes, aptitudes and skills acquired over the core modules of the course.

## **After completing the course, the student will be competent in the following skills:**

- 1:** Assess the true difficulties that come with the practical pursuit of an idea or concept
- 2:** Abilities for independent study and self-teaching that are required to undertake the research or professional activity in the near future
- 3:** Capacity to summarize the state of the art on a certain topic and find the hot points of this topic proposing new ideas or concepts to achieve progress beyond the state of the art
- 4:** Skill at oral and written communication, circulating the results and interaction with colleagues and professionals from other disciplines

## **Relevance of the skills acquired in the course**

Through this highly specialised module, the students will be able to apply their knowledge of the topic to propose new ideas and projects, gaining abilities that will be of service in their immediate professional future.

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## **Evaluation**

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### **Assessment tasks**

#### **The student will prove that he/she has achieved the expected learning results by means of the following assessment tasks:**

- 1:** The student will present a written report with a maximum of 15 pages (Times New Roman 12, spacing 1.5) that summarizes the state of the art on a certain research line with a multidisciplinary character, highlights the hot topics on this research line and proposes new ideas to go beyond the state of the art. In addition, the student may present a few preliminary experiments to probe the validity of his/her ideas. This work will be presented to a board of three examiners. In addition to the written report, a public presentation of the work will be made in front of a board of three examiners. The presentation will last a maximum of 15 minutes and will be followed by a debate. The final mark will take into account both the quality of the written report (70 %) and its defence presentation (30 %) which will take into account the tutors report.
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## **Activities and resources**

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### **Course methodology**

#### **The learning process that has been designed for this course is based on the following activities:**

The project will be directed by two doctors with a large experience in the tutoring of doctoral theses and projects. These supervisors necessarily will belong to two different areas of knowledge. The students will have free access to the UZ library which has powerful databases, specialised books and subscriptions to numerous scientific magazines. In addition, the students will have access to the laboratories at INA and their equipment, as well as other tools and infrastructures available at UZ and ICMA.

## **Outline of the Programme**

**The programme offered to the students to help them achieve the learning results includes the following activities :**

- 1:** Highly personalised tutoring, favouring an increase in the student's autonomous work and encouraging students to propose their own ideas and to participate in all stages of the project. Frequent open discussions with the tutors and other colleagues working in the research groups that the student has joined will also be helpful.

## **Course planning**

### **Calendar of actual sessions and presentation of works**

This module will take place in the second term, preferably tutorials will be in the mornings to avoid interference with the master lectures.

## **Bibliographic references of the recommended readings**