MASTERS DEGREE IN

Nanostructured Materials for Nanotechnology Applications NANOMAT

Master Presentation

Dr. Maria Pilar Pina

(mapina@unizar.es)

- https://ciencias.unizar.es/master-en-materiales-nanoestructurados-para-aplicaciones-nanotecnologicas-2014-15
- https://estudios.unizar.es/estudio/ver?id=637&anyo_academico=2022
- https://inma.unizar-csic.es/formacion/master-nanomat/

LMA LABORATORIO DE MICROSCOPIAS AVANZADAS

CIENCIAS ZARAGOZA

INMA INSTITUTO DE NANOCIENCIA Y MATERIALES DE ARAGÓN

EXCELENCIA SEVERO OCHOA

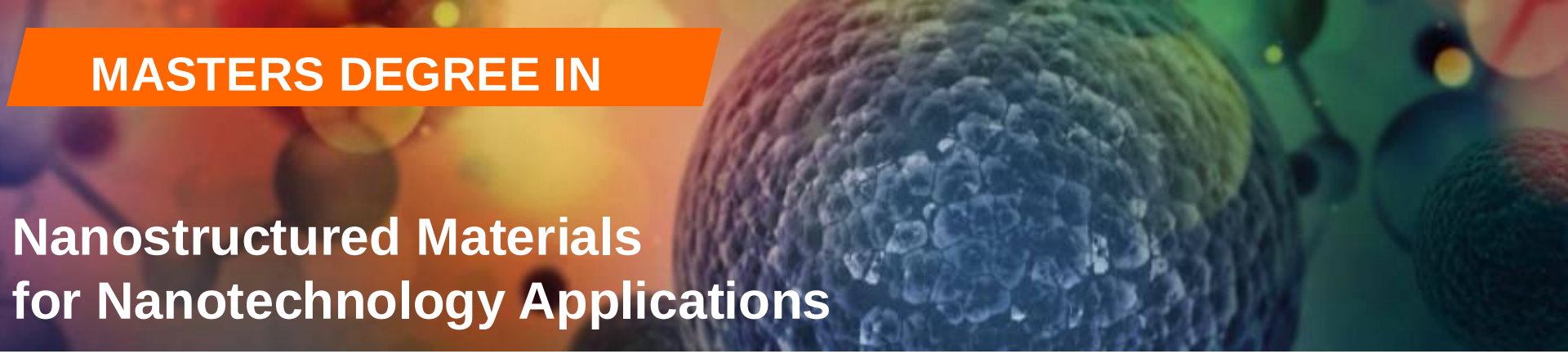
Instituto Confucio Universidad Zaragoza 西班牙萨拉戈萨孔子学院

MASTERS DEGREE IN

Nanostructured Materials for Nanotechnology Applications

OBJECTIVE

The objective of this master is to provide **high-quality University Multidisciplinary Education** in the **synthesis, assembly, fabrication and characterization** of nanostructured materials as well as **practical experience and skills** in the fabrication of micro and nanodevices.



MASTERS DEGREE IN

Nanostructured Materials for Nanotechnology Applications

MULTIDISCIPLINAR

PRACTICAL

INTERNATIONAL

Admission: 25 Students

1 Year Long

60 ECTS

1 ECTS= 25 hours student work

MASTERS DEGREE IN

Nanostructured Materials
for Nanotechnology Applications

Academic Requirements

- ✓ Bachelor Degree in Sciences (physics, chemistry, biotechnology, biochemistry, materials science) or Engineering (chemical engineering, biochemical engineering, materials engineering and related)
- ✓ Particular Cases: academic contents revision by Unizar Post-Graduate Office and Master Coordinator
- ✓ English Level B1 (recommended B2)
- ✓ Personal Interview

MASTERS DEGREE IN

Nanostructured Materials for Nanotechnology Applications

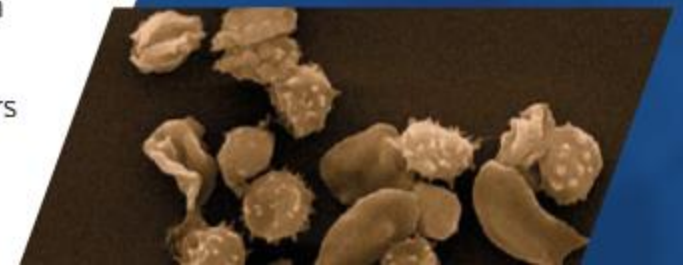
Universidad de Zaragoza

This official Master from Zaragoza University (Spain) has a duration of one academic year and comprises 60 ECTS credits. The course is suitable for graduates with science, engineering, medicine or related degrees keen to develop careers at the forefront of Nanoscience and Nanotechnology.

