Degree competences to which the subject contributes

**Specific:**
1. Determination of the applicability to the food and bioprocesses sector of sensors and instrumentation techniques for measuring and data acquisition. Ability to detect the advantages and limitations of the diverse technologies and measurement equipments.
2. Ability to choice the measurement and acquisition data instrumentation in order to optimize the efficiency of the agri-food and biotechnological industries. Designing the implementation of the use and maintenance protocols of such systems.
3. Identification of the opportunities and knowledge of the scientific basis of nanotechnology application in the treatment of bioproducts. Identification of the benefits and risks of nanotechnology applied to food packaging and conservation.

**General:**
4. Ability to apply the language and techniques of industrial management in the agrifood and biotechnological sector
5. Identification of the industrial technologies with larger future impact and develop new applications of such technologies in the food and biotechnological industry.
6. Ability to indentify and use monitoring systems in quality control of food products.

**Transversal:**
7. Ability to assess and improve the design of processes and products considering social and environmental impacts.
8. SUSTAINABILITY AND SOCIAL COMMITMENT: Being aware of and understanding the complexity of the economic and social phenomena typical of a welfare society, and being able to relate social welfare to globalisation and sustainability and to use technique, technology, economics and sustainability in a balanced and compatible manner.
9. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.
390219 - ISM2 - Measuring Systems and Instruments

Teaching methodology

We indicate here the repertoire of teaching methods to be applied in the different training activities according to the teaching plans of the subject.

- Lecture or conference: presentation of knowledge by university professors or by external specialists.
- Participatory classes: collective solving exercises, conducted group discussions with the lecturer and other students in the classroom; classroom presentation of an activity individually or in small groups.
- Lab / Workshop: realization of designs, measurements, verifications, etc.; and presentation of results in oral or written form individually or in small groups.
- Theoretical and practical works: conducted classroom activity or exercise, individually or in small groups, with the advice of the lecturer.
- Project or short works: based on the realization, individually or in groups, of a work of reduced complexity or scope.
- Information search: Information search by students, it allows the acquisition of knowledge, skills and attitudes related to obtaining information.
- Simulation: Activity related to a case or problem, each student or each group is assigned a role under which they must intervene in the development of the situation.

Evaluation activities.

Learning objectives of the subject

This course is a second part after the sensing and acquisition of data in which the students gets detailed vision of different methods and techniques of measurement and their applications.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 125h</th>
<th>Hours large group:</th>
<th>40h</th>
<th>32.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Guided activities:</td>
<td>5h</td>
<td>4.00%</td>
</tr>
<tr>
<td></td>
<td>Self study:</td>
<td>80h</td>
<td>64.00%</td>
</tr>
</tbody>
</table>
# 390219 - ISM2 - Measuring Systems and Instruments

## Content

### Chapter 1

**Learning time:** 40h  
Theory classes: 40h

**Description:**  


The spatial correlation of data in continuous variables: modeling and interpolation.

Thermal analysis and calorimetry. Thermomechanical analysis (TMA), Determination of water absorption-desorption isotherms (DVS), thermogravimetric analysis (TGA), differential scanning microcalorimetry (DSC).

Applied nanotechnology. Effects of nanoparticles in food and bioproducts, detection and characterization. Application Examples. Efficient use of energy

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**Qualification system**

Ongoing assessment.

**Regulations for carrying out activities**

Presentiality. Continuous monitoring. Short tests.

**Bibliography**

**Basic:**


**Complementary:**


