



Universitat de Lleida

# DEGREE CURRICULUM **RESEARCH METHODOLOGY AND EXPERIMENTAL DESIGN**

Coordination: BACARDIT DALMASES, ANNA

Academic year 2023-24

# RESEARCH METHODOLOGY AND EXPERIMENTAL DESIGN 2023-24

## Subject's general information

Subject name	RESEARCH METHODOLOGY AND EXPERIMENTAL DESIGN			
Code	103159			
Semester	2nd Q(SEMESTER) CONTINUED EVALUATION			
Typology	Degree	Course	Character	Modality
	Master's Degree in Leather Engineering	1	OPTIONAL	Attendance-based
Course number of credits (ECTS)	4.5			
Type of activity, credits, and groups	Activity type	PRALAB	PRAULA	TEORIA
	Number of credits	2.5	0.5	1.5
	Number of groups	1	1	1
Coordination	BACARDIT DALMASES, ANNA			
Department	INDUSTRIAL AND BUILDING ENGINEERING			
Teaching load distribution between lectures and independent student work	Face-to-face classes: 50 hours. Autonomous learning: 75 h.			
Important information on data processing	Consult <a href="#">this link</a> for more information.			
Language	English Spanish Catalan			

# RESEARCH METHODOLOGY AND EXPERIMENTAL DESIGN 2023-24

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
PROFESSOR PENDENT ASSIGNAR		4,5	

## Subject's extra information

The subject will have two important focus:

- Acquisition of all the concepts and methodologies explained both in the master classes and in the practical classes.
- Promote the contact of the students with companies and events related to the search in the tannery sector.

Among the methodology that will be used in the subject there is organization of workshops, incorporation of audiovisual materials and contact with experts. Individual and group exercises will also be introduced on research work, extracted from conferences in International Conferences and indexed magazines.

- If one of the activities of laboratory or continuous assessment is not carried out, it will be considered as not scored.

## Learning objectives

When finishing the subject the student must be able to:

- Recognise the methodology of the design of experiments as an important component in scientific research.
- Analyze the statistical modeling procedure. Analysis and evaluation of the proposed models.
- Recognise and apply different experimental strategies, considering different scientific and technological situations.
- To acquire ability to apply the concepts and procedures of statistical optimization.
- Identify and write different types of documents; from scientific / technological projects to scientific or informative articles; applying research strategies for information and the management programs of appropriate bibliographic references.
- Make the planning, development and conclusion of a scientific-technical work related to the field of leather.
- Presentally orally a scientific-technical work following a logical and simple structure where the key knowledge about scientific and technical communication is revealed.

## Competences

Basic skills:

B06. Owning and understanding knowledge that provides a basis or opportunity to be original in the development and / or application of ideas, often in a research context.

B07. That the students apply the acquired knowledge and be able to solve problems in new or little-known

environments within broader (or multidisciplinary) contexts related to their area of study.

B08. That students are able to integrate knowledge and face the complexity of formulating judgments based on information that, being incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments.

B09. Let students communicate their conclusions - and the latest knowledge and reasons that support them - to specialized and non-specialized audiences in a clear and unambiguous way.

B10. That students have the learning abilities that allow them to continue studying in a way that will have to be very self-directed or autonomous.

Generic skills:

CG1. Apply mathematical, analytical, scientific, instrumental, technological and management aspects.

CG2. Technically and economically manage projects, facilities, plants, companies and technology centers.

CG3. Research, develop and innovate.

CG4. Lead, plan and supervise multidisciplinary teams.

Transversal skills:

CT1. Communicate clearly and precisely orally and in writing in Catalan and Spanish and in a third language, especially English.

CT2. Efficiently use digital technologies in their professional field.

CT3. Propose innovative, creative and entrepreneurial solutions in situations typical of the professional field.

CT4. Evaluate the sustainability and social impact of the proposed proposals and act with ethical, environmental and professional responsibility.

Specific competences:

CE4. Apply theories and principles of leather engineering in order to analyze complex situations and make decisions through engineering resources.

CE9. Design a strategic planning and apply it to systems of production, quality and environmental management in the field of leather engineering.

## Subject contents

Carrying out a scientific-technical work related to the field of leather.

Scientific and technological research and the different methods of investigation. Scientific communication Sources of information and research strategies of the same. Foundations to write different scientific-technical documents.

Basic principles of statistical design of experiments: designs with a completely randomized factor, designs with more than one factor, factorial designs, fractional factorial designs, designs with Latin squares, statistical optimization.

## Methodology

The methodological axes of the subject are:

1. Master classes.

2. Problem resolution.

5. Case study.

6. Project plan.

9. Written work.

10. Problem based learning.

11 Inverted education.

## Development plan

The subject consists of theoretical classes assigned to the general schedule of the Master in Leather Engineering.

Problems will be done in class.

The first partial exam will be held during the week of March 27 to 31.

The second partial exam will be held during the weeks of May 29 to June 23.

The make-up exam will be held during the week of June 26 to June 30.

## Evaluation

Evaluation	Proportion
Exercises	15%
Group work	15%
Oral Exposition	25%
Written tests	35%
Tutors' report	10%

## Bibliography

MAIN:

• Bacardit, A.; Ollé, L.;  
Diseño de experimentos en

ingeniería del cuero. EEI, 2011. ISBN 84-931837-8-4

• Box, G.E., Hunter W.G., Hunter J.S.; Estadística para investigadores, Ed. Reverté, 1989

ADDITIONAL:

• Montgomery, D.C.; Design and analysis of experiments, Ed. John Wiley & Sons, Singapur, 1991

• Kuehl, R.O.; Diseño de experimentos, Ed. Thomson Learning, México, 2001.

• Boletines técnicos: AQEIC, Mecanipiel., World Leather, JSLTC, JALCA, CPM.