220550 - Industrial Plants

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 758 - EPC - Department of Project and Construction Engineering
Academic year: 2019
Degree: MASTER'S DEGREE IN MANAGEMENT ENGINEERING (Syllabus 2012). (Teaching unit Compulsory)
ECTS credits: 5

Teaching languages: Catalan, Spanish

Teaching staff

Coordinator: MIQUEL CASALS CASANOVA

Degree competences to which the subject contributes

Specific:
1. Apply quantitative and experimental methods for making decisions in situations where intangibles appear
2. Apply theories and inherent principles in the production and logistics area in order to analyze uncertainty complex situations and make decisions using engineering tools.

General:
3. Ability to apply knowledge to solve problems in new environments or unfamiliar environments within broader contexts (or multidisciplinary) related to engineering.
4. Self-learning capacity to independent continuous training.
5. Ability to effectively communicate their findings, knowledge and concluding reasons to skilled and unskilled audiences, clearly and unambiguously.
6. Ability to integrate knowledge and formulate judgments with the aim of making decisions based on information that, with incomplete or limited include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments.
7. Ability to understand the impact of engineering solutions in a global and social context.
8. Ability to operate and lead multidisciplinary and multicultural groups, with negotiation skills, group work, relationships in an international setting, and conflict resolution.
220550 - Industrial Plants

**Teaching methodology**

The course is divided into three parts:

Theory classes plus assisted activities
Practical classes
Self-study for doing exercises and activities.

In the theory classes, teachers will introduce the theoretical basis of the concepts, methods and results and illustrate them with examples appropriate to facilitate their understanding.

In the practical classes (in the classroom), teachers guide students in applying theoretical concepts to solve problems, always using critical reasoning. We propose that students solve exercises in and outside the classroom, to promote contact and use the basic tools needed to solve problems.

Students, independently, need to work on the materials provided by teachers and the outcomes of the sessions of exercises/problems, in order to fix and assimilate the concepts.

The teachers provide the curriculum and monitoring of activities (by ATENEA).

**Learning objectives of the subject**

The aim of this subject is to provide a basic knowledge to make possible the interrelation between economic activities, specially the industrial ones, and its physical environment together with the building which supports them. Studying in depth the conception of the idea, the specification of the implementation needs and the legal criteria which have to be satisfied and accomplished.

i.e., it is expected to provide the basic knowledge to the student so as to:

- Have enough capacity to analyse, define and transmit in a clear, specific and exhaustive manner the needs which a building has to satisfy.

- Have the criteria on her/his disposal to choose among different possible town-planning alternatives, the most suitable one to their needs, taking into account both constructive and technical aspects.

**Study load**

<table>
<thead>
<tr>
<th>Total learning time: 125h</th>
<th>Hours large group:</th>
<th>8h</th>
<th>6.40%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group:</td>
<td>15h</td>
<td>12.00%</td>
</tr>
<tr>
<td></td>
<td>Guided activities:</td>
<td>22h</td>
<td>17.60%</td>
</tr>
<tr>
<td></td>
<td>Self study:</td>
<td>80h</td>
<td>64.00%</td>
</tr>
</tbody>
</table>
## Content

<table>
<thead>
<tr>
<th>Module 1: Previous knowledge and problems definition</th>
<th>Learning time: 8h 06m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 0h 36m</td>
</tr>
<tr>
<td></td>
<td>Practical classes: 2h</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 2h 30m</td>
</tr>
<tr>
<td></td>
<td>Self study : 3h</td>
</tr>
</tbody>
</table>

**Description:**
- Introduction to the concept of industrial complexes
- Historic introduction to industrial complexes
- Interrelations between architecture-industry-construction
- General definition of its problems involving its design

<table>
<thead>
<tr>
<th>Module 2: Plant Layout</th>
<th>Learning time: 32h 18m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 1h 48m</td>
</tr>
<tr>
<td></td>
<td>Practical classes: 5h</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 4h 30m</td>
</tr>
<tr>
<td></td>
<td>Self study : 21h</td>
</tr>
</tbody>
</table>

**Description:**
- Introduction to the production means
- Basis for the industrial process layout
- Basic typologies and forms of industrial processes
- Auxiliary elements of the production system. Classification
- General services of manufacture
- Services for personnel
- Layout
- Systematic layout planning
- Analysis of the alternatives and choice of the definitive layout
### Module 3: Adaptation to legal framework

<table>
<thead>
<tr>
<th>Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Occupational health in the industrial plant.</td>
</tr>
<tr>
<td>- Legal framework. Royal Decree 486/1997 &quot;Minimum safety and health requirements in workplaces&quot;.</td>
</tr>
<tr>
<td>- Interior environment conditions: ventilation, natural lightning, temperature, etc.</td>
</tr>
<tr>
<td>- Other regulations. Technical Building Code.</td>
</tr>
<tr>
<td>- Safety requirements of building against fire.</td>
</tr>
<tr>
<td>- Legal framework of fire-prevention.</td>
</tr>
<tr>
<td>- Fire-prevention regulations implementation in industrial buildings.</td>
</tr>
<tr>
<td>- Energy saving criteria. Industrial buildings sustainability.</td>
</tr>
</tbody>
</table>

**Learning time:** 25h 24m  
Theory classes: 1h 24m  
Practical classes: 2h  
Guided activities: 3h  
Self study : 19h

### Module 4: Constructive solutions

<table>
<thead>
<tr>
<th>Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- The structural system. System elements: ground, foundations and structure.</td>
</tr>
<tr>
<td>- Structural typologies and scope).</td>
</tr>
<tr>
<td>- Criteria for choosing the structure type.</td>
</tr>
<tr>
<td>- Slabs.</td>
</tr>
<tr>
<td>- Bases.</td>
</tr>
<tr>
<td>- Pavements.</td>
</tr>
<tr>
<td>- Roofs. Typologies and scope).</td>
</tr>
<tr>
<td>- Facades. Types and scope).</td>
</tr>
</tbody>
</table>

**Learning time:** 24h 36m  
Theory classes: 1h 36m  
Practical classes: 2h  
Guided activities: 6h  
Self study : 15h
Module 5: Systems' definition

Description:
Introduction to the definition of the industrial building's systems:
- Cold water systems.
- Hot water systems.
- High Pressure Air (HPA).
- Fire prevention systems.
- Plumbing and drainage.
- Instal·lacions de vapor
- HVAC systems
- Electricity system

Learning time: 19h 24m
Theory classes: 1h 24m
Practical classes: 2h
Guided activities: 3h
Self study: 13h

Module 6: Location and industrial urbanism

Description:
- Considerations of industrial location.
- Location methods
- Urban figures which define the town planning.
- Ordering type of buildings. Basic parameters.
- Regulation of building's uses. Urbanistic compatibility.

Learning time: 15h 12m
Theory classes: 1h 12m
Practical classes: 2h
Guided activities: 3h
Self study: 9h

Qualification system

The final grade depends on:
- Presence during theoretical lectures, practical lectures and assisted activities, weight 10%
- Project, weight 40%
- Exam, weight 50%

There will be a final Activity to repeat the assessment of the exam.
Bibliography

Basic: