



Universitat de Lleida

DEGREE CURRICULUM  
**INDUSTRIAL PLANT DESIGN**

Coordination: ALBAREDA SOTERAS, XAVIER

Academic year 2019-20

## Subject's general information

<b>Subject name</b>	INDUSTRIAL PLANT DESIGN			
<b>Code</b>	102493			
<b>Semester</b>	1st Q(SEMESTER) CONTINUED EVALUATION			
<b>Typology</b>	<b>Degree</b>	<b>Course</b>	<b>Character</b>	<b>Modality</b>
	Bachelor's degree in Industrial Organization and Logistics Engineering	4	OPTIONAL	Attendance-based
<b>Course number of credits (ECTS)</b>	6			
<b>Type of activity, credits, and groups</b>	<b>Activity type</b>	PRAULA		TEORIA
	<b>Number of credits</b>	3		3
	<b>Number of groups</b>	1		1
<b>Coordination</b>	ALBAREDA SOTERAS, XAVIER			
<b>Department</b>	COMPUTER SCIENCE AND INDUSTRIAL ENGINEERING			
<b>Teaching load distribution between lectures and independent student work</b>	Lectures activities: 60 hours Independent study work: 90 hours			
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.			
<b>Language</b>	Catalan			
<b>Distribution of credits</b>	3 Theory 3 Practice			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
ALBAREDA SOTERAS, XAVIER	xavier.albareda@udl.cat	6	

## Learning objectives

- Basic industrial housing. Determinants of buildability in the design of plants.
- Basic industrial construction. Typologies of buildings and structures. Design parameters.
- Lay-out. Implementation of processes. Accessibility. Conditions of work places.
- Passive fire protection. Affection to the plant distribution.
- Energy costs and industrial services (electricity, water, gas ...). Economic valuation and optimization.
- Industrial lighting. Determinants of energy efficiency.

## Competences

### Basic

B02 That students know how to apply their knowledge to their work or vocation in a professional manner and possess the skills that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study.

B05 That students have developed those learning skills necessary to undertake further studies with a high degree of autonomy.

### General competences

CG3. To synthesize basic and technological subjects, which enable them to learn new methods and theories, and provide them with versatility to adapt to new situations.

CG10. To work in a multilingual and multidisciplinary environment.

### Specific competences

CE18. To acquire capacity for planning and developing new projects, products and processes.

CE22. To acquire capacity to design enterprise information systems.

CE25. To acquire capacity to calculate and analyze costs.

CE28. To acquire capacity to design and optimize industrial plants and productive processes.

CE30. To acquire capacity to supply chain management.

CE31. To acquire capacity for production planning and control, maintenance program implementation and perform statistical process control.

### Transversal

CT3. To implement new technologies and technologies of information and communication.

## Subject contents

### **T1- Basic legislative structure.**

Regulation and legal order.

Legislation and European directives.

Regulations of mandatory and recommended compliance.

Regulations, UNE standards, ISO.

### **T2- Basic industrial urbanism**

Urban regulations.

Tipus de suelo, general planning plan, relevant urban parameters ...

Industrial plots Topography, geotechnics, access, external infrastructures.

Basic graphic documentation.

### **T3- Basic industrial construction.**

Typology of usual industrial buildings. Defining parameters. Elements

CTE state of charges. Casuistics. Orders of magnitude. Application criteria.

Geotechnical studies Foundations

Typologies of industrial structures. Prefabricated construction solutions. Materials and applications Orders of magnitude.

Guidelines and criteria for selection, distribution and position.

Basic graphic documentation.

### **T4 Lay-out.**

Lay-out Causes, options and location factors.

Conditioners of location, objectives and factors of affectation in the lay-out.

Physical industrial space: distribution by product and process. Minimum spaces required.

Implementation of processes. Process diagrams Flowcharts.

Conditions of jobs. Accessibility. Ergonomics and proxemics.

Associated regulations of mandatory compliance.

Basic graphic documentation.

### **T5 RSCIEI and CTE**

Main aspects of affectation in the plant distribution .:

Typology of industrial buildings.

Fire load, fire sectors, Compartmentation.

Evacuation routes, exits, doors, stairs ...

Guidelines and application criteria.

Basic graphic documentation.

## T6 Energy costs

Fluid and energy supplies. Rate structure. Components and application. Casuistry.

Cost evaluation Calculation and optimization Billing.

Guidelines and efficiency criteria.

## T7 Lighting Technology

Basic lighting information. Labor lighting requirements. Parameters of quality and performance.

Recommended regulations. Lighting design of the workspaces. Psychological factors (Kruithof diagram ...).

Sources of artificial light. Characteristics and selection parameters.

Luminaires Characteristics and selection parameters.

Photometric curves Diagrams Isolux. Glare.

Calculation of facilities. Support software.

Basic graphic documentation.

## Methodology

### Master classes

Exhibition of the concepts, principles and fundamental relationships of each topic. Illustrative examples.

### Problems

Proposal, discussion and solution of the exercises related to the concepts of each topic.

### Autonomous learning works

Delivery of proposed works (case method) as practical materialization of the concepts achieved.

## Development plan

Week	methodology	Theme	classroom hours	autonomous work hours
1	Master class Problems	T1- Basic legislative structure. T2- Basic industrial urbanism	4	6
2	Master class Problems	T3- Basic industrial construction. (1)	4	6
3	Master class Problems	...T3- Basic industrial construction. (2)	4	6
4	Master class Problems	...T3- Basic industrial construction. (3)	4	6
5	Master class Problems	T4 Lay-out. (1)	4	6
6	Master class Problems	...T4 Lay-out. (2)	4	6

7	Master class Problems	...T4 Lay-out. (3)	4	6
8	Master class Problems	T5 RSCIEI and CTE (1)	4	6
9	Master class Problems	... T5 RSCIEI and CTE (2)	4	6
10	Master class Problems	T6 Energy costs (1)	4	6
11	Master class Problems	...T6 Energy costs (2)	4	6
12	Master class Problems	T7 Lighting Technology (1)	4	6
13	Master class Problems	...T7 Lighting Technology (2)	4	6
14	Master class Problems	...T7 Lighting Technology (3)	4	6
15	Tutorials		4	6
		TOTAL	60	90

## Evaluation

Continuous evaluation of the subject (compulsory attendance > 90%).

Realization in group, of works and exercises of the different subjects, from a case of practical application.

5 deliveries throughout the course. None of the exercises evaluated will exceed 30% of the overall score.

Students who renounce continuous assessment will adjust to the scheduled exam calendar, in addition to the presentation of the deliveries of course.

Weight evaluation

1P 30% exam

2P 30% exam

Deliveries course work 40%

## Bibliography

Casals Casanova, Miquel. Industrial complexes .. Barcelona: Center for Resources and Support for Teaching, Polytechnic University of Catalonia: UPC editions, 2001

Application technical regulations.