# **.- Milk, meat production and technology**

# **Mod. Milk and Meat Production**

## Prof. Maurizio Moschini

### ***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

The course aims to provide scientific and technical skills in livestock production (milk, meat). The management and feeding techniques in ruminants and monogastric rearing will be addressed for animal performance optimization, including animal health and welfare, sound product quality, and environmental benefits.

At the end of the course, the student will learn to acquire and understand the main issues about breeding and managing cattle (milk and meat), swine, and poultry (broiler, laying hen). The student will know about animal feeding management and precision feeding to improve animal performance. The student will be capable of analyzing and managing the main problems of cattle breeding (milk and meat), swine, and poultry (broiler and laying hen). The student will also be capable of addressing animal nutrition and management innovations to improve production performance and reduce environmental impact.

### ***COURSE CONTENT***

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|  |  ETCS |
| Facilities and equipment in animal rearing | 0.75 |
| * Cattle housing: dairy cow and beef;
* Swine housing: breeding, gestation, farrowing, growing, and finishing;
* Poultry housing: breeding flocks, broilers, replacement pullets, and laying hens.
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| Management strategies and precision technologies | 3.25 |
| Cattle* Feeding and herd management: dry, pregnant, and lactating cows; calves, yearlings, and older feeders, heifers, and beef;
* Ventilation and cooling systems.

Swine* Feeding and management: sow, baby pigs, growing-finishing pigs, breeding herd;
* Ventilation and heating systems.

Poultry* Breeding flocks: feeding, production phases, egg collection, hatching;
* Broiler (brooding, grow-out, load-out): litter and stocking density, systems for feeding, drinking, and lighting;
* Pullets rearing;
* Heating and ventilation systems.
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| Automated on-farm precision management | 0.75 |
| * Precision monitoring technology, implementation opportunities, and challenges.
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| Manure and environment | 0.25 |
| * Manure handling and biosecurity.
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| Tutorials - Class exercises | 1 |

***READING LIST***

Large Dairy Herd Management, 3rd ed. (David K. Beede).

Feed efficiency in swine (edited by Patience J.F.), 2012.

Commercial poultry nutrition, 3rd ed. (Leeson S. and Summers J.D.).

Additional reference bibliography will be provided during the course.

***TEACHING METHOD***

The teaching method will include two types of activities:

1. Classroom lectures (5 ETCS, 40 hours) where the fundamental concepts of the course are exposed.
2. Classroom practical activities (1 ETCS, 12 hours) are divided into 4 hours of exercise where scenarios are analyzed to involve the students in identifying optimal solutions to the problem highlighted by applying what they learned during lectures and in 8 hours of outdoor educational visits. The activities aim to facilitate students' reasoning and learning about the concepts investigated in the classroom lectures.

***ASSESSMENT METHOD AND CRITERIA***

The exam is oral and consists of at least three general questions from which further specific questions might arise. Students are graded according to objective knowledge of the topics and appropriate use of particular terminology. The maximum score assigned to each general question is 10/30. The evaluation aims to provide a measure of the overall degree of preparation of the student over the entire program and to make the teacher understand the capacity of reasoning and analytical rigor of the student. Overall, the student must demonstrate knowledge of what has been dealt with during the course, appropriate terminology, and the ability to handle different scenarios encompassing connections between various topics explained throughout the course.

***NOTES AND PREREQUISITES***

Prof. Maurizio Moschini will receive students after classes or by appointment in the Department of Animal, Nutrition and Food Sciences - DiANA (tel: 0523/599192 - maurizio.moschini@unicatt.it).

Further information can be found on the blackboard page of the course.

# **Mod. . Technology of Animal Chain Products**

## Dott. Andrea Minuti

### ***COURSE AIMS AND INTENTED LEARNING OUTCOMES***

Provide the students with the essential concepts to understand the sector of the milk production, its composition and the technologies necessary for its transformation into dairy products, with attention to issues concerning food quality and safety.

Provide the students with the scientific basis to understand the main issues related to the production and marketing of meat-based products, with attention to the quality, health and hygiene management aspects of the transformation processes used throughout the production chains.

At the end of the course, the student will be able to learn about breeding techniques and describe the main stages of the production cycle of animals destined to produce foodstuffs, and to understand the main productive factors that can influence the quality of the products of animal origin. The student will possess the ability to apply the knowledge for the production of foodstuffs of animal origin.

