



Universitat de Lleida

DEGREE CURRICULUM  
**PROTEIN CHEMISTRY**

Coordination: MORERA PRAT, JOSEP MARIA

Academic year 2018-19

Subject's general information

<b>Subject name</b>	PROTEIN CHEMISTRY			
<b>Code</b>	103116			
<b>Semester</b>	1st Q(SEMESTER) CONTINUED EVALUATION			
<b>Typology</b>	<b>Degree</b>	<b>Course</b>	<b>Character</b>	<b>Modality</b>
	Master's Degree in Leather Engineering	1	COMPULSORY	Attendance-based
<b>Course number of credits (ECTS)</b>	6			
<b>Type of activity, credits, and groups</b>	<b>Activity type</b>	PRALAB	PRAULA	TEORIA
	<b>Number of credits</b>	2	0.5	3.5
	<b>Number of groups</b>	2	1	1
<b>Coordination</b>	MORERA PRAT, JOSEP MARIA			
<b>Department</b>	COMPUTER SCIENCE AND INDUSTRIAL ENGINEERING			
<b>Teaching load distribution between lectures and independent student work</b>	60 hours classroom lessons Self study 90 hours			
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.			
<b>Language</b>	Català/Castellà			
<b>Distribution of credits</b>	3.5 teoria 0.5 praula 2 pralab			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
MORERA PRAT, JOSEP MARIA	josepmaria.morera@udl.cat	6	
SPINOSI , RENO	reno.spinosi@udl.cat	2	

## Subject's extra information

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
- Mechanical 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

At the end of the activity, the student must be able to:

- Know the definition of amino acids, peptides and proteins
- Formulate amino acids, peptides and proteins correctly
- Know and apply the acid-base properties of amino acids
- Know the structure of proteins
- Know the factors that influence the denaturation of proteins
- Know the composition of collagen
- Know the main applications of collagen
- Know the main chemical reactions that affect the tanning process
- Know the main types of tanning and retanning

## Competences

### Basic

B06 To possess and understand 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 students know how to apply the acquired knowledge and have the ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.

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

### General competitions

CG1. To apply properly mathematical, analytical, scientific, instrumental, technological and management aspects.

### Specific competences

CE2. To analyze, apply and project the main unit operations and the systems that make up the leather manufacturing process.

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

CE9. To project, calculate and design products, processes, facilities and layouts, related to the field of leather engineering.

## Subject contents

### Teoria

1. Amino acids, peptides and proteins
2. The collagen
3. Main reactions of collagen during the tanning process
4. Stabilization of collagen: Types of tanning

### Laboratory practices

1. Buffering simulation in delimiting
2. Manufacture of a chrome liquor
3. Study of the relation-oxalation of chrome salts
4. Masking of chrome salts
5. Detanning methods
6. Leather faded

## Methodology

- Master classes. Theoretical explanation reinforced with examples.
- Problems. Discussion and correction of exercises proposed at home. The exercises will be provided to the student in a dossier.
- Practices. In the laboratory for groups. Each group will have to submit a report.
- Written evidence. Exercise resolution by the student individually.

## Development plan

Week	Methodology	Content	Classroom hours	Self study hours
1-5	Classroom lessons/problems	Subjects 1-2-3	15	23
6	Laboratory practices	Laboratory practices	20	35
7-8	Classroom lessons/problems	Subject 3	6	9
9	Exam	Subjects 1-3	2	
10	-	-	-	-
11-15	Classroom lessons/problems	Subject 4	15	23
16	Exam	Subject 4	2	

## Evaluation

In the middle of the course there will be an eliminatory midterm exam. At the end of the course there will be a second midterm exam and an final exam. At the end of the course the student who passed the first midterm exam will have the possibility of taking the second midterm exam or doing the final exam. The student who has suspended the first midterm exam may only take the final exam. Each midterm exam will be worth 35% of the final mark of the subject and the final exam will be 70%.

The exercises presented and evaluated during the course will weigh 10% of the final mark of the subject.

The practices (work in the laboratory + report) will weigh 20% of the final mark of the subject

## Bibliography

### **Básic:**

Morera, J.M. (2000). *Química Técnica de Curtición*. 1a ed. Igualada: EEI-EAI. ISBN 84-931837-0-9.

Covington, A.D. (2011). *Tanning Chemistry. The Science of Leather*. 1a ed. Cambridge: RSC Publishing. ISBN 978-1-84973-434-9

Heidemann, E. (1993). *Fundamentals of Leather Manufacturing*. 1a ed. Darmstadt: Eduard Roether K.G. ISBN 3-7929-0206-0.

Bruice, P.Y. (2008), *Química Orgánica*, 5a ed. México: Pearson Educación. ISBN 9789702607915.

### **Complementary:**

Wade Jr., L.G. (2004). *Química Orgánica*. 5ª ed. Madrid, [etc.]: Pearson Educación, cop. 2004. ISBN 9788420541020.

Vollhardt, K.P.C.; Heathcock, C.H. (1990). *Química Orgánica*. 1a ed. Barcelona: Ed. Omega, S.A. ISBN 8428208824.

Streitwieser, A. (1987). *Química Orgánica*. 3a ed. Madrid: Ed. Interamericana. ISBN 8476053533.

Ege, S. (2000). *Química Orgánica*. 1a ed. Barcelona: Ed. Reverté, S.A. ISBN 8429170650 (O.C.).

O'Flaherty, F. Y otros. (1978). *The Chemistry and Technology of Leather*. 1a ed. Malabar: Krieger Publishing Company