MASTER'S DEGREE OF ENGINEERING

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MAJOR IN IOT & SMART CITIES

DEGREE: **National Diploma of Engineering** – internationally recognized as a **Master's Degree of Engineering.** For a complete description of this degree please refere to the relevant Campus France page:
https://ressources.campusfrance.org/esr/diplomes/en/titre_ingenieur_en.pdf

LENGTH: 2 years, including 3 semesters of coursework and 1 semester of internship (industry or laboratory)

PROGRAMME PRESENTATION

Today, IoT is the major driver of growth in the telecommunications market. Smart devices have become innovation enablers in all industrial fields (transportation, energy, surveillance, industrial logistics, agriculture, healthcare, consumer electronics).

These numerous options mean that companies developing products and services are making important strategic decisions combining their prediction of how markets will evolve and how they will meet this evolution through IoT. As a consequence, the demand of competences in this new and evolving landscape is increasing.

The Smart Cities and Urban IoT program graduates engineers with technical expertise in the IoT infrastructures (licensed and unlicensed connectivity), networking, cybersecurity and data science, as well as with a developed sense of the value chain of IoT and data, and of the opportunity and challenges that they represent.

Build the smart objects +

Collect and transmit the raw data +

Extract knowledge from the data

KEY FEATURES OF THE PROGRAMME

- ✓ Advanced digital communication
- ✓ Network and security
- ✓ Interconnection of devices
- ✓ Data Science
- ✓ Urban IoT
- ✓ Technical Project

PRE-REQUISITES

- A Bachelor degree or equivalent in related fields
- Proven knowledge in the following fields:
- Introduction to computer networks (TCP/IP networks)
- Coding (any language)
- Signal processing
- Introduction to digital communications (optional but strongly recommended)
- Linux Operating System

CAREER PERSPECTIVES

IoT strategy, deployment and management
- ✓ IoT project manager
- ✓ Data scientist
- ✓ IoT consultant

IoT infrastructure
- ✓ IoT developer
- ✓ Network & Telecoms architect

The explosion of connected objects has led to a growth in job offers in the sector, multiplied by 15 between 2014 and 2017. Our students from this major will have a broad spectrum of knowledge based on the global vision of an IoT network:
- Design, sensor identification
- Retrieval and processing of information
- Cloud and network security
- Transmission techniques and digital communications.

From cars connected to smart homes, smart cities offer a limitless range of applications to communicating objects, creativity will be at the heart of IoT engineers' professions

YEAR 1
FALL SEMESTER – OCTOBER TO JANUARY

COURSES FUNDAMENTAL KNOWLEDGE*	VOLUME COURSES + LAB 96H	ECTS CREDITS
JAVA Programming	24h	3
Database	24h	3
UNIX	24h	3
Telecommunication Networks	24h	3

*compulsory courses (12 ECTS)

COURSES SPECIFIC KNOWLEDGE**	VOLUME COURSES + LAB 96H	ECTS CREDITS
Introduction to IoT	24h	3
C programming	24h	3
Microsystems	24h	3
Signals and communications	24h	3
Introduction to Cybersecurity	24h	3

Web programming	24h	3
Software engineering	24h	3

** choose 4 courses (12 ECTS) from the 7 – Total: 96h

COURSES SOFT SKILLS AND MODERN LANGUAGES*	VOLUME 90H	ECTS CREDITS
Management of international projects	18h	2
Technical English	18h	2
French as Foreign language	54h	4

* 3 compulsory courses (8ECTS) – Total : 90h

SPRING SEMESTER – APRIL TO JULY

COURSES NETWORKS & SERVICES*	VOLUME COURSES + LAB 120H	ECTS CREDITS
Network & Service administration	32h	2
Switching & Routing IPv4 and IPv6	32h	2
Cloud Architecture	24h	2
Wireless Security	20h	2
Radio propagation	12h	2

*compulsory courses (10 ECTS) – Total : 120h

COURSES DATA ACQUISITION*	VOLUME COURSES + LAB 114H	ECTS CREDITS
Java for Android (Android Studio)	32h	2
Data collection (C, theory micro C, I/O practice)	28h	2
Overview of wireless Networks	20h	2
Machine learning	24h	2
OS Embedded	20h	2

*compulsory courses (10 ECTS) – Total : 114h

PROJECT*	VOLUME 60H	ECTS CREDITS
Practical engineering project	60h	5

*compulsory project (5 ECTS)

COURSES SOFT SKILLS AND MODERN LANGUAGES*	VOLUME 48H	ECTS CREDITS
TOEIC preparation	18h	2
French as Foreign language	30h	3

* compulsory courses (5ECTS) – Total : 48h

YEAR 2
FALL SEMESTER – OCTOBER TO JANUARY

COURSES *NETWORK AND INTERCONNECTION OF DEVICES* *	VOLUME COURSES + LAB 84H	ECTS CREDITS
Mobile network architecture 3GPP	36h	3
2G to IoT	18h	3
Radio and antennas for Embedded Systems	30h	3

*compulsory courses (9 ECTS) – Total 84h

COURSES *SECURITY* *	VOLUME COURSES + LAB 50H	ECTS CREDITS
Security basics & mini project	30h	3
Security IoT & TP	20h	3

*compulsory courses (6 ECTS) – Total 50h

COURSES *IOT LABS* *	VOLUME COURSES + LAB 56H	ECTS CREDITS
Wireless sensor net Lab & TP SmartMesh IP	32h	3
IA applied with Smart Cities – Part 1	24h	3

*compulsory courses (6 ECTS) – Total 56h

JANUARY TO APRIL

COURSES *NETWORK AND INTERCONNECTION OF DEVICES* *	VOLUME COURSES + LAB 88H	ECTS CREDITS
Cellular IoT : LTE-M & NB-IoT	12h	3
LPWAN Network & Services (LoRa + Sigfox)	12h	3
Vehicular & AD-HOC net	24h	3
5G – ICT Huawei Academy	40h	3

*compulsory courses (12 ECTS) – Total 88h

COURSES *IOT LABS* **	VOLUME COURSES + LAB 76H	ECTS CREDITS
Wireless sensor net Lab	20h	3
MangOH Lab	32h	3
IA applied with Smart Cities -Part 2 with project	24h	3

*compulsory courses (9 ECTS) – Total 76h

PROJECT*	VOLUME 120H	ECTS CREDITS
Practical final engineering project	120h	8

*compulsory project (8 ECTS)

COURSES *SOFT SKILLS AND MODERN LANGUAGES**	VOLUME 48H	ECTS CREDITS
Professional English for Job Seekers	18h	2
French as Foreign language	30h	3

* compulsory courses (5ECTS) – Total : 48h

SPRING SEMESTER – APRIL TO SEPTEMBER

INTERSHIP* INDUSTRY OR LAB INTERNSHIP	VOLUME 800H	ECTS CREDITS
Industry or Lab internship	800h	30

*compulsory intership (30 ECTS)