The course is multidisciplinary and aims to provide students with fundamental knowledge, practical experience, and skills to become a practitioner in Nanotechnology, whether in industry, research or academia.

International, Multidisciplinary, and Postgraduate unique environment.

The University of Zaragoza and the Institutes of Nanoscience and Materials Science of Aragón (INA and ICMA) have exceptional materials preparation and characterization equipment, including some unique instruments in Spain and Europe.



The course is completely taught in English by highly qualified members of research and academic staff within the INA, ICMA, and the Faculty of Science of Zaragoza University as well as by other national and international departments and industrial representatives.

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1542 Universidad Zaragoza

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EXCELENCIA SEVERO OCHOA

CSIC CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

LMA LABORATORIO DE MICROSCOPIAS AVANZADAS

THE COURSE MODULES ARE:

CORE MODULES

1. Fundamental Properties of Nanostructured Materials (6 ECTS credits)
2. Preparation of Nanostructured Materials (6 ECTS credits)
3. Assembly and fabrication of Nanostructures (6 ECTS credits)
4. Characterization I: Physical-chemical techniques (6 ECTS credits)
5. Characterization II: Advanced Microscopies (6 ECTS credits)
6. ~~Case studies of industrial applications (6 ECTS credits)~~

OPTIONAL MODULES

~~7.a Introduction to Research in Nanoscience and Nanotechnologies (5 ECTS credits)~~

~~7.b Fabrication of Micro and Nanodevices (5 ECTS credits)~~

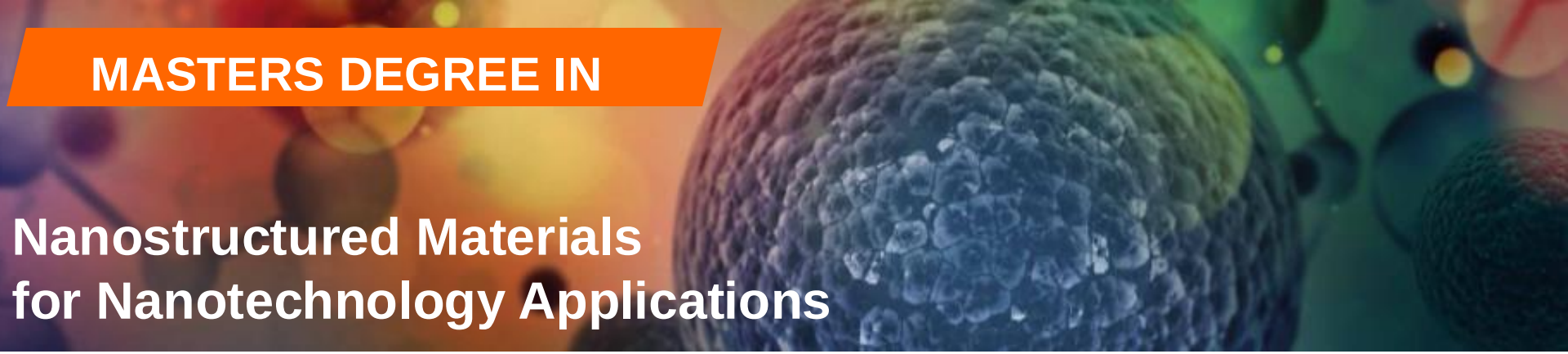
~~7.c Multidisciplinary Joint Educational Project (5 ECTS credits)~~

