COURSE DETAILS

"HOUSING, PLANNING AND DESIGN"

DEGREE PROGRAMME: PRECISION LIVSTOCK FARMING

ACADEMIC YEAR 2025-2026

GENERAL INFORMATION – TEACHER REFERENCES

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GENERAL INFORMATION ABOUT THE COURSE

INTEGRATED COURSE (IF APPLICABLE): ANIMAL HOUSING AND ENVIRONMENTAL IMPACT
MODULE (IF APPLICABLE): HOUSING, PLANNING AND DESIGN (AGR10)
CHANNEL (IF APPLICABLE):
YEAR OF THE DEGREE PROGRAMME (I, II, III): I
SEMESTER (I, II): I
CFU: 5

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

none

PREREQUISITES (IF APPLICABLE)

none

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.

Moreover, 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

The student needs to:
Understanding the housing facilities required for livestock health and welfare:
- Animal environment in the housing system;
- Optimal microenvironmental conditions (temperature, humidity, and concentrations of gases and particulate matter);

Dimension standards for housing, feedlots and exercise areas required for:
- Cattle and Buffalo (including milking systems);
- Pigs, poultry and sheep.

Strategies for manure management
Sensing technology for assessing microclimatic conditions.

Applying knowledge and understanding

Independent judgment:
The student must demonstrate the ability to draw conclusions from a set of information in order to identify the most suitable design solutions for the specific farm and context. They must be able to stay informed and up to date on modern types and solutions applicable in the field of livestock building design. The student must also know which systems can be used to ensure animal welfare by controlling the micro-environmental conditions inside the barn. They must be able to assess the energy balance at the housing system level and be capable of sizing the various phases and facilities related to animal husbandry using spreadsheets and designing basic layouts with computer-aided design (CAD) software.
Communication skills: *The student must be able to present a project plan during the exam and summarize the results achieved in a complete yet concise manner, using appropriate technical language.*
Learning skills: *The student must be able to apply the methodological tools learned for the design of rural buildings. They must also be capable of independently updating their knowledge by attending major conferences, seminars, or trade fairs related to rural buildings.*

COURSE CONTENT/SYLLABUS

FRONTAL LESSONS	HOURS

1. Animal housing	
Animal environment in the housing system	**3**
Microenvironmental conditions (temperature, humidity, and concentrations of gases and particulate matter)	**3**
Air conditioning	**2**
Ventilation systems	**3**
2. Housing, feedlots, and exercise areas	
Cattles	***7***
Buffalos	***2***
Milking systems	***3***
Pigs	***4***
Poultry	***3***
Sheep	***2***
Manure management and treatment strategies	***4***
2. Sensing technology for assessing microclimatic conditions	**4**
TOTAL	**40**

PRACTICAL TEACHING	ORE
Dimensioning of livestock housing and facilities with spreadsheet	**5**
Designing basic layouts with computer-aided design software	**5**
TOTAL	**10**

READINGS/BIBLIOGRAPHY

Lecture notes provided during the course.
Recording files from the lessons
Notes from the teacher

TEACHING METHODS

Teacher will use: a) lectures for approx. 60 % of total hours, also supported by the use of multimedia; b) practical exercises supported by specifical software for approx. 10% of total hours or CFU; c) technical visit to further elaborate on applied knowledge for approx. 30% of total hours or CFU. 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:

Exam type	
written and oral	
only written	
only oral	X
project discussion	x
other	

b) Evaluation pattern:

The final evaluation consists solely of an oral exam. During the exam, the student will be required to present the project developed, solve a sizing exercise for a barn with accessory rooms for any livestock species covered during the course, and illustrate and discuss the theoretical content of the course. No midterm exams are scheduled.

Average number of topics addressed during the oral exam: 3

Average duration of the oral exam: approximately 30–40 minutes

The oral exam will be assessed based on the following criteria: completeness, clarity of presentation, relevance, and technical skills. At least 30 days must pass between a failed exam and the student's admission to the next exam session.

1. Evaluation Method:

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.