

Course guide

320081 - DBTC - Design of Bleaching and Dyeing Processes. Colorimetry

Last modified: 02/04/2024

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 702 - CEM - Department of Materials Science and Engineering.

Degree: BACHELOR'S DEGREE IN TEXTILE TECHNOLOGY AND DESIGN ENGINEERING (Syllabus 2009). (Compulsory subject).

Academic year: 2024 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: Riba Moliner, Marta

Others: Cayuela Marin, Diana

PRIOR SKILLS

Previously studying the subject Materials for Textile Product Design is highly desirable.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

CE20-GETDT. Applied knowledge of sizing and finishing processes. (Specific Technology Module: Textile)

CE23-GETDT. Applied knowledge of preparation, bleaching, and dyeing unit operations. (Specific Technology Module: Textile)

CE25-GETDT. Applied knowledge of chemistry for the textile industry. (Specific Technology Module: Textile)

TEACHING METHODOLOGY

- Presential sessions for delivery of the topics with active student involvement.
- Presential sessions of practical work.
- Self-directed study and report preparation. Cooperative learning.
- Preparation and development of assessable group activities.

LEARNING OBJECTIVES OF THE SUBJECT

GLO1. To acquire a professional knowledge for the design of colour spaces and the preparation, bleaching, batch dyeing and surface colorimetry of all types of textiles.

GLO2. To develop skills for industrial quality and safety management in batch dyeing processes.

GLO3. To become acquainted with the industrial network of dye and finish manufacturers and the technical specifications for finished textiles, with a view to the integral development of textile production processes.

GLO4. To develop the specific and transversal skills associated to the academic work.

STUDY LOAD

Type	Hours	Percentage
Self study	90,0	60.00
Hours large group	30,0	20.00
Hours small group	30,0	20.00

Total learning time: 150 h

CONTENTS

Topic 1: DESIGN OF PREPARATION AND BLEACHING PROCESSES

Description:

- 1.1. Unit processes: Singeing, carbonising, , scouring, degreasing, washing, chemical and optical bleaching.
- 1.2. Optimization of processes formulations.
- 1.3. Optimization of production processes.
- 1.4. Technical specifications for the resulting textile products, with emphasis on international trade

Specific objectives:

- OE2. Assessing the reliability of tests
- OE3. Planning testing quality control process and product.
- OE4. Criteria for the presentation of results.

Related activities:

RA0, RA1

Full-or-part-time: 50h

Theory classes: 10h

Laboratory classes: 10h

Self study : 30h

Topic 2: INDUSTRIAL USES OF COLORIMETRY

Description:

- 3.1. Fundamentals of instrumental colorimetry.
- 3.2. Colour measurement
- 3.3. White degree measurement
- 3.4. Colour differences and tolerances
- 3.5. Kubelka Munk's laws.

Full-or-part-time: 50h

Theory classes: 8h

Laboratory classes: 10h

Self study : 32h

Topic 3: DESIGN OF BATCH DYEING PROCESSES

Description:

- 2.1. Technical specifications for dyeings. Fastness standards. Dyeability.
- 2.2. Technical information about dye preparations: reception control.
- 2.3. Relationship between specific types of textile materials and the most suitable dyestuffs for their dyeing.
- 2.4. Batch dyeing machinery and textile dyeing processes. Technology management.
- 2.5. Optimization criteria for dyeing processes.

Related activities:

RA2, RA3, RA4

Full-or-part-time: 50h

Theory classes: 12h

Laboratory classes: 10h

Self study : 28h

GRADING SYSTEM

Students will be assessed in a continual manner for self-directed learning and team work.
The presence in the practical work is mandatory. Only 2 justified absences will be accepted.
Knowledge and skill acquisition will be assessed as follows:

- First evaluation session: 30%.
- Second evaluation session: 30%.
- Laboratory technical reports: 30%
- Presentation of technical rapport: 10%

Students who have suspended the first partial exam may choose, by communicating to the teacher, a review of recovery. The recovery of the first exam will take a written test, the second day of the exam, then the same with grade 0 to grade 5. replace the initial qualification provided they exceed

The teacher may request at any time, a justification of the conclusions of the reports the student has to prove participation

For those students who meet the requirements and submit to the reevaluation examination, the grade of the reevaluation exam will replace the grades of all the on-site written evaluation acts (tests, midterm and final exams) and the grades obtained during the course for lab practices, works, projects and presentations will be kept.

If the final grade after reevaluation is lower than 5.0, it will replace the initial one only if it is higher. If the final grade after reevaluation is greater or equal to 5.0, the final grade of the subject will be pass 5.0.

BIBLIOGRAPHY

Basic:

- Canal Arias, J. M. Innovacions i processos de preparació i blanqueig. Terrassa: UPC. EUETIT, 2007.
- Shishoo, R. Plasma technologies for textiles [on line]. Boca Raton: Woodhead/CRC, 2007 [Consultation: 09/07/2024]. Available on: <https://www-sciencedirect-com.recursos.biblioteca.upc.edu/book/9781845690731/plasma-technologies-for-textiles>. ISBN 9781420044508.
- Gordon, S. [et al.]. Cotton: science and technology. Boca Raton: Woodhead/CRC, 2007. ISBN 9780849391019.
- Canal Arias, J. M. Apuntes de operaciones básicas de preparación, blanqueo, tintura y estampación. Terrassa: UPC, 2006.
- Burkinshaw, S. M. Chemical principles of synthetic fibre dyeing [on line]. London: Blackie Academic & Professional, 1995 [Consultation: 02/07/2024]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=6489789>. ISBN 0751400432.
- Johnson, Alan. The theory of coloration of textiles. 2nd ed. Bradford: Society of Dyers and Colourists, 1989. ISBN 0901956481.
- Revista de química e industria textil. Barcelona: Asociación Española de Químicos y Coloristas Textiles, 2000-2009.
- Canal Arias, J. M. Criteris per a la innovació de processos de tintura en base a la MTD. Terrassa: UPC. EUETIT, 2007.
- Marco, Ángel. Los colorantes reactivos en la tintura de fibras celulósicas y sus mezclas. Barcelona: Asociación Española de Químicos y Coloristas Textiles, 2004.
- Heywood, Derek (ed.). Textile finishing. Bradford: Society of Dyers and Colourists, 2003. ISBN 0901956813.
- Brown, P. J.; Stevens, K. Nanofibers and nanotechnology in textiles. Cambridge: Woodhead, 2007. ISBN 9781845691059.