

## Course guide

### 320079 - DELM - Design of Knitted Laminar Structures

**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

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**Coordinating lecturer:** FRANCESC CANO CASAS

**Others:**

#### PRIOR SKILLS

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

#### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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**Specific:**

CE26-GETDT. Knowledge of mesh laminate structures and formed garments and their applications. (Specific Technology Module: Textile)

#### TEACHING METHODOLOGY

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The course is divided into two parts corresponding to the technologies 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 presential activity sessions.

#### LEARNING OBJECTIVES OF THE SUBJECT

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- 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

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Type	Hours	Percentage
Hours small group	30,0	20.00
Hours large group	30,0	20.00
Self study	90,0	60.00

**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 differents 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.  
Knoe the effects that can be introduced into the strucutres to increase their commercial values.  
Know represents these efects.

**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

## GRADING SYSTEM

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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.

## BIBLIOGRAPHY

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### Basic:

- Raz, Samuel. Warp knitting production. Heidelberg: Melliand Textilberichte, 1987.
- Spencer, David J. Knitting technology: a comprehensive handbook and practical guide [on line]. Cambridge UK: Woodhead, 2001 [ Consultation : 04/11/2022 ]. Available on : <https://www.sciencedirect-com.recursos.biblioteca.upc.edu/book/9781855733336/knitting-technology>. ISBN 1855733331.

### Complementary:

- Raz, Samuel. Flat knitting: the new generation. Bamberg: Meisenbach, 1991. ISBN 3875250532.
- Iyer, C. [et al.]. Circular knitting: technology process, structures, yarns, quality. 2nd ed. Bamberg: Meisenbach, 1995. ISBN 9783875250664.