

Course guide

320076 - MDPT - Materials for Textile Design

Last modified: 19/04/2023

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: 2023 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: Carrera Gallissà, Enric *
Arduy Raso, Monica

Others: Carrera Gallissà, Enric
Arduy, Mònica
Cayuela Marin, Diana

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CE19-GETDT. Knowledge of materials and their application in the textile field. (Specific Technology Module: Textile)

TEACHING METHODOLOGY

- Face sessions to present content.
- Face sessions of practical work.
- Self study and exercises.
- Preparation and measurable activities.

At its exhibition contents professor will introduce the theoretical foundations of the subject, concepts, methods and results and illustrate them with examples for easy understanding.

The practical sessions in the classroom will be the Physics Laboratory and Textile Chemistry and Textile Laboratory Polymers

The students will have to study independently to assimilate concepts, solve exercises

LEARNING OBJECTIVES OF THE SUBJECT

GLO1. Knowledge of the science, the physical and chemical technology and properties of the materials textile amenable to spinning and weaving.

GLO2. To be able to design any type of fabric of analogous characteristics to which habitually they are attributed to conventional fabric with the typical properties of conventional ones.

GLO3. Capacity to know, understand and be able to select textile materials as a function of the specifications of the target product and a predetermined design.

GLO4. To know, understand and be able to use available equipment and techniques for the fibre analysis of textile materials with a view to ensuring appropriate use.

GLO5. To understand textile material degradation and dry interaction with the environment with a view to its avoidance or minimization.

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: TEXTILE FIBRES. PROPERTIES RELATED TO FIBRE GEOMETRY. FIBRE ANALYSIS

Description:

- 1.1. Textile fibres. Definition, classification and general concepts.
- 1.2. Fibre length. Characterization and significance to textile processes and design.
- 1.3. Crimping. Characterization and significance to textile processes and design.
- 1.4. Fineness. Characterization and significance to textile processes and design.
- 1.5. Cross-sectional shape. Characterization and significance to textile processes and design.

Related activities:

RA1, RA2, RA3

Full-or-part-time: 25h

Theory classes: 4h

Practical classes: 6h

Self study : 15h

Topic 2: PROPERTIES RELATED TO THE NATURE OF FIBRES

Description:

- 2.1 Fibre density. Characterization and significance to textile processes and design.
- 2.2 Mechanical properties of fibres. Characterization and significance to textile processes and design.
- 2.3 Technical properties of fibres. Characterization and significance to textile processes and design.
- 2.4 Sorption properties of fibres. Conditioning. Characterization and significance to textile processes and design.
- 2.5 Optical properties of fibres. Characterization and significance to textile processes and design.
- 2.6 Electrical properties of fibres. Characterization and significance to textile processes and design.

Related activities:

RA4, RA5, RA6

Full-or-part-time: 25h

Theory classes: 6h

Laboratory classes: 4h

Self study : 15h

Topic 3: NATURAL FIBRES. PROPERTIES, IDENTIFICATION AND RELATIONSHIP TO TEXTILE DESIGN

Description:

- 3.1. Structure and properties of cellulose natural fibres.
- 3.2. Structure and properties of wool, silk and the main types of piles.
- 3.3. Identification of natural fibres.

Related activities:

RA7, RA8

Full-or-part-time: 33h

Theory classes: 7h

Practical classes: 6h

Self study : 20h

Topic 4: CHEMICAL FIBRES. PRODUCTION, PROPERTIES AND IDENTIFICATION. RELATIONSHIP TO TEXTILE DESIGN

Description:

- 4.1. Polymerization reactions and spinning processes for chemical fibres.
- 4.2. Relationship between structure and properties in chemical fibres.
- 4.3. Identification of chemical fibres.

Related activities:

RA9, RA10, RA11, RA12

Full-or-part-time: 56h

Theory classes: 11h

Practical classes: 12h

Self study : 33h

GRADING SYSTEM

- In application of the regulations for the return of unsatisfactory results of ESEIAAT, there will be a recovery of the 1st part, consisting of a review, with the same format and basis of contents as the 1st partial examination.
- This reconduction examination will be carried out in the space, day and hours assigned for the second parcial. In other words, whoever completes the reconduction examination will have four hours to do the second and partial exam.
- Those who, having obtained a grade lower than 5.0 of the first partial exam, will be entitled to take the exam of the renewal, request to take the examination of renewal. This request will be made by the way and within the period indicated by the responsible teacher.
- The mark of the examination of the renewal will replace the mark obtained in the first partial examination, provided that the mark of the examination of renewal is higher than that of the 1st partial examination.

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:

- Gacén Guillén, J. Fibras textiles: propiedades y descripción: curso básico. 1991. Terrassa: UPC, 1991. ISBN 8476530994.
- Gacén Guillén, J. Aspectos de las fibras químicas. 3ª ed. Terrassa: UPC, 1990. ISBN 8476530757.
- Carrera, Enric. Física textil: propiedades físicas para caracterizar la calidad de las fibras textiles [on line]. Barcelona: Universitat Politècnica de Catalunya, 2017 [Consultation: 14/05/2020]. Available on: <http://hdl.handle.net/2117/106313>.
- Sinclair, Rose. Textiles and fashion: materials, design and technology [on line]. Cambridge: Woodhead Publishing, 2015 [Consultation: 04/11/2022]. Available on: <https://www.sciencedirect-com.recursos.biblioteca.upc.edu/book/9781845699314/textiles-and-fashion>. ISBN 9781845699314.

Complementary:

- Journal of the Textile Institute [on line]. Manchester: Textile Institute, 1910- [Consultation: 14/05/2020]. Available on: <https://www.tandfonline.com/loi/tjti20>.
- Morton, E. W.; Hearle, J. W. S. Physical properties of textile fibres. 3rd ed. London: The Textile Institute, 1993. ISBN 1870812417.
- Anderson, S. L. Textile fibres: testing and quality control. Manchester: The Textile Institute, 1984. ISBN 0900739509.
- Carter, M. E. Essential fiber chemistry. New York: Marcel Dekker, 1971. ISBN 0824710886.
- Gacén Guillén, J.; Maillo Garrido, J. Algodón y celulosa: estructura y propiedades. Terrassa: UPC, 1987. ISBN 8460048160.
- Gacén Guillén, J. Lana: parámetros químicos. Terrassa: ETSEIAT, 1989. ISBN 8460070263.
- Warner, S. B. Fiber science. Englewood Cliffs, NJ: Prentice Hall, 1995. ISBN 0024245410.
- Cook, J. G. Handbook of textile fibres, vol. 1 i 2. 5th ed. Shildon: Merrow, 1984.
- Horrocks, A. R.; Anand, S. Handbook of technical textiles [on line]. 2nd ed. Cambridge UK: Woodhead Publishing; Textile Institute, 2016 [Consultation: 04/11/2022]. Available on: <https://www.sciencedirect-com.recursos.biblioteca.upc.edu/book/9781782424581/handbook-of-technical-textiles>.