~~7.d Practical work in a Nanotechnology-related company (5 ECTS credits)~~

MANDATORY INDIVIDUAL RESEARCH PROJECT

8. Final Master Project ~~(14 ECTS credits)~~

18 ECTS



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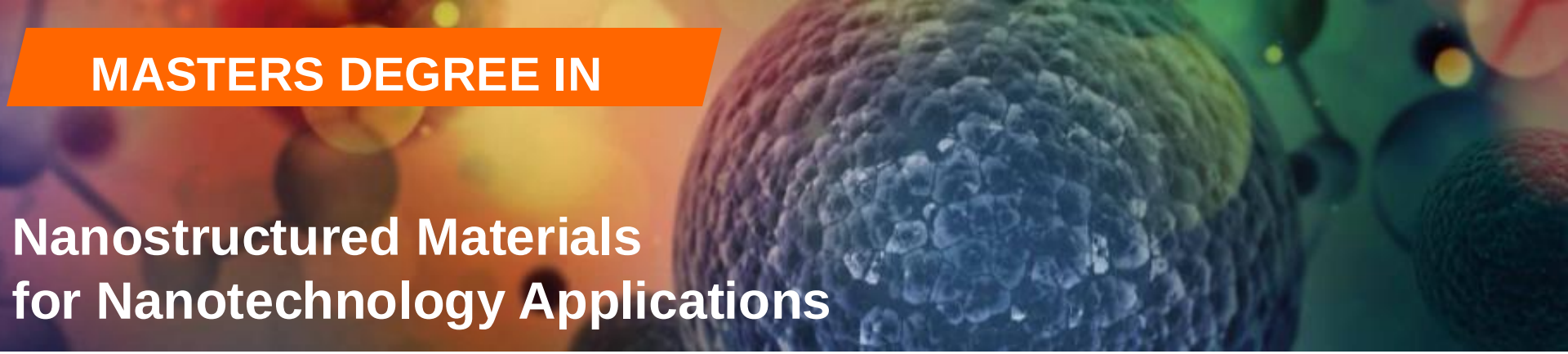
Nanostructured Materials for Nanotechnology Applications

MODULOS	MATERIA	ASIGNATURAS
MODULO 1: FUNDAMENTAL/OBLIGATORIO	FUNDAMENTOS DE NANOCIENCIA	Fundamentals at the Nanoscale
	SINTESIS, ENSAMBLAJE Y NANOFABRICACION	(66112 Modulo 2) Assembly and Fabrication of Nanostructured Materials
		(66111 Modulo 3) Synthesis of Nanostructured Materials
	TECNICAS DE CARACTERIZACION	(66114 Modulo 4) Characterization I: Physico-Chemical Techniques
		(66104 Modulo 5) Characterization II: Advanced Microscopies
MODULO 2: AVANZADO/ OPTATIVO	APLICACIONES NANOTECNOLOGICAS	Micro and Nanodevices for Energy & Environment (3 ECTS)
		Nanomaterials for Biomedical Applications/Nano for Health (3 ECTS)
		Safe & Sustainable Nanotechnologies (3 ECTS)
	CARRERA PROFESIONAL Y EMPRENDIMIENTO	*Interships (6 ECTS)*
		Knowledge Transfer & Entrepreneurship (3 ECTS)
		Communication Skills & Open Science (3 ECTS)
	FENOMENOS EN LA NANOESCALA	*MATERIALS MODELLING (3 ECTS)*
		NANOSCALE SPINTRONICS AND PHOTONICS (3 ECTS)
		NANOMATERIALS FOR ELECTRONICS AND QUANTUM TECHNOLOGIES (3 ECTS)
MODULO 3	TFM	TFM (18 ECTS)



MASTERS DEGREE IN

Nanostructured Materials for Nanotechnology Applications

MULTIDISCIPLINARY

Departments Involved from Unizar

1. Biochemistry & Molecular Biology
2. Science & Technology of Materials & Fluids
3. Physics of Condensed Matter
4. Chemical & Environmental Engineering
5. Analytical Chemistry
6. Organic Chemistry
7. Physical Chemistry
8. Inorganic Chemistry
9. Marketing Direction & Market Research
10. Documentation Sciences & History of Science

