

# Structural Analysis Seminars (250706)

## General information

<b>School:</b>	ETSECCPB
<b>Departments:</b>	902 - Centre Internacional de Mètodes Numèrics en Enginyeria, 751 - Departament d'Enginyeria Civil i Ambiental
<b>Credits:</b>	2.5 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: Luis Miguel Cervera Ruiz

Teacher: Luis Miguel Cervera Ruiz

## Generic objectives

Subject to acquire knowledge on trends in research related to structural analysis

Capability to acquire the latest knowledge on research issues related to structural analysis

Recent advances in research topics related to structural analysis

This course aims to give an overview about the possibilities offered by numerical simulation in the structural analysis. The student will be able to exercise in different aspects of the structural calculation. All the necessary knowledge will be reviewed and appropriate calculation tools (software, interfaces, etc.) will be provided.

## Skills

### *Generic skills of subject*

To conceive, design, analyze and manage structures or structural elements of civil engineering or building, encouraging innovation and the advance of knowledge.

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

## ECTS credits: total hours of student work

	Dedication	
	Hours	Percent

<b>Supervised Learning</b>	<b>Theory</b>	5.00	40.0%
	<b>Assignments</b>	0.00	0.0%
	<b>Laboratory</b>	7.50	60.0%
	<b>Supervised activities</b>	22.00	176.0%
<b>Self-Learning</b>		50.00	

## Contents

### **Introduction**

#### *Dedication*

1.0h. Theory

#### *Description*

Introduction: course objectives, the format of the lessons, tasks

### **Geometric modeling and meshing**

#### *Dedication*

5.5h. Laboratory

#### *Description*

Software Introduction

Tutorial geometric modeling

Tutorial discretization

### **Solid Mechanics**

#### *Dedication*

2.0h. Theory

#### *Description*

Stresses and strains

Elasticity and elastic problem

### **Structural analysis**

#### *Dedication*

2.0h. Theory

#### *Description*

Static analysis 2D and 3D

### **Dynamic Analysis**

#### *Dedication*

2.0h. Laboratory

*Description*

Dynamic analysis of structures in bars and continue on.

**Activities**

***Thin plate with axial load***

*Dedication*

2.0 h. Supervised activities

***Thin plate with own weight***

*Dedication*

2.0 h. Supervised activities

***Cantilevered transverse load on the end***

*Dedication*

2.0 h. Supervised activities

***Flat structure with holes and coulmnas***

*Dedication*

2.0 h. Supervised activities

***Large edge beam with hole***

*Dedication*

2.0 h. Supervised activities

***Section of tunnel***

*Dedication*

2.0 h. Supervised activities

***Cylindrical tank***

*Dedication*

2.0 h. Supervised activities

***A foundation corner column***

*Dedication*

2.0 h. Supervised activities

***Laminar cylindrical tank domed***

*Dedication*

2.0 h. Supervised activities

***Arcaded building structure***

*Dedication*

2.0 h. Supervised activities

### ***Frequencies and modes own structure folded sheets***

#### ***Dedication***

2.0 h. Supervised activities

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

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

Continuous assessment consists of different activities, both individual and group formative in nature, made during the course (in the classroom and outside it). Assessment tests consist of a set of application exercises according to the themes developed in the course. The rating is calculated as an average of the work done throughout the course.

### **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 0,8 hours per week of classroom activity (large size group).

The 0,8 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.

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**

In class and during the two hours after school.

### **Basic bibliography**

- KJ Bather. **Finite Element Procedures**. Prentice Hall. 1986.
- Zienkiewicz, OC, Taylor, RL. **The Finite Element Method for Solid and Structural Mechanics**. Elsevier Butterworth-Heinemann. . 2005..