

# Advanced Technics in Construction (250722)

## General information

<b>School:</b>	ETSECCPB
<b>Departments:</b>	751 - Departament d'Enginyeria Civil i Ambiental, 758 - Departament d'Enginyeria de Projectes i de la Construcció
<b>Credits:</b>	5.0 ECTS
<b>Programs:</b>	1140 - MÀSTER UNIVERSITARI EN ENGINYERIA ESTRUCTURAL I DE LA CONSTRUCCIÓ (pla 2015)
<b>Course:</b>	2015/2016
<b>Course language:</b>	Castellano

## Faculty

Responsible faculty: Antonio Aguado De Cea

Teacher: Antonio Aguado De Cea

## Generic objectives

Subject to deepen in modern construction techniques

- Knowledge of the most modern and with more future construction techniques in the field of civil engineering, building and industrial constructions .

Prefabrication . Application of prefabrication in building construction, industrial construction and civil works. Conception, processes , advantages and disadvantages, implementation on workshop and on site. Tunnelling . Cut and cover tunnels and underground tunnels (NMA , TBM ) . Conception, equipment, processes , performance, advantages and disadvantages, control. Construction of viaducts. Long length viaducts (push, span by span ) or long span bridges (cantilever, cable-stayed, suspension, arcs ) . Conception, processes , equipment and auxiliary equipment (cranes , cable cranes , special formwork , roller units). Construction of dams . RCC dams and HV dams. Conception. Manufacturing, transportation and laying of concrete. Construction of harbour docks. Vertical breakwaters and levees of loose materials . Drawers . Manufacture and placement of blocks. Construction of shoulders . Dredging

## Skills

### *Specific skills*

Designing and building using traditional materials (reinforced concrete, prestressed concrete, structural steel, masonry, wood) and new materials (composites, stainless steel, aluminum, shape memory alloys?).

To apply innovative and sustainable technological aspects in the management and implementation of projects and works.

To analyze the multiple technical and legal conditions arising in the construction of public works, and use proven methods and proven technologies with the aim of achieving greater efficiency in construction while respecting the environment and protecting the safety and health of workers and users of public works.

**Generic skills of subject**

To develop, improve and use conventional materials and new construction techniques to ensure the safety requirements, functionality, durability and sustainability.

To define construction processes and methods of organization and management of projects and works.

To design plans for safety, quality and environmental and socioeconomic impacts related to the construction process.

**ECTS credits: total hours of student work**

		Dedication	
		Hours	Percent
<b>Supervised Learning</b>	<b>Theory</b>	24.00	53.3%
	<b>Assignments</b>	15.00	33.3%
	<b>Laboratory</b>	6.00	13.3%
	<b>Supervised activities</b>	3.00	6.7%
<b>Self-Learning</b>		105.00	

**Contents**

**Block 1: General Issues concerning the construction sector**

**Dedication**

8.0h. Theory + 5.0h. Assignments + 2.0h. Laboratory

**Description**

Block 1: General Issues concerning the construction sector

practice

Lab

**Objectives**

Introduction. Life cycle of the construction sector. The construction phase as part of a global process. Interaction between different stages. Industry characteristics construction. Situation at national and international level. The quality construction. Integrated systems account for different levels of analysis. construction vs prefabricated construction site. The degree of industrialization of construction. The Construction versus the environment. Innovation in construction as factor

change. Regulatory situations.

### **Block 2: Basics of execution. Policy cases**

#### ***Dedication***

8.0h. Theory + 5.0h. Assignments + 2.0h. Laboratory

#### ***Description***

Block 2: Basics of execution. Policy cases  
practice

Lab

#### ***Objectives***

Review basics of construction. Critical analysis of different cases called type. From the macro-micro processes. See examples attached sheets. Standard, spatial and temporal climatic incidents

### **Block 3: Aspects específicos implementation**

#### ***Dedication***

8.0h. Theory + 5.0h. Assignments + 2.0h. Laboratory

#### ***Description***

Block 3: Specific aspects of implementation  
practice

Lab

#### ***Objectives***

Construction in adverse situations: Climate (hot-cold), under water, at high altitude, difficult sites, etc. Special Techniques: pushing, lifting, turning, transportation. Rationale for them. Description with specific cases. Construction foundation elements and other works directly related field (extensions, tunnels, screens, etc.). Hormigo singular constructions (elevated tanks, towers, blades, etc.). Singular constructions of metal structures (tall buildings, towers, covers, etc.). Other singular constructions (marine environments, waterworks, etc.). Demolition techniques works.

### **Activities**

#### ***Visit to company Compact Habit***

#### ***Dedication***

3.0 h. Supervised activities

### **Grading rules (\*)**

***(\*) The evaluation calendar and grading rules will be approved before the start of the course.***

The mark of the course is obtained from the ratings of continuous assessment and their corresponding laboratories and/or classroom computers.

Continuous assessment consist in several activities, both individually and in group, of additive and training characteristics, carried out during the year (both in and out of the classroom).

The teachings of the laboratory grade is the average in such activities.

The evaluation tests consist of a part with questions about concepts associated with the learning objectives of the course with regard to knowledge or understanding, and a part with a set of application exercises.

### **Test rules**

Failure to perform a laboratory or continuous assessment activity in the scheduled period will result in a mark of zero in that activity.

### **Teaching methodology**

The course consists of 2,3 hours per week of classroom activity (large size group) and 0,3 hours weekly with half the students (medium size group).

The 2,3 hours in the large size groups are devoted to theoretical lectures, in which the teacher presents the basic concepts and topics of the subject, shows examples and solves exercises.

The 0,3 hours in the medium size groups is devoted to solving practical problems with greater interaction with the students. The objective of these practical exercises is to consolidate the general and specific learning objectives.

The rest of weekly hours devoted to laboratory practice.

Support material in the form of a detailed teaching plan is provided using the virtual campus ATENEA: content, program of learning and assessment activities conducted and literature.

### **Office hours**

### **Basic bibliography**

- Antonio Aguado. **apuntes de la asignatura.**