# COURSE DETAILS

# " WASTE MANAGEMENT AND IMPACT "

DEGREE PROGRAMME: PRECISION LIVESTOCK FARMING

ACADEMIC YEAR 2025 - 2026

## GENERAL INFORMATION – TEACHER REFERENCES

TEACHER: ANGELA SALZANO
PHONE: 0812536215
EMAIL: ANGELA.SALZANO@UNINA.IT

## GENERAL INFORMATION ABOUT THE COURSE

INTEGRATED COURSE: ANIMAL HOUSING AND ENVIRONMENTAL IMPACT
MODULE: WASTE MANAGEMENT AND IMPACT
SSD OF THE MODULE: AGRI-09/C (EX AGR/19)
CHANNEL:
YEAR OF THE DEGREE PROGRAMME (I, II, III): I
SEMESTER: I
CFU: 5

## REQUIRED PRELIMINARY COURSES (IF MENTIONED IN THE COURSE STRUCTURE "REGOLAMENTO")

*There are no required preliminary courses*

## PREREQUISITES (IF APPLICABLE)

*There are no prerequisites*

## LEARNING GOALS

*Understanding the main environmental impacts associated with both intensive and extensive livestock farming (greenhouse gas emissions, land use, water and air pollution, eutrophication, etc.). Ability to perform environmental assessments using tools and indicators. Knowledge of national and European environmental regulations governing livestock activities (e.g., Nitrates Directive, CAP, etc.). Analysis of the livestock production cycle to identify environmentally critical points. Development of sustainable strategies for the management of livestock effluents, animal feeding, use of natural resources, and waste reduction.*

*Morover, the course aims primarily to prepare students for activities related to agricultural and agro-industrial buildings and associated technical systems. In particular, it provides training for the design and construction of rural buildings, starting from territorial planning, regulatory/authorization procedures, and environmental impact assessment. The course offers the knowledge required for the sizing of the main housing systems used in intensive livestock farming. Special attention is given to environmental parameters and energy aspects related to the operation of livestock facilities in general.*

## EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)

### Knowledge and understanding

*At the end of the course, the students will have acquired:*

- *a solid knowledge of the main environmental impacts associated with different types of livestock farming (atmospheric emissions, water pollution, land and resource use);*
- *an understanding of ecosystem dynamics related to animal production, particularly in relation to climate change and biodiversity;*
- *the ability to interpret data and technical reports on the environmental impact of livestock systems;*
- *updated knowledge of relevant national and European regulations and guidelines, and of best practices for sustainable management;*
- *critical awareness of the environmental issues affecting the sector and of the main tools for impact assessment.*

### Applying knowledge and understanding

*The students will be able to:*

- *analyze and critically assess the environmental impact of a livestock production system, including through the use of quantitative models and environmental indicators;*
- *propose and design technical and management solutions to reduce environmental impact (e.g., effluent treatment, low-emission feeding, energy efficiency);*
- *apply environmental analysis tools and methods;*
- *contribute to the planning of interventions for the environmental sustainability of farms, both at the farm and territorial levels;*
- *integrate the acquired knowledge in a multidisciplinary context, interacting with professionals in the fields of livestock production, environmental science, and public health.*

## COURSE CONTENT/SYLLABUS

| FRONTAL LESSONS | HOURS |
|---|---|
| *Guidelines of Good Agricultural Practice* | **6** |
| *International, National and Regional laws regulating on manure management* | **8** |

| | |
|---|---|
| *Nitrogen cycle* | **4** |
| *Nitrogen and Phosphorous balance* | **4** |
| *Environmental aspects associated with livestock* | **8** |
| | |
| TOTAL | **30** |

| PRACTICAL TEACHING | HOURS |
|---|---|
| *Structural actions to improve manure management in livestock farms* | **6** |
| *Examples of rationing for nitrogen and mineral balance* | **7** |
| *Utilization of manure for anaerobic digestion* | **7** |
| TOTAL | **20** |

## READINGS/BIBLIOGRAPHY

- *Slides*
- *Allevamento animale e riflessi ambientali (2010) G. M. Crovetto and A. Sandrucci. Ed. Fondazione iniziative zooprofilattiche e zootecniche – Brescia.*
- *Lecture notes provided during the course.*

## TEACHING METHODS

*Teacher will use:*
*a) lectures for approx. 60% of total hours;*
*b) practical exercises for approx. 10% of total hours or CFU;*
*c) practical activity for 30% of the total hours.*
*The teacher will use a student-centered method; tutorials; Practical lessons, learning by doing method. The lessons will be supported by multimedia teaching material available to students on the teacher's website, after registering for the course*

## EXAMINATION/EVALUATION CRITERIA

**a) Exam type:**

*For **integrated courses**, there should be one exam.*

| **Exam type** | |
|---|---|
| **written and oral** | |
| **only written** | |
| **only oral** | X |
| **project discussion** | |
| **other** | |

| | | |
|---|---|---|
| **In case of a written exam, questions refer to: (*)** | **Multiple choice answers** | |
| | **Open answers** | |
| | **Numerical exercises** | |

(*) multiple options are possible

**b) Evaluation pattern:**

*The final exam will consist of at least four questions (at least two for each integrated course).*

*The final grade will be weighted according to the ECTS credits of each course unit, as follows:*

- *Module: **Housing, Planning and Design** (5 ECTS) – 50%*
- *Module: **Waste Management and Impact** (5 ECTS) – 50%*

*The evaluation will be carried out in accordance with the "Exam Management Regulations" approved by the Didactic Coordination Committee of the Master's Degree Program in Precision Livestock Farming.*

*For the evaluation, the "Regulation for Guidelines_for_exams_management" approved by the Didactic Coordination Committee of the Master Degree in Precision Livestock Farming will be considered.*