

COURSE DESCRIPTION

Name of the Course:		Rehabilitation of concrete structures						
Specialization Code:		U02.07.ICV.IZ.M24.		Course Code:		3.DS.OP12		
Year of study:	2	Semester:	3	Examination form: (E-Exam; Co- Colloquy; P-Project; P/F-Passed/Failed)	E	ECTS credits granted (CR):	E (Co)	7
					P		P (P/F)	
Course Category: (DF- Fundamental; DD- General engineering; DS-Specialty engineering; DC-Complementary; PR-Practical stage)								DS
Course Type: (OB-Compulsory; OP-Elective; FC-Facultative)								OP
Number of hours per semester: Total of hours per week (TH) x Number of weeks per semester								
TOTAL :	112	Individual study (IS):			56	Contact hours (C + S;L;P):		56
Academic staff member in charge: (Full name, Academic position and Department)				<i>Dan Zamfirescu, Assoc. Professor., Reinforced concrete structures</i>				

Faculty	Engineering in foreign languages Master study programme	Number of contact hours per semester				
	Field	Civil Engineering	Total	Course	Seminar	Laboratory
Specialization	Structural Engineering	56	28			28

Course objectives - Description of the main competences: Acquire the knowledge necessary for assessment of existing concrete structures safety level. Rehabilitation methods. Types of intervention. Technologies.

Content description:

1. COURSE	<ol style="list-style-type: none"> 1. Structural and nonstructural compliance criteria for existing reinforced concrete structures. 2. Collection of information for assessment. 3. Qualitative assessment of reinforced concrete structures. 4. Quantitative assessment methods suitable for main types of structures. 5. Selection of seismic hazard class. Establishment of the necessity and level of intervention. 6. Consolidation methods for main types of reinforced concrete structures. 7. Base isolation as a method of intervention for reinforced concrete structures, vulnerable to earthquakes. 8. Case studies.
2. Seminar / Laboratory / Project / Practical stage	Seismic assessment of a vulnerable reinforced concrete building. Project for intervention for the structure.

3. Bibliography	<ol style="list-style-type: none"> 1. ATC 40, Seismic Evaluation and Retrofit of Concrete Buildings, Applied Technology Council, 1996. 2. FEMA 356, Prestandard and Commentary for the Seismic Rehabilitation of Buildings, Federal Emergency Management Agency. 3. FEMA 440, Improvement of Nonlinear Static Seismic Analysis Procedures, Federal Emergency Management Agency. 4. EN 1998-3 (2005): Eurocode 8: Design of structures for earthquake resistance – Part 3: Assessment and retrofitting of buildings. The European Union Per Regulation 305/2011, Directive 98/34/EC, Directive 2004/18/EC. 5. P100-3/ Cod de evaluare si proiectare a lucrarilor de consolidare la cladiri existente, vulnerabile seismic, vol. 1 - Evaluare, vol. 2 –Consolidare 6. Aguilar, J.A. (1995). Case studies of rehabilitation of existing reinforced concrete buildings in Mexico-City. Master Degree Dissertation, University of Texas, Austin, SUA. http://fsel.engr.utexas.edu/publications/docs/thesis6.pdf 7. Rizkalla, S., Hassan, T. (2002). Rehabilitation of concrete structures with FRP. Proceedings of the 3rd International Conference on the Behaviour of Damaged Structures, Rio de Janeiro, Brazil. http://www.ce.ncsu.edu/srizkal/linked_files/RehabilitationOfConcreteStructuresWithFRP_Brazil-july02.pdf 8. FEMA 273. (1997). NEHRP guidelines for the seismic rehabilitation of buildings. http://www.wbdg.org/ccb/DHS/ARCHIVES/fema273.pdf
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Criteria to be considered for the final mark	Weight of each criterion in the final mark (%)
1. Exam defence (final examination)	50
2. Appreciation during the entirely semester	
2.1 Seminar activity	20
2.1 Laboratory activity	
2.2 Project activity (the project has not a distinct final mark)	30
3. Periodical examinations	
3.1 Written / oral examination	
3.2 Home works, reports, essays etc.	
4. Other criteria (to be specified)	
Short description of the final evaluation procedure: Written exam, ½ regarding theoretical knowledge obtained during the course and ½ problems that are based on the course activity.	

Estimation of the total number of hours per semester requested for the individual study (IS)			
Type of individual activity	No. of hours	Type of individual activity	No. of hours
1. Study of the course notes	8	8. Preparation of the final examination	15
2. Study of the compulsory bibliography		9. Advisory class participation	2
3. Study of the supplementary bibliography	4	10. Practical documentation on site	2
4. Preparation of specific activities	20	11. Additional documentation on library	3
5. Preparation of home works		12. Internet network documentation	2
6. Preparation of periodical written examinations		13. Others (to be specified)	
7. Preparation of periodical oral examinations		TOTAL number of hours	56

Date:
20.03.2013

Signature of the Academic Staff member in charge:
Dan Zamfirescu