



## 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						
2.5	Year of study	2	2.6 Semester	2	2.7 Assessment	C	2.8 Subject category	DID DOB

### 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 static knowledges.

### 5. Requirements (where appropriate)

5.1	For the course	
5.2	For the applications	



## 6. Specific competences

Professional competences	<p>The physical and mechanical properties of the concrete and reinforcements</p> <p>The ultimate and exploitation limit states of the reinforced concrete elements subjected to different loads</p> <p>The rules of the Eurocode 2 regarding the reinforced concrete structures calculus</p>
Cross competences	<ul style="list-style-type: none"> <li>- to realise destructive and nondestructive tests on simple concrete, reinforcement and reinforced concrete elements,</li> <li>- to design the reinforced concrete elements subjected to different types of loads</li> <li>- to check the reinforced concrete elements to the ultimate and serviceability limit states</li> </ul>

## 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 and Torsion.		
11.	Serviceability 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			
<i>In the UTC-N library</i>			
1. T. Oneț, Radu OLAR – Reinforced Concrete Handbook part.1, UT Press 2010			
2. T. Oneț, R.Olar – Beton Armat, UTPress 2003			
3. Z. Kiss, T. Oneț – 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. Oneț – Betonul, UTPres, 1996

6. T. Oneț, T. Clipii, A. Cuciureanu – Betonul structural, Editura Societatea Academică MATEIU BOTEZ, Iași 2006

7. I. Cadar, T. Clipii, A. Tudor – Beton Armat, Timișoara, 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 $\geq$ 5.00 (P $\geq$ 5 and T $\geq$ 5)			

**UNIVERSITATEA TEHNICĂ**  
DIN CLUJ-NAPOCA

Date of filling in	Course holder	Course responsible
october 2017	Șef Lucrări Dr. Ing. Radu OLAR _____	Șef Lucrări Dr. Ing. Radu OLAR _____
Date of approval in the department:	Head of department:	
october 2017	Conf. Dr. Ing. Attila Puskás _____	