Course guide
320194 - TDP - Textiles for Product Design

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 INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2010). (Optional subject).
Academic year: 2022 ECTS Credits: 6.0 Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: Ventura Casellas, Heura
Others: Ventura Casellas, Heura

PRIOR SKILLS

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Hours small group</td>
<td>30,0</td>
<td>20.00</td>
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<tr>
<td>Hours large group</td>
<td>30,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>60.00</td>
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</tbody>
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Total learning time: 150 h
# CONTENTS

## Topic 1. Introduction to the textile and clothing industry

**Description:**
1.1. Textile value chain
1.2. Socioeconomic importance
1.3. Textile products and their uses

**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

**Full-or-part-time:** 4h
Theory classes: 2h
Self study: 2h

## Topic 2. Textile fibres and their possibilities in product design

**Description:**
2.1. Classification of textile fibres
2.1.1. Natural fibres of plant, animal and minerals
2.1.2. Man-made fibres from natural polymers
2.1.3. Man-made synthetic fibres
2.2. Main properties and their influence in design

**Specific objectives:**
Learn to classify textile fibres according to their nature. Know the main properties of textile fibres from the perspective of engineering design.

**Related activities:**
P1. Identification microscopy and organoleptic textile fibres
P2. Mechanical characterisation of textile fibres

**Full-or-part-time:** 24h
Theory classes: 4h
Laboratory classes: 4h
Self study: 16h

## Topic 3. Spinning from the perspective of design

**Description:**
3.1. Fundamentals of spinning processes
3.2. Yarn properties
3.3. Influence of yarn construction on the textiles products

**Specific objectives:**
Know and understand, from the perspective of product design, the basic operations of spinning processes, the main properties of yarns, and their influence on the textile products.

**Full-or-part-time:** 10h
Theory classes: 2h
Laboratory classes: 2h
Self study: 6h
**Topic 4. Weaving and knitting from the perspective of design**

**Description:**
4.1. Fundamentals of woven fabrics
   4.1.1. Weaves
   4.1.2. Looms
4.2. Fundamentals of knitted fabrics
   4.2.1. Weft-knitted fabrics
   4.2.2. Warp-knitted fabrics
4.3. Influence of fabric properties in product design

**Specific objectives:**
Learn the basics of woven fabrics and their weaves, and understand their production process. Learn the basics of knitted fabrics. Learn in practice the main tests used to characterise fabrics from the perspective of product design.

**Related activities:**
P3. Mechanical characterisation of fabrics

**Full-or-part-time:** 22h
Theory classes: 4h
Laboratory classes: 6h
Self study: 12h

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**Topic 5. Nonwoven fabrics**

**Description:**
5.1. Fundamentals of nonwoven fabrics
5.2. Production systems
5.3. Properties and applications of nonwoven fabrics

**Specific objectives:**
Learn the fundamentals of the production technologies for nonwoven fabrics, their properties and their main applications.

**Full-or-part-time:** 14h
Theory classes: 4h
Laboratory classes: 2h
Self study: 8h

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**Topic 6. Finishing from the perspective of design**

**Description:**
6.1. Pre-treatment processes for fabrics and their relevance
6.2. Colouring processes
6.3. Main finishing processes

**Specific objectives:**
Learn the basics of the main finishing processes and its possibilities from the perspective of product design.

**Full-or-part-time:** 12h
Theory classes: 2h
Laboratory classes: 2h
Self study: 8h
### Topic 7. Industrial clothing process

**Description:**
- 7.1. Industrial clothing process
- 7.2. Pattern making: from 2D to 3D
- 7.3. Joining fabrics
- 7.4. Tech-pack

**Specific objectives:**
Learn the principles of pattern making and fabric joining for the production of textile products.

**Related activities:**

**Full-or-part-time:** 14h
- Theory classes: 2h
- Laboratory classes: 4h
- Self study: 8h

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### Topic 8. Composite materials reinforced with textile structures

**Description:**
- 8.1. Fundamentals of composite materials
- 8.2. Main reinforcement fibres and textile structures
- 8.3. Composite production technologies
- 8.4. Properties estimation: rule of mixtures

**Specific objectives:**
Learn the basics of composite materials, the production technologies, and the main fibres and textile structures used as reinforcement. Know the rule of mixtures for the estimation of the properties of a composite.

**Related activities:**
P5. Production and analysis of a composite

**Full-or-part-time:** 21h
- Theory classes: 5h
- Laboratory classes: 6h
- Self study: 10h

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### Topic 9. Technical textiles

**Description:**
- 9.1. Textiles for medicine
- 9.2. Textiles for sport
- 9.3. Textiles for the automotive sector
- 9.4. Smart textiles
- 9.5. Other technical textiles

**Specific objectives:**
Know the main applications of textiles for technical use.

**Related activities:**
Course project

**Full-or-part-time:** 29h
- Theory classes: 5h
- Laboratory classes: 4h
- Self study: 20h
GRADING SYSTEM

First partial exam: 20%
Second partial exam: 20%
Deliverables (exercises, questionnaires, practicum reports): 30%
Course project: 30%

BIBLIOGRAPHY

Basic:

Complementary: