

# Master of Science Cyber-physical systems engineering CPSE

*CYBER-PHYSICAL SYSTEMS ENGINEERING  
A WELL-BALANCED THEORY/PRACTICE  
INDUSTRY 4.0 TRAINING PROGRAM*

*Campus of Aix-en-Provence*



## INTRODUCTION

This program aims at training future engineers and researchers to evolve in complex multi-disciplinary industrial environments embedding Cyber-Physical Systems as well as other mainstream Industry 4.0 concepts, technologies and processes :

- To explore the concepts, methods, models and tools used to design, simulate, manufacture and control Cyber-Physical Systems (CPS) in the scope of Industry 4.0
- To train future engineers and researchers to evolve in complex multi-disciplinary industrial environments embedding CPS as well as other mainstream Industry 4.0 technologies and processes

## PUBLICS

- Salaries
- Students
- Graduated engineers

## CAREERS

- PhD in a field related to Industry 4.0 and CPS, in academia or in industry (CIFRE), to become a recognized expert in an area of the Industry 4.0.
- R&D in large companies or startups, in numerous sectors (manufacturing, construction, services, consultancy, etc.) and fields (automotive, aerospace, health, IoT, etc.).

## PREREQUISITES

- First year of Master of Science degree or an equivalent foreign diploma
- For Arts et Métiers students : through the 2A and 2B selection processes

## PARTNERS

- **Academic partners:**  
Laboratory MAP Marseille (France), IMATI-CNR of Genova (Italy), ETS Montréal, Quebec (Canada), Laboratory LURPA, ENS Cachan (France)
- **Industrial partners:**  
Polyshape, SAFRAN, PSA, Cap Gemini, Airbus, Cetim

## KEY STRENGTHS

- Deep theoretical knowledge on the mainstream concepts, methods, models and tools involved in CPS engineering and Industry 4.0 technologies and processes
- Extended practical skills for the definition of multi-disciplinary technical solutions for CPS engineering
- Deep understanding of the overall value chain, the strategic and supply chain management
- Structured research methodology to address a wide range of Industry 4.0 related research challenges
- Transversal skills gained when confronting to both academic and industrial multi-disciplinary projects
- International exposure through the courses taught in English and exchange with foreign students

## PROCEDURE

Applications end mid-June  
The admission process includes an oral presentation to evaluate the motivations and level of English

## COST OF MSc

Tuition fee for EU/EEA and non-EU/EEA citizens : around 243€/academic year and it has to be paid the registration day, at the latest. There is no application fee

## PROGRAM

Full-time training in two main sessions :

Teaching language : English

ECTS credits: 30 credits/session (60 ECTS for the M2)

Learning outcomes are reached through a well-balanced training program that combines theoretical and practical learning sequences, during which students are placed in both academic and real-life industrial configurations, in order to develop multiple transversal skills.

■ From September to January (courses) : 4 professionalizing and 6 scientific modules, a language module (24h), a long multi-disciplinary project (128h). This project aims at further investigating the notions introduced in the various modules, and further interacting with state-of-the-art methods, models and tools through real-life industrial projects.

■ From February to September : master thesis in academia or industry, in France or abroad.

The 4 professionalizing modules are as follows (48h) :

- Research methodology (12h)
- Artificial Intelligence and data analytics (12h)
- Industry 4.0: concepts, survey and future trends (12h)
- Digital factory and supply chain management (12h)

The 6 scientific modules are as follows (144h) :

- Digital Mock-Up for CPS modeling and advanced engineering (24h)
- Reverse engineering and digital prototyping of CPS (24h)
- Continuity for CPS engineering in a heterogeneous context (24h)
- Supervision of CPS during the engineering and exploitation phases (24h)
- Advanced robotics (24h)
- Mechatronics, advanced control, identification and fault-detection for CPS (24h)

## CONTACT

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**For more information:**

[www.artsetmetiers.fr/fr/formation/master-admissions](http://www.artsetmetiers.fr/fr/formation/master-admissions)

**foreign students:**

[admissions@ensam.eu](mailto:admissions@ensam.eu)