



Universitat de Lleida

# DEGREE CURRICULUM **LEATHER PROCESS CHEMISTRY 2**

Coordination: COMBALIA CENDRA, FELIP

Academic year 2023-24

## Subject's general information

Subject name	LEATHER PROCESS CHEMISTRY 2			
Code	103153			
Semester	1st Q(SEMESTER) CONTINUED EVALUATION			
Typology	Degree	Course	Character	Modality
	Master's Degree in Leather Engineering	1	COMPULSORY	Attendance-based
Course number of credits (ECTS)	5			
Type of activity, credits, and groups	Activity type	PRALAB	PRAULA	TEORIA
	Number of credits	2	1.5	1.5
	Number of groups	1	1	1
Coordination	COMBALIA CENDRA, FELIP			
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			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
COMBALIA CENDRA, FELIP	felip.combalia@udl.cat	3	
SOLE FERRER, MARIA MERCE	mariamerce.sole@udl.cat	2	

## 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.
- To promote the contact of the students with companies and events related to the search of 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 Congresses and indexed magazines.

- If you do not carry out any of the activities of the laboratory or continuous evaluation, it will be considered as not evaluated.

It is **COMPULSORY** that the students bring the following elements of individual protection (EPI) to the practices at the laboratory.

- Laboratory gown from UdL
- Protection glasses
- Chemical protection gloves

They can be purchased through the shop Údels of the UdL:

C/ Jaume II, 67 baixos  
Centre the Cultures i Cooperació Transfronterera

<http://www.publicacions.udl.cat/>

There will be a specific service for the *Campus Universitari d'Igualada*.

The use of other elements of protection (for example caps, masks, gloves of chemical or electrical risk, etc.) will depend on the type of practice to be done. In that case, the teacher will inform of the necessity of specific EPI.

Not bringing the EPI's described or not fulfilling the norms of general security that are detailed below imply that the student can not access to the laboratories or have to go out of them. The no realisation of the practices for this reason imply the **consequences in the evaluation** of the subject that are described in this course guide.

## GENERAL NORMS OF SECURITY IN LABORATORY PRACTICES

- Keep the place of realisation of the practices clean and tidy. The table of work has to be free from backpacks, folders, coats...
- No short trousers or short skirts are allowed in the laboratory.
- Closed and covered footwear is compulsory in the laboratory.
- Long hair needs to be tied.
- Keep the laboratory gown laced in order to be protected from spills of chemicals.
- Bangles, pendants or wide sleeves are not allowed as they can be trapped.
- Avoid the use of contact lenses, since the effect of the chemical products is much bigger if they enter between the contact lense and the cornea. Protection over-glasses can be purchased.
- No food or drink is allowed in the laboratory.
- It is forbidden to smoke in the laboratories.
- Wash your hands whenever you have contact with a chemical product and before going out of the laboratory.
- Follow the instructions of the teacher and of the laboratory technicians and ask for any doubt on security.

For further information, you can check the following document of the *Servei de Prevenció de Riscos Laborals de la UdL*: <http://www.sprl.udl.cat/alumnes/index.html>

## Learning objectives

When finishing the subject the student must be able to:

- Identify macromolecules:organic and inorganic.
- Identify different polymeric materials used in the industry.
- Description of different polymerization processes at the industrial level.
- Planify the synthesis of a polymer.
- To explain the modifications produced in the leather when it is retanned with certain types of polymers.
- Deduct which types of monomers should be used to obtain a polymer to be used in the leather finishing process.
- Define the main characteristics of the polymers used in the skin finishing process.
- Analyse different types of polymers to determine their physical, structural and chemical properties.

## Competences

- Basic competences

B06. To be original in the development and / or application of ideas, often in a research context.

B07. To 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

B10. To have the learning abilities that allows to continue studying in an autonomous way.

- General competences

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

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.

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

CE1. To analyze the different raw materials, intermediate and final products in the leather manufacturing process.

CE8. To apply the main mechanisms of the organic reactions of the macromolecules and the polymers to their synthesis and their application in the industry.

## Subject contents

1. Chemistry of neutralizing.
2. Organic macromolecules: tannins.
3. Application of macromolecules and polymers in leather retanning.
4. Involved agents in the dyeing and fatliquoring operations.
5. Synthesis of macromolecules and polymers.
6. Introduction to polymeric materials.
7. Structure, conformation and morphology of polymers.
8. Physical, structural and chemical properties of polymers.
9. Synthesis of acrylic resins.
10. Synthesis of butadiene resins.
11. Synthesis of polyurethanes.
12. Synthesis of cellulose derivatives lacquers.
13. Analysis of the polymers used in the leather finishing processes.

## Methodology

- 1 Master classes.
- 2 Exercise and / or problem resolution
- 3 Practices.
- 4 Group work.
- 5 Visit.
- 6 Conferences.
- 7 Written work.
- 8 Inverted education

## Development plan

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

Visits and seminars will be made to companies outside the general schedule.

A week of practices will be held during the month of May.

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
Exercices	10%
Study case resolution	10%
Practices report	20%
Written test	40%
Company visit	10%
Tutor's report	10%

## Bibliography

MAIN:

• Apunts de l'assignatura.  
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Digital UdL.  
Horta Zubiaga, A.;  
Macromolècules. 2 vols.  
Madrid: UNED, 1991. ISBN  
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- Seymour, R.B.; Carraher, C.E. Jr.; Introducción a la química de los polímeros. Ed. Reverté, 1995. ISBN 84-291-7926-7.
- Szycher, M.; Szycher's handbook of polyurethanes. CRC Press, 1999. ISBN 978-0-8493-0602-0.
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- Morera, J.M. (2000). *Química Técnica de Curtición*. 1a ed. Igualada: EUETII-ESAI.
- Bacardit, A y Ollé, L. (2002). *El Acabado del cuero*. 1a ed. Igualada: EUETII-ESAI.
- Ege, S. (2000). *Química Orgánica*. 1a ed. Barcelona: Ed. Reverté, S.A.
- Vollhardt, K.P.C.; Heathcock, C.H. (1990). *Química Orgánica*. 1a ed. Barcelona: Ed. Omega, S.A.
- Streitwieser, A. (1987). *Química Orgánica*. 3a ed. Madrid: Ed. Interamericana.

ADDITIONAL:

- Brydson, J.A.; Plastics materials. Oxford: Butterworth-Heinemann, 1999. ISBN 0-7506-4132-0.
- Atlas of polymer and plastics analysis, D.O. Hummel. Verlag, 3a. Ed, 1991.