Course guide
220550 - 220550 - Industrial Plants

Last modified: 19/04/2023

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 758 - EPC - Department of Project and Construction Engineering.

Degree: MASTER'S DEGREE IN MANAGEMENT ENGINEERING (Syllabus 2012). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 5.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: MIQUEL CASALS CASANOVA

Others:

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.

Generical:
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.

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

Type	Hours	Percentage
Hours large group	8,0	6.40
Self study	80,0	64.00
Hours medium group	15,0	12.00
Guided activities	22,0	17.60

Total learning time: 125 h

CONTENTS

Module 1: Previous knowledge and problems definition

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

Full-or-part-time: 8h 06m
Theory classes: 0h 36m
Practical classes: 2h
Guided activities: 2h 30m
Self study : 3h

Module 2: Plant Layout

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

Full-or-part-time: 32h 18m
Theory classes: 1h 48m
Practical classes: 5h
Guided activities: 4h 30m
Self study : 21h

Module 3: Adaptation to legal framework

Description:
- Occupational health in the industrial plant.
- Interrelation between industrial plant- occupational health. Concepts.
- Legal framework. Royal Decree 486/1997 "Minimum safety and health requirements in workplaces".
- Interior environment conditions: ventilation, natural lightning, temperature, etc.
- Other regulations. Technical Building Code.
- Safety requirements of building against fire.
- Legal framework of fire-prevention.
- Fire-prevention regulations implementation in industrial buildings.
- Energy saving criteria. Industrial buildings sustainability.

Full-or-part-time: 25h 24m
Theory classes: 1h 24m
Practical classes: 2h
Guided activities: 3h
Self study : 19h

Module 4: Constructive solutions

Description:
- The structural system. System elements: ground, foundations and structure.
- Structural typologies and scope).
- Criteria for choosing the structure type.
- Slabs.
- Bases.
- Pavements.
- Roofs. Typologies and scope).
- Facades. Types and scope).

Full-or-part-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

Full-or-part-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.

Full-or-part-time: 15h 12m
Theory classes: 1h 12m
Practical classes: 2h
Guided activities: 3h
Self study : 9h

ACTIVITIES

THEORY/LARGE GROUPS SESSIONS

Description:
Preparation before and after the theory sessions and attendance

Specific objectives:
Transfer the necessary knowledge for a correct interpretation of the contents in the large group sessions, resolving doubts about the content of the course and generic skills development.

Material:
Notes posted to the Atenea platform.
General literature of the course.

Delivery:
During some sessions, exercises will be conducted in the class, individually or in small groups.
Students attendance will be positively evaluated. Attendance over 90% of the sesions equals to 5% of the course qualification.

Full-or-part-time: 34h
Theory classes: 6h
Guided activities: 22h
Self study: 6h

EXERCISES/MEDIUM GROUPS SESSIONS

Description:
Preparation before and after the exercises sessions and attendance to the sessions

Specific objectives:
Acquire the necessary skills for a correct interpretation of the problems of the course, and their satisfactory resolution.
Preparation for the practical part of exams of the course. Development of generic skills.

Material:
Notes posted to the Atenea platform.
General literature of the course.
Exercises on the Atenea platform.

Delivery:
During these sessions, exercises will be conducted in class or virtually, individually or in small groups.
Students attendance is compulsory.
Students attendance and delivery of the proposed exercises equals to the 5% of the course qualification.

Full-or-part-time: 25h
Practical classes: 15h
Self study: 10h

PROJECT

Description:
Small Group Project dealing with the complete course contents

Specific objectives:
Project must demonstrate that the student has achieved the concepts, principles and basic fundamentals related to course content and has knowledge about his applicability under real conditions

Material:
General specifications of the project

Delivery:
The deliverable is the project itself
Equals to 40 % of the course qualification

Full-or-part-time: 42h
Self study: 42h

EXAM

Description:
Individual and writing assessment about the contents of the course

Specific objectives:
The exam must demonstrate that the student has acquired and assimilated the concepts, principles and fundamentals related to the complete course

Material:
Instructions and terms for the exam

Delivery:
The hand-in will be the result of the exam
It represents 50% of the final course grade

Full-or-part-time: 24h
Theory classes: 2h
Self study: 22h

GRADING SYSTEM

The final grade depends on:

- Presence during lectures and delivery of the proposed activities, weight 10%
- Project, including correction of delivered activities,weight 50%
- Exam, weight 40%

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

BIBLIOGRAPHY

Basic:
- Casals Casanova, Miquel [et al.]. Diseño de complejos industriales : fundamentos. Barcelona: Edicions UPC, 2008. ISBN 9788483019528.