Degree competences to which the subject contributes

Specific:
1. A capacity for spatial vision and an understanding of graphic representation techniques, using the traditional methods of metric and descriptive geometry and computer-aided design applications

Teaching methodology

The subject organizes in:
- Presencials sessions in theory classrooms or CAD, with big group, where the theoretical contents are imparted and are made exercises related, making use of blackboard and projection of multimedia material.
- Presencials sessions in classrooms of CAD with small groups, where practices of application of the explained concepts are carried out to theory. Every week a different practice is worked (activities 1 to 7). They have to give at the end of class in digital file and/or sketch and they have to be completed during the week and give them in paper during the following session.
- A project or work related with all contents.
- Autonomous work of study and realization of exercises and weekly practices.

The necessary documentation to do the subject will put in the digital campus ATENEA at the disposal of the students. The following categories will be established: theory (notes and summary files), practices (headline of each practice), work (guidelines final work), exercises (heading and solutions, so that the student can study out of the schedule of class) and former examinations of course.

Learning objectives of the subject

- To promote the vision and spatial intelligence.
- To know the more usual techniques of graphic representation in the engineering.
- To provide the students the capacity to manipulate and to describe spatial forms through a flat support.
- Enable student to be able to interpret and to conceive the real space of three dimensions.
- To determine in shape and dimensions any piece or real mechanism.
## 220084 - Graphic Expression I

### Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group:</th>
<th>32h</th>
<th>21.33%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours small group:</td>
<td>28h</td>
<td>18.67%</td>
</tr>
<tr>
<td></td>
<td>Self study:</td>
<td>90h</td>
<td>60.00%</td>
</tr>
</tbody>
</table>
## Content

<table>
<thead>
<tr>
<th>Section</th>
<th>Learning time</th>
<th>Description</th>
<th>Related activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fundamentals of Computer Aided Design</td>
<td>13h</td>
<td></td>
<td>1,2,3,4,5,6,7,8</td>
</tr>
<tr>
<td>Description:</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2. Advanced plane geometry and its extension to space</td>
<td>15h</td>
<td></td>
<td>2,7,8,9,10,11</td>
</tr>
<tr>
<td>Description:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Applied descriptive geometry and spatial</td>
<td>78h</td>
<td></td>
<td>3,4,5,6,7,8,9,10,11</td>
</tr>
<tr>
<td>Description:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Laboratory classes:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Self study:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theory classes: 3h</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laboratory classes: 3h</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self study : 9h</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laboratory classes: 8h</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Self study : 47h</td>
<td></td>
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</tbody>
</table>
### 4. Introduction to industrial standards

**Learning time:** 44h  
- Theory classes: 6h  
- Laboratory classes: 13h  
- Self study: 25h

**Description:**

**Related activities:**  
4, 5, 7, 8, 9, 10, 11
### Planning of activities

| ACTIVITY 1: CAD 2D BASIC NOTIONS. DRAWING OF SHEET FORMAT (PRACTICES PRESENCIALS) | Hours: 4h  
Laboratory classes: 2h  
Self study: 2h  
Theory classes: 0h |
<table>
<thead>
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<tbody>
<tr>
<td>Description:</td>
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</tbody>
</table>

| ACTIVITY 2: GEOMETRIC SIDES. RESOLUTIONS OF TANGENCIES (PRACTICES PRESENCIALS) | Hours: 4h  
Laboratory classes: 2h  
Self study: 2h |
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<tbody>
<tr>
<td>Description:</td>
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</tbody>
</table>

| ACTIVITY 3: AXONOMETRIC PERSPECTIVE (PRACTICES PRESENCIALS) | Hours: 4h  
Laboratory classes: 2h  
Self study: 2h |
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<tr>
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<tbody>
<tr>
<td>Support materials:</td>
<td></td>
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</tbody>
</table>

| ACTIVITY 4: DIEDRIC SYSTEM. PRINCIPAL AND AUXILIARY NORMALIZED VIEWS (PRACTICES PRESENCIALS) | Hours: 8h  
Laboratory classes: 4h  
Self study: 4h |
<table>
<thead>
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<tbody>
<tr>
<td>Description:</td>
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</table>

| ACTIVITY 5: ARCHITECTURAL REPRESENTATION. DIEDRIC VIEWS | Hours: 4h  
Laboratory classes: 2h  
Self study: 2h |
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<tbody>
<tr>
<td>Description:</td>
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</table>
| ACTIVITY 6: CAD 3D BASIC NOTIONS. CONSTRUCTION OF REGULAR POLYHEDRONS (PRACTICES PRESENCIALS) | Hours: 4h  
Self study: 2h  
Laboratory classes: 2h |
|---|---|
| ACTIVITY 7: CONSTRUCTION OF PIECES IN 3D (PRACTICES PRESENCIALS) | Hours: 30h  
Self study: 18h  
Laboratory classes: 12h |
| ACTIVITY 8: FINAL WORK (INDIVIDUAL ACTIVITY) | Hours: 27h  
Laboratory classes: 2h  
Self study: 25h |
| ACTIVITY 9: PARTIAL EXAM | Hours: 2h  
Theory classes: 2h |
| ACTIVITY 10: FINAL EXAM | Hours: 2h  
Theory classes: 2h |
| ACTIVITY 11: THEORY SESSIONS | Hours: 61h  
Self study: 33h  
Theory classes: 28h |

Description:

Support materials:
Qualification system

The final qualification is the sum of the following final qualifications:

\[ N_f = 0.2 \, N_{ep} + 0.25 \, N_p + 0.2 \, N_t + 0.35 \, N_{ef} \]

- \( N_f \): Final qualification
- \( N_{ep} \): Partial examination mark (activity 9)
- \( N_{ef} \): Final examination mark (activity 10)
- \( N_p \): Practise mark (activities 1 to 7)
- \( N_t \): Final project qualification (activity 8)

* Although not mandatory, it is planned to recover the grade of the partial when it is less than 5 in the final exam. If the final exam grade is greater than or equal to 5 and the partial exam grade is less than 5, the final grade is:

\[ N_f = 0.2 \times 5 + 0.25 \, N_p + 0.2 \, N_t + 0.35 \, N_{ef} \]

Regulations for carrying out activities

- The weekly activities in CAD classrooms (activities 1 to 7) are compulsory. To pass the course a maximum of 2 faults are allowed.
- All activities can be done with help of files.
220084 - Graphic Expression I

Bibliography

Basic:

Complementary:

Others resources:

Hyperlink
http://ocw.unican.es/ensenanzas-tecnicas/ expresion-grafica-y-dao/
http://ocw.upm.es/ expresion-grafica-en-la-ingineria/
http://www.tododibujo.com/