IPL INTERNATIONAL SUMMER SCHOOL

ITECH ÉCOLE D'INGÉNIEURS FORMATION - RECHERCHE

SUMMER SCHOOL
in applied chemistry

June 11 - July 09, 2026
Lyon, France

The €2500 program fee covers:

- **Housing in a student residence**
  Individual rooms with bathroom.
- **French classes**
  ECTS credits: 2. Three levels: beginner, intermediate, advanced.
- **Tentative list of cultural and industrial visits and activities**
  Transportation provided.

In Lyon

- A **tour of the city** and its architecture, history
- A **cooking class**
- **A French session** at the local market
- A session on **intercultural communication**

Tain l'Hermitage

- **Valrhôna:** chocolate museum and factory with a tasting
- **Cave de Tain:** tour of a winery with a tasting **The Lyon region**
- **Visits to companies :** Bayer, The United Nations Office at Geneva ou Red Cross Office at Geneva
- Visit to a cosmetics company (TBC)

- **Practical lab sessions at ITECH**
  ECTS credits: 7

Program

I. Adhesive formulation and practical work in application

Instructor: Sylvie Durdilly et Céline Akono-Zibi

- **Manufacturing, application, and controls of a wood adhesive with:**
  - Specifications
  - The role of raw materials
  - Control of bonds (on the wood shear ample)
  - Shear test with a dynamometer
  - Application of a pressure sensitive adhesive
  - Loop tack test with a dynamometer

II. Manufacturing of decorative water-based paints

Instructor: Jean-Pascal Philibert

- **Main steps of the process**
  - Handling the raw materials for a white water-based paint *(fillers, pigment, binder, additives)*
  - Carrying out all the stages of the process
  - Application on standard panels
  - Quality control of decorative paint: rheology/opacity/gloss/specific gravity/dry content
  - Analysis of the results

- **Learning outcomes**
  - Process engineering: water-based coating manufacturing
  - Structure/properties relations: impact of raw materials on coating performances
  - Quality control: how to characterize a liquid paint formulation

III. How to design a plastic part: from design to end-of life.

Instructor: Cédric Boschard

- **How to choose a plastic material:**
  - Introduction to what is a plastic and different families
  - Practical work on material recognition
- **How to design a part and understand its properties:**
  - Demonstration and practical session on a CAD software
  - Demonstration of multiple standardized tests for plastics
- **The different manufacturing techniques**
  - Introduction to different plastic processing technologies *(Injection, Thermoforming…)* along with demonstrations
- **Recycling:**
  - Closed-loop economy, and sustainable development
- **Learning outcomes**
  - Understanding what is a plastic with their different families
  - Basic knowledge of different plastic processing technologies *(Injection molding, thermoforming, etc…)*
  - Characterization of plastic materials *(tensile, Impact…)*
  - Basic knowledge on plastic recycling techniques.

IV. Practical work in colorimetry

Instructor: Caroline Gouttebarge and Sophie Nazarian

- **Course content**
  - Presentation of basics of colorimetry: observation conditions *(lights)*
  - Color characteristics *(hue, chroma, lightness)*
  - Presentation of colorimetry software:
    * Quality control: interpretation of colorimetry data *(Cielab color space)*
- **Practical work**
  - Reproduce a target color using colorimetric software and lights cabin
- **Learning outcomes**
  - Visual evaluation of color
  - Measurement of tonality, saturation, color
  - Color matching *(with various tools)*

V. Introduction to leather manufacturing

Instructor: Franck Diaz, Agnès Thomasset, and Delphine Bégué

- **Theoretical content**
  - Introduction to leather processes: from raw hides to finish leather : Beamhouse, Tanning, Wet-end, and Finishing
  - The basics of leather formulation
- **Practical work**
  - Let's dive into the wet-end process and give the intrinsic characteristics to leathers : Color and softness
  - Let's discover the finishing process and make finished leather: Upgrading, final color, shine, touch and protection
- **Learning outcomes**
  - Basics of protein reactivity
  - Tanning and cross linking of collagen
  - Coloration of leather: wet-end and finishing
  - Hiding leather defects in finishing
  - Basic knowledge of leather production
  - Dye and pigment selection

VI. Analytical chemistry

Instructor: Pascale Fillon and Oriane Cavelier

- **Practical work to learn chemistry laboratory skills, notably the following:**
  - Gas chromatography: gas chromatography principle and concrete application on the analysis of a mixture of unknown solvents *(separation, identification and quantification)*
  - Infrared spectro-photometry principle: sampling techniques according to the product under analysis, highlight of major chemical bonds, identification of unknown polymers, concrete applications on any type of support *(liquid, powder, plastic material, paint, textile, leather...)*
- **Learning outcomes**
  - What gas chromatography analysis and infrared spectro-photometry are used for, what information they allow one to gather about a product
  - "Reverse engineering": analyzing the components of materials
  - Become familiar with some of the machines used to carry out these analyses, how to interpret the results

VII. Introduction to cosmetic products

Instructor: Sophie Nazarian

- **Theoretical class:**
  - What is an emulsion?
  - What are lipsticks made of?

- **Practical class:**

Make-up products: lipstick

- Formulation and characterization of a lipstick
  * with different waxes
  * with different oil phases
  * Controls: sensory tests

Skin care products: emulsions

- Formulation of oil/water and water/oil emulsions
  * with different nature of surfactants
  * with different oil phases
  * Controls: pH, viscosity, centrifugation and microscope observations

Learning outcomes:

- Basic principles of chemical formulation with the added sanitary constraints applied to cosmetics – Characterization: analysis and measure of materials' structure and properties
- Introduction to controls: quality, tests for desired properties
- Introduction to some of the main raw materials used in cosmetics

VIII. Introduction to textile manufacturing

Instructor: Fabien Roland

- **Presentation of the manufacturing textile chain, from raw materials to end-products**
  - Overview of textile technologies and relative machines
  - Visit of the textile platform
    * Spinning, weaving and knitting workshops
    * Finishing and testing laboratories
- **Practical work: treatments on a cotton/polyester blend fabric**
  - Dyeing
    * Use of a dyeing lab machine, type jigger
    * Development of a dyeing recipe and a dyeing process
    * Analysis of the result: color yield, levelness
  - Chemical finishing
    * Use of a finishing lab line, type padder and stenter frame
    * Development of a finishing recipe with chemical repellents
    * Analysis of the result: water and oil repellency control
- **Learning outcomes**
  - Textile manufacturing technologies
  - Dyeing machinery and process
  - Stain-repellent finishing

Applications are now open!

Ideal for students with one or two years of undergraduate studies in science, especially chemistry.

For more program information and the application, visit:
www.iplsummerschool.com

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