



POLITÉCNICA

UNIVERSIDAD  
POLITÉCNICA  
DE MADRID

UNIVERSIDAD POLITÉCNICA DE MADRID  
**MASTER'S DEGREE IN  
MATERIALS  
ENGINEERING**



**ETSIT**  
UPM



  
**INDUSTRIALES**  
ETSII | UPM





## General information

**Orientation:** scientific - research

**Credits:** 90 ECTS credits

**Duration:** 1.5 academic years (3 semesters)

**Mode:** classroom learning

**Language:** English

**Start date:** September 2023

**Contact:** [coordinación.ing-materiales.caminos@upm.es](mailto:coordinación.ing-materiales.caminos@upm.es)



## Objective

The main objective of the Master's Degree in Materials Engineering is to provide students **advanced knowledge in materials science and engineering**. It seeks to train specialist engineers with **highly technical and scientific preparation in an intrinsically multidisciplinary field** and with a high capacity for adaptation, both in research, development and innovation and in professional activity.

Learn cutting-edge experimental and theoretical skills in materials fabrication, simulation, characterization, manipulation, processing, control and recycling **in collaboration with main research centers in Madrid:**



<http://materiales.imdea.org>



<http://blogs.upm.es/cime/>



<http://www.isom.upm.es>



<http://cemdatic.upm.es>



<http://ies.upm.es>



<http://www.denim.upm.es>



## Career prospects

After obtaining the master's degree, the graduates will:

- Be qualified to lead the innovation and development processes in advanced structural and functional materials in multiple applications with great social impact.
- Have all the knowledge, skills and competences necessary to carry out research work in leading research centers in materials science and engineering, as well as in laboratories or companies for the development, characterization, production and quality control of materials.
- Have the necessary qualification to carry out advisory or managerial functions in industries related to materials science and technology.
- Gain access to PhD programs at participating institutions, and foster their future careers in academia or industry.



## Target

Graduates with a minimum of 240 ECTS credits in the fields of science or engineering (Materials Engineering, Materials Science, Physics, Physical Engineering, Chemistry, Mechanical Engineering and Electrical Engineering, among others). Knowledge of English is required (B2 or equivalent).



## Registration

Fees:

1.750 € (nationals of EU member states)

13.900 € (nationals of non-EU member states)

Pre-enrollment period already opened: [Calendar](#)

Instructions: [Link](#)

Apply now: <https://www.upm.es/helios/>

Contact: [coordinación.ing-materiales.caminos@upm.es](mailto:coordinación.ing-materiales.caminos@upm.es)



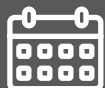


## Structure

The Master's Degree in Materials Engineering is structured in **three** semesters of 30 ECTS credits each.

The **first** semester provides advanced general training in materials science and engineering, while in the **second** the student chooses between two specialties: Structural Materials and Functional Materials. In the **third** semester the students carry out the master's thesis.

Type of subject	ECTS credits
Compulsory	30
Elective	30
Master Thesis	30
<b>Total</b>	<b>90</b>



## Syllabus

### First semester (fall)

- C1. Microstructural Characterization (6 ECTS credits)
- C2. Properties of Materials (4.5 ECTS credits)
- C3. Advanced Manufacturing of Structural Materials (3 ECTS credits)
- C4. Advanced Manufacturing of Functional Materials (3 ECTS credits)
- C5. Modelling and Simulation in Materials Engineering (6 ECTS credits)
- C6. Materials for Energy (3 ECTS credits)
- C7. Biological Materials (4.5 ECTS credits)
- E2. Physics and Chemistry of Materials (3 ECTS credits, pre-requisit module)
- E3. Mechanics of Materials (3 ECTS credits, pre-requisit module)

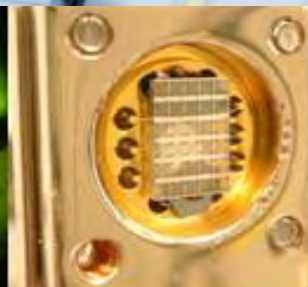
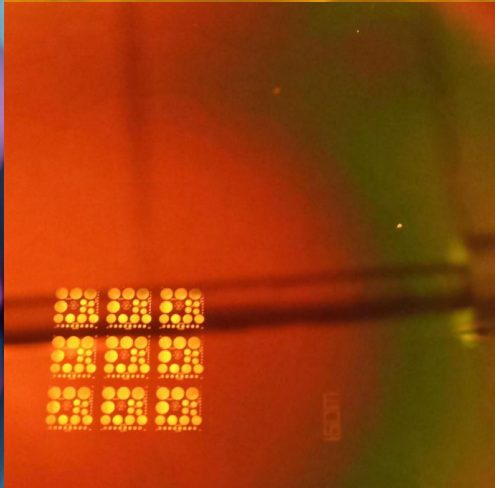
### Second semester (spring)

#### Structural Materials (3 ECTS credits each)

- SE1. Structural Design
- SE2. Impact Mechanics
- SE3. Structural Integrity
- SE4. Forensic Engineering
- SE5. Alloy Design and Advanced Physical Metallurgy
- SE6. Nanocomposites and Nanostructured Hybrid Materials
- SE7. Materials for Extreme Conditions
- SE8. Polymers
- SE9. Introduction to Research in Materials Science and Engineering – Structural Materials

#### Functional Materials (3 ECTS credits each)

- FE1. Electrochemistry for Energy-related Applications
- FE2. Photovoltaic Materials and Devices
- FE3. Materials for Photonic Devices
- FE4. Nanoelectronics
- FE5. Solid-state Lighting
- FE6. Metamaterials and Plasmonics
- FE7. Future Magnetic Materials
- FE8. Laboratory of Nanoelectronics
- FE9. Introduction to Research in Materials Science and Engineering – Functional Materials



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