

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	Structuri
1.4	Field of study	Civil Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Civil, Industrial and Agricultural Buildings /Engineer (English language)
1.7	Form of education	Full time
1.8	Subject code	38.0

2. Data about the subject

2.1	Subject name				Beton armat si precomprimat II						
2.2	Course responsible/lecturer				Sl.Dr.Ing. Olar Radu-Ioan-Radu.Olar@dst.utcluj.ro						
2.3	Teachers in charge of seminars				Asist.Dr.Ing. Moldovan Dumitru Vasile-Dumitru.Moldovan@dst.utcluj.ro						
2.4	Year of study	3	2.5	Semester	1	2.6	Assessment	E	2.7	Subject category	DID/DI

3. Estimated total time

3.1	Number of hours per week	5	3.2	of which, course:	3	3.3	applications:	
3.4	Total hours in the curriculum	70	3.5	of which, course:	42	3.6	applications:	
Individual study								hours
Manual, lecture material and notes, bibliography								20
Supplementary study in the library, online and in the field								17
Preparation for seminars/laboratory works, homework, reports, portfolios, essays								24
Tutoring								2
Exams and tests								3
Other activities								0
3.7	Total hours of individual study		66					
3.8	Total hours per semester		150					
3.9	Number of credit points		6					

4. Pre-requisites (where appropriate)

4.1	Curriculum	Knowledge of material strength, static and stability, reinforced and prestressed concrete I
4.2	Competence	The reinforced concrete part 1 knowledges.

5. Requirements (where appropriate)

5.1	For the course	Knowledges of Reinforced and Prestressed Concrete 1
5.2	For the applications	Knowledges of Reinforced and Prestressed Concrete 1

6. Specific competences

Professional competences	<p>C1. Recognition of the elements and structures of constructions in the field of civil engineering specific to the study program Civil, Industrial and Agricultural Constructions.</p> <p>C1.1. Identifying the structural and functional role of the elements of a civil, industrial and agricultural construction: plates, beams, pillars.</p> <p>C1.2. Explaining the constructive composition of the different categories of civil, industrial and agricultural constructions: structural systems made of reinforced concrete frames.</p> <p>C1.3. Graphic representation and modeling of different types of civil, industrial and agricultural constructions in order to prepare a specific technical documentation: graphic representation of the reinforcement carcasses of the structural elements in order to elaborate the technical project for execution.</p> <p>C1.4. Assessing the quality of a civil, industrial and agricultural construction, using evaluation criteria specific to the field: checking the load-bearing capacity and the state of deformation and cracking of the reinforced concrete elements.</p> <p>C2. Dimensioning of construction elements in the field of civil engineering specific to the study program Civil, Industrial and Agricultural Constructions.</p> <p>C2.1. Identification of construction materials and types of structures in constructions: Concrete, reinforcements, additives, finishings for concrete structures.</p> <p>C2.2. Description of actions and establishment of loads by correlation with location factors: evaluation of loads and exposure classes and selection of related materials.</p> <p>C2.3. Use of calculation methods specific to the types of structures and methods for sizing the components of a civil, industrial and agricultural construction in order to prepare a specific technical documentation: use of calculation methods in the ultimate limit state and in the service limit state for reinforced concrete elements components of a structure, such as plates, beams and columns for the elaboration of the technical project for execution.</p> <p>C2.4. Evaluation, selection and optimal use of different materials that make up the construction elements: evaluation of the type of concrete, the type of reinforcement, the size of the elements and the amount of materials needed to withstand loads specific to the functionality and location of a civil, industrial and agricultural.</p> <p>C2.5. Transposition of the results of sizing calculations in the technical documents of the project for civil, industrial and agricultural constructions: elaboration of execution plans, material requirements and technical memory for the reinforced concrete elements components of a structure, such as slabs, beams and columns for elaboration of the technical project for execution.</p> <p>C3. Technological and economic design for the execution, operation and maintenance of constructions in the field of civil engineering specific to the study program Civil, Industrial and Agricultural Constructions.</p> <p>C3.1. Description of the technological processes for the realization of a civil, industrial and agricultural construction: the composition of the concrete, ways of pouring per element and per structure.</p> <p>C3.2. Explanation of the properties of construction materials, construction materials and installation technologies for civil, industrial and agricultural constructions: shrinkage and slow flow of concrete with reinforcement, mechanical strength and their assurance.</p> <p>C3.3 Design of the technological processes specific to the different phases of realization of the</p>
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	<p>elements of civil, industrial and agricultural constructions in view of the execution: the phases of realization of the prestressed concrete.</p> <p>C4. Respecting the quality and sustainable development requirements specific to a civil, industrial and agricultural construction.</p> <p>C4.1. Identification and use of technical regulations specific to a civil, industrial and agricultural construction: SR EN 1992-1-1 and National Annex, SR EN 206-1: 2004, P100: 2013, CP012: 2007, NE012-1: 2007, NE012-2 : 2010.</p> <p>C4.2. Adapting the calculation methods used in civil, industrial and agricultural constructions to their behavioral peculiarities.</p> <p>C4.3. Respecting the principles and using the methods of composition and calculation specific to a civil, industrial and agricultural construction and the requirements identified in the preparation of technical documentation: the principle $R \geq A$, where R means resistances affected by reduction factors and A means actions affected by multiplication factors .</p> <p>C4.4. Application of the provisions of the quality standards for the design of a civil, industrial and agricultural construction: the provisions of the standards CP012: 2007, NE012-1: 2007, NE012-2: 2010 ensure the quality of the execution of the concrete works.</p>
Cross competences	<p>T1. Responsible execution of professional tasks, in conditions of restricted autonomy and qualified assistance.</p> <p>CT1. Applying efficient and responsible work strategies, punctuality, seriousness and personal responsibility, based on the principles, norms and value of professional ethics for the elaboration of technical projects.</p> <p>T2. Familiarization with the roles and activities specific to teamwork and distribution of tasks for subordinate levels.</p> <p>CT2. Applying efficient teamwork techniques, on various hierarchical levels: the best prepared will benefit by teaching the weakest by fixing knowledge and the poorest will benefit from answers to problems in a short, real time.</p> <p>T3. Awareness of the need for lifelong learning: efficient use of learning resources and techniques for personal and professional development.</p> <p>CT3. Documentation in Romanian for professional and personal development, through continuous training and efficient adaptation to the new technical specifications: continuous review of the standards in force in order to ensure all design requirements and to monitor changes in standards.</p>

