ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

43000441 - Advanced analysis and design of concrete structures

DEGREE PROGRAMME

04AM - Master Universitario Ingenieria De Estructuras, Cimentaciones Y Materiales

ACADEMIC YEAR & SEMESTER

2018/19 - Semester 2

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1. Description

1.1. Subject details

Name of the subject	43000441 - Advanced analysis and design of concrete structures
No of credits	4.5 ECTS
Type	Optional
Academic year ot the programme	First year
Semester of tuition	Semester 2
Tuition period	February-June
Tuition languages	English
Degree programme	04AM - Master universitario ingenieria de estructuras, cimentaciones y materiales
Centre	04 - Escuela Tecnica Superior de Ingenieros de Caminos, Canales y Puertos
Academic year	2018-19

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Hugo Eduardo Corres Peiretti (Subject coordinator)		hugoeduardo.corres@upm.es	- -
Fco.javier Leon Gonzalez		franciscojavier.leon@upm.es	Sin horario.
Alejandro Perez Caldentey		alejandro.perezc@upm.es	Sin horario.

Jose Romo Martin		jose.romo@upm.es	Sin horario.

* The tutoring schedule is indicative and subject to possible changes. Please check tutoring times with the faculty member in charge.

3. Prior knowledge recommended to take the subject

3.1. Recommended (passed) subjects

El plan de estudios Master Universitario Ingenieria de Estructuras, Cimentaciones y Materiales no tiene definidas asignaturas previas recomendadas para esta asignatura.

3.2. Other recommended learning outcomes

- Structural analysis. Computer Science. Prestressed and reinforced concrete. Concrete and steel structures

4. Skills and learning outcomes *

4.1. Skills to be learned

CE13 - - Capacidad para el ejercicio profesional de alta especialización o para la investigación predoctoral mediante la utilización de recursos de modelización predictiva en Análisis y diseño estructural en régimen dinámico y/o no lineal.

CG3 - Capacidad de diseñar, analizar e interpretar experimentos relevantes en Ingeniería Estructural, Geotécnica y de Materiales Estructurales.

4.2. Learning outcomes

RA42 - Knowledge of the nonlinear behaviour of concrete structures based on the interpretation of the experimental results available.

* The Learning Guides should reflect the Skills and Learning Outcomes in the same way as indicated in the Degree Verification Memory. For this reason, they have not been translated into English and appear in Spanish.

5. Brief description of the subject and syllabus

5.1. Brief description of the subject

Advanced analysis and design of concrete structures, including nonlinear behavior both at ULS and SLS, Strut-and-Tie Method as well as specific subjects as prestressing, fire behavior and fibre reinforced concrete

5.2. Syllabus

1. Material nonlinear behaviour
2. Slender elements
3. Behaviour of structures in seismic areas
4. SLS behaviour
5. Behaviour of structures subjected to fire
6. Fibre reinforced concrete
7. Strut-and-tie method applied to structural elements
8. Specific topics on prestressing

6. Schedule

6.1. Subject schedule*

Week	Face-to-face classroom activities	Face-to-face laboratory activities	Other face-to-face activities	Assessment activities
1	**Theoretical class** Duration: 03:00 Lecture			
2	**Theoretical class** Duration: 03:00 Lecture			
3	**Theoretical class** Duration: 03:00 Lecture			
4	**Theoretical class** Duration: 03:00 Lecture			
5	**Theoretical class** Duration: 03:00 Lecture			
6	**Theoretical class** Duration: 03:00 Lecture			
7	**Theoretical class** Duration: 03:00 Lecture			**See evaluation criteria** Written test Continuous assessment Duration: 03:00
8	**Theoretical class** Duration: 03:00 Lecture			
9	**Theoretical class** Duration: 03:00 Lecture			
10	**Theoretical class** Duration: 03:00 Lecture			
11	**Theoretical class** Duration: 03:00 Lecture			
12	**Theoretical class** Duration: 03:00 Lecture			
13	**Theoretical class** Duration: 03:00 Lecture			

14	**Theoretical class** Duration: 03:00 Lecture			
15	**Theoretical class** Duration: 03:00 Lecture			**See evaluation criteria** Written test Continuous assessment Duration: 03:00
16	**Theoretical class** Duration: 03:00 Lecture			
17				**See evaluation criteria** Written test Final examination Duration: 03:00

The independent study hours are training activities during which students should spend time on individual study or individual assignments.

Depending on the programme study plan, total values will be calculated according to the ECTS credit unit as 26/27 hours of student face-to-face contact and independent study time.

* The subject schedule is based on a previous theorical planning of the subject plan and might go to through experience some unexpected changes along throughout the academic year.

7. Activities and assessment criteria

7.1. Assessment activities

7.1.1. Continuous assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
7	See evaluation criteria	Written test	Face-to-face	03:00	100%	5 / 10	CE13 CG3
15	See evaluation criteria	Written test	Face-to-face	03:00	100%	5 / 10	CE13 CG3

7.1.2. Final examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
17	See evaluation criteria	Written test	Face-to-face	03:00	100%	5 / 10	CE13 CG3

7.1.3. Referred (re-sit) examination

No se ha definido la evaluación extraordinaria.

7.2. Assessment criteria

Evaluation through ?continuous assessment?
PE1. Quizzes

PE2. First exam 50%

PE3. Second exam 50%

Description: Consists of two exams (PE2 and PE3), each one will have theoretical questions and practical exercises. In addition there will be four short in-class quizzes (PE1.1 to PE1.4) that will be given after the theoretical classes in non-previously announced dates.

Evaluation criteria: Two short quizzes (PE1.1 and PE1.2) will take place before the First exam (PE2) and the other two quizzes (PE1.3 and PE1.4) will take place before the Second exam (PE3). The short quizzes will be scored

from 0 to 10 points. The arithmetic mean of PE1.1 and PE1.2 will be divided by 10 and will be used to increase the score of the First exam (PE2) only if the score of PE2 is greater than 4. The arithmetic mean of PE1.3 and PE1.4 will be divided by 10 and will be used to increase the score of the Second exam (PE3) only if the score of PE3 is greater than 4.

Place and period: To be determined by the Head of Studies

Result of the evaluation through ?continuous assessment?

The final score will be: The arithmetic mean of the scores in PE2 and PE3.

The subject will be passed if the final score of both PE2 and PE3 is equal or greater than 5.

Those students with a score less than 5 in any of the two exams (PE2 and PE3) will not pass the subject and will have another opportunity in the second period examination (extraordinary), which will have the same format as the evaluation through ?final exam only?.

Evaluation through ?final exam only?

Description: Consists of a single exam, which will last from 3 to 4 hours. This exam will be formed by several theoretical and practical exercises related to any part of the contents of the subject.

Evaluation criteria: Each one of the exercises will be graded from 0 to 10 points. The final score will be the arithmetic mean of the scores obtained on each exercise.

Place and period: To be determined by the Head of Studies.

Result of the evaluation through ?final exam only?

The final score will be the one obtained in the final exam.

The subject will be passed if the final score is equal or greater than 5.

Those students with a score less than 5 will not pass the subject.