CPS2
International
Master track

Cyber-Physical and Social Systems

"Contribute to the research and development of innovative and technical cyber-physical systems!"

ci.mines-stetienne.fr/cps2

www.mines-stetienne.fr

INSPIRING
INNOVATION
SINCE 1816

Mines Saint-Étienne

3 campuses
- Saint-Étienne
- Provence
- Lyon

2 500 students

1st French institution
on the fight against climate change

6 Engineering degrees

13 Masters of Science (MSc.)

5 Specialised Master

5 Research and Academic Centres

1 Science popularisation center, La Rotonde

Our assets

- Training high-level experts to meet the challenges of digital, ecological, energy and industrial transitions

- Scientific and entrepreneurial excellence for the transfer of technologies to companies

- Regional, national and international outreach for innovation of territories and industries

- Promotion of diversity and equal opportunity

- Development and management of a large network of partners: universities, companies, competitive clusters, standards organisations, etc.

- Personalized support: we build your path together

International CPS2 track
of the master in Computer Science

The Master in Computer Science, track Cyber-Physical and Social Systems: Artificial Intelligence and Internet of Things (CPS2: AI and IoT) is an international track of the master in Computer Science of University of Lyon, jointly operated by University Jean Monnet of Saint-Étienne and Mines Saint-Étienne - Institut Mines Télécom.

The aim of this program is to provide students with a triple expertise on technologies and methods to design and integrate intelligent cyber-physical systems, interfacing the physical, social and digital dimensions of our environments:

- Technological, by controlling the design and implementation of information systems and applications that integrate physical (communication, perception, action, etc.) and social (privacy, trust, community, etc.) characteristics.

- Functional, by understanding the issues and challenges of digital systems to the combination of different dimensions of the new complex environments.

- Scientific, by the mastery of models necessary for the formalization of all interactions between the dimensions of a cyber-physical system.

Topics taught in CPS2 are related to the Internet of Things, Web and mobile applications, Artificial Intelligence, Cloud and Edge Infrastructures, Digital Twins, Cyber-security, Scientific Writing. Application domains include Industry 4.0, Smart Cities, Smart Buildings, Intelligent Transport Systems.

Target students and target careers

Applicants with at least a Bachelor degree level (180 ECTS) or M1 degree level (240 ECTS) in computer science or equivalent are invited to apply. A good command of English is mandatory.

International students' applications are very welcome and the selection committee will assess the equivalence for admission to the Master CPS2.

The CPS2 program opens opportunities of careers in the research and development of innovative and technical cyber-physical systems: research and development scientists, managers of IT field, cyber-physical system architects, supporting engineers in design and development of cyber-physical systems, experts in socio-technical systems, experts or functional consultant, project manager in applications such as health, transport, energy and environment.

Syllabus

Courses are taught in English and are structured according to the European Credit Transfer System with 120 credits over four semesters of full-time studies.

M1 Curriculum	ECTS
Semester 1 — From September to January	**30**
Overview of research, development and innovation activities	4
Data interoperability and semantics	2
CPS2 engineering and development	6
Mobile programming	2
Web programming	5
Programming connected devices	5
Foreign language	3
Machine learning	3
Semester 2 — From January to June	**30**
Integrative development of a CPS2	4
Introduction to artificial intelligence	4
Multi-agent programming	3
From statistics to data mining	5
Internet of things and the web of things	2
Internship	12

For more details, flash this code

M2 Curriculum	ECTS
Semester 2 — From September to January	**30**
Research and Development Project	5
Scientific writing	4
Professional insertion	2
Digital Twins	4
Multi Agent Coordination	5
Semantic Web	5
Cloud and Edge Infrastructures	3
Cybersecurity	2
Semester 2 — Master thesis - Internship from early February to late July	**30**

Applications

Deadline

- **March/April** for non-EU applicants, applying through Campus France
- **31ˢᵗ May** for EU applicants

Final notification for all

- **July**

Tuition fees

The French government subsidizes higher education. Tuition fees are relatively low for students, and are defined by Campus France.

Feedback from alumni

Poulomi Nandy, Software Engineer at Easy Global Market

The CPS2 program is a life changer. It has all the courses required to become a good software engineer, and some courses are focused on research. The marking system is awesome with a mix of written exams and practical/project work. The professors are highly skilled researchers. It was a very intense course, and overall I enjoyed learning a lot. This master program is the sole and whole reason where I am today in my career. It took me only 1 month to search and find a job after I finished my degree.

Jehad Melad, Preparing Auto-Entrepreneur

Generally, the course was full of knowledge and I learned a lot of things that I would not learn without enrolling in this program. Most of my skills and my knowledge which I am proud of were gained during this journey. I am satisfied with my achievements during the CPS2 program.

Rediet Gebretsion Tadesse, Frontend developer at Telefonica

I learned a lot from the program, starting from data formats to how to work together with developers with version control. I was introduced and worked with trending new technologies in Software Engineering. It was worth to spend my two years studing this rich set of courses. After graduation it didn't take me time to find a job I like. In addition to what I was prepared for specific interviews, I had proficient knowledge which I gained from the CPS2 Master program.

Alaa Daoud, Post-Doctoral researcher at MINES Saint-Étienne

I joined CPS2 as a second year student. During the academic year 2017-2018 I was able to refine my knowledge in computer science in general, and especially in the domains of Multi-Agent Systems, Semantic Web, and Internet of Things. Following this master, I succeeded to define and to move towards acheiving my career goals as a Researcher.

Feedback from companies and PhD advisors

" *One of the aims of EDF R&D is to prepare for the energy scenarios of the future by working on disruptive technologies. By proposing a cursus on AI and IoT technologies, MSc CPS2 is a perfect partner that prepares future research engineers to meet our business needs and find solutions to major research challenges in the energy domain.* "

Bruno Traverson, Research Engineer, EDF R&D

" *The Master CPS track in Artificial Intelligence and Internet of Things provides courses related to state-of-the-art CPS technologies, as well as fundamental scientific approaches that are useful to build novel CPS systems. My research group at Télécom SudParis / IP Paris, conducts research related to building the next generation of IoT systems. CPS2 students are highly qualified having the proper expertise to join my team and provide worthwhile research contributions.* "

Georgios Bouloukakis, Associate Professor Télécom SudParis / IP Paris

UNIVERSITÉ DE LYON

MINES Saint-Étienne
Une école de l'IMT

UNIVERSITÉ JEAN MONNET SAINT-ÉTIENNE

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www.mines-stetienne.fr

MINISTÈRE
DE L'ÉCONOMIE,
DES FINANCES
ET DE LA SOUVERAINETÉ
INDUSTRIELLE ET NUMÉRIQUE
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