



## COLORIMETRY AND ADVANCED FINISHING

**COORDINATION**  
BEGUE, DELPHINE

**ACADEMIC YEAR**  
2023-2025

### SUBJECT GENERAL INFORMATION

Subject name	COLORIMETRY AND ADVANCED FINISHING			
Code	3SEM-SUB1			
Typology	3rd semester. Continued evaluation.			
Course number of credits (ECTS)	9			
Type of activity, credits, and groups	<i>Degree</i>	<i>Course</i>	<i>Character</i>	<i>Modality</i>
	<i>Joint Master Degree in Leather Technology</i>	<i>1</i>	<i>Compulsory</i>	<i>Blended learning</i>
Coordination	BEGUE, DELPHINE			
University	ITECH			
Language	English			

## LEARNING OBJECTIVES

- 1- Learn to visually assess colour.
- 2- To measure and control colour.
- 3- Understand and interpret colorimetric measurements.
- 4- To understand colorimetry in leather industry.
- 5- To understand the tools for matching colour in leather dyeing.
- 6- To understand how to formulate a colour in leather finishing.
- 7- To know how to control colour on leather.
- 8- To understand leather finishing: formulations, mechanical operations.
- 9- To understand the different kind of finishing (raw materials, applications, up-grading).
- 10- To understand leather finishing and specifications.
- 11- To understand a countertype process in finishing.

## LEARNING OUTCOMES

### Basic

CB6 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.

CB7 That students have the learning skills that allow them to continue studying in a way that will be largely self- directed or autonomous

### General

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

CG3 Research, develop and innovate.

CG4 Lead, plan and supervise multidisciplinary teams.

### Specific

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

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

CE5 Identify the main industrial processes of leather manufacturing in its three phases: beamhouse, tanning and post-tanning and finishing.

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

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

## SUBJECT CONTENT

### 1. COLOUR ANALYSIS

#### 1.1. Color - Basic Elements and Principles

- Definition of color
- Light (composition - properties)
- CIE Illuminants
- The Eye - Vision of color - Defects
- CIE Observer
- Description of colors
- Use of Dyes and Pigments
- The Combination Laws: addition/subtraction synthesis, juxtaposition
- The Color Circle
- The Color Triangle
- Metamerism (definition - reasons)
- Color Matching (method - practical advice)

#### 1.2. Colorimetry

- Color Cards/Charts and Atlas
- The Measurement of Colors: CIELab System - CIE 1931 Diagram - RGB System
- Quality Control :  $DE^*$  -  $DE\ CMC$  -  $DE\ CIE\ 1994$  -  $DE\ CIE\ 2000$  - Indexes ...
- Tolerance and acceptance of colors
- Measurement Devices: Colorimeters- Spectrocolorimeters - Multiangles ...

#### 1.3. The coloring of products and materials

- The Calculation of Color - Software for Computer-Aided Color Matching
- Prediction of Formulae / Compositions to obtain a target color
- Color Processing Rules
- Relations gloss / color and hiding power / color
- Kubelka-Munk Theory and Saunderson Correction
- Opaque / transparent / semi-transparent Coloring
- Formulation and Correction of Color (CACM)
- Control of Color Strength

### 2. COLOUR ANALYSIS PRACTICALS

#### 2.1. Colorimetry: dyeing

- Ternary Diagram (Maxwell triangle) methodology, trichromy.
- Dyestuff data sheet analysis, CE
- Colour matching in dyeing

## **2.2. Colorimetry: finishing**

- Colour matching in finishing
- Spectrophotometer for formulation: pigment data
- Spectrophotometer for quality control
- Metamery

## **3. ADVANCED LEATHER FINISHING**

### **3.1. A Reminder: Finishing basics**

- Support
- Kinds of finishings
- Structure of the finishing

### **3.2. A Reminder: Chemicals**

- Resins
- Colors
- Additives

### **3.3. How a formulation is done**

- Choice of resins
- How achieve the color
- Additives and impacts on the properties

### **3.4. Technology of finishing**

- Spray
- Roller coating
- Drying systems
- Other Application methods
- Mechanical Process

### **3.5. Products Process & specific cases**

- A few basics about specifications
- Leather goods & shoes
- Garment
- Nappa: Automotive/Upholstery

#### 4. LEATHER FINISHING PRACTICALS

- 4.1. To check leather: standards quality controls (veslic, flexometer, others...)
- 4.2. To draw up specifications
- 4.3. To propose a finishing process
- 4.4. To countertype an original finishing
- 4.5. To do different kinds of finishing's: garment, leather goods, automotive, upholstery...

### METHODOLOGY

#### THEORY CLASSES

E-learning via digital campus, with the explanation of concepts, materials and work plan.

Support material: Course notes and relevant bibliography.

#### EXERCISES AND SELFSTUDY

Supervised exercise sessions by the teacher

General description: Individual exercises, self-learning and individual study.

Support material: Course notes and relevant bibliography.

Deliverable: Exercises to deliver at the end of every unit via digital campus.

#### PRACTICES IN THE TANNING PILOT PLANT

General description: Formulations of different processes will be performed on a pilot level, individually or in small groups. It should be performed a notebook where to recorded all the modifications of the process and used products during the process.

Support material: Practices are held at the leather pilot plant. All materials and chemicals are in the same pilot plant. The scripts of the processes will be provided by the teacher in charge of monitoring practices.

Deliverable: At the end of these practices the student shall deliver the practices report, which will content note of all the data, calculations, incidents, and observations. They should expose to the teacher their results during an oral presentation

### EVALUATION

Exercises	10%
Practices	30%
Exam 1	30%
Exam 2	30%