



Universitat de Lleida

DEGREE CURRICULUM
**INSTRUMENTAL ANALYSIS
AND STANDARDIZATION**

Coordination: SOLE FERRER, MARIA MERCE

Academic year 2023-24

Subject's general information

Subject name	INSTRUMENTAL ANALYSIS AND STANDARDIZATION			
Code	103156			
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	3	0.5	1.5
	Number of groups	1	1	1
Coordination	SOLE FERRER, MARIA MERCE			
Department	INDUSTRIAL AND BUILDING ENGINEERING			
Teaching load distribution between lectures and independent student work	Classroom and laboratory lessons 50 hours Self study 70 hours			
Important information on data processing	Consult this link for more information.			
Language	Catalan, Spanish and English			
Distribution of credits	Theoric lessons 1.5C Laboratory practises 0.5C Pralab 3C			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
SOLE FERRER, MARIA MERCE	mariamerce.sole@udl.cat	5	

Subject's extra information

The main objectives for the students are to acquire an advanced ability to evaluate the quality of the leather and its raw materials, and the solutions to its measuring problems.

In order to achieve these goals, an introduction into the chemical, physical and leather solids laboratory practices will be done.

A very important aspect of this subject is the aptitude of interpreting the results of the analysis of leather, and the capability to correlate these results with the influence of the mechanical and chemical factors of the production processes.

Due to the great significance of the regulations, guidelines, quality specifications and the Restricted Substances Lists in this field, the student will be introduced to the mechanisms and necessary sources in order to be continuously updated.

This is a very practical subject, and the methodology insists on making exercises (problem solving exercises and short laboratory tests) in every lesson.

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 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

- Acquire advanced knowledge about solving the problem of measuring and evaluating the quality of the leather and its raw materials.
- To know the necessary resources to keep updated on the constant changes of the regulations about leather testing.
- To know the use of material and devices found in the testing leather laboratory.
- To know how to correctly read and interpret the information given by every test or analysis.
- The student must develop a necessary criterion to correctly interpret the causes and factors that led to the obtained results of the leather analysis, being able to integrate and correlate them with the knowledge learned in the subjects of Technology and Processes.
- To achieve the ability to apply the learned information into creating possible solutions to new analytical challenges, which may appear in the leather sector. As well as to improve the existing methods, basing from procedures of other industries.
- Acquire the adequate scientific fundamentals to adapt in any emerging technique or method.

Competences

Basic Competences

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 selfdirected or autonomous.

General Competences

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

CG4. Lead, plan and supervise multidisciplinary teams.

Specific Competences

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

CE11. To apply the necessary legislation in the field of leather engineering.

Transversal Competences

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

CT2. Efficient use of digital technologies in the professional field.

CT3. To propose innovative, creative and enterprising solutions in situations specific to the professional field.

CT5. Apply the gender perspective to the functions of the professional field.

Subject contents

Unit 1. Standardization of leather testing

Unit 2. Sampling

Lesson 2.1. Number of leathers to analyze from the batch.

Lesson 2.2. Location of sampling on the leather.

Unit 3. The physical testing of leather

Lesson 3.1. General comments. Conditioning.

Lesson 3.2. Measurement of dimensions.

Lesson 3.3. Resistance to mechanical and abrasive actions.

Lesson 3.4. Performance from water and water vapor.

Lesson 3.5. Performance from heat and cold.

Unit 4. Measuring leather fastness

Lesson 4.1. The concept of fastness. Characteristics of fastness tests.

Lesson 4.2. Study of the main fastness tests.

Unit 5. Chemical analysis of leather

Lesson 5.1. Introduction to the leather chemical analysis. RSL lists.

Lesson 5.2. Determination of main components: moisture, fats, leather substance, etc.

Lesson 5.3. Determination of pH.

Lesson 5.4. Determination of chromium and other inorganic substances. Chromium(VI).

Lesson 5.5. Determination of formaldehyde and other low concentration substances.

Unit 6. Quality requirements

Lesson 6.1. Concept of Quality. Quality regulations and recommendations. Leather Working Group.

