

Optional course : code UE HAE931E

Acoustic sensors with associated systems, (5 ECTS)

Learning Outcomes:

- Acquire the theoretical bases to understand the operation of an automated instrumentation chain with applications in thermal and mechanical sensors. A technical project will be proposed for the practical part.

Description :

- Sensors basic characteristic
 - Characterization of physical sensors and their conditioning circuits => to understand various aspect of the sensor chain-conditioning circuit – measurement instruments
 - -review of the characteristics of sensors (linearity, sensitivity, resolution, precicion, etc..)
 - and readout electronic circuits (instrumentation amplifiers, charge amplifiers, etc..)
 - -environment sensors (temperature, humidity)
 - -strain sensors and their readout circuits
- Acoustic Sensors
 - Elasticity and piezoelectricity of materials
 - Static sensors and actuators: force, displacement, electrical voltage. Examples of applications
 - Vibrating Sensors. Resonance conditions;. Equivalent electrical diagrams;. Examples of applications
 - Signal processing in acoustics. The resonance. Time-frequency. Impedance adaptation;. Generation and detection electronics
 - Transducers and Imaging. Design and performance;. Ultrasound. Focus in far and near fields;. Acoustic imaging;
- Labs :
 - Hands-on exercices

