66113 - Introduction to Research in Nanosciencie

Información del Plan Docente

Academic Year	2016/17
Academic center	100 - Facultad de Ciencias
Degree	539 - Master's in Nanostructured Materials for Nanotechnology Applications
ECTS	5.0
Course	1
Period	First semester
Subject Type	Optional
Module	---

1.Basic info

1.1.Recommendations to take this course

" *Introduction to Research in Nanoscience and Nanotechnology* " an optional module equivalent to 5 ECTS credits or 125 student work hours. The course is given in the first term of the academic year.

The objective of this module is to provide the student with skills and tools to develop his or her scientific career in the fields of Nanoscience and Nanotechnology.

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

1.2.Activities and key dates for the course

The classes for this module begin at the start of the academic year and will last till January. The module will be taught in parallel with modules 1, 2 and 3.

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 site of the Faculty of Science (https://ciencias.unizar.es/web/horarios.do) and the

master web site (www.unizar.es/nanomat).

2.Initiation

2.1.Learning outcomes that define the subject

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

Know the steps of the scientific method.

Understand the importance of oral and written communication in science

Know and understand the main stages in a scientist career

Are able to conduct an efficient and valid literature search

Understand the basics of intellectual property rights and patents

Be aware of Ethical Issues arising from research in nanoscience

Understand the seriousness of plagiarism

2.2.Introduction

Brief presentation of the course

Introduction on how to search for the most relevant academic literature (how to keep up-to-date with the state of the art; search databases; software tools for publishing and managing bibliographies, market studies). Description of the research process (science and the scientific method; data collection and analysis; results interpretation; ethic guidelines and data protection; dissemination of the results; oral and written communication). Reviewer evaluation. Faking data & plagiarism. Ethical issues. Roadmap of the researcher career (grants, how to improve the chances of getting a grant, pre-doctoral grants, research centers map, research secondment, postdoc period). The need for a multidisciplinary curriculum; The basics to become a Nanoengineer or a nanoscientist; Areas of specialization; Nanoscientists and/or Nanotechnologists. Opportunities in academia and industry: Communication skills. Intelectual property rights. Communication skills. Intellectual property rights.

3.Context and competences

3.1.Goals

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

This module intends to provide students with necessary tools to efficiently develop their research in the fields of Nanoscience and Nanotechnology. The importance of the communications skills of a scientist will be highlighted and practical examples will be given. In addition, the students will be informed about the key stages of a scientific career in academia and industry. Topics such as how to design and write a grant or a project proposal will be analysed through practical cases. The importance of intellectual property and how it can be protected will be studied.

3.2.Context and meaning of the subject in the degree

As previously mentioned, this module is meant to provide useful tools for the development of a scientific career. Students should acquire these tools early in their career, hence why this module is taught during the first semester.

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3.3.Competences

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

Demonstrate oral and written communication skills

Comprehend the different stages in scientific careers

Make use of the scientific method

Understand the importance of intellectual property and how it can be protected

Perform an effective literature search.

Use software tools for composing and managing bibliographies

3.4.Importance of learning outcomes

In the context of this Masters course, the " *Introduction to research in Nanoscience and Nanotechnology* " module aims to make the student aware of the relevance of having a wide set of tools to develop his/her career, which include how to design your own research project, analyze the data and report the results, essential oral and written communication skills, effective literature searching, understanding the career stages of a scientist in industry and academia, protection of the intellectual property, etc.

4.Evaluation

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

For students choosing **continuous assessment** (attendance to at least 80% of this module lectures is required):

Practical exercises proposed by the lecturers which will consist in the analysis of study cases where the students need to show how to solve that practical case and demonstrate oral and written communication skills. These exercises will be assessed on a scale of 1 to 10.

GLOBAL EXAMINATION (students that did not pass the ongoing assessment or students that wish to increase their mark) , the assessment consists of a written test (50%) and an oral test (50%) before a board of three lecturers from the subject area. In these tests, the student must display knowledge of the topics taught in this module as well as their ability to apply this knowledge to specific problems. This knowledge will be assessed on a scale of 1 to 10. Scientific communication skills will be evaluated - on a scale of 1 to 10 - and here correct use of scientific language, audiovisual techniques, graphics, clarity of presentation, etc. will be expected. Both oral and written exams will take place in the language used for the course: English.

5.Activities and resources

5.1.General methodological presentation

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

A general examination of the contents of this module will be performed through participatory Master classes, there will be

case and problem analysis activities where these principles can be observed, examined in depth, evaluated and clarified.

5.2.Learning activities

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

Each topic area making up the programme for the module will be presented, analysed and discussed by the lecturer through participatory master classes lasting 50 minutes. The lecturers will provide the students with notes, handouts or summaries of class content prior to the beginning of the class (preferably via ADD) along with the recommended reading for more in-depth understanding of the topic.

Open forum and discussion on the basic concepts and their application. Problem solving and practical case studies. All the above will take place in 50 minute classes with the essential participation of the students as speakers.

5.3.Program

5.4.Planning and scheduling

Calendar of actual sessions and presentation of works

This calendar will be published at the beginning of each academic year in the web site of the Faculty of Science (https://ciencias.unizar.es/web/horarios.do). Additional information could be found at www.unizar.es/nanomat . All classes will be in the afternoon.

5.5.Bibliography and recomended resources