



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

<b>Subject name</b>	RESEARCH METHODOLOGY AND EXPERIMENTAL DESIGN			
<b>Code</b>	103122			
<b>Semester</b>	1st Q(SEMESTER) CONTINUED EVALUATION			
<b>Typology</b>	Degree	Course	Character	Modality
	Master's Degree in Leather Engineering	2	OPTIONAL	Blended learning
<b>Course number of credits (ECTS)</b>	6			
<b>Type of activity, credits, and groups</b>	Only examination			
<b>Coordination</b>	BACARDIT DALMASES, ANNA			
<b>Department</b>	INDUSTRIAL AND BUILDING ENGINEERING			
<b>Teaching load distribution between lectures and independent student work</b>	Classroom and laboratory lessons: 60 hours Self study: 90 hours			
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.			
<b>Language</b>	Catalan Spanish English			
<b>Distribution of credits</b>	Anna Bacardit 3 ECTS Eulàlia Borràs 3 ECTS Theoretical 2C Theoretical 2 ECTS Practical 1,5C Practical 1,5 ECTS			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
BACARDIT DALMASES, ANNA	anna.bacardit@udl.cat	0	

## 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. Owing 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.

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 competencies:

CG1. Apply mathematically, analytical, scientific, instrumental, technological and management aspects appropriately.

CG2. Technical and economic management of projects, facilities, plants, companies and technology centers.

Specific competences:

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

CE10. 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

# RESEARCH METHODOLOGY AND EXPERIMENTAL DESIGN 2023-24

Week	Methodology	Units	Attendance hours	Autonomous working hours
1	Lectures and exercise solving lessons. Practical activity.	Unit 1	2,5	4,75
2	Lectures and exercise solving lessons. Practical activity.	Unit 1	5	4,75
3	Lectures and exercise solving lessons. Practical activity. Laboratory session.	Units 2	5	7,5
4	Lectures and exercise solving lessons. Practical activity.	Unit 3	5	7,5
5	Lectures and exercise solving lessons. Practical activity.	Unit 3	5	7,5
6	No Lectures in this week			
7	Lectures and exercise solving lessons. Practical activity.	Unit 4	5	7,5
8	Lectures and exercise solving lessons. Practical activity.	Unit 4		7,5
9	Mid-course Exam	Units 5	5	5
10	No Lectures in this week			
11	Lectures and exercise solving lessons. Practical activity.	Unit 5	5	7,5
12	Lectures and exercise solving lessons. Practical activity.	Unit 6	5	7,5
13	Lectures and exercise solving lessons. Practical activity.	Unit 5	5	7,5
14	Lectures and exercise solving lessons. Practical activity.	Units 7	5	4,75
15	Lectures and exercise solving lessons. Oral and written presentation of the Group Work.	Unit 7	5	4,75
16-17	Final Exam		2	6
18	Tutoring			
19	Second-chance Exam			

## Evaluation

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

## Bibliography

MAIN:

- Bacardit, A.; Ollé, L.;

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

## ADITIONAL:

- 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.