Fundamental Knowledge - Practical Experience - Soft Skills

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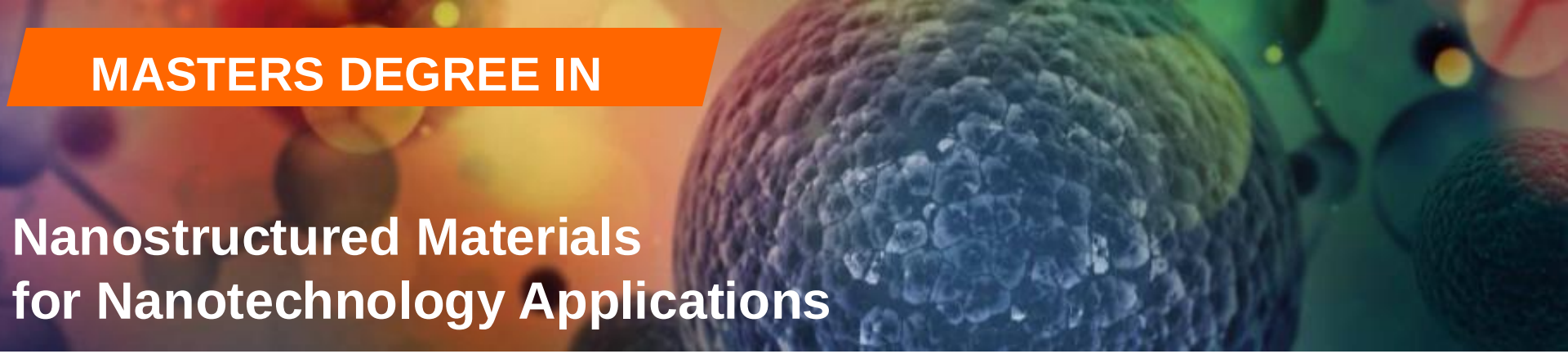
CSIC Consejo Superior de Investigaciones Científicas

LMA Laboratorio de Microscopías Avanzadas



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Nanostructured Materials for Nanotechnology Applications

MULTIDISCIPLINARY

Invited lecturers from other Institutions (UCM, IMB-CNM-CSIC, EOP, U.Liverpool…)

Invited Speakers from companies: Catedra SAMCA

Students from different backgrounds: Physics, Chemistry, Biotechnology, Chemical Eng., Mat. Sciences, Industrial Eng…)

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Thursday's NanoSpin-off TALKS

YouTube

Cátedra SAMCA de Nanotecnología
Universidad Zaragoza

SAMCA

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TALKS

Emprendiendo ciencia, aprendiendo innovación.
RUBYnanomed (Portugal)

Carbon Nanomembranes 2D-Materials beyond Graphene
CNM Technologies GmbH (Germany)

Bridging the gap between Academy to Business (A2B)
Nanoenergy, SPin-off of Porto University

NANOVEX BIOTECHNOLOGIES: A GLOBAL BORN COMPANY
NANOVEX BIOTECHNOLOGIES SL (Spain)

VLC Photonics: pioneering services for the development of photonic integrated circuits
VLC Photonics (Spain)

TECNAN: Innovative nanotechnological protectors for industry
TECNOLOGIA NAVARRA DE NANOPRODUCTOS S.L. TECNAN (Spain)

Lessons learned from my experience in nanotech company OXOLUTIA
OXOLUTIA SL (Spain)

Immaterial. Materials discovery and molecular engineering of MOFs
Immaterial (U.K)

BIVO, Centro de Investigación en Tejidos Orgánicos, Bioestructuras y Biomateriales.
BIVO S.COOP (Spain)

Fotoglass where life and light meet
Fotoglass (Spain)

CSIC
Consejo Superior de Investigaciones Científicas

Universidad Zaragoza

MASTERS DEGREE IN

Nanostructured Materials for Nanotechnology Applications

PRACTICAL

More than 50 % of the credits are practical

Training in advanced tools for Nanotecnology (LMA)

Communication and management skills

INTERSHIPS-UNIVERSA

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CSIC Consejo Superior de Investigaciones Científicas

