

## 320194 - TDP - Textiles for Product Design

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering  
 Teaching unit: 702 - CMEM - Department of Materials Science and Metallurgy  
 Academic year: 2019  
 Degree: BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2010). (Teaching unit Optional)  
 ECTS credits: 6 Teaching languages: Catalan, Spanish

### Teaching staff

Coordinator: Carrera Gallissà, Enric  
 Others: Carrera Gallissà, Enric  
 Ventura, Heura

### Opening hours

Timetable: To be arranged with each student

### Prior skills

Not having completed a Bachelor's Degree in Textile Design and Technology

### Requirements

Not having completed a Bachelor's Degree in Textile Design and Technology

### Teaching methodology

Sessions of theory  
 Sessions of practical work at laboratory

### Learning objectives of the subject

OE1: To have a general view of the possibilities that the textile materials and technologies for product design  
 OE2: To be capable to solve design problems with textile materials

### Study load

Total learning time: 150h	Hours large group:	30h	20.00%
	Hours small group:	30h	20.00%
	Self study:	90h	60.00%

## 320194 - TDP - Textiles for Product Design

### Content

<p>Chapter 1. Introduction to the textile and clothing industryh</p>	<p>Learning time: 5h Theory classes: 2h Self study : 3h</p>
<p>Description: Structure of the textile industry Socioeconomic importance Uses of textiles Basic nomenclature of textiles The concept of textile design</p> <p>Specific objectives: Know and understand the structure of the textile cycle, its socioeconomic importance, the nomenclature and the main applications of the products obtained by this industry, as well as the concept of textile design</p>	
<p>Item 2. Textile fibers and their possibilities in product design</p>	<p>Learning time: 40h Theory classes: 6h Laboratory classes: 4h Self study : 30h</p>
<p>Description: Classification of textile fibers. abbreviations Natural fibers of plant, animal and minerals Man made fibers Main physical properties that influence the design Major chemical properties that influence the design Textile Labelling</p> <p>Related activities: P1. Identification microscopy and organoleptic textile fibers P2. Marches analytical identification of textile fibers</p> <p>Specific objectives: Learn to textile fibers classified by their nature. Know the main properties of textile fibers from the perspective of engineering design and labeling legislation. Learn to identify the main textile fibers with optical microscopy techniques and analytical gears</p>	

## 320194 - TDP - Textiles for Product Design

<p>Item 3. Spinning and processes from the perspective of design</p>	<p>Learning time: 24h Theory classes: 6h Laboratory classes: 4h Self study : 14h</p>
<p>Description: Properties of wires and their influence on the design of textiles Cotton spinning process: Opening and cleaning of fibers, Card, Draw frame, Roving, Ring spinning, OE spinning, air jet spinning, spinning friction, coil twisted. Worsted spinning process Process of spinning wool carding Process spinning regenerated</p> <p>Related activities: P3. Determination title and twisting wires P4. Workshop on the practical operation of the main machines of the spinning process</p> <p>Specific objectives: Know and understand the basic operations of spinning processes, the characteristics of cotton spinning processes, yarn, wool carding and regenerated and the main properties of the wires from the perspective of product design. Learn practical way to determine the main properties of the threads as tittle, twisting and retaliation, as well as the regularity of mass.</p>	
<p>Item 4. Woven fabrics, knniting and weaving from the perspective of design</p>	<p>Learning time: 24h Theory classes: 6h Laboratory classes: 4h Self study : 14h</p>
<p>Description: Fundamentals of Theory woven Ligaments basic: Plain, tweet and Ras. Principles of double fabric, cloth both sides, and special fabrics Jacquard Design ligaments puff Operation and pierced mesh looms Knited fabric and its applications Properties of tissues that influence product design</p> <p>Related activities: P5. Workshop on the practical operation of the shed looms P6. Workshop CAD design fabrics</p> <p>Specific objectives: Learn the basics of the theory of woven and ligaments fundamental bases of complex derivatives and ligaments as well as the main tools used in the design of ligaments woven. Learn the basics of knitted fabrics and applications. Learn practical way the main tests used to characterize tissue from the perspective of product design.</p>	