### ***COURSE CONTENT***

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|  | CFU |
| Aspects and issues related to animal production (environmental, cultural, social and nutritional aspects)  | 0.2 |
| National and global statistics of animal livestock breeds for meat production. Production, consumption and sources of supply. | 0.3 |
| Production techniques of livestock for meat production. Animal registry and traceability of products of animal origin. Physiological bases of stress and regulations on animal welfare (breeding, transport, slaughtering). | 0.5 |
| Skeletal muscle tissue, Physiology of muscle contraction. Chemical-nutritional composition of meat. Post-mortem processes (rigor mortis, meat acidification) and maturation of the meat (maturation). | 0.3 |
| Slaughtering technology and procedures. Phases of slaughter. Health mark. Commercial classification of carcasses: cows, pigs and poultry. Anatomical cuts of bovine, pig and poultry. | 0.5 |
| Ante and post-mortem factors that influence the chemical, hygienic-sanitary, organoleptic and technological characteristics of meat. Technologies to improve meat quality (conservation and tenderness). | 0.5 |
| Procedures for prevention, surveillance and control of zoonoses. Residues in meat (drugs, pesticides, pollutants) and microbial contamination. Growth promoters: use, effects and residues. Labeling. | 0.3 |
| Statistics on milk and cheese consumption. Main dairy animals (cattle, sheep, goat and buffalo breeds). | 0.4 |
| Composition and characteristics of milk, carbohydrates (lactose), proteins, lipids. Factors that determine the variability of milk composition and production. Influence of food and animal health on the quality characteristics of milk and cheese. | 0.5 |
| Physiology of the mammary gland, synthesis of milk components, secretion and removal of milk. | 0.3 |
| Elements of microbiology of milk and derivatives. Good hygiene practices from the stable to the processing plant. Correct milking and milk storage practices. Milk production, refrigeration and collection. Drinking milk and cream, condensed. Fermented milks and yogurt. | 0.4 |
| Cheeses: classification and regulatory outline. Acid and rennet coagulation: biochemical and chemical-physical mechanisms. Curd purging and maturation. Manufacturing technology of the main cheese categories. Manufacturing technology for processed cheeses. Butter: normative outline, classification, manufacturing and packaging technologies. | 0.5 |
| Principal specifications for the production of cheese D.O.P. and I.G.P. | 0.3 |
| Exercises: seminars, lab experiences and guided tours | 1 |

***READING LIST***

Lecture notes and material posted on the website (Blackboard platform).

Lawrie’s Meat Science 7th Edition Woodhead Publishing

La Produzione Igienica della Carne, G.M. Tantillo, Edagricole, 2001.

Dairy Processing Handbook, TetraPak Processing Systems AB (1995)

Dairy Science and Technology, P- Walstra, J.T.M. Wouters, T.J. Geurts, 2nd edition, CRC Press (2006).

Fundamentals of Cheese Science, P.F. Fox, T.P. Guinee, T.M. Cogan, P.L.H. McSweeney, Aspen Publishers (2000).

***TEACHING METHOD***

The course includes classroom/telematich lectureslectures (5 CFU, 40 hours) where the key concepts of the course will be exposed. There will also be classroom/telematich practical activities (1 CFU, 12 hours) divided into 4 hours of indoor exercise where scenarios will be analyzed to involve the student in identifying optimal solutions to the problem highlighted and what has been analyzed during lectures, and in 8 hours of outdoor educational visits. The activities will aim to facilitate the student's ability to reason and learn about the concepts dealt with in the frontal lessons.

***ASSESSMENT METHOD AND CRITERIA***

The exam is oral and consists of at least three general questions from which further specific questions can arise. Students will have to demonstrate that they know how to orient themselves among the topics discussed during the lessons. The score is assigned based on the following criteria: a) objective knowledge of the topics mastery of the topics and the appropriate use of specific terminology; b) clear presentation; c) ability to answer exhaustively questions related to different issues. The score on a 0-30 scale will be communicated immediately at the end of the test.

***NOTES AND PREREQUISITES***

Dott. Andrea Minuti receives after class or by appointment at the Department of Animal Science, Food and Nutrition – DIANA (tel: 0523/599127 – andrea.minuti@unicatt.it).