

Summer Course

Integrated Agriculture and Sustainable Animal Feeding

Coordinators: André M. de Almeida and Madalena Lordelo (ISA/DCEB)

Teaching Staff: André M. de Almeida; Cátia Martins; David Fangueiro; David Ribeiro; Elisabete Augusto Fernandes; Elisabete Figueiredo; Inês Carolino; Madalena Lordelo; Rita Fragoso; Teresa Ribeiro

Attendants: Graduation students, MSc students, PhD students, professionals and public interested in sustainability in animal production

Language: English

Duration:

Contact hours: 32 h (lectures and practical sessions)

Field trips: 16 h contact (three field trips, of 8 h duration each, will be scheduled along the course)

Total contact hours: 48 h

Credits: 6 credits ECTS

Time-schedule: during June 2023 (lessons will be scheduled from 8h to 12h in working days, and the field trips will last a full working day)

Enrollment: deadline 15th May 2023

Number of students: Minimum 6 participants / Maximum 15 participants

Registration fees: With evaluation and, in case of approval, attribution of 6 ECTS: 750 euros for each participant

Documents to submit with the application:

1. Identity document (copy)
2. Short biography
3. Certificate of qualifications (copy)
4. Letter of motivation
5. Recommendation letters (two)

Selection Criteria:

1. Preference order: 1st students, 2nd professionals, 3rd general public.
2. Short biography and motivation letter evaluation for final acceptance decision.

Evaluation and certificates:

The evaluation will be performed as follows: ´

1. Mandatory: attendance of 80 % of lessons and all the field trips.
2. Final grade= grade obtained in written Exam on the topics addressed during the program.
3. Students will have access to a participation certificate. This certificate will be issued by the Academic Division and is subjected to the due fees.

Objectives/topics:

The main goal of this course is to be acquainted with the following topics:

1. Cattle production systems
2. Small Ruminant Production systems
3. Pig production systems
4. Poultry production systems
5. Basis of animal nutrition and feeding in pigs and poultry
6. Basis of animal nutrition and feeding in ruminants
7. Major challenges in animal feeding in the context of the different production systems
8. Alternative feedstuffs in animal nutrition
9. Greenhouse gas emissions and ruminant production
10. Effluent management in animal production
11. Mitigation of GHG emissions in animal production

Learning outcomes:

At the end of this course, it is expectable that students will be able to:

1. Briefly characterize dairy and beef cattle production systems
2. Briefly characterize small ruminant production systems
3. Briefly characterize pig production systems
4. Briefly characterize the laying hen production system
5. Briefly characterize broiler and turkey production systems
6. To know the basic aspects of ruminant and monogastric digestion systems
7. To know the major feedstuffs used in animal feeding
8. To know the major constraints and challenges regarding animal feeding
9. To know possible alternative feedstuffs of interest in animal nutrition
10. To know the basic aspects about GHG emission monitoring and characterization in the framework animal production and effluent management and their relation to global warming
11. To know the essential aspects related to the mitigation of GHG emissions in the framework of animal production systems

Syllabus:



1. **Cattle production systems:** Basic knowledge about dairy and beef production systems. Major breeds, Production cycle and products
2. **Small ruminant production systems:** Basic knowledge about sheep (wool, mutton and lamb) and dairy goat production systems. Major breeds, Production cycle and products
3. **Swine production systems:** Basic knowledge about intensive and extensive pig production systems. Major breeds, Production cycles and products
4. **Laying hen production systems:** Basic knowledge about the laying hen production cycle and system. Organization of the production, Major strains, Production cycle and products
5. **Broiler and turkey production systems:** Basic knowledge about meat chicken and turkey production systems. Organization of the production, Major strains, Production cycle and products
6. **The animal digestion systems:** Introduction to the swine digestion system. Introduction to the ruminant digestion system. Introduction to poultry digestion system
7. **Classical feedstuffs used in animal nutrition:** Cereals grains; legumes and pulses grains; Soybean meal and other proteinaceous concentrates; animal-origin products; Fats; Fodders; Minerals, vitamins and additives
8. **Basis feed formulation for monogastrics:** Principles of formulation; Pearson square and the first corn-soybean meal formulation; basic formulation
9. **Sustainability issues in animal nutrition:** International markets and animal nutrition. Import and export of feedstuffs in the international markets. Environmental and economical sustainability of production and trade of cereals, soybean meal and other commodities used in animal nutrition
10. **Alternative feedstuffs in animal nutrition – case studies:** Novel feedstuffs of putative use in animal nutrition. Application case-studies: insects, algae and microalgae
11. **Greenhouse gas emissions in cattle production systems:** Methods of quantification of GHG emissions in dairy and beef cattle production systems. Intensive VS grass-based milk production systems. Strategies to reduce emissions via the production system
12. **Greenhouse gas emissions and effluent management:** Methods of quantification of GHG emissions related to effluent management. Strategies to reduce emissions via effluent management

Practical sessions:

1. Feed formulation and feed manufacture exercises
2. Animal feed trial with quails
3. Emission quantification from farms using a dedicated software – practical exercises

Field trips:

1. Visit to a commercial feed production plant (day one, morning)
2. Visit to an insect production farm (day one, afternoon)
3. Visit to a dairy farm (day two, morning)
4. Visit to a poultry production farm (day two afternoon)

