320056 - EPF - Engineering of Manufacturing Processes

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 712 - EM - Department of Mechanical Engineering
Academic year: 2018
Degree: BACHELOR’S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)
ECTS credits: 6
Teaching languages: Catalan, Spanish

Teaching staff
Coordinator: Jordi Sans García

Degree competences to which the subject contributes

Specific:
4. MEC: Applied Knowledge in systems and fabrications processes, metrology and quality control.

Transversal:
1. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.
2. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.
3. TEAMWORK - Level 3. Managing and making work groups effective. Resolving possible conflicts, valuing working with others, assessing the effectiveness of a team and presenting the final results.

Teaching methodology
In the theory sessions, the teacher will introduce the theoretical basis.
Laboratory sessions.
Individual work and problem solving.

Learning objectives of the subject

- Introduce concepts, techniques and methodologies in the area of manufacturing.
- Provide an overview of the relation between design and manufacturing.
- Familiarization and use of technical language of industrial environment.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 144h</th>
<th>Hours large group:</th>
<th>45h</th>
<th>31.25%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours medium group:</td>
<td>0h</td>
<td>0.00%</td>
<td></td>
</tr>
<tr>
<td>Hours small group:</td>
<td>15h</td>
<td>10.42%</td>
<td></td>
</tr>
<tr>
<td>Guided activities:</td>
<td>0h</td>
<td>0.00%</td>
<td></td>
</tr>
<tr>
<td>Self study:</td>
<td>84h</td>
<td>58.33%</td>
<td></td>
</tr>
</tbody>
</table>
### TOPIC 1: Metrology and verification

**Learning time:** 18h  
Theory classes: 4h  
Practical classes: 2h  
Laboratory classes: 2h  
Self study: 10h

**Description:**
1.1 Unit systems  
1.2. Tolerances and adjustments  
1.3. Surface states, roughness  
1.4. Measuring instruments  
1.5. Errors in the measurement

**Related activities:**
Laboratory description: based on the practice of obtaining measurements to objects by using the tools available for this purpose.

**Specific objectives:**
(ENG) - conèixer i utilitzar les diferents eines de medició, així com la seva particular aplicació i manipulació

### TOPIC 2: Machining processes

**Learning time:** 41h  
Theory classes: 10h  
Practical classes: 5h  
Laboratory classes: 6h  
Self study: 20h

**Description:**
2.1 Machining  
2.2 File and mechanical brushing  
2.3 Turning  
2.4 Drill and ream  
2.5 Milling  
2.6 Abrasive machining  
2.7 Sawed and smoothed  
2.8 Gears manufacture

**Related activities:**
Description laboratory: Step by different workstations where you can perform various tasks, such as turning operations, milling, assembly...

**Specific objectives:**
(ENG) - conèixer i diferenciar les diferents màquines i complements disponibles en el taller.  
- Aprender la manera correcte d'utilització, així com les normes bàsiques de seguretat i comportament en un taller mecànic
<table>
<thead>
<tr>
<th>TOPIC 3: Joining and cutting processes</th>
<th>Learning time: 11h</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Theory classes: 3h</td>
</tr>
<tr>
<td>3.1 Resistance welding</td>
<td>Practical classes: 1h 30m</td>
</tr>
<tr>
<td>3.2 Oxyacetylene welding</td>
<td>Laboratory classes: 1h 30m</td>
</tr>
<tr>
<td>3.3 Electric arc welding</td>
<td>Self study: 5h</td>
</tr>
<tr>
<td>3.4 Flame cutting</td>
<td></td>
</tr>
</tbody>
</table>

**Related activities:**
Step by different workstations where you can perform welding and cutting.

<table>
<thead>
<tr>
<th>TOPIC 4: Applications of investors connected to the network</th>
<th>Learning time: 9h 30m</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Theory classes: 3h</td>
</tr>
<tr>
<td>4.1 EDM (Electrical Discharge Machining)</td>
<td>Practical classes: 1h 30m</td>
</tr>
<tr>
<td>4.2 Laser</td>
<td>Self study: 5h</td>
</tr>
<tr>
<td>4.3 Cutting water</td>
<td></td>
</tr>
</tbody>
</table>
### TOPIC 5: Renewable Energy applications and others

**Learning time:** 40h 30m  
- Theory classes: 10h  
- Practical classes: 5h  
- Laboratory classes: 5h 30m  
- Self study: 20h

#### Description:
- 5.1 Definition  
- 5.2 Short history  
- 5.3 Machines with CNC  
- 5.4 CNC classifications  
- 5.5 Components of machines with CNC  
- 5.6 Axes and reference systems  
- 5.7 Programming  
- 5.8 Languages used  
- 5.9 Storage of these programs  
- 5.10 ISO programming language  
- 5.11 Common types of functions  
- 5.12 Scheduling workflows  
- 5.13 Parametric programming  
- 5.14 Working in 3D  
- 5.15 Use of auxiliary programs  
- 5.16 CAM

#### Related activities:
- In the laboratory: basic problems of programming and the practical application of problems to the machine.

#### Specific objectives:
(ENG)  
- conèixer i aprendre a utilitzar les diferents eines de programació disponibles.  
- conèixer i aprendre a utilitzar les diferents màquines de cnc disponibles

---

### Qualification system

- Written tests: there will be two written tests, each with a value of 25% of the final mark (25% + 25%)  
- Problem solving: 22%  
- Report/s of individual labs: 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.
Bibliography

Basic:


Complementary:


