SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Civil Engineering
1.3	Department	Structures
1.4	Field of study	Civil Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	CCIA English/Engineer
1.7	Form of education	Full time
1.8	Subject code	30.00

2. Data about the subject

2.1	Subject name			Reinforced and Prestressed Concrete I			
2.2	Subject area			Civil Engineering			
2.3	Course responsible/lecturer			Lecturer phd.eng. Olar Radu – radu.olar@dst.utcluj.ro			
2.4	Teachers in charge of seminars			Dumitru Moldovan, Horia Constantinescu			
2.5 Year of study	2	2.6 Semester	2	2.7 Assessment	C	2.8 Subject category	DID

3. Estimated total time

3.1 Number of hours per week	5	3.2 of which, course:	3	3.3 applications:	2
3.4 Total hours in the curriculum	70	3.5 of which, course:	42	3.6 applications:	28
Individual study					24
Manual, lecture material and notes, bibliography					6
Supplementary study in the library, online and in the field					14
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					6
Tutoring					7
Exams and tests					2
Other activities					1

3.7	Total hours of individual study	60
3.8	Total hours per semester	130
3.9	Number of credit points	5.0

4. Pre-requisites (where appropriate)

4.1	Curriculum	
4.2	Competence	The strength of materials and statisc knowledges.

5. Requirements (where appropriate)

5.1	For the course	
5.2	For the applications	

6. Specific competences

Professional competences	The physical and mechanical properties of the concrete and reinforcements The ultimate and exploitation limit states of the reinforced concrete elements subjected to different loads The rules of the Eurocode 2 regarding the reinforced concrete structures calculus
Cross competences	- to realise destructive and nondestructive tests on simple concrete, reinforcement and reinforced concrete elements, - to design the reinforced concrete elements subjected to different types of loads - to check the reinforced concrete elements to the ultimate and serviciability limit states

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	The proper knowledge of specific terms in the concrete design domain
7.2	Specific objectives	to be able to design reinforced concrete structural elements

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1.	Reinforced Concrete. Composite Action. Concrete.	The courses are presented both in a traditional and multimedia way, the students can interfere with questions and discussions are possible	
2.	Compressive Strength. Tensile Strength.		
3.	Stress-strain relationship. Modulus of Elasticity.		
4.	Shrinkage. Thermal Movement. Creep. Durability.		
5.	Steel reinforcement. Characteristic Material Strengths. Characteristic loads.		
6.	Definition of the Limit State. Factors of Safety. Analysis of the Structure. Analysis of the Section.		
7.	Theory of Bending.		
8.	Rectangular and Flanged Section in Bending.		
9.	Bending and Axial Load.		
10.	Shear an Torsion.		
11.	Serviciability Limit States. Calculation of Curvatures.		
12.	Calculation of Deflection.		
13.	Flexural cracking. Control of Cracks Widths.		
14.	Thermal and Shrinkage Cracking under Serviceability Requirements		

Bibliography

In the UTC-N library

1. T. Oneţ, Radu OLAR – Reinforced Concrete Handbook part.1, UT Press 2010
2. T.Oneţ, R.Olar – Beton Armat, UTPress 2003
3. Z. Kiss, T. Oneţ – Proiectarea structurilor de beton după SR – EN 1992-1, Abel 2008
4. G. Viorel, C. Măgureanu, Z. Kiss – Îndrumător laborator, litografie IPCN, 1983
5. C. Măgureanu, T. Oneţ – Betonul, UTPres, 1996
6. T. Oneţ, T. Clipii, A. Cuciureanu – Betonul structural, Editura Societatea Academică MATEIU BOTEZ, Iaşi 2006
7. I. Cadar, T. Clipii, A. Tudor – Beton Armat, Timişoara, 1999

Virtual didactic materials

1. Movies with tests on reinforced concrete elements.

8.2. Applications/Seminars	Teaching methods	Notes

1.	Practical experiments – the cast in of a reinforced concrete beam (1/2)	Direct involvement of the student in the problems solving process	
2.	Practical experiments – the cast in of a reinforced concrete beam (2/2)		
3.	Practical experiments – the cast in of a reinforced concrete slab piece (1/2)		
4.	Practical experiments – the cast in of a reinforced concrete slab piece (2/2)		
5.	Nondestructive tests on simple and reinforced concrete.		
6.	Destructive tests on concrete: strengths.		
7.	Destructive tests on concrete: deformations		
8.	Tests regarding the reinforcements used to reinforcement concrete		
9.	Tests regarding the adherence between the reinforcements and concrete.		
10.	The dimensioning of the reinforced concrete elements subjected to bending – singly reinforced		
11.	The dimensioning of the reinforced concrete elements subjected to bending – double reinforced		
12.	The dimensioning of the reinforced concrete elements on shear force		
13.	The dimensioning of the reinforced concrete elements on torsion		
14.	Crack widths and deformations calculus		
Bibliography			

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

During the semester period, visits on the construction sites can be organised in order to be presented to students practical aspects related with the execution and structural design of the structural reinforced and prestressed elements. Direct contact with the representatives of the companies are possible.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
Course	Quality evaluations performed by analysis, synthesis, generalization of data obtained through its own investigation and acquirements	The evaluation consist in the knowledges verification, the problems solving and theory (questions), in writing (1.00+1.00 hours)	Problems (P); Theory (T); N=0,40P+0,60T
Applications			
10.4 Minimum standard of performance			
N≥5.00 (P≥5 and T≥5)			

Date of filling in: 21.09.2016 Teachers in charge of seminars

Course responsible/lecturer:
Şef Lucrări Dr. Ing. Radu OLAR

Date of approval in the department: Head of department:
Conf. Dr. Ing. Attila Puskás