LMA Laboratorio de Microscopias Avanzadas

MASTERS DEGREE IN

Nanostructured Materials for Nanotechnology Applications

INTERNATIONAL

Completely taught in English

Movility Programme Erasmus+

Post-graduate Programme: Fundación Carolina

Collaboration Agreement with Nanjing Tech University

Erasmus Mundus Master on Membrane Engineering: students (8-9) joining in Semester II

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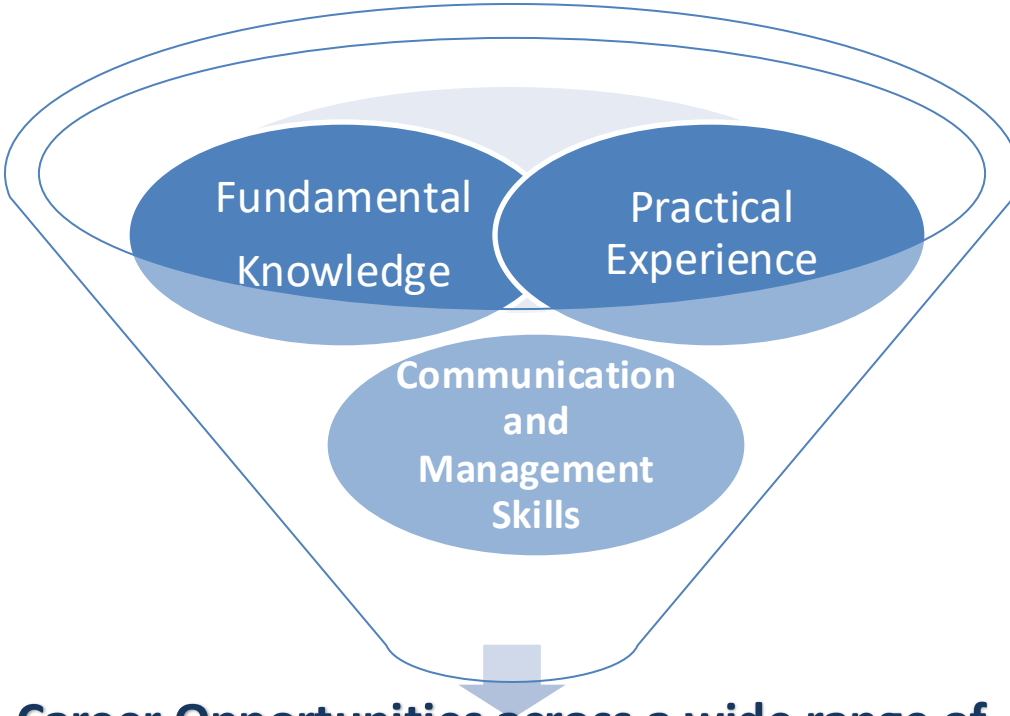
Nanostructured Materials for Nanotechnology Applications

Academic Activities … to Achieve



Career Opportunities across a wide range of industry sectors as well as in academia and research

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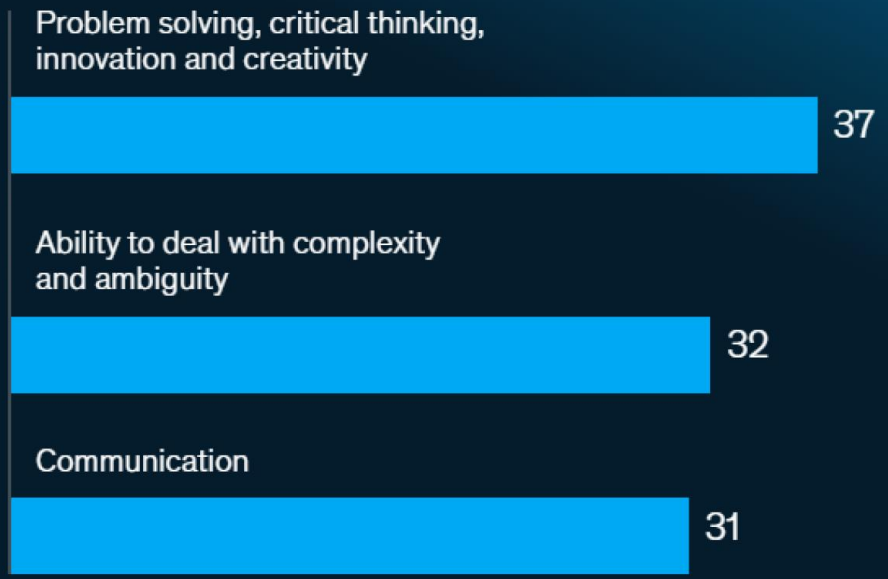
Missing skills

