.- Environmental Sustainability of Livestock Production

Prof. Maurizio Moschini

COURSE AIMS AND INTENDED LEARNING OUTCOMES

The course aims to teach students about the nature and extent of emissions into the air, soil and water attributable to the main species of zootechnical interest, the types and techniques of farming, the food strategies adopted and the management of effluents produced, with a view to environmental sustainability and compliance with current regulations. Students are taught how to estimate the impact of livestock farms on the environmental indicators evaluated in life cycle studies, as well as the methods for mitigating emissions from a sustainable farming perspective. The role of food management in controlling production efficiency is addressed with reference to the legislation on the environmental impact of livestock farming.

At the end of the course, students will know and understand the main environmental emissions that are attributable to livestock farming and livestock manure management. They will know food strategies for improving production efficiency and reducing the nitrogen and phosphorus in effluents. They will know how to control air quality in enclosures with a view to animal welfare and safety for operators. They will know the main treatments applicable to zootechnical effluents to mitigate emissions into the environment and to apply possible solutions for the use of any resulting products. They will know the main techniques for purifying the air coming from farms and reducing the nitrogen content in livestock manure. Students will be able to identify and critically examine the nature of emissions with space-time cognition, evaluate alternative sustainable scenarios of production processes, and plan mitigation strategies.

COURSE CONTENT

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|  | ECTS |
| Livestock farms and the environment |  |
| Animal breeding and contribution to water, soil and air contamination; environmental impact indicators and mitigation strategies | 1.25 |
| Zootechnical effluents |  |
| Definition; qualitative-quantitative characteristics; Italian and European legislation; farm management and the development of potentially toxic odours and gases, control techniques and regulatory compliance | 0.75 |
| Regulatory compliance in soils with different levels of vulnerability to zootechnical effluents; management precaution in the handling of effluents with reference to animal welfare and operator safety | 0.25 |
| Food strategies for controlling nitrogen and phosphorus excretion in manure | 2.25 |
| Treatments of zootechnical effluents |  |
| Treatment systems and distribution techniques | 0.25 |
| Systems for reducing the nitrogen content in zootechnical effluents | 0.25 |
| Tutorials | 1 |

READING LIST

Allevamento animale e sostenibilità ambientale: i principi, Vol. 1, Franco Angeli Ed., 2018

Allevamento animale e sostenibilità ambientale: le tecnologie, Vol. 2, Franco Angeli Ed., 2018

Effluenti zootecnici. Impiantistica e soluzioni tecnologiche per la gestione sostenibile (Maggioli Ed.), Giorgio Provolo, 2012.

Further supplementary reading references for the individual topics will be provided during the course.

TEACHING METHOD

Theoretical frontal lectures (5 ECTS, 35 hours), during which the key concepts of the subject will be presented. Frontal tutorials (1 ECTS, 12 hours), during which defined scenarios for student involvement will be addressed, the aim being to identify optimal solutions to the problems highlighted and the topics covered during the frontal lectures. The tutorials aim to facilitate the student's ability to reason and learn about what is addressed in the classroom lectures.

ASSESSMENT METHOD AND CRITERIA

A final oral exam comprising three general questions from which further specific questions may arise. Ten marks are allotted to each general question and the final mark, out of thirty, will be communicated immediately at the end of the exam.

The assessment aims to provide a measure of the student's overall level of preparation on the entire course programme and to help the lecturer understand the student's reasoning skills and analytical rigour. Altogether, students must demonstrate their knowledge of the course contents and how to express themselves with the appropriate terminology, as well as their ability to orient themselves in different scenarios, demonstrating the ability to propose feasible environmental mitigation processes.

NOTES AND PREREQUISITES

Students must possess basic knowledge of the concepts of biological processes and animal physiology.

Information on office hours available on the teacher's personal page at http://docenti.unicatt.it/.