Lesson 6.2. Case study: The quality of the leather for footwear.

Unit 7. Analysis of chemical products and raw materials

Lesson 7.1. Control of pickled and wet-blue leather.

Lesson 7.2. Analysis of raw chemicals.

Lesson 7.3. Analysis of vegetable tanning extracts.

Lesson 7.4. Analysis of fatty products / fatliquors.

Lesson 7.5. Analysis of other products.

Unit 8. Waste water analysis

Lesson 8.1. Waste water reference values.

Lesson 8.2. Tannery waste water features.

Lesson 8.3. Sampling.

Lesson 8.4. Determination of Organic load.

Lesson 8.5. Determination of Suspended matter.

Lesson 8.6. Determination of Metal content.

Lesson 8.7. Determination of Nitrogen.

Lesson 8.8. Determination of Phosphorous.

Lesson 8.9. Determination of Toxicity.

Unit 9. Practices

Methodology

The three main points of the Subject are:

1. Theory: Lectures where the professor exposes the definitions, materials and the working plan.
2. Practical exercises: Solving exercises and short laboratory tests. Optionally, a group project will be included, with an oral and written presentation.
3. Visit to the facilities of the A3 Leather Innovation Center.
4. Laboratory practices: Carrying out laboratory practices, with a later written presentation.

In every unit, various exercises will have to be done individually and autonomously by the students, and handed in to the teacher to assess them.

In addition, the students have the responsibility to reinforce their knowledge in an autonomous approach, taking as a foundation the content given and/or recommended by the teacher.

Development plan

Week	Methodology	Units	Attendance hours	Autonomus working hours
1	Lectures and exercise solving lessons.	Unit 1	5	5,5
2	Lectures and exercise solving lessons. Practical activity.	Unit 2	5	5,5
3	Lectures and exercise solving lessons. Practical activity.	Unit 3	5	5,5
4	Practices MEC			
5	Lectures and exercise solving lessons. Practical activity. Laboratory session.	Unit 3	5	5,5
6	Practices MEC			
7	Lectures and exercise solving lessons. Practical activity. Laboratory session.	Unit 4	5	5,5
8	Lectures and exercise solving lessons. Laboratory session.	Unit 4	5	5,5
9	Mid-course Exam	Units 1-4		7
10	Lectures and exercise solving lessons. Practical activity.	Unit 5	5	5,5
11	Lectures and exercise solving lessons. Practical activity. Laboratory session.	Unit 5	5	5,5
12	Practices MEC			
13	Lectures and exercise solving lessons.	Unit 6	5	5,5
14	Practices MEC			
15	Lectures and exercise solving lessons. Practical activity. Laboratory session.	Unit 7 and 8	5	5,5
16-17	Final Exam	Units 5-8		7
18	Tutoring			
19	Second-chance Exam			

Evaluation

Exercises	25%
Laboratory practices	25%
Written Test 1 (Units 1-4)	25%
Written Test 2 (Units 5-8)	25%

Students have the right to take the second chance exam of the Written Test 2 in the 19th week. In order to have the right to obtain the final grade, the laboratory practices must be carried out and the corresponding reports delivered on time.

The student who has the approval to be evaluated through alternative evaluation (see requirements and procedure in the evaluation regulations) must perform the following activities: written test 1 and 2 (85%) and laboratory (15%).

Bibliography

Main bibliography

- Font, J. (2016). Análisis y Ensayos en la Industria del Curtido. Escuela de Ingeniería (Igualada).
- Font, J. (2018). Dossier of the Subject in the UdL Campus

Additional bibliography:

- D.C. Harris. Quantitative Chemical Analysis. (2007). Ed. W.H. Freeman, 7th Edition.
- Standard methods published in the Journals JSLTC and AQEIC.
- Journals: Journal of AQEIC, World Leather, JSLTC, JALCA, CPMC.
- <http://www.iultcs.org>
- <http://www.iso.org>
- <http://www.aenor.es>
- http://www.aqeic.org/aqeic_2014/esp/