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

7.1	General objective	Development of competencies regarding the observance of the safety requirements and sustainable development of a reinforced concrete construction
7.2	Specific objectives	Assimilation of the theoretical knowledge regarding the design and verification of a reinforced concrete element and the interpretation of the reinforced and prestressed concrete projects, as well as those regarding the verification of the correctness of the design and execution. Assimilation of the knowledge of writing and presenting a technical report containing the calculation brief and the necessary materials.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
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1. Presentation of the constituent elements of reinforced and prestressed concrete structures, behavioral and calculation features	-	-
2. The calculus and the design of the reinforced concrete slabs (I)		
3. The calculus and the design of the reinforced concrete slabs (II)		
4. The calculus and the design of the reinforced concrete slabs (III)		
5. The calculus and the design of the reinforced concrete flat slab (I)		
6. The calculus and the design of the reinforced concrete flat slab (II)		
7. The calculus and the design of the reinforced concrete columns (I)		
8. The calculus and the design of the reinforced concrete columns (II)		
9. The calculus and the design of the reinforced concrete columns (III)		
10. The calculus and the design of the reinforced concrete corbels		
11. Checks and design for Serviciability Limit States.		
12. Principles of prestressing. Prestressing Methods. (I)		
13. Principles of prestressing. Prestressing Methods. (II)		
14. Principles of prestressing. Prestressing Methods. (III)		
Bibliography Bibliography In the UTC-N library 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) Introduction. Presentation of the topic and nominal distribution of project data	-	-
2) Predimensioning elements and evaluating slab loads, calculating MEd for slab		
3) Calculation of the amount of reinforcements in the slabe and their arrangement		
4) Slab sketch check		
5) Slab delivery (drawing and calculation notes, drawing)		
6) Evaluation of secondary beam loads, calculation of MEd and VEd for the secondary beam		
7) Reinforcement arrangement details		
8) Secondary beam sketch check		
9) Secondary beam delivery (drawing and calculation notes, overview)		
10) Static frame calculation, MEd, reinforcements arrangement, VEd, envelope diagram, frame node reinforcement details		

11. Checks and design for Serviceability Limit States.		
12) Beam and column sketch check		
13) Delivery of main beam and column (drawing and calculation notes)		
14) Remaining drawings final delivery		
Bibliography Bibliography <ul style="list-style-type: none"> • T. Oneț, Radu OLAR – Reinforced Concrete Handbook part.1, UT Press 2010 • Z. Kiss, T. Oneț – Proiectarea structurilor de beton după SR – EN 1992-1, Abel 2010 • SR EN 1992-1-1 - Eurocod 2: Proiectarea structurilor din beton • Cod de proiectare seismic, partea i, prevederi de proiectare pentru cladiri, indicativ P 100-1/2013 • I. Terteia – Betonul precomprimat, Editura Tehnică, București, 1981 • T. Oneț, I. Terteia – Proiectarea betonului structural, Casa Cărții de Știință, Cluj-Napoca, 1995 • I. Terteia, T. Oneț, V. Păcurar, Z. Kiss, C. Măgureanu – Proiectarea betonului precomprimat, UTPres, 1986 		

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
10.4 Course	Quality evaluations performed by analysis, synthesis, generalization of data obtained through its own investigation and acquirements	The written and oral evaluation consist in the knowledges verification (2.00 hours)	[T]: 60%
10.5 Applications	The problem solving Project	The written evaluation consist in the problems solving in writing (1.00 hours)	[Pr]: 10% [P]: 30%
10.6 Minimum standard of performance			
10.4 Minimum standard of performance: $N = 0.6 \cdot [T] + 0.1 \cdot [Pr] + 0.3 \cdot [P] \geq 5.00$ (a) Eligibility for the examination: attendance at project meetings and