But HR professionals report difficulty recruiting candidates who have the necessary soft skills for an automating world.

Top three areas of missing soft skills,
% of respondents



Dive deeper

Society for Human Resource Management

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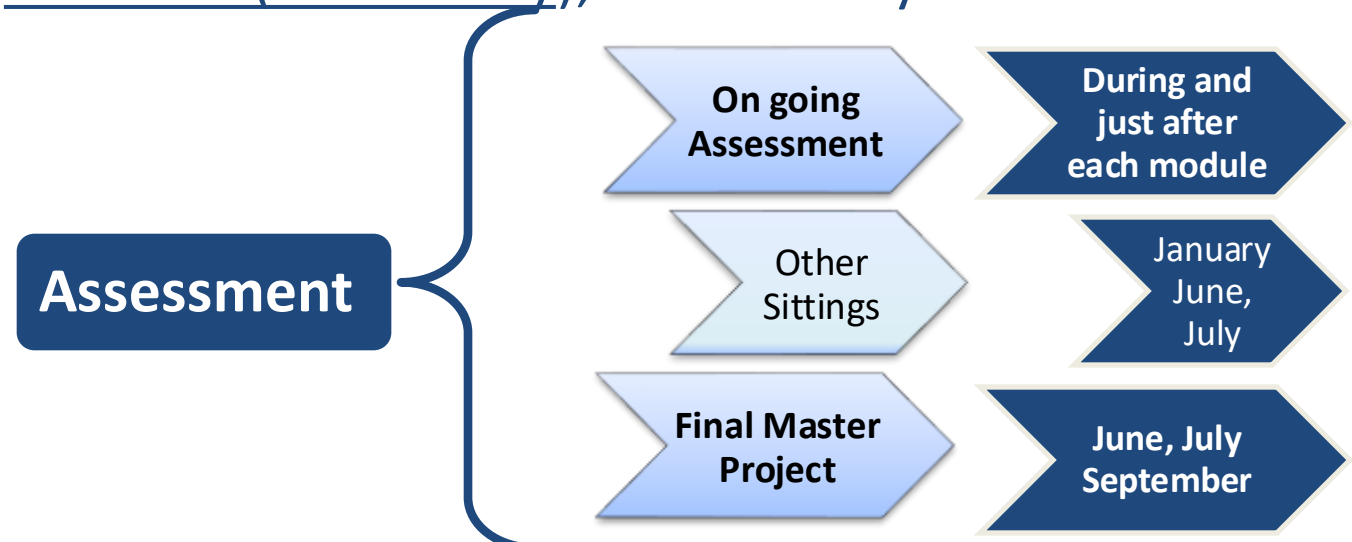
Nanostructured Materials
for Nanotechnology Applications

TIMING, SCHEDULE, ASSESMENT

Lectures: from September 2025 to April 2026

Schedule: from Monday to Friday , from 15:10 up to 20:00 h (50´)

Morning Activities: experimental work-FMP, attendance to scientific seminars (mandatory), occasionally lab sessions



Evaluation procedure specific for each module

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CHRONOGRAM 1st Semester

Module 1: Fundamental Properties of Nanostructured Materials — September Exam 2nd October

Module 2: Preparation of Nanostructured Materials — End September To End-October

Module 3: Assembly and Fabrication of Nanostructured Materials — Mid of October To End November

