

Course guide

240EI026 - 240EI026 - Constructions and Industrial Architecture

Last modified: 16/05/2023

Unit in charge: Barcelona School of Industrial Engineering
Teaching unit: 758 - EPC - Department of Project and Construction Engineering.
Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2014). (Compulsory subject).
Academic year: 2023 **ECTS Credits:** 4.5 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: Pujadas Álvarez, Pablo

Others: Pujadas Álvarez, Pablo
Cuerva Contreras, Eva
Ferré Tafalla, Xavier
Ikumi Montserrat, Tai

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

CEMEI17. Ability on the design, manufacturing, construction and operation of industrial plants.
CEMEI18. Knowledge about manufacturing, construction, facilities, infrastructures, and urban design in the field of industrial engineering.
CEMEI19. Knowledge and abilities for the calculation and design of structures.
CEECONS2. Apply the adequate knowledge for the design, construction and management of buildings and its surroundings, especially in the field of engineering.

TEACHING METHODOLOGY

The teaching methodology is divided in three parts:

- Face-to-face exposition sessions of the contents (master classes)
- Face-to-face sessions of the practical coursework (practical classes)
- Autonomous work of the study and realization of the exercises and the activities (realization of projects)

In the master classes, the basic concepts of the course are explained. The supporting material is the general reference of the course, which will be complemented during the classes with additional information. The students will have complementary information available in the Digital Campus Atenea. In the sessions of the practical coursework, the Professors will guide the students to the application of the theory concepts to solve exercises, basing especially in the critical reasoning at all times. Exercises derived from real cases will be set, and the students will have to solve it in and outside of the classes, in order to foster the contact and use of the basic necessary tools for the resolution of exercises.

The students will previously need to have been working at home to foster the understanding of the exercises presented. The students, in an autonomous way, will have to work the material provided by the Professors and the result of the sessions of the practical workgroup in order to assimilate and fix the concepts. The proposal for implementation of an industrial process will also have to be carried out from the analysis of a real industry of the same category (case study), where the applied knowledge acquired during the course will be reflected

LEARNING OBJECTIVES OF THE SUBJECT

The aim of this course is to provide some basic knowledge in the interrelationship between the economic activities, especially the industrial ones, and its physical environment together with the construction which supports it, the specification of the needs of the implementation and the legal criteria to satisfy and fulfill.

What is to say, that this course aims to provide the student the basic knowledge so that he/she:

- Has the sufficient skills to analyse, define and communicate in a clear way, precise and thorough the requirements which an industrial facility must meet
- Meet the criterion to choose between different possible urbanistic, constructive and technical solutions, that one which is the most suitable and close to its needs
- And finally, so that the student is able to set in a basic way an industrial facility

STUDY LOAD

Type	Hours	Percentage
Self study	72,0	64.00
Hours large group	27,0	24.00
Hours small group	13,5	12.00

Total learning time: 112.5 h

CONTENTS

URBANISM

Description:

It aims to provide the theory and practical basic knowledge regarding to planning and urban management, as well as the execution in the urban public areas. Even so, taking into account sustainable criteria and regarding to the environment

Specific objectives:

- Regulatory framework of urbanism
- Interrelation between industry and land
- Urban planning

Related activities:

- Construction coursework
- Final exam

Full-or-part-time: 27h

Practical classes: 6h

Laboratory classes: 4h

Self study : 17h

DESIGN AND CONSTRUCTION OF INDUSTRIAL PLANTS

Description:

The basis to carry out the floor distribution of the industrial process will be given, explaining the types and basic ways which can present, which are the auxiliary elements of the production system, the general manufacturing services and the staff services. The target is that the student analyses a certain industrial process, making an analysis of the alternatives and the election of the distribution in a final plant

Specific objectives:

- Productive diagrams
- Machine sheets
- Floor distribution

Related activities:

- Construction coursework
- Final exam

Full-or-part-time: 53h

Practical classes: 9h

Laboratory classes: 10h

Self study : 34h

STRUCTURAL ENGINEERING

Description:

Provide some basic knowledge of the geotechnical parameters of the floor and the different typologies of the structural elements which are in contact with the land, the way the student has available the election criteria of the type of structure

Specific objectives:

- Mechanics of the floor. Foundations
- Types of buildings and industrial plants

Related activities:

- Final exam

Full-or-part-time: 14h

Practical classes: 5h

Self study : 9h

FIRE PROTECTION ENGINEERING

Description:

Provide the scientific basis of the physical properties of the fire and the combustion and give some basic knowledge of the regulations and codes applicable to the engineering of fire protection

Specific objectives:

- Regulation workframe
- Passive elements for the fire protection

Related activities:

- Final exam

Full-or-part-time: 19h

Practical classes: 7h

Self study : 12h

GRADING SYSTEM

The ordinary evaluation is carried out through several procedures:

- (1) a final exam (EF), in which the student has to demonstrate his ability to apply the knowledge learned and develop resolution procedures to short and specific questions;
- (2) a course work (TC), in which the student has to present, in groups, a proposal for the implementation of an industrial process based on the analysis of a real industry;
- (3) participation and performance in the course (PRC), in which the student's participation in the activities carried out in the classroom is evaluated, punctual deliveries of short and practical exercises, and other activities proposed for the course so that the learning and learning The self-assessment of the knowledge acquired.

$$N_{\text{final}} = 0,50 \text{ NEF} + 0,40 \text{ NTC} + 0,10 \text{ NPRC}$$

N_{final} – final grade

NEF - final exam grade

NTC- course work grade

NRC – performance in the course = 0,4NP + 0,6NQ

NP – participation in the course

NQ- grade from the self-evaluation tests via Atenea

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In case of re-evaluation, the N_{final} will be the one corresponding to the mark obtained in the re-evaluation exam (which will be valued at a maximum of 7.0)

EXAMINATION RULES.

- No calculators, mobile phones or any other supporting material is allowed when doing the exams.
- All students who have not passed the subject in any of the two semesters, regardless of whether they have a grade or a qualification of Not Presented, will be able to take the re-assessment exam.
- The re-assessment exam is only for the exam part and will be valued at a maximum of 7.0.
- If the student who presents for re-assessment exam do not pass the subject, the highest mark will be kept between the result of the ordinary evaluation (if any) and that of the re-assessment exam.

BIBLIOGRAPHY

Basic:

- Casals Casanova, M.; Roca Ramon, X. Construcció industrial : introducció i conceptes bàsics [on line]. Barcelona: Edicions UPC, 2003 [Consultation: 13/09/2022]. Available on: <https://upcommons.upc.edu/handle/2099.3/36747>. ISBN 8483016818.

Complementary:

- Esteban i Noguera, J. La Ordenación urbanística : conceptos, herramientas y prácticas [on line]. Barcelona: Iniciativa Digital Politècnica, 2011 [Consultation: 12/09/2022]. Available on: <https://upcommons.upc.edu/handle/2099.3/36652>. ISBN 9788476535851.
- Heredia Scasso, Rafael de. Arquitectura y urbanismo industrial : diseño y construcción de plantas, edificios y polígonos industriales. [2ª ed.]. Madrid: Escuela Técnica Superior de Ingenieros Industriales. Sección de publicaciones, DL 1981. ISBN 8474840171.
- Ackermann, Kurt; Lambot, Ian; Aicher, Otl. Building for industry. London: Watermark, cop. 1991. ISBN 1873200192.
- Konz, Stephan A. Diseño de instalaciones industriales. México, D.F: Limusa, 1991. ISBN 9681836642.