COURSE DETAILS

" INSTRUMENTATION AND MEASUREMENTS FOR LIVESTOCK FARMING"

DEGREE PROGRAMME: PRECISION LIVESTOCK FARMING

ACADEMIC YEAR 2025-2026

GENERAL INFORMATION – TEACHER REFERENCES

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GENERAL INFORMATION ABOUT THE COURSE

INTEGRATED COURSE: INFORMATION TECHNOLOGY FOR PRECISION LIVESTOCK FARMING
MODULE: INSTRUMENTATION AND MEASUREMENTS FOR LIVESTOCK FARMING
SSD OF THE MODULE: IMIS-01/B – MISURE ELETTRICHE ED ELETTRONICHE
TEACHING LANGUAGE: ENGLISH
YEAR OF THE DEGREE PROGRAMME (I, II, III): I YEAR
SEMESTER (I, II, ANNUAL): II SEMESTER
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

Informing and training the students on the founding concepts of measurement theory and on the main measurement methodologies and procedures for analyzing signals in the time domain and in the amplitude domain. Providing the practical competencies for the use of sensors and transducers, basic measurement instruments, as well as of devices for automatically controlling them.

Moreover, the course aims to provide students with advanced notions related to automation and robotics, with particular attention to applications in the PLF context, and to convey practical skills for the use and management of specific control systems for robotic applications in this field.

EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)

Knowledge and understanding

The course provides students with the basic methodological knowledge and tools necessary both to analyze the main measurement problems within the precision livestock farming field, and to choose and effectively use basic sensors, transducers, and measurement instruments to face such problems. The tools can allow the student to grasp the causal connections between physical phenomena in the empirical world and the properties of physical quantities in the symbolic world, together with the main characteristics that an adequate method of measurement addressed to these properties must have, and to understand the implications of the measurement choices on the final measurement result.

Applying knowledge and understanding

The course provides the skills and tools necessary to apply the knowledge in practice, fostering the ability to use basic methodological tools to define, design, and implement a metrological approach suitable for addressing ordinary measurement problems in practical applications typical of the precision livestock farming sector.

COURSE CONTENT/SYLLABUS

FRONTAL LESSONS	HOURS
Fundamentals of measurement theory	**8**
Signals, quantities, and domains of interest	**4**
Electronic measuring systems and instruments	**6**
Time domain: period and frequency measurements	**6**
Measurement uncertainty	**8**
Sensors and transducers	**6**
TOTAL	**38**

PRACTICAL TEACHING	HOURS
Practical use of basic sensors and transducers	**4**
Practical use of basic measurement instruments	**4**
Evaluation of uncertainty in basic measurement issues in PLF sector	**4**
TOTAL	**12**

READINGS/BIBLIOGRAPHY

Course handout, slides projected during the course, international standards.

TEACHING METHODS

The teacher will use: a) frontal lessons for about 65% of the total hours; b) laboratories for the application and deepening of the knowledge acquired during lectures for about 30% of the total hours; d) seminars on specific topics for about 5% 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:

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

b) Evaluation pattern:

Oral questions are asked that focus on the entire program, and discussion of the results of the practical exercises developed during the course is required. The final grade is determined by the average of the scores achieved in these activities. The grade obtained contributes 50% to the final evaluation of the entire integrated course (50% INSTRUMENTATION AND MEASUREMENTS FOR LIVESTOCK FARMING and 50% ROBOTICS).

For the evaluation, the “Regulation for Guidelines_for_exams_management” approved by the Didactic Coordination Committee of the Master Degree in Precision Livestock Farming is considered.