

MASTERS- COMPUTER SCIENCE

IN BRIEF

Type of diploma : Master degree

Ministry field(s) : Science and Technology

PRESENTATION

MORE INFO

The computer science programmes offer a scientific and technical training to teach future computer scientists in the rapidly evolving field of information communications technology.

Our education programmes are directed towards both research and professional areas with a view to training computer scientists that meet the job market needs and requirements.

The programmes are taught on two distinct campuses:

- * Master course "**Internet Technologies**" delivered in Pau
- * Master course "**Big data**" delivered in Pau.
- * Master course "**Computer systems for Industrial logistics and services engineering**" delivered in Anglet - Basque Coast,
- * Master 2 course "**Industry 4.0**" delivered in Anglet - Basque Coast.

ORGANIZATION

- M2 Industry 4.0

ORGANIZATIONAL UNIT

Collège Sciences et Technologies pour l'Énergie et l'Environnement (STEE)

PLACES

Pau, Anglet

PERSON IN CHARGE

M2 Industry 4.0

PRESENTATION

MORE INFO

Number of students : 20

Internship : (5-6 months)



APPLICATIONS
ARE
OPEN



APPLY
NOW

PARTNER LABORATORIES

LIUPPA



The aim of this master is to train Computer Sciences and Information Technologies experts in order to be able to address the new challenges of current and future generations of digital societies. Current trends on digital technologies represented by the Internet of things, cyber-physical 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** 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 in research or R&D organizations.

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

This master 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 profit from the territorial synergy of the Aerospace industry located in the south west 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 organisations, 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 specialised 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 organisations in research and development departments.

SKILLS

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

- * Identify and analyse the functional and non-functional requirements of digital organisations (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 organisations.
- * 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, analyse, and interpret the body of scientific literature, contemporary issues and innovations 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 the 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
- * Online program based on online training (tutored and self-paced sessions) and individual and collective virtual learning environments.
- * Region Aquitaine Scholarships for non-EU students
- * [EIFFEL Scholarship of Excellence](#)
- * [E2S Talents' Academy Scholarships for all students](#)
- * Specific Master's scholarship

TRAINING CONTENT

Master 2 Computer Sciences: Industry 4.0		
Academic Semester 1		
Core curriculum		
Course Title	Course Description	ECTS*
Industry 4.0 cyber-physical Systems Engineering	This course is designed to provide students with	4

	<p>theoretical and practical skills to understand and perform requirements analysis and systems design, including systems engineering referential models and methodologies for Industry 4.0 cyber-physical systems.</p> <p>This course also aims to provide an overview and raise awareness on topical issues in innovation management. It deals with issues such as: Entrepreneurship, management 4.0, PSS, Quality, Sustainability, Predictive maintenance, Lean 4.0, Security, confidentiality, QoS, ethics.</p>	
<p>Business Intelligence and Business Analytics</p>	<p>This course aims at providing students with the foundations and developing competences in designing data</p>	<p>4</p>

	<p>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.</p>	
Research Initiation	<p>This course aims at providing students with scientific methodologies and project management competences for developing a real industrial and/or research oriented project.</p>	3
French as a Foreign Language, English	<p>This course aims at acquiring competencies in both written and oral communication in French or English</p>	3
IT Digital Transformation option (UPPA ANGLET Campus)		

<p>Service and Micro-Service Oriented Architectures</p>	<p>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 micro-services-oriented approaches for designing and developing heterogeneous systems and system of systems. Integration and interoperability solutions will be studied and applied.</p>	<p>4</p>
<p>Cloud Computing Services and Technologies</p>	<p>The aim of this course is to provide students with the knowledge and competences in order to design and develop scalable, secure and cost-efficient infrastructures, platforms and software as a services for</p>	<p>4</p>

	digital organisations.	
Internet of Things	The aim of this course is to provide students with the knowledge and competences in order to design and develop of Smart IoT systems based on the integration and orchestration of sensors and effectors objects of cyber-physical systems.	4
Semantic Web, Advanced Databases and Open Linked Data	This course aims at providing students with basic skills for designing and developing structured and unstructured advance databases in order to cope with the heterogeneous data planes dimensions required by the generations of information systems.	4
Digital Manufacturing option (ENIT Tarbes Campus)		
Advanced Robotics	At the end of this course,	4

	<p>the student should be able to analyze a given application in order to establish a robotic/cobotic solution to automatize it by considering different aspects and constraints. From this training, the student will be also able to explain robotics tools (models, trajectory generator and control law), use them and justify their choices in a certain context.</p> <p>Some specific aspects related to robotics in interaction and collaboration with human will be addressed as well.</p>	
<p>Advanced virtual environments</p>	<p>The aim of this course is to present the basic concepts of Virtual Reality (such as hardware interfaces, software functionalities</p>	<p>4</p>

	<p>or development environments), as well as some recent scientific and applicative advances of Virtual Reality in the framework of industry 4.0, and digital twins.</p>	
<p>Advanced Additive manufacturing</p>	<p>The aim is to provide technical bases on 3D printing, current and futures technologies, to analyze in depth 3D metal printing (technical limitations, detailed costs, defects causes/ solutions), to explore the topological design methods and the process simulation/ monitoring, with professors and 3 industrial partners, and ending with an application project.</p>	<p>4</p>
<p>Advanced Industrial</p>	<p>The aim of this course</p>	<p>4</p>

<p>Distributed and Embedded Systems</p>	<p>is to present and manipulate processors (e.g. FPGA, micro-controller, Arduino, ESP) in charge of treating information coming from sensors (including lighting systems, signal and image) using a wireless interface (e.g. BLE, WIFI) as well as enabling the control of distributed intelligent systems through actuators or effectors.</p>	
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ACADEMIC SEMESTER 2 INTERNSHIP

<p>Research internship</p>	<p>This internship is intended to allow students applying a scientific approach and project management methodologies for an academic or industrial research project.</p>	<p style="text-align: center;">30</p>
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Examples of application domains :

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

ACCESS CONDITIONS

Academic requirements

This second year of the Master 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  level in English

INSCRIPTION MODALITIES



EXPENSES

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 Program as follows: European nationals: **€243**, extra-European nationals: **€3770**.

For academic year 2021-2022, the Board of Directors has extended its policy of automatically providing **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 from the CVEC, however they may be subject to a different tuition scale.*

FURTHER STUDY

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:

- * PhD student and R&D Engineer

ORGANIZATIONAL UNIT

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

PLACES

Anglet

PERSON IN CHARGE

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