MICROSYSTÈMES AUTONOMES

AUTONOMOUS MICROSYSTEMS

Lecturers: **Ian O CONNOR, Pedro ROJO ROMEO**

| Lecturers : 16.0 | TC : 0.0 | PW : 8.0 | Autonomy : 0.0 | Study : 4.0 | Project : 0.0 | Language : FR

Objectives

Spectacular advances in the field of micro-nano-technologies have paved the way for the integration of extremely diverse functionalities in a volume of the order of mm3. Autonomous microsystems, based on this integration and at the heart of the emergence of sensor networks and the Internet of Things, do not require an external energy supply, are able to communicate wirelessly and integrate sensors/actuators as well as data processing circuits. Their applications are numerous: distributed sensor/actuator systems in automotive, civil engineering, health, production lines, etc.

Keywords : micronanoelectronic technologies, sensors/actuators, energy harvesting, low power design

Programme	Introduction to the principles of microelectronic technologies
	Description of specific integrated sensor/actuator technologies, applications
	Ambient energy harvesting
	Electronic signal conditioning
	Constraints linked to nanoscale integration (thermal, mechanical, noise, etc.)
	Practical work: Introduction to micro-nanotechnologies in a clean room
	Practical work: Design of a low-noise, low-power, low-voltage CMOS amplification block
	Study class: study of an autonomous microsystem

Learning outcomes	• Understand the issues and principles of autonomous microsystems
	• Know the manufacturing techniques and operating principles of integrated microsensors
	• Be able to analyze an integrated circuit handling sensor signal conditioning and acquisition
	• Know energy recovery techniques (mechanical, thermal, photovoltaic) at the integrated scale

Independent study	Objectifs : This activity is not concerned with framed autonomy activities outside personal work.
	Méhodes : This activity is not concerned with framed autonomy activities outside personal work.

Core texts	S. Senturia, *MICROSYSTEM DESIGN*, Springer, 2000
	N. Maluf *AN INTRODUCTION TO MICROELECTROMECHANICAL SYSTEMS ENGINEERING*, Artech, 2004

Assessment	2-hour written test without documents (50%)
	Practical work (lab work, study class) (50%)