

(B) Course information in English

General course information:

Course title:	Reinforced Concrete Design II	Course code:	CE07_S01
Credits:	5	Work load (hours):	160
Course level:	Undergraduate <input checked="" type="checkbox"/>	Graduate <input type="checkbox"/>	
Course type:	Mandatory <input checked="" type="checkbox"/>	Selective <input type="checkbox"/>	
Course category:	Basic <input checked="" type="checkbox"/>	Orientation <input type="checkbox"/>	
Semester:	7 th	Hours per week:	4
Course objectives (capabilities pursued and learning results):			
Steel-concrete bond and anchorage details. Behavior and design of reinforced concrete structures under serviceability conditions. Ultimate strength design of R/C slabs (reinforcement details). Punching shear. Limit analysis of R/C beams- moment redistribution. Yield-line theory of R/C slabs. Design of joints - reinforcement details- brittle type failures. Frame joints. Shear walls.			
Prerequisites:			
1. Reinforced Concrete Design I 2. Structural Analysis II			

Instructor's data:

Name:	Philip C. Perdikaris
Level:	Professor
Office:	Rm. 108
Tel. – email:	Tel: +30-24210-74151 fax: +30-24210-74117 email: filperd@uth.gr
Other tutors:	-

Specific course information:

Week No.	Course contents	Hours	
		Course attendance	Preparation
1	Serviceability conditions (equivalent transformed cross-section, stresses, strains)	4	3
2	Crack opening and deformations/deflections under serviceability conditions (code requirements)	4	3
3	Bending moment vs. curvature diagram for R/C beams «M- κ » (cracking, first steel yielding, ultimate strength)	4	3
4	Steel-concrete bond (nature, mechanism, strength)	4	3
5	Anchorage of steel reinforcing bars. Code specifications	4	2
6	Steel bar splicing (beams, columns, code specifications)	4	2
7	Slabs (types, elastic analysis, one- and two-direction slabs, slab loads transferred to supporting beams). Approximate design methods (ultimate strength design under flexure) for rectangular R/C slabs under uniform surface load: (a) strip method (Markus tables), (b) checker-board loading method (Czerny tables)	4	3
8	Ultimate flexural strength design of rectangular R/C slabs (steel reinforcement details, code specifications)	4	3
9	R/C slabs under concentrated loads (reinforcement for flexure) – Punching shear	4	3
10	Plastic analysis of prismatic indeterminate R/C members (plastic hinges, lower/upper bound of plasticity theory, collapse limit load)	4	3
11	Plasticity factor. Moment–curvature (M- κ) diagrams. Plastic hinge rotation capacity/requirement for critical cross-section	4	3
12	Moment redistribution in R/C beams. Full and partial moment redistribution (code specifications)	4	3
13	Plastic analysis of R/C slabs (yield-line theory). Joint capacity design - detailing of joints - anchorage of reinforcement – brittle type failures	4	3
14	Design of frame joints. Shear walls	4	3

Additional hours for:			
Class project	Examinations	Preparation for examinations	Educational visit
30	4	30	

Suggested literature:

1. Greek Code for the Design of Reinforced Concrete Structures (2000)
2. Eurocode 2: Part 1-1 (EN1992-1-1)
3. Eurocode 8 part 1 (EN1998-1)
4. Greek Code for Seismic Design
5. Class notes for RC II
6. Nilson, A., "Design of Reinforced Concrete Structures"
7. Fardis M., "A course on Reinforced Concrete"
8. Penelis/Stylianidis/Kappos/Ignatakis, «Reinforced Concrete Structures»
9. Reinforced Concrete Structures (Park & Paulay, ed. Wiley)
10. Designers' Guide to EN 1998-1 and EN 1998-5, M.N.Fardis, E. Carvalho, A. Elnashai, E. Faccioli, P. Pinto, A. Plumier, Thomas Telford.

Teaching method (select and describe if necessary - weight):

Teaching	<input checked="" type="checkbox"/>	83%
Seminars	<input type="checkbox"/>	-
Demonstrations	<input type="checkbox"/>	-
Laboratory	<input type="checkbox"/>	-
Exercises	<input checked="" type="checkbox"/>	15%
Visits at facilities	<input checked="" type="checkbox"/>	2%
Other (describe):	<input type="checkbox"/>	-
Total		100%

Evaluation method (select)- weight:

	<u>written</u>	<u>%</u>	<u>Oral</u>	<u>%</u>
Homework	<input type="checkbox"/>		<input type="checkbox"/>	
Class project	<input checked="" type="checkbox"/>	25	<input checked="" type="checkbox"/>	5
Interim examination	<input type="checkbox"/>		<input type="checkbox"/>	
Final examinations	<input checked="" type="checkbox"/>	70	<input type="checkbox"/>	
Other (describe):	<input type="checkbox"/>		<input type="checkbox"/>	