Course guide
205068 - 205068 - Smart Textiles

Last modified: 02/04/2024

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 702 - CEM - Department of Materials Science and Engineering.

Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Optional subject).
MASTER'S DEGREE IN AERONAUTICAL ENGINEERING (Syllabus 2014). (Optional subject).
MASTER'S DEGREE IN SPACE AND AERONAUTICAL ENGINEERING (Syllabus 2016). (Optional subject).

Academic year: 2024 **ECTS Credits:** 3.0 **Languages:** English

LECTURER

Coordinating lecturer: Mònica Ardanuy Raso

Others: Gil Gali, Ignacio
Ilén, Elina Emilia

TEACHING METHODOLOGY

Sessions of theory
Sessions of practical work at class
Sessions of practical work at laboratory

LEARNING OBJECTIVES OF THE SUBJECT

OE1.To know the main characteristics and properties smart and multifunciontal textiles
OE2. To be able to develop new smart textiles for specific applications

STUDY LOAD

Type	Hours	Percentage
Self study	48,0	64.00
Hours large group	27,0	36.00

Total learning time: 75 h

CONTENTS

LESSON 1. Introduction to smart textiles

Description:
1.1. Basic concepts
1.2. Subtracts for smart textiles
1.3. Components and actuators

Full-or-part-time: 15h
Theory classes: 6h
Self study : 9h

LESSON 2. Energy harvesting textiles

Description:
2.1. Basic concepts
2.2. Piezoelectric textiles
2.3. Triboelectric textiles
2.4. Solar textiles

Full-or-part-time: 5h
Theory classes: 2h
Self study : 3h

LESSON 3. Chromoactive textiles

Description:
3.1. Basic concepts
3.3. Photochromic, Thermochromic, Halochromic, Solvatochromic and other textiles

Full-or-part-time: 15h
Theory classes: 6h
Self study : 9h

LESSON 4. Shape memory textiles

Description:
4.1. Basic concepts
4.2. Examples of shape memory fabrics

Full-or-part-time: 13h
Theory classes: 4h
Self study : 9h

LESSON 5. Conductive textiles

Description:
5.1. Basic concepts
5.2. Examples of conductive textiles

Full-or-part-time: 15h
Theory classes: 6h
Self study : 9h

LESSON 6. Textile sensors

Description:
6.1. Basic concepts
6.2. Examples of textile sensors

Full-or-part-time: 12h
Theory classes: 3h
Self study : 9h

GRADING SYSTEM

Exam 1: 20%
Exam 2: 20%
Exercises and practical cases: 30%
Course project: 30%.

BIBLIOGRAPHY

Basic:

- Koncar, Vladan. Smart textiles and their applications. Duxford: Woodhead Publishing, 2016. ISBN 9780081005835.
- Tao, Xiaoming. Handbook of smart textiles. Singapore: Springer, 2015. ISBN 9789814451444.