25842 - Compound Materials: Design and Development of Pieces

Información del Plan Docente

Academic Year	2017/18
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	271 - Bachelor's Degree in Industrial Design and Product Development Engineering
ECTS	5.0
Year	
Semester	Second Four-month period
Subject Type	Optional
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The learning process designed for this subject is based on the following:
Theoretical classes
the classic lecture format will be used but usually will be done through slides
the student will be able to download it from the Internet
Practical classes

25842 - Compound Materials: Design and Development of Pieces

They will be held in the computer pool. Practice will be hold in the composites lab.
Subject work
They can be individual and / or grouped. It will be decided depending upon the number of students.

5.2.Learning tasks

The distribution of lectures will correspond to this scheme:
A. Introduction and materials 7 hours
A.1 composites
A.2 Applications
A.3 fibers
A.4 resins
A.5 Sandwich and cores
A.6 Adhesives
A.7 Laminate Composite Materials
B. Analysis and design of composite materials 4 hours
B.1 Hooke's Law
B.2 Theory l¡mina
B.3 laminate Theory
B.4 Stress Analysis
B.5 Failure criteria
B.6 sandwich structures
B.7 damage tolerance
C. Manufacture of composite 12 hours
Processes C.1 open mold
Projection
hand layup
vacuum bag
infusion
pre-impregnated
centrifugation
winding filamentary
rfi
Processes C.2 closed mold
Rtm / VARTM
Thermoset injection
Rim / RRIM / SRIM
Press molding
Smc / bmc
pultrusion
D. Testing composites 2 hours
D.1 laminates according to standard assays
D.2 tests non-standard applications

5.3.Syllabus

5.4.Course planning and calendar

Activities will include the following:
Design a simple piece.
Calculation of such part by software.
Manufacture of specimens to evaluate the characteristics of materials.
Test specimens of the materials.
Recalculation with the actual properties.
Redesign with real properties.

25842 - Compound Materials: Design and Development of Pieces

Making demonstrator-piece
Piece testing.
Comparison between the results obtained and expected.

5.5.Bibliography and recommended resources

- 1. Materiales compuestos / Director de la obra Antonio Miravete ; coautores, E. Larrode, L. Castejón ... [et al.] [Zaragoza] : Los autores, 2000
- 3. Miravete de Marco, Antonio. Los nuevos materiales en la construcción / Antonio Miravete Zaragoza : Antonio Miravete, cop.1994
- Miravete de Marco, Antonio. Optimisation of design of composite structures / Antonio Miravete . 1st ed. Cambridge [etc.] : Woodhead Publishing, 1996
- 5. Miravete de Marco, Antonio. 3-D Textile Reinforcement in Composite Materials / Miravete A. et al.. CRC (USA) y Woodhead (U.K.), 1999
- 6. Tsai, Stephen W.. Diseño y análisis de materiales compuestos / Stephen W. Tsai, Antonio Miravete de Marco Barcelona [etc.] : Reverté, cop. 1988
- Reddy, Junuthula Narasimha. Practical analysis of composite laminates / J. N. Reddy, A. Miravete . Boca Raton [etc.] : CRC, cop. 1995