Course guide
390263 - PFARM_MA1 - Precision Farming

Last modified: 06/06/2023

Unit in charge:	Barcelona School of Agri-Food and Biosystems Engineering
Teaching unit:	**Degree:** MASTER'S DEGREE IN ENABLING TECHNOLOGIES FOR THE FOOD AND BIOPROCESSING INDUSTRY (Syllabus 2020). (Optional subject).

Academic year: 2023   **ECTS Credits:** 5.0   **Languages:** Spanish, English

LECTURER

Coordinating lecturer: Emilio Gil

Others: Javier Campos

PRIOR SKILLS

Scientific-technical degree training: graduates in degrees of a duration equal to or greater than 240 ETCS of engineering or science studies.

REQUIREMENTS

Face-to-face clasroom, participation in practices and in the topics raised in class

TEACHING METHODOLOGY

MD1 - Face to face sessions: Written (word, pdf, infographics, PowerPoints, case studies, best practices, etc.) about sensors and electronic systems. Media contents (videos, etc.)
MD2 - Study cases (they can be press articles, digital platforms links, etc. or study cases created by trainers) to be read by trainees and discussed with the trainer.
MD 3 - Complementary readings. To be read and comment by trainees on the Virtual Co-working, alternatively, the trainer can ask trainees to send him main conclusions.
MD 4 - E-homework: In this case, we could propose a case of a particular farm, with specific need, where sensors are used to measure one or more parameters and obtain field data.
MD 5 – Practical activities.

LEARNING OBJECTIVES OF THE SUBJECT

The main objective of this subject is to increase competences (attitudes, skills, knowledge) of MSc students about how to use ICT Tools for the proper implementation of PA, through an innovative training program. Additionally, this subject includes the next specific objectives:
• Aware and transfer knowledge related with the Precision Agriculture
• Showing specific and affordable ICT solutions for the application of Precision Agriculture to real farm situations
• Promoting the customized diagnosis of needs in terms of ICT solutions and evaluation of requirements and cost/benefit relation.
• Improving the communication and knowledge and experiences sharing between research entities and professionals.

PFARM_MA1 will promote work-based learning, including opportunities to apply knowledge in practical projects "real life" workplace situations.

PFARM_MA1 will apply concepts linked to work-based learning approach through the promotion of self-diagnosis of needs and applicability of solutions to the specific framework of the Small and Medium Farms.

PFARM_MA1 will be based on "experiential learning" and "learning by doing", through the use and/or direct contact with ICT Tools for supporting the implementation of Precision Agriculture, through different alternative ways, depending on the characteristics of the training group.

STUDY LOAD

Type	Hours	Percentage
Hours large group	35,0	28.00
Self study	90,0	72.00

Total learning time: 125 h

CONTENTS

Module 1

Description:
Introduction to Precision Agriculture. Current trends in Precision Farming. Technology available in the market (sensors, GPS, ICT tools, robots). Main hardware application. Main software applications. Future perspectives.

Full-or-part-time: 25h
Theory classes: 8h
Guided activities: 1h
Self study : 16h

Module 2

Description:
Sensors and electronics systems. Basis of electronics. Fundamentals of sensors. Remote sensors (RPAS, airplanes, satellites). Proximity sensor. Electronics mounted in the agricultural machinery. Technologies of variable dose (spraying, fertilization, tillage). Disease detection. Precision irrigation systems.

Full-or-part-time: 25h
Theory classes: 8h
Guided activities: 1h
Self study : 16h

Module 3

Description:
GNSS and geo-referencing. Introduction to GNSS. Basis of Global positioning systems (GPS). GPS in real-time applications and DGPS. Remote sensing and Geographic Information System (GIS). Weed management. Yield monitoring. Specific planting. Intelligent systems. Auto guidance tractors.

Full-or-part-time: 25h
Theory classes: 8h
Guided activities: 1h
Self study : 16h

Module 4

Description:
ICT devices. ICT introduction. Information Systems. Big Data. Data Management on the Farm. Cloud-based. Software applications.

Full-or-part-time: 25h
Theory classes: 8h
Guided activities: 1h
Self study : 16h

Module 5

Description:
Agricultural machinery automation. Fundamentals of robotics. Navigation systems. Artificial vision. Main projects of robotic technology in agriculture. UAV. Terrestrial robots. Autonomous Vehicles. Machine to machine communication. Machine learning.

Full-or-part-time: 25h
Theory classes: 8h
Guided activities: 1h
Self study : 16h

GRADING SYSTEM

Continuous evaluation

EXAMINATION RULES.

Face-to-face subject. Continuous evaluation. Deliveries