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: 2018
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

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 yams 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

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 of the textile fibres used for technical applications
OE2. To be able to develop new fibres for specific applications

Study load

<table>
<thead>
<tr>
<th>Total learning time: 125h</th>
<th>Hours large group: 30h</th>
<th>24.00%</th>
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</thead>
<tbody>
<tr>
<td>Hours small group: 15h</td>
<td>12.00%</td>
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<tr>
<td>Self study: 80h</td>
<td>64.00%</td>
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## Content

<table>
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<tr>
<th>TOPIC</th>
<th>Description</th>
<th>Related activities</th>
<th>Specific objectives</th>
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<td><strong>TOPIC 1. Introduction to the innovations in textile fibres</strong></td>
<td>1.1. Innovations in the field of high performance fibres, high functionality fibres, nanofibres, biofibres, etc.</td>
<td></td>
<td>OE1</td>
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</table>
| **TOPIC 2. High performance fibres** | 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. | | OE1, OE2 |

### Learning time:
- **TOPIC 1**: 2h
  - Theory classes: 1h
  - Self study: 1h
- **TOPIC 2**: 52h
  - Theory classes: 12h
  - Laboratory classes: 6h
  - Self study: 34h
## TOPIC 3. High functionality fibres

### Description:
- 3.1. High comfort fibres
- 3.2. Conductive/antistatic fibres
- 3.3. Superabsorbent fibres
- 3.4. Antibacterial and antifungal fibres
- 3.5. Thermochromic 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

### Learning time:
- 18h
  - Theory classes: 5h
  - Laboratory classes: 1h
  - Self study: 12h

## TOPIC 4. Fibres from biopolymers

### 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

### Learning time:
- 30h
  - Theory classes: 8h
  - Laboratory classes: 3h
  - Self study: 19h
### 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

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#### 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.
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**Bibliography**

**Basic:**


**Others resources:**