Advanced Electronic Systems Engineering

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How to apply ?

This programme aims to:

- **enable MSc graduates to become quickly operational in industry at engineer level in the field of electronics;**
- **train graduates to master advanced techniques in electronics. They will have acquired the necessary skills to model, develop and build analogical, numerical, RF or even microwave frequency electronic systems, complying with electromagnetic compatibility;**
- **provide the fundamentals of modern electronics in theory and in practice, relevant both to SME's and multinationals.**

2nd year of Master studies
Semester 3 (30 ECTS)
Electromagnetic compatibility techniques: Definition of electromagnetic compatibility (EMC) with effects of electromagnetic interference (EMI); Radiation emitted by a guilty device and received by a victim device (Device under test); Conductive coupling between the source and the receptor; Different factors causing EMI damages (including electrostatic discharges, lightning electromagnetic pulses, nuclear electromagnetic pulses, power line surges, …); Laws, regulators, EMC directives…; EMC design, grounding and shielding; Noisy circuits to be separated from the rest of the device; Decoupling or filtering, technology rules to reduce EMI in practical situations (integrated circuits, hybrid circuits, …). *Sensors*: Sensors: models of sensors and actuators; Physical signals: digital pre-processing, identification, data fusion. *Radio-frequency electronics*: Design technique radiofrequency and microwave; Waves Kurokawa; S parameter; Stability of assets quadrupole parameters; Simultaneous adaptation; Noise and amplification; Specific circuits: couplers, splitters, phase shifters....; GaAs and SiGe technologies; Wireless RF systems: Wifi, Bluetooth, ZigBee...; RFID systems. *Programmable logic components*: Structure and use of programmable logic devices (FPGAs, specific processors); Estimation of material resources needed for the implementation of FPGA signal processing algorithms; Internal architecture; Examples of signal and image processing; Real-time digital filters: application to edged detection; Fast arithmetic operators; Implementation methodology: design, simulation, verification; Applications: real-time pattern recognition; Performance analysis; Partitioning and scheduling of tasks, methodology for dynamic reconfiguration. *System architecture*: Introduction to embedded systems and system on chip (SoC); Soft CPU: OPENRISC; On chip communication (Busses); The wishbone bus; Network on chip (NoC); Software/hardware codesign; Complex system modelling using UML2. *French as foreign language*: Levels - beginners to advanced; Language classes and workshops; Lectures on subjects of general cultural interest (compulsory for diploma courses); Cultural activities.
Semester 4 (30 ECTS)
Local culture: to question what is culture, the distinction between cultures, the shaping of collective identities, stereotypes; give cultural tips to facilitate the adaptation to the country of destination. *Project*: Literature review and existing solutions; Specifications drafted; Planning tasks; Design and implementation of an electronic system. *Training period*: minimum of 3 months, from mid-March until the end of June.