COURSE DESCRIPTION

Name of the Course:	Special reinforced concrete structures							
Specialization Code:	**U02.07.ICV.IZ.M24.**			**Course Code:**	**2.DS.OP03**			
Year of study:	**1**	**Semester:**	**2**	**Examination form:** (**E-**Exam; **Co-** Colloquy; **P-**Project**; P/F-**Passed/Failed)	**E**	**ECTS credits granted (CR):**	**E (Co)**	**6**
					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)	*Gheorghe VLAICU, Associate Professor, Reinforced Concrete Structures*							

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

Course objectives - Description of the main competences: Achieving capabilities to design reinforced concrete special structures - silos, tanks, industrial chimneys, cooling towers.

Content description:

1. COURSE	1. Silos - types of silos, functions, performances 2hrs 2. Silos - criteria for dimensioning the component parts 2hrs 3. Silos - loads on the cells walls 2hrs 4. Silos - main provisions of the Romania Code 2hrs 5. Silos - main provisions of the European Codes 2hrs 6. Tanks - types of tanks, performances 2hrs 7. Tanks - rectangular tanks: stresses from the liquid pressure 2hrs 8. Tanks - circular: stresses from the liquid pressure 2hrs 9. Tanks - circular tanks under seismic actions 2hrs 10. Cooling towers - wind forces on circular towers 2hrs 11. Cooling towers - stresses calculation on towers walls 2hrs 12. Chimneys - types, performances 2hrs 13. Chimneys - thermal calculation 2hrs 14. Chimneys - wind and seismic calculation 2hrs
2. Seminar / Laboratory / Project / Practical stage	**1. Grain silo battery with a capacity of about 10.000tons** 1.1 - Initial design 2hrs 1.2 - Seismic design of the battery 2hrs 1.3- Mat design 4hrs 1.4- Columns design 2hrs 1.5- Design of the slab under the cells 2hrs 1.6- Cells design 4hrs 1.7 - Detailing 2hrs **2. Water tank of 5.000m^{3}of prefabricated and prestressed concrete** 2.1 - Initial design 2hrs 2.2 - Pressures from water action 2hrs

	2.3 - Pressures from seismic actions 2hrs 2.4 - Design of the prestressing cables 2hrs 2.5 - Detailing 2hrs
3. Bibliography	1. Structural Engineering Handbook-Ed.ChenWai Fah-CRC PRESS 1999 2. ACI 307-98 Design and Construction of RC Chimneys 3. Proiect tip de siloz de cereale de 50.000 tone -IPCT 4. Proiect tip de rezervor circular acoperit din beton precomprimat - IPCT 5. SR EN 1991-4 -Silos and tanks 6. SR EN 1992-3 -Silos and tanks 7. SR EN 1998-4 -Silos, tanks and pipes 8. SR EN 1991-1-3- Wind actions 9. SR EN 1991-1-5-Thermal action

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	
2.1 Laboratory activity	
2.2 Project activity (the project has not a distinct final mark)	
3. Periodical examinations	
3.1 Written / oral examination	
3.2 Home works, reports, essays etc.	20
4. Other criteria (to be specified) Project defense	30
Short description of the final evaluation procedure: The students have to treat two subjects (in writing) the same for all, then they will have to defend their paper in an open discussion	

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	7		8. Preparation of the final examination	9
2. Study of the compulsory bibliography	6		9. Advisory class participation	
3. Study of the supplementary bibliography	6		10. Practical documentation on site	
4. Preparation of specific activities	17		11. Additional documentation on library	4
5. Preparation of home works			12. Internet network documentation	7
6. Preparation of periodical written examinations			13. Others (to be specified)	
7. Preparation of periodical oral examinations			**TOTAL number of hours**	56

Date:
March 2013

Signature of the Academic Staff member in charge:
Gheorghe VLAICU