

MAGIS Track

2019-2020

GENERAL PRESENTATION

Master's degree Materials Science and Engineering – Université Paris Sciences et Lettres

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The Master's program in Materials Science and Engineering (MSE) from Université PSL provides the experimental and theoretical background required to **design the materials** of the future and to **improve the performance** of existing materials and predict their lifespan. **Co-sponsored by Chimie ParisTech, MINES ParisTech and ESPCI Paris**, this program aims to build bridges between the processes of development, synthesis and layout, (micro) structures and structural and/or functional properties of various materials such as polymers, metal alloys, ceramics and biomaterials.

The first year of the Master's degree in Materials Science and Engineering is common to the three tracks offered for the second year:

- Track "Materials for the Future: Design and Engineering" – taught in French
- Track "Materials and Engineering Sciences in Paris" – fully taught in English or in French
- Track "Microfluidics" – taught in French

The Master's degree in Materials Science and Engineering is designed to train **high-level scientists** with an integrative view of materials and their functionalities all along their life cycle. The learn-by-doing approach is enhanced through more than 150 hours of experimental work during the two years of the master's program and at least 32 weeks of internship either in the academic field or in high-technology industries.

Who should apply?

Master 1

Bachelor of Science degree in Chemistry, Physics, Mechanics, Engineering (equivalent to 180 ECTS).

Master 2

Students who have:

- completed a M1 year in science,
- successfully completed their 2nd year of engineering school.

Students with a Bachelor of Science degree might be also accepted.

Opportunities

- PhD in one of the doctoral schools (DS) of PSL (DS Systems Engineering, Materials, Mechanics, Energetics; DS Physics and chemistry of materials, DS Physical and analytical chemistry), elsewhere in France or abroad;
- High-technology industries (transports, aircraft, biotechnologies, chemistry, optics...)
- PSL-ITI (Institute of Technology and Innovation) program: The purpose of this research-based program is to train a new generation of exceptionally high-level engineers, researchers, PhDs and entrepreneurs who are open to multidisciplinary study, innovation and entrepreneurship.
- Advanced Master's degree (for example: Design of Materials and structures from MINES ParisTech, etc)

CURRICULUM

Master 2: Track « Materials and Engineering Sciences in Paris » – MAGIS

The objectives of this program are to provide students with a deep understanding of materials science & engineering and solid mechanics fundamentals and to impart a better knowledge of recent developments in the field, for advanced industrial applications and innovative processes. This track provides an education in the mechanics of materials. It focuses on the relationships between processes, materials, microstructures, and mechanical properties for advanced industrial applications and innovative processes.

The track « MAGIS » is divided into core courses and the choice of one option to choose among 4:

- Option 1 (Op1) : Damage and fracture of materials and structure
- Option 2 (Op2) : Metal and alloy processing, advanced methods and innovative processes
- Option 3 (Op3) : Polymers and composites life-cycle
- Option 4 (Op4) : Innovative cutting processes and smart machining

This track is proposed in partnership with the University Paris Saclay and Arts & Métiers ParisTech.

Semester 3		ECTS	Op1	Op2	Op3	Op4
EQUALIZATION TEACHING UNITS (not mandatory, 0 ECTS)	30 h	0				
CORE COURSES	150 h	18				
<i>Materials Sciences</i>	30 h	3				
<i>Materials constitutive equations</i>	30 h	3				
<i>Numerical methods for continuum mechanics</i>	30 h	3				
<i>Méthodes expérimentales et identification de champs</i>	30 h	3				
<i>Advanced experimental methods</i>		3				
<i>Research project</i>		3				
OPTION (3 mandatory units + 1 unit to be choosen)	120 h	12				
<i>Fracture mechanics</i>	30 h	3	O			
<i>Mechanics of materials under impact loading</i>	30 h	3	O		X	
<i>Continuum damage mechanics</i>	30 h	3	O	X		X
<i>Heterogeneous media : large scale behaviours</i>	30 h	3	X	X	X	X
<i>Polymers processing</i>	30 h	3	X	X	O	X
<i>Algorithmic modelling of multiphysics processes</i>	30 h	3	X	X	X	X
<i>Solid metal processing</i>	30 h	3	X	O	X	O
<i>Fatigue of materials : mechanisms and modelling</i>	30 h	3	X	X	X	X
<i>Fluid metal processing</i>	30 h	3		O		18
<i>Metal processing, modelling and numerical processing</i>	40 h	3		O		
<i>Durability of polymers</i>	30 h	3			O	
<i>Behavior of polymers</i>	30 h	3			O	
<i>Thermomechanical aspects and simulation</i>	30 h	3				O
<i>Dynamics and experimentation</i>	30 h	3				O
Total du S3	300 h	30				
Semester 4	Internship (minimum 5 months) 30 ECTS *	30				
Total du M2	300 h	60				

O : mandatory teaching unit for the given option

X : optional teaching unit for the given option

PRACTICAL INFORMATION

Institution for registration

Chimie ParisTech
11 rue Pierre et Marie Curie
75005 PARIS
www.chimie-paristech.fr

Teaching institutions

Most of the courses are held in three partner institutions of the master's program! Chimie ParisTech, MINES ParisTech, ESPCI Paris.

MINES ParisTech
60 boulevard Saint-Michel
75006 Paris
www.mines-paristech.fr

ESPCI Paris
10 rue Vauquelin
75005 PARIS
www.espci.fr

All these institutions are located in the center of Paris.



For the MAGIS track, some teachings will take place at Arts & Métiers ParisTech - Boulevard de l'Hôpital (Paris 13^e arrondissement) and at the University Paris Saclay (1 day / week).

Contacts

Master's degree in Materials Science and Engineering:

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<https://www.psl.eu/formation/master-sciences-et-genie-des-materiaux>

MADI Track: Domitille Giaume, Cécilie Duhamel, Corinne Soulié, Cécile Monteux

MAGIS Track: Thilo Morgeneyer

Microfluidics Track: Jacques Fattaccioli

<https://microfluidics-master.fr/>

PSL Welcome desk: welcomedesk@psl.eu / 01 75 00 02 91

The Welcome Desk helps international students for administrative procedures and boosts up their everyday life.

A bilingual team organizes different activities throughout the year. Touristic joggings, cultural visits...there is events for everyone! At these events international students meet other students, both international and Parisians who are part of the PSL network, improve their skills in French and discover the different parts of Paris.

For more information, Facebook page: Welcome to Paris and to PSL!