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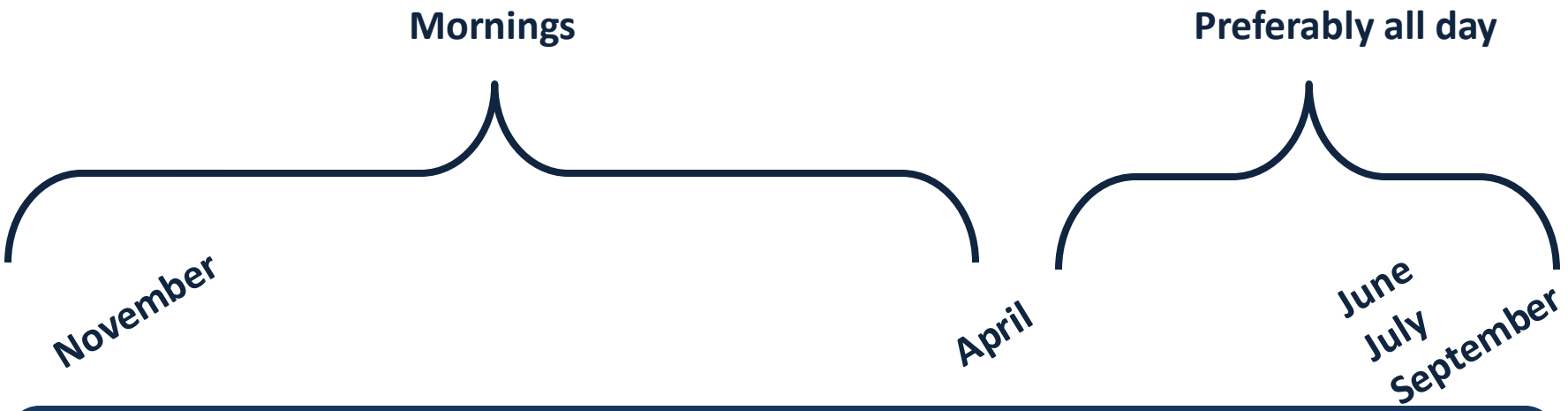
FMP CHRONOGRAM (recommended)



FINAL MASTER PROJECTS LIST

MASTERS DEGREE IN

Nanostructured Materials for Nanotechnology Applications

How to choose your Final Master Project

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Choose from a wide choice at
https://inma.unizar-csic.es/formacion/master-nanomat/

Contact the supervisor/s of the project you are interested in.
General Session for Topics Exposition

First Official list available in First-November (Annex I) at:
https://ciencias.unizar.es/master-en-materiales-nanoestructurados-para-aplicaciones-nanotecnologicas-2014-15
Sign the FMP Custody/Learning Agreement (Annex II) +
https://ciencias.unizar.es/sites/ciencias.unizar.es/files/users/fmlou/pdf/Asuntos_academicos/annex_ii_englishnanomat.pdf

Master Topics & INMA RESEARCH

Transversal Research Areas

A5. SYNTHESIS, PROCESSING & SCALING OF FUNCTIONAL MATERIALS (SPE)

- L5.1: Design and synthesis of functional organic materials
- L5.2: Manufacture and processing of nano and microstructures
- L5.3: Laser material processing and surface modification
- L5.4: Continuous production of nanomaterials

A6. SINGULAR EXPERIMENTAL TECHNOLOGIES (TES)

- L6.1: Nanofabrication and Advanced Microscopy
- L6.2: Analysis of materials in singular international scientific and technical infrastructures
- L6.3: Micro- and nano-sensors "on-chip
- L6.4: New technologies for the purification and liquefaction of Helium
- L6.5: Chemical microsensors and contactors based on nanostructured materials

Oriented Research Areas

A1. MATERIALS FOR ENERGY AND ENVIRONMENT (MEM)

- L1.1: Nanoporous materials and membranes for molecular separations
- L1.2: Fuel cells and batteries
- L1.3: Magnetocaloric materials and magnetic cooling
- L1.4: State-of-the-art solar cells processed in solution
- L1.5: Catalytic materials that can be activated by electromagnetic radiation for intensification processes
- L1.6: Carbon nanomaterials and catalysts for energy and environment

A2. MATERIALS FOR BIOMEDICINE (BIO)

- L2.1: Nanodiagnostic tools for health and nutrition
- L2.2: Advanced therapies based on nanoconjugates: hyperthermia and delivery of bioactive molecules
- L2.3: Antimicrobial materials and in vivo models of bacterial infection
- L2.4: Nanocatalysis for biomedical and biotechnological applications
- L2.5: Tissue regeneration and tissue engineering
- L2.6: Nanotoxicology and Nanosafety

A3. MATERIALS FOR INFORMATION TECHNOLOGIES (MTI)

- L3.1: Magnetic materials for spintronics and energy-saving electronics
- L3.2: Organic and molecular electronics
- L3.3: Nanosystems and nanodevices for electronics and spintronics
- L3.4: Hybrid quantum technologies

A4. NEW PHENOMENA AT THE NANOSCALE (NFN)

- L4.1: Physics of nanosystems
- L4.2: Nanostructure, magnetism and hyperthermia of magnetic nanoparticles
- L4.3: Atomic and molecular scale physics and surface engineering
- L4.4: Nanophotonics

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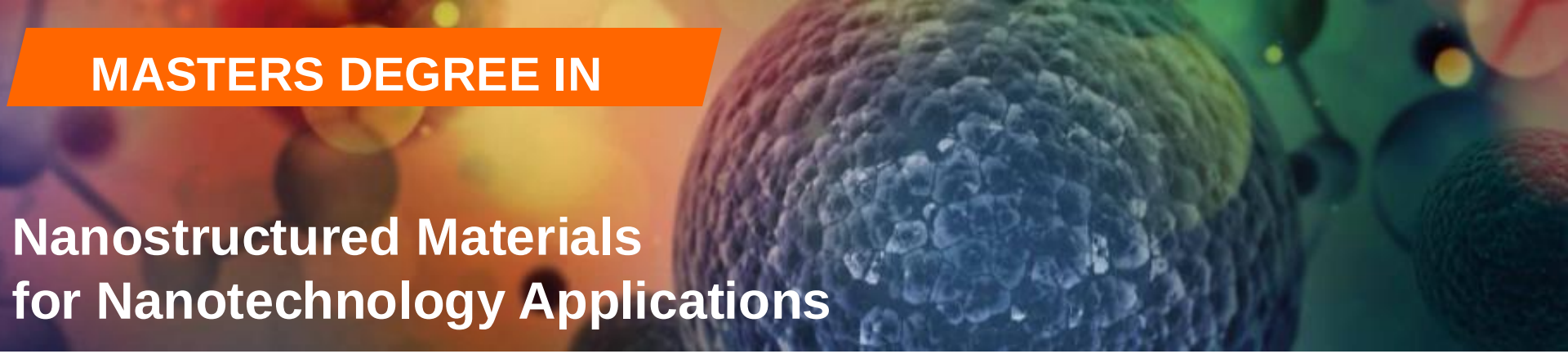

MASTERS DEGREE IN

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Nanomat Grants & related

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https://inma.unizar-csic.es/formacion/becas-y-ayudas/

Programa PI2

Realización de prácticas universitarias dirigidas a estudiantes con talento para su iniciación a la investigación en el INMA. La financiación del programa PI2 por parte del INMA se circunscribirse a la realización de TFMs en el marco de las prácticas extracurriculares en actividades de investigación PEX.

Ver más

Becas de colaboración

Estas becas de colaboración ofrecidas por el Ministerio de Educación y Formación Profesionales y dirigidas a alumnos de Grado y Máster tienen como objetivo la iniciación en la carrera científica realizando tareas de investigación en departamentos universitarios

Ver más

Becas de la Cátedra SAMCA

Becas para estudiantes del Máster Master Degree in Nanostructured Materials for Nanotechnology Applications - NANOMAT.

Ver más

Ayudas JAE Intro ICU

Becas de introducción a la investigación ofrecidas por el INMA para estudiantes de Grado y Máster con el objetivo de iniciarse en la carrera científica, dando aconocer en el ámbito universitario las posibilidades profesionales que ofrecen los Institutos del CSIC en las diferentes áreas científicas.

Ver más

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