





M2 Industry 4.0

Master Computer science









Component
Collège
Sciences et
Technologies
pour l'Energie et
l'Environnement
(STEE)



Language(s) English

Presentation

Apply here from October to March

The aim of this master's is to train Computer Sciences and Information Technologies experts in order to be able to address the new challenges of the current and future generations of digital societies. Current trends in digital technologies represented by the Internet of things, cyberphysical systems, social networks, cloud computing, big data and cognitive computing, mobile robotics, digital twin, and additive manufacturing have provided the basis for a new industrial revolution named Industry 4.0.

Our Industry 4.0 Computer Sciences Master's degree offers a 1 year, full-time postgraduate program, aimed at providing solid scientific and technological foundations in order to innovate, design, and develop future digital organizations based on the new Smart Anything Everywhere (SAE) paradigm. It is suited for students planning both an academic or an industrial career and provides the theoretical basis and the practical expertise required to pursue research or R&D organizations.

The master's is fully taught in English providing a main core curriculum and two options named IT Digital Transformation and Digital Manufacturing.

This master's is hosted by the College of Sciences and Technologies for Energy and Environment (STEE) of the Université de Pau et des Pays de l'Adour (UPPA) in Anglet (France) as well as by The National Engineering School of Tarbes (ENIT) of the National Polytechnic Institute of Toulouse, in Tarbes (France).

This master is supported by the prestigious French Initiative of Excellence label I-SITE (Initiatives Sciences, Innovation, Territories, and Economy) obtained by the E2S-UPPA project and profits from the territorial synergy of the Aerospace industry located in the southwest valley of France.

The program is carried out in close collaboration with the Computer Sciences Laboratory of the UPPA (LIUPPA research laboratory) and with the Production Engineering Laboratory of the ENIT (LGP research laboratory) as well as several R&D organizations, where scientific and experimental practicals will be performed.

Students will also benefit from the global research environment and administrative support of the University Pau & Pays Adour, the ENIT, and the E2S I-site program.







Objectives

- * Prepare students at an advanced specialized level to meet present and future scientific and technological challenges in digital industries and enterprises.
- * Develop research skills to engage in quality and successful research,
- * Prepare students for leading positions in private and public organizations in research and development departments.

Your university

Pau

Tarbes

Skills

At the end of this program, the students in the « Industry 4.0 Computer Science Master" will be able to:

- * Identify and analyze the functional and nonfunctional requirements of digital organizations (industries and enterprises).
- * Design and model multi-dimensional architectures resulting from the integration and coordination of Internet of Everything entities (IoT, Data, People, Services, Cloud Computing infrastructures, robots, 3D printers, etc.) aimed at satisfying the requirements of digital organizations.
- * Develop and implement a proof of concept system integrating the various Internet of Everything dimensions.
- * Design and conduct experiments in order to test and evaluate Industry 4.0 systems.
- * Review, analyze, and interpret the body of scientific literature, contemporary issues, and innovations in computer sciences and information technologies disciplines.

* Carry out a research project aimed at developing a state-of-the-art as well as identifying and solving scientific and technological challenges within the context of Industry 4.0.

Additional information

Program intensity: Full-time

Duration: 1 year

Languages: Fully taught in English

Delivery mode:

- * On Campus at STEE College and LIUPPA Laboratory (Anglet) for the IT Digital Transformation option.
- * On Campus at ENIT and LGP Laboratory (**Tarbes**) for the Digital Manufacturing

This program is open to work-study and lifelong learners.

Scholarships

- * EIFFEL Scholarship of Excellence
- Catalogue des Bourses Campus France

The International Master Programs Admission Office

master.programs@univ-pau.fr

Organisation

Organization





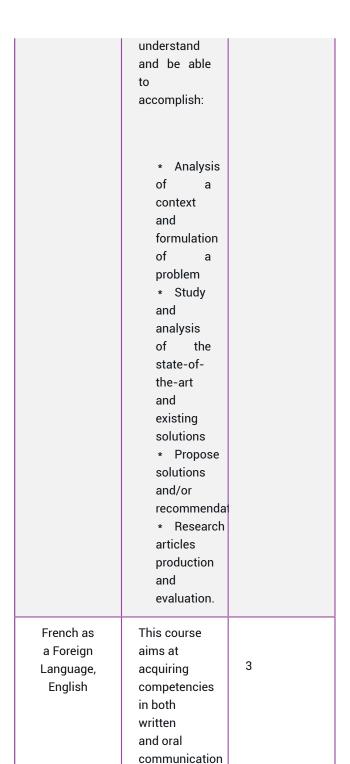


Master 2 Computer Sciences: Industry 4.0				
Academic Semester 1				
	Core Curriculum			
Course Title	Course Description	ECTS*		
Industry 4.0 cyber- physical Systems Engineering & Innovation	This course is designed to allow learners to acquire theoretical and practical competencies to understand and to carry on requirements analysis and design of systems, integrating referential models of system engineering and methodologies well adapted for Cyber-Physical Systems of Industry 4.0. The course will follow a project-based oriented teaching methodology.	4		

Business Intelligence and Business Analytics	This course aims at providing students with the foundations and developing competencies in designing data flow paths allowing the construction of multi-dimensional data warehouses as well as the implementation of machine learning techniques in order to implement diagnosis, prediction, and prescription models for smart systems.	4
Research Initiation	This course is designed to provide students with theoretical and practical skills to carry out a research project and in particular to	3







in French or English.

IT Digital Transformation option (UPPA ANGLET Campus)					
Service and Micro-Service Oriented Architectures	This course aims at providing students with the concepts and approaches for understanding and designing distributed systems allowing them in particular understand and to apply service-oriented and microservices-oriented methods for designing and developing heterogeneous systems and systems of systems. Integration and interoperability solutions will be studied and applied.	4			
Cloud Computing Services and	The aim of this course is to provide	2			







Technologies I	students with the knowledge and competences in order to design and develop scalable, secure, and cost-efficient infrastructures, platforms, and software as a service for digital organisations. This course is about virtualization and Dock containers.	
Cloud Computing Services and Technologies II	The aim of this course is to provide students with the knowledge and competencies in order to design and develop scalable, secure, and cost-efficient infrastructures, platforms, and software as a service for digital organizations. This course is about	2

	designing at the infrastructure, middleware, and software levels.	
Internet of Things	* The aim of this course is to provide students with the knowledge and competencies in order to design and develop Smart IoT systems based on the integration and orchestration of sensors and effectors objects of cyber- physical systems such as: * Explain how businesses can extract information and insights	







	from IoT				information	
	Data. * Understar				systems.	
	the steps	the steps	Digital Manufacturing option (ENIT Tarbes Campus)			
	of the Data			Advanced	At the end of	4
	Analysis			Robotics	this course,	
	Lifecycle				the student	
	and				should	
	perform				be able to	
	these				analyze	
	tasks.				a given	
	* Explain				application	
	the				in order to	
	different				establish	
	types				a robotic/	
	of data				cobotic	
	analytics:				solution to	
	descriptive,				automatize	
	predictive,				it by	
	and				considering	
	prescriptive.				different	
					aspects and	
Semantic	This course	4			constraints.	
Web,	aims to				From this	
Advanced	provide				training, the	
Databases,	students with				student will	
and Open	basic skills				be also able	
Linked Data	for designing				to explain	
	and				robotics	
	developing				tools	
	structured				(models,	
	and				trajectory	
	unstructured				generator,	
	advanced				and control	
	databases to				law), use	
	cope with the				them, and	
	heterogeneous				justify their	
	data plane				choices in	
	dimensions				a specific	
	required by				context.	
	the					
	generations				Some	
	of				specific	
÷		'	•		aspects	







	related to robotics in interaction and collaboration with humans will be addressed as well.			in-depth 3D metal printing (technical limitations, detailed costs, defects causes/	
Advanced virtual environments	Advanced The aim of 4 virtual this course		solutions), to explore the topological design methods and the process simulation/ monitoring, with professors and 3 industrial partners, and ending with an application project.		
	advances of Virtual Reality in the framework of industry 4.0, and digital twins.		Advanced Distributed and Embedded Systems	The aim of this course is to present and manipulate processors (e.g. FPGA,	4
Advanced Additive Manufacturing	The aim is to provide technical bases on 3D printing, current and futures technologies, to analyze	4		micro- controller, Arduino, ESP) in charge of treating information coming from sensors (including	





	lighting systems, signals, and images) using a wireless interface (e.g. BLE, WIFI) as well as enabling the control of distributed intelligent systems through actuators or effectors.	
ACADEM	IC SEMESTER 2 INT	ERNSHIP
Research Internship	This internship is intended to allow students to apply a scientific approach	30

and project

management methodologies

academic or industrial

Examples of application

domains:

research project.

Industry	
4.0, Smart	
Manufacturing,	
Autonomous	
Vehicles,	
Smart	
Building,	
Smart	
Enterprises	
including	
Business	
Intelligence	
and	
Business	
Analytics	
(Machine	
Learning)	

* ECTS: European Credit Transfer and Accumulation System

Trainings

Intership: Mandatory

Intership duration: 5-6 months

Abroad intership: Optional

Admission

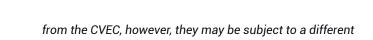
Admission requirements

Academic requirements

This second year of the Master's degree is open to students after completion of the first year of a Master's degree or Diploma equal to bac+4 from a European







university (minimum of 240 ECTS credits) in Engineering, Science, or Equivalent (Bachelor of Engineering, Bachelor of Science or Equivalent).

Admission requirements

Applicants must be fluent in English, both in writing and speaking. An applicant whose native language is not English has to take a recognized international English test.

English Language Requirements

Minimum required score: CECRL B2 | __ level in English

Tuition Fees and partial exemptions

Administrative tuition in France is determined at a national level. The French Ministerial Order of April 19, 2019, amended on June 9, 2020, sets university tuition for a Master's Program as follows: European nationals: €243, extra-European nationals: €3770.

For the academic year 2022-2023, the Board of Directors has extended its policy of automatically providing a partial reduction of these fees at the UPPA. As a result, extra-European nationals will be granted automatic partial reductions such that they will be able to pay the same enrollment fees as European nationals.

Extra fees:

In addition to academic tuition, most students must pay a student body fee (CVEC, which cost €92 in 2020-2021).

NB: Admitted candidates in any course of study who have taken a break of more than two years from their studies will enroll via the UPPA's Continuing Education service (Formation Continue / FORCO). They are exempt

Student capacity

20

tuition scale.

And after

Further studies

Sectors

* Computer Science, Information Technologies, Systems Engineering, Digital Mentor, Collaborative Robots Expert, IT/OT Integration Manager, Industrial Big Data Scientist, Lean 4.0 Engineer

Fields

* Industry, Research, and R&D structures

Positions

* Ph.D. student and R&D Engineer

Useful info

Contacts

Administration contact

M2 Industry 4.0

masteri40@univ-pau.fr

Head of Teaching

Ernesto Exposito Garcia

ernesto.exposito-garcia@univ-pau.fr







Partner schools

ENIT

LIUPPA

Place

- Anglet
- Tarbes

Campus

- Anglet
- **A** Tarbes







Program

Industry 4.0 Semester 9