Course guide

320079 - DELM - Design of Knitted Laminar Structures

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: 2022 ECTS Credits: 6.0 Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: FRANCESC CANO CASAS

Others:

PRIOR SKILLS

A prior sound knowledge of graphical expression, materials and applied mechanics principles is required.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CE26. (ENG) TEX: Coneixement sobre estructures laminars de malles i peces conformades i les seves aplicacions.

General:
CG04. IND: Ability to solve problems with initiative, decision making, creativity, critical thinking and to communicate and transmit knowledge and skills in the field of Industrial Engineering.

Transversal:
1. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.
2. EFFECTIVE USE OF INFORMATION RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.
07 AAT N1. SELF-DIRECTED LEARNING - Level 1. Completing set tasks within established deadlines. Working with recommended information sources according to the guidelines set by lecturers.

TEACHING METHODOLOGY

The course is divided into two parts corresponding to the tecnolgies weft knitting and warp knitting; in each part follows the same approach: structure (types and effects of knitting fabric) machine (mechanisms and parameters of the knitting and weaving) and production (calculations). Face sessions to explain the above approach with industrial vision, small-group discussion of problems and questions under teachers' supervision in presentational activity sessions.

LEARNING OBJECTIVES OF THE SUBJECT

- To acquire a basic knowledge of the different types of structures present in textiles products and their industrial uses.
- To be able to use the acquired knowledge to design new textile structures.
- To master the representation of knitted fabrics as a bridge between weaving and textile structure design.
- To become acquainted with available weaving techniques in order to understand their potential and limitations as regards knitted structure production, as well as structure alteration mechanisms.
## STUDY LOAD

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

## CONTENTS

### PART 1: WEFT KNITTING STRUCTURES

### Topic 1: STRUCTURE

**Description:**
- 1.1 Structural characteristics and parameters.
- 1.2 Weft knitted fabric geometry.
- 1.3 Basics structures of weft knits.
- 1.4 Loop formation sequence: the basic knitting action of the leedle machine.

**Specific objectives:**
- Characterize the knitting structure
- Represent the knitting structure
- Understand the working cycle of the needle

Full-or-part-time: **25h**
- Theory classes: **5h**
- Laboratory classes: **5h**
- Self study: **15h**

### Topic 2: TECHNOLOGY

**Description:**
- 2.1 Characteristics of knitting machines.
- 2.2 Knitting elements and production calculations.
- 2.3 Weaving potential of each type of knitting machine.

**Specific objectives:**
- Know the parts and parameters of knitting machines.
- Know how to prepare the knitting machine for knitting of different structures.
- Know the different commercial structures that can manufactures in different knitting machines.

Full-or-part-time: **25h**
- Theory classes: **5h**
- Laboratory classes: **5h**
- Self study: **15h**
 Topic 3: STRUCTURE DESIGNS

Description:
3.1 Structural effects.
3.2 Colour effects.
3.3 Shape effects.

Specific objectives:
Know the mechanisms to modify the structures.
Know the effects that can be introduced into the structures to increase their commercial values.
Know represents these effects.

Full-or-part-time: 25h
Theory classes: 5h
Laboratory classes: 5h
Self study: 15h

PART 2: WARP KNITTING STRUCTURES

 Topic 4: STRUCTURE

Description:
4.1 Structural characteristics and parameters.
4.2 Warp knitted fabric geometry.
4.3 Basics structures of warp knits.
4.4 Loop formation sequence: the basic knitting action of the needle machine.

Specific objectives:
Characterize the structures.
Represent the structures.
Understand the process of formation of stitches.

Full-or-part-time: 25h
Theory classes: 5h
Laboratory classes: 5h
Self study: 15h

 Topic 5: TECHNOLOGY

Description:
5.1 Characteristics of machines.
5.2 Knitting elements and production calculations.
5.3 Weaving potential of each loom type.

Specific objectives:
Know the parts and parameters of knitting machines.
Know how to prepare the knitting machine for knitting different structures.
Know the different commercial structures that can be manufactured in different knitting machines.

Full-or-part-time: 25h
Theory classes: 5h
Laboratory classes: 5h
Self study: 15h
**Topic 6: STRUCTURE DESIGNS**

**Description:**  
6.1 Structural effects.  
6.2 Colour effects.  
6.3 Technical structures.

**Specific objectives:**  
Know the mechanisms to modify the structures.  
Know the effects that can be introduced into the structures to increase their commercial values.  
Know represents these effects

**Full-or-part-time:** 25h  
Theory classes: 5h  
Laboratory classes: 5h  
Self study: 15h

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**GRADING SYSTEM**

Written tests (First evaluation: 35%, Second evaluation: 35%)  
Practices: 30%

To pass the course, a resulting grade equal to or greater than five must be obtained. Students who have failed the first partial exam will be able to opt, by notifying the teacher, for a recovery / reconduction exam. The recovery / renewal of the first partial exam will be carried out with a written test, on the day of the second partial exam, after it, with a maximum grade of 5.0. The grade obtained will replace the initial grade as long as it is higher.

For those students who meet the requirements and take the reevaluation exam, the grade of the reevaluation exam will substitute the marks of all the evaluation acts that are face-to-face written tests (controls, midterms and final exams) and the practical grades will be maintained. Works, projects and presentations obtained during the course. If the final grade after the re-evaluation is lower than 5.0, it will replace the initial one only if it is higher. If the final grade after the re-evaluation is greater than or equal to 5.0, the final grade for the course will be approved with a grade of 5.0.

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**BIBLIOGRAPHY**

**Basic:**  

**Complementary:**  