

Advanced Course

PRECISION LIVESTOCK FARMING

Zaragoza (Spain), 1-5 April 2019

1. Objective of the course

The objective of this course is to provide participants with the knowledge and skills needed to assist in practical implementation of Precision Livestock Farming (PLF) systems, with focus on the Mediterranean conditions and species.

The demand for products of animal origin is increasing year by year and is related to the growing world population and changes in food consumption patterns. FAO expects that the worldwide demand for animal products will increase by 75% by 2050. Consumers increasingly demand healthy food, animal welfare, sustainability and traceability. At the same time economic considerations frequently lead to significant intensification. Even if PLF applications are often associated with intensification, we will demonstrate that PLF also offers solutions for extensive systems in harsh environments and for small scale farming.

PLF comprises systems and technologies to remotely monitor grouped or individual animals. It provides information that enables the highest quality husbandry leading to good health and welfare and sustainable and efficient productivity. A wide range of technologies can be used to continuously record real-time data by using modern information and communication technologies (ICT), such as sensors, cameras, microphones, wireless networks, etc.

PLF systems become part of the management system on farm and should generate added value for the farmers and other stakeholders. It is important to understand how to turn collected data into relevant information supporting the farmers' decision. It is essential to transfer the approaches and the knowledge into commercial products and services that will be implemented on farm. Beyond that, the generated information will provide benefits to all stakeholders.

At the end of the course participants will have gained:

- Awareness of how animals can be monitored through PLF technologies.
- An understanding of principles to generate PLF solutions.
- Knowledge of how to turn PLF data into relevant information.
- A view of the state of the art in PLF technologies and their application.

- Insight into potential business models for implementing PLF products and services.
- Skills in the use of PLF tools through technical visits and demonstrations.
- Experience in the analysis of PLF solutions through creative team work sessions.

2. Organization

The course will take place at the Mediterranean Agronomic Institute of Zaragoza (IAMZ) of the International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM), and will be given by well qualified lecturers from research centres, universities, and private companies in different countries.

The course will be held over a period of one week, from 1 to 5 April 2019, in morning and afternoon sessions.

3. Admission

The course is designed for 25 participants with a university degree and is specially oriented towards public and private decision makers and managers, producers, technical advisors, ICT and R&D professionals of the livestock sector.

Given the diverse nationalities of the lecturers, knowledge of English, French or Spanish will be valued in the selection of candidates, since they will be the working languages of the course. IAMZ will provide simultaneous interpretation of the lectures in these three languages. Some demonstrations and practical sessions will require a basic understanding of English.

4. Registration

Candidates must apply online at the following address:
<http://www.admission.iamz.ciheam.org/en/>

Applications must include the *curriculum vitae* and copy of the supporting documents most related to the subject of the course.

The deadline for the submission of applications is **21 January 2019**. The deadline will be extended for candidates not applying for a grant and not requiring a visa while places are available.



Applications from those requiring authorization to attend the course, may be accepted provisionally.

Registration fees for the course amount to 500 euro. This sum covers tuition fees only.

5. Scholarships

Candidates from CIHEAM member countries (Albania, Algeria, Egypt, France, Greece, Italy, Lebanon, Malta, Morocco, Portugal, Spain, Tunisia and Turkey) may apply for scholarships covering registration fees, and for scholarships covering the cost of travel and full board accommodation in the Hall of Residence on the Aula Dei Campus.

Candidates from other countries who require financial support should apply directly to other national or international institutions.

6. Insurance

It is compulsory for participants to have medical insurance valid for Spain. Proof of insurance cover must be given at the beginning of the course. Those who so wish may participate in a collective insurance policy taken out by the IAMZ, upon payment of the stipulated sum.

7. Teaching organization

The course requires personal work and interaction among participants and with lecturers. The international characteristics of the course favour the exchange of experiences and points of view.

The programme has an applied approach. Formal lectures are complemented by examples, technology demonstrations, technical visits, group work and a round table discussion.

Technical visits will show working PLF systems in commercial farms. After these visits, the challenge for participants in a group work session is to come up with creative options to apply PLF solutions to the Mediterranean conditions and species.

8. Programme

1. **Livestock sector: opportunities, challenges and stakeholders (1 hour)**
 - 1.1. Worldwide situation in an era of global change
 - 1.2. The Mediterranean scenario including socioeconomic aspects
2. **Basics of PLF and examples (6 hours)**
 - 2.1. Understanding animals using technology
 - 2.2. PLF definition

- 2.3. PLF approaches: turning data into valuable information
- 2.4. Examples from different species
- 2.5. Conclusions
- 2.6. Showcasing technology

3. Developing and implementing PLF systems (3 hours)

- 3.1. From algorithm to product phase 1, phase 2 and phase 3
- 3.2. Data management: use of big data, cloud computing, Internet of Things (IoT) in the decision making process
- 3.3. Examples of developed products and related problems
- 3.4. Timing to reach product in the market
- 3.5. Determinants of uptake and success including labour aspects
- 3.6. Business models
- 3.7. Is PLF affordable for small farms?
- 3.8. Who owns data/information and general data protection rules (GDPR)
- 3.9. Conclusions

4. Zooming into PLF needs in the Mediterranean countries (7 hours)

- 4.1. Range of extensive and intensive systems
- 4.2. Animal behaviour in rangeland systems
- 4.3. Specific problem for PLF use outdoors
- 4.4. Biology of heat tolerance and water balance
- 4.5. Mediterranean PLF case studies
- 4.6. Conclusions and discussion

5. Technical visits

- 5.1. Demonstration of PLF technology at an experimental sheep farm
- 5.2. Semi-intensive sheep farm
- 5.3. Automated goat dairy farm
- 5.4. Robotic monitoring of broiler chickens

6. Group work exercise: development of a creative PLF concept on a real farm (6 hours)

- 6.1. Introduction to practical and composition of groups
- 6.2. Collecting information in a technical visit
- 6.3. Working sessions
- 6.4. Presentation of results and discussion

7. Round table discussion (2 hours)

- 7.1. Ethical considerations for all stakeholders
- 7.2. Milking robots, success or failure?
- 7.3. www - what can be learned? where are we now? where are we going?: participants' ideas
- 7.4. www - who is doing what and when?

8. User experience (1 hour)

GUEST LECTURERS

J.L. ALABART, CITA-GA, Zaragoza (Spain)
D. BERCKMANS, Catholic Univ. Leuven (Belgium)
F. BOCQUIER, SupAgro, Montpellier (France)
G. CAJA, Univ. Autònoma Barcelona (Spain)
A. GODO, The Volcani Center, Rishon LeTsiyon (Israel)
I. HALACHMI, The Volcani Center, Rishon LeTsiyon (Israel)

M. JOY, CITA-GA, Zaragoza (Spain)
C. KNIGHT, Univ. Copenhagen (Denmark)
H. LEHR, FAROMATICS, Barcelona (Spain)
D. SPELLER, Applied Group, Sheffield (United Kingdom)
C. UMSTÄTTER, Agroscope, Ettenhausen (Switzerland)
E. VRANKEN, FANCOM, Panningen (The Netherlands)



CIHEAM

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