

Course guide

205555 - 205555 - Advances in Dyeing and Printing of Fabrics

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: MASTER'S DEGREE IN TEXTILE DESIGN AND TECHNOLOGY (Syllabus 2020). (Compulsory subject).

Academic year: 2024 **ECTS Credits:** 5.0 **Languages:** English

LECTURER

Coordinating lecturer: Coordinador: Marta Riba

Others: Diana Cayuela

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

MUDITT-CE3. The ability to manage and optimize advanced dyeing and printing processes.

Generical:

CG3. Lead, plan and supervise multidisciplinary teams.

MUDITT-CG1. Apply mathematical, analytical, scientific, instrumental, technological and management knowledge related to the field of textile design and technology.

MUDITT-CG2. Project, calculate and design products and processes related to the field of textile design and technology.

MUDITT-CG4. Carry out research, development and innovation in the field of textile design and technology.

MUDITT-CG5. Carry out strategic planning and apply it to production, quality and environmental management systems in the field of textile design and technology.

Transversal:

CT4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

Basic:

CB06. Manage original concepts in research projects.

CB07. Student capacity to use their knowledge in new and multidisciplinary situations.

CB08. Generate decision from incomplete information assuming its social and ethical responsibilities.

CB09. Improve technical communication of results.

CB10. Improve self-learning capacity

TEACHING METHODOLOGY

The teaching methodology is divided in three parts:

- Classroom sessions of exposition-participation of the contents and elaboration of exercises.
- Classroom sessions of laboratory experiences
- Autonomous study and elaboration of exercises and activities.

In the exposition-participation sessions, teacher will introduce the theoretical basis of the subject, concepts, methodologies and results. All supported by examples and, if necessary, assigning the realization of exercises with the objective to improve the learning and comprehension of that topic.

During the laboratory sessions, the teacher will guide students with the explanation of theoretical concepts towards the resolution of experimental assays, based on a critical reasoning. Activities to be solved in and out of the classroom will be proposed to students, with the aim to promote the contact and utilization of basic tools for an instrumental system.

Students, autonomously, will have to work with the material given by teacher and with the results obtained in the laboratory-exposition sessions to internalize concepts. Teachers will provide a study program and tracking of the activities (ATENEA).

LEARNING OBJECTIVES OF THE SUBJECT

When the subject is accomplished the student should have to: have acquired knowledge on advanced techniques and processes of textile dyeing and printing processes.

STUDY LOAD

Type	Hours	Percentage
Self study	80,0	64.00
Hours small group	45,0	36.00

Total learning time: 125 h

CONTENTS

Unit 1: Improvement of the dyeing processes

Description:

- 1.1 Identification of the improvement necessities of the conventional dyeing processes
- 1.2 Advances in textile auxiliary products

Related activities:

Classroom sessions with content exposition.
Classroom sessions with laboratory and practical work.

Full-or-part-time: 39h

Laboratory classes: 9h

Self study : 30h

Unit 2: Fundamentals and application of colorimetry to textile goods

Description:

- 2.1 Fundamentals of the science of colour
- 2.2 Colour perception components
- 2.3 Colour ordination systems
- 2.4 Colour differences
- 2.5 Aplicació de la teoria de Kubelka-Munk als tèxtils
- 2.6 Color i constitució química

Related activities:

Classroom sessions with content exposition.
Classroom sessions with laboratory and practical work.

Full-or-part-time: 42h

Laboratory classes: 12h

Self study : 30h



Unit 3: Dyeing advanced processes

Description:

- 3.1 Minimal water consumption dyeing technologies (sc-CO₂, encapsulation, etc.)
- 3.2 Dyeing by microwave
- 3.3 Yarn dyeing

Related activities:

Classroom sessions with content exposition.
Classroom sessions with laboratory and practical work.

Full-or-part-time: 19h

Laboratory classes: 9h

Self study : 10h

Unit 4: Improvement of printing processes

Description:

- 4.1 Identification of the improvement needs of the conventional printing processes

Related activities:

Classroom sessions with content exposition.

Full-or-part-time: 11h

Laboratory classes: 6h

Self study : 5h

Unit 5: Digital printing

Description:

- 5.1 Introduction to digital printing
- 5.2 Ink properties
- 5.3 Functional inks
- 5.4 Evaluation criteria

Related activities:

Classroom sessions with content exposition.

Full-or-part-time: 14h

Laboratory classes: 9h

Self study : 5h

GRADING SYSTEM

With the aim to weigh the autonomous work and the team work of the students, a continuous evaluation system will be applied.

Attendance to practical sessions (activities) is required (excepting if justified to teacher).

The evaluation of the acquisition of knowledge, competences and abilities will be realised by:

- First evaluation: 20%
- Second evaluation: 20%
- Technical laboratory reports: 35%
- Deliverables and others: 25%

Acceptance or pass criteria is from a qualification of 5.0. If the first evaluation is retaken (only it will be done if the student informs the teacher in advance time enough), this will be done during the day of the second evaluation and, the maximum qualification of it will be 5.0. The obtained mark will substitute the initial qualification (in the case of an upper mark).

To all the students that fulfil the requirements and they take the retaken exam, the qualification of that exam will substitute all marks regarding all written evaluation venues (partial exams, final exams, controls) and other marks obtained during the course such as practical experiences (laboratory), projects, studies and presentations will remain. Only if the mark of the retaken exam is below 5.0, it not be substituted by the initial. If the final mark after the retaken exam is 5.0 or upper, the final mark of the subject will be 5.0.

Teacher can ask for the justification of the reports of students at any time, with the objective to ensure their active participation.

BIBLIOGRAPHY

Complementary:

- Gilabert, Eduardo J.; Martínez, Francisco M. Medida de la luz y el color. Tomo 2: Aplicaciones. València: Universitat Politècnica de València, 2007. ISBN 9788479089276.

- Gulrajani, M. L. Advances in the dyeing and finishing of technical textiles. Cambridge, UK: Woodhead Publishing, 2013. ISBN 085709761X.

- Hoath, Stephen D. Fundamentals of inkjet printing: the science of inkjet and droplets [on line]. Weinheim: Wiley-VCH Verlag, 2016 [Consultation: 20/02/2023]. Available on :

<https://onlinelibrary-wiley-com.recursos.biblioteca.upc.edu/doi/book/10.1002/9783527684724>. ISBN 9783527684724.