CÓDE	NAME OF MODULE	TYPE
	NANOSTRUCTURAL PROPERTIES	M

M = mandatory
E = elective

3.3.1. Learning goals of the module.

(List the specific learning goals that the current module should provide to the student; goals can focus on content, skills, or attitudes.)

THE MAIN GOAL OF THIS MODULE IS TO ESTABLISH THE CONNECTION BETWEEN THE NANOSTRUCTURES THAT HAVE BEEN PRESENTED IN PREVIOUS MODULI AND THE DIFFERENT PHYSICAL PROPERTIES THAT THOSE NANOSTRUCTURED MATERIALS HOLD. SPECIAL EMPHASIS WILL BE ADDRESSED FOR A DEEPER UNDERSTANDING OF THE ELECTRONIC STRUCTURE IN LOW DIMENSIONAL SYSTEMS, AN INTRODUCTION TO TRANSPORT PROPERTIES, AS WELL AS AN INTRODUCTORY REVIEW OF MAGNETIC, OPTICAL AND MECHANICAL PROPERTIES OF NANOSTRUCTURES.

3.3.2. Methodology: learning activities and credit value of the module (ECTS).

3.3.2.1. Learning activities.

(Time required to teach the module; links to other modules included in the MSc Program and suggested chronological sequence with the latter)

THE MODULUS CONSISTS OF 30 LECTURES OF ONE HOUR EACH IN THE CLASS WHERE THEORETICAL CLASSES AND SEMINARS WILL BE CONDUCTED.

THE MODULUS WILL BE TAUGHT DURING THE SECOND SEMESTER OF THE FIRST COURSE OF THE MASTER. IN THIS WAY, THE STUDENT WILL DEVELOP A SOLID BASIS ON STRUCTURAL AND ELECTRONIC PROPERTIES OF DIFFERENT NANOSTRUCTURES DURING THE FIRST SEMESTER, AND THE CONNECTION WITH THE DIFFERENT MECHANICAL, OPTICAL, MAGNETIC AND TRANSPORT PROPERTIES CAN BE REACHED PROGRESSIVELY ALONG THE COURSE.

3.3.2.2. ECTS credit value (and time)
1 ECTS credit = 25 hours UPV/EHU

TYPE OF LECTURE[1]	Theory		Practice							Evaluation	
										Periodic Grading	Final Grading
	M[2]	S	PA	PL	PO	TA	TAI	PCL	PCC		
Classroom lectures	25	5	10		10						
Personal work [3]	30		10		10						
TOTAL	57	5	20		20						

(1) M (standard lecture); S (seminar); PA (practical exercises in classroom); PL (practical exercises in laboratory); PO (practical exercises with computers); TA (non-industrial workshops); TAI (industrial workshops); PCL (clinical practice); PCC (field practice); the acronyms are taken from the Spanish wording.
(2) M = maximum allowed is 60% of the full classroom lectures .
(3) Personal work = time that the student would use to prepare and develop individual and group assignments.

3.3.2.3. Module Program.

(Lectures)

Lecture 1	INTRODUCTION
Lecture 2	ELECTRONIC PROPERTIES
Lecture 3	TRANSPORT PROPERTIES
Lecture 4	OPTICAL PROPERTIES
Lecture 5	MAGNETIC PROPERTIES
Lecture …	MECHANICAL PROPERTIES

3.3.2.4. Bibliography.

(Basic and specialized bibliographies, journal references, internet addresses, etc.)

-"Handbook of nanoscience, Engineering, and technology", Donald Brenner, Sergey Lyshevski, Gerald Lafrate, William A. Goddard III (eds.) CRC PRESS, 2002.
- "Encyclopedia of Nanoscience and Nanotechnology", Hari Singh Nalwa (ed.) American Scientific Publishers. 2005
- "Exploring Nanotechnology" CD-ROM encyclopedia. NANOPOLYS. 2005
http://nanotech.nanopolis.net
- "Principles of Nano-optics", Lucas Novotny and Bert Hecht, Cambridge university Press, 2006
- **- "Mesoscopic Physics and electronics", T. Ando, Y. Arakawa, F. Furuya, S. Komiyama and H. Nakashima, Spinger, 1998.**
- **"Mesoscopic systems. Fundamentals and Applications", Yoshimasa Murayama, Wiley-Vch, 2001.**

3.3.3. Criteria and methods for evaluation and grading

(Analysis of the methodology that will be used to evaluate the learning process of the student)

THIS MODULUS IS A FUNDAMENTAL ONE IN THE MASTER, THEREFORE THE KNOWLEDGE DEVELOPED BY THE STUDENT WILL BE VALUES BY MEANS OF AN EXAM WITH AN IMPORTANCE IN THE FINAL GRADING OF 50%. THE REST OF THE GRADING WILL BE BASED ON THE PERIODIC EVALUATION OF PRACTICAL WORK, EXERCISES, AND INTEREST (25%) AND BY MEANS OF A FINAL PRESENTATION OF A TOPIC (25%).

3.3.4. Learning resources

THE LIBRARIES OF THE CHEMISTRY FACULTY, THE DEPARTMENT OF MATERIALS PHYSICS, AND THE DONOSTIA INTERNATIONAL PHYSICS CENTER WILL BE OPEN RESOURCES FOR THE STUDENTS OF THE MASTER. COMPUTING FACILITIES AT THE DIFFERENT GROUPS IN THOSE DEPARTMENTS WILL BE ACCESIBLE BY THE STUDENTS.

3.3.5. Language and number of groups attending the module

1	NUMBER OF GROUPS
x	LANGUAGE: ENGLISH

3.3.6. Fields of science and technology to which the module is related

CODE	FIELD
	PHYSICS OF CONDENSED MATTER
	APPLIED PHYSICS

3.3.7. Department in charge of the Program

CODE	DEPARTMENT (1)
	DEPARTMENT OF MATERIALS PHYSICS

3.3.8. Teachers in charge of the module

DNI	Teacher UPV/EHU	Number of credits
	Prof. Angel Rubio Secades	1.7

DNI	Teacher other institutions	Number of credits
	Javier Aizpurua Iriazabal	0.9
	Andres Ayuela	0.4