## 320194 - TDP - Textiles for Product Design

<p>Item 5. Nonwoven</p>	<p>Learning time: 5h Theory classes: 2h Self study : 3h</p>
<p>Description: Major acquisition systems Properties of Nonwovens for product design, main applications</p> <p>Specific objectives: Learn the fundamentals of the technology of obtaining the nonwoven and its main applications.</p>	
<p>Item 6. Finishing from the perspective of design</p>	<p>Learning time: 10h Theory classes: 2h Laboratory classes: 2h Self study : 6h</p>
<p>Description: Finishing processes for the production of textile materials applied to product design Bleaching and dyeing processes Sizing and finishing processes</p> <p>Related activities: P7. Prototyping from the end product specifications</p> <p>Specific objectives: Learn the basics of the main finishing processes and its possibilities from the perspective of product design.</p>	
<p>7. Clothing Industry</p>	<p>Learning time: 16h Theory classes: 2h Laboratory classes: 6h Self study : 8h</p>
<p>Description: The garment design process. Pattern and marked Cutting, sewing and ironing</p> <p>Related activities: P8. Workshop CAD design pattern P9. Evaluation tissue properties</p> <p>Specific objectives: Learn the principles of pattern and design as well as industrial processes of cutting, sewing and ironing.</p>	

## 320194 - TDP - Textiles for Product Design

Item 8. Technical textiles	Learning time: 18h Theory classes: 4h Laboratory classes: 2h Self study : 12h
<p>Description:</p> <ul style="list-style-type: none"><li>Geotextiles</li><li>Textile medicine</li><li>Textile sport</li><li>Textiles for the automotive and other transport</li><li>Other applications of textiles</li></ul> <p>Related activities:</p> <ul style="list-style-type: none"><li>P10. Visit a textile industry</li></ul> <p>Specific objectives:</p> <ul style="list-style-type: none"><li>Know the main applications of textiles for technical use.</li></ul>	

### Qualification system

First exam: 25%  
Second exam: 25%  
Practice workshop or laboratory 5%  
Work on labeling: 5%  
Work on textile fibers: 20%  
Work on technical fabrics: 20%

## 320194 - TDP - Textiles for Product Design

### Bibliography

#### Basic:

El Mogahzy, Y.E. Engineering textiles: integrating the design and manufacture of textile products. Cambridge; Boca Raton: Woodhead Publishing: CRC Press, 2009. ISBN 9781845690489.

Wilson, Jacques. Handbook of textile design: principles, processes and practice. Boca Raton: Cambridge, UK: CRC Press; Woodhead, 2001. ISBN 9781855735736.

Carrera, Enric. Caracterización de tejidos: principales ensayos físicos para evaluar la calidad de los tejidos textiles [on line]. Terrassa: UPC. Departament d'Enginyeria Tèxtil i Paperera, 2015 [Consultation: 29/06/2016]. Available on: <<http://hdl.handle.net/2117/76654>>.

Scott, Richard A. Textiles for protection. Cambridge: Woodhead Publishing, 2005. ISBN 1855739216.

Shishoo, R. Textile advances in the automotive industry. Cambridge: Woodhead Publishing, 2008. ISBN 9781845693312.

Shishoo, R. Textiles in sport. Cambridge: Woodhead Publishing, 2005. ISBN 9781855739222.

Li, Y.; Dai, X.-Q. Biomechanical engineering of textiles and clothing. Cambridge: Woodhead Publishing, 2006. ISBN 9781845690526.

#### Complementary:

Bartels, V. Handbook of medical textiles. Cambridge: Woodhead Publishing, 2011. ISBN 9781845696917.

Briggs-Goode, A.; Townsend, K. Textile design: principles, advances and applications. Cambridge: Woodhead Publishing, 2011. ISBN 9781845696467.

Gacén, Joaquín. Fibras textiles: propiedades y descripción: curso básico. Terrassa: UPC. ETSEIT. Càtedra de Polímers Tèxtils i Fibras Químiques, 1991. ISBN 8476530994.

Hu, Jinlian. Structure and mechanics of woven fabrics. Cambridge: Woodhead Publishing, 2004. ISBN 9780849328268.