Degree competences to which the subject contributes

**Specific:**
1. Developing of criteria for selection and integration of robots and automatization systems in the food sector.
2. Ability to determine the communication and processing technologies appropriate for the control, production and distribution of food and bioproducts.
3. Designing the implementation of monitoring, control and automatization for food and biotechnological industries. Ability to detect the points of the productive chain susceptible of automatization.

**General:**
4. Ability to apply the language and techniques of industrial management in the agrifood and biotechnological sector
5. Applying of commercialization systems and logistics to the agri-food and bioprocesses sector.
6. Identification of the industrial technologies with larger future impact and develop new applications of such technologies in the food and biotechnological industry.
7. Ability to identify and use monitoring systems in quality control of food products.
8. Ability to assess and improve the design of processes and products considering social and environmental impacts.

**Transversal:**
9. 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.
This course allows the student to get the tools and knowledge necessary to monitor, control and manage the different processes involved in a product transformation throughout the various stages, from receipt of the raw material to shipment.

Teaching methodology

Lecture: presentation of knowledge by university professors.
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.
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 allows the student to get the tools and knowledge necessary to monitor, control and manage the different processes involved in a product transformation throughout the various stages, from receipt of the raw material to shipment.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 125h</th>
<th>Hours large group:</th>
<th>40h</th>
<th>32.00%</th>
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<tbody>
<tr>
<td></td>
<td>Guided activities:</td>
<td>5h</td>
<td>4.00%</td>
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<tr>
<td></td>
<td>Self study:</td>
<td>80h</td>
<td>64.00%</td>
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### Content

**FIRST PART**

<table>
<thead>
<tr>
<th>Learning time: 40h 16m</th>
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<tbody>
<tr>
<td>Theory classes: 13h 30m</td>
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<tr>
<td>Guided activities: 1h</td>
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<tr>
<td>Self study: 25h 46m</td>
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</table>

**Description:**

**TOPIC 1:** Networks and services of Telecommunications. Internet. 3.5 hours


**TOPIC 2:** Local area networks. 3.5 hours


**TOPIC 3:** Industrial communications networks. 3 hours


**TOPIC 4:** Field Buses and Industrial Ethernet 4,5 hours

Field buses: CAN and Proﬁbus
Industrial Ethernet. Comparison of solutions based on response time. The concept of Industry 4.0. Presentation and discussion of advanced technologies based on Industrial Ethernet.

**Related activities:**

[CP1] [CP2]
SECOND PART

Learning time: 59h 43m
- Theory classes: 17h 30m
- Guided activities: 4h
- Self study: 38h 13m

Description:
TOPIC 5: Wireless networks. 9.5 hours
General characteristics. Pros and cons. Basic concepts and regulation.
Standardized technologies (2G-4G, Wi-Fi, Bluetooth, NFC, RFID, VLC, UWB and GPS), characteristics, features, products and uses.

TOPIC 6: Internet, Internet of Things and the Industrial Internet of Things. 12 hours
Internet. Evolution towards the Internet of Things (IoT). IoT architectures. IoT ecosystem. Particularities of the Industrial IoT (IIoT)
Wireless solutions for IoT. Evolution of existing standards (M2M, Wi-Fi and Bluetooth). Specific solutions for IoT (WSN, LPWANs) and IIoT (WirelessHART, ISA 100.11a and 6TiSCH).
Presentation and discussion of application scenarios, use cases and products and/or solutions.

Related activities:
[CP3] [CP4] [LAB0][LAB1]

THIRD PART

Learning time: 25h 01m
- Theory classes: 9h
- Self study: 16h 01m

Description:
TOPIC 7: Interactive Marketing
Objectives, importance of marketing. Evolution and technologies to be used.
The customer's feedback loyalty and long-term relationships.

TOPIC 8: Logistics and distribution of the chain. Case study on food and bioprocesses. 6 hours
Introduction to the food logistics distribution sub-chain. Basic modules that compose it.
Introduction to the logistics sub-chain of food production and processing. Basic modules that compose it.
Inter-phase between both logistic sub-chains. Sub-division criteria.
KET in the logistics chain:
- Logistic technology
- Movement and micro transport units: intra-logistics.
- Algorithms of calculation and optimization of routes.
- Algorithms for the management of entrances, silo and warehouse exits.
- Trace in the food logistics chain. Conditions of the trace in transport and storage.
- SW of joint management of internal transport systems.
- Warehouse management SW, specialized in the area of food.
- Logistics of the transport of live animals.
- Reverse logistics.
- Dry, refrigerated, frozen and live products. Logistical constraints.
# 390221 - CAG2 - Communication Systems and Production Management

<table>
<thead>
<tr>
<th>Qualification system</th>
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<tr>
<td>Ongoing assessment</td>
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<th>Regulations for carrying out activities</th>
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<td>Others resources:</td>
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<td>Specific bibliography will be offered for each topic.</td>
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