Last update: 22-07-2019

220291 - Advances in Textile Fibers

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 714 - ETP - Department of Textile and Paper Engineering
Academic year: 2019
Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Teaching unit Optional)
ECTS credits: 5 Teaching languages: Catalan, English

Teaching staff

Coordinator: MONICA ARDANUY RASO

Others: LAURA GONZALEZ LOPEZ

Degree competences to which the subject contributes

Specific:

1. Ability to apply multivariate analysis techniques in market knowledge about materials and textiles in order to implement a flow production system.
2. Ability to develop new fibers or yarns and woven and non-woven structures according to specifications and latest technologies for specific technical applications.
3. Ability to manage and optimize production processes of technical textiles.

Teaching methodology

Theoretical classes
Analysis of Case Studies
Laboratory classes

Learning objectives of the subject

OE1. To know the main characteristics and properties of the textile fibres used for technical applications
OE2. To be able to develop new fibres for specific applications

Study load

Total learning time: 125h	Hours large group:	30h	24.00%
	Hours small group:	15h	12.00%
	Self study:	80h	64.00%

Last update: 22-07-2019

220291 - Advances in Textile Fibers

Content

TOPIC 1. Introduction to the innovations in textile fibres

Learning time: 2h

Theory classes: 1h
Self study : 1h

Description:
1.1. Innovations in the field of high performance fibres, high functionality fibres, nanofibres, biofibres, etc.

Related activities:
X

Specific objectives:
OE1

TOPIC 2. High performance fibres

Learning time: 52h

Theory classes: 12h
Laboratory classes: 6h
Self study : 34h

Description:
2.1. High mechanical performance fibres: Polyethylene HP, Polyamide HP, Polyester HP, Alcohol de Polyvinyl HP, Acrylic HP, etc.
2.2. High thermally resistant fibres: polybenzoazole (PBO, PBI, PBIOH), polysulphurs of phenilene (PPS), fluorcarbonfibres, fibres from thermoset polymers, Polyetherketones (PEEK), Aromatic polyamides, carbon fibres, glass fibres, ceramic fibres, etc.

Related activities:
Sessions of theory
Sessions of practical work at class
Sessions of practical work at laboratory

Specific objectives:
OE1, OE2

Last update: 22-07-2019

220291 - Advances in Textile Fibers

TOPIC 3. High functionality fibres

Learning time: 18h

Theory classes: 5h
Laboratory classes: 1h
Self study : 12h

Description:
3.1. High comfort fibres
3.2. conductive/antistatic fibres
3.3. Superabsorbent fibres
3.4. Antibacterial and antifungal fibres
3.5. Thermocromic fibres
3.6. Another high functionality fibres

Related activities:
Sessions of theory
Sessions of practical work at class
Sessions of practical work at laboratory

Specific objectives:
OE1, OE2.

TOPIC 4. Fibres from biopolymers

Learning time: 30h

Theory classes: 8h
Laboratory classes: 3h
Self study : 19h

Description:
4.1. Introduction to biopolymers
4.2. Fibres based on natural polymers
4.3. Fibres obtained from biomass
4.4. Fibres synthesised from microorganisms
4.5. Fibres synthesised from monomers obtained from biomass
4.6. Bast fibres

Related activities:
Sessions of theory
Sessions of practical work at class
Sessions of practical work at laboratory

Specific objectives:
OE1, OE2

Last update: 22-07-2019

220291 - Advances in Textile Fibers

TOPIC 5. Microfibres and nanofibres	Learning time: 23h Theory classes: 4h Laboratory classes: 5h Self study : 14h

Description:
5.1. Introduction
5.2. Microfibres
5.3. Nanofibres: electrospinning, nanoweb structure, characterization and applications

Related activities:
Sessions of theory
Sessions of practical work at class
Sessions of practical work at laboratory

Specific objectives:
OE1, OE2

Qualification system

Exam 1: 20%
Exam 2: 20%
Exercises and practical cases: 30%
Course project: 30%.
For those students who meet the requirements and submit to the reevaluation examination, the grade of the reevaluation exam will replace the grades of all the on-site written evaluation acts (tests, midterm and final exams) and the grades obtained during the course for lab practices, works, projects and presentations will be kept.
If the final grade after reevaluation is lower than 5.0, it will replace the initial one only if it is higher. If the final grade after reevaluation is greater or equal to 5.0, the final grade of the subject will be pass 5.0.

Last update: 22-07-2019

220291 - Advances in Textile Fibers

Bibliography

Basic:

Hearle, J.W.S. (ed.). High-performance fibres. Cambridge: Boca Raton: Woodhead; CRC, cop. 2001. ISBN 1855735393.

Horrocks, A.R.; Anand, S.C. (eds.). Handbook of technical textiles. Boca Raton [etc.]: Cambridge: CRC Press; Woodhead, cop. 2000. ISBN 1855733854.

Bunsell, A.R. (ed.). Handbook of tensile properties of textile and technical fibres. Cambridge: Boca Raton: Woodhead; CRC, 2009. ISBN 9781845693879.

Brown, P.J.; Stevens, K. (eds.). Nanofibers and nanotechnology in textiles. Boca Raton [etc.]: Cambridge: CRC; Woodhead, 2007. ISBN 9781845691059.

Hongu, T.; Phillips, G.O.; Takigami, M. New millennium fibers. Boca Raton [etc.]: Woodhead/CRC, cop. 2005. ISBN 1855736012.

Blackburn, R.S. (ed.). Biodegradable and sustainable fibres. Boca Raton [etc.]: CRC: Woodhead publishing limited, cop. 2005. ISBN 185573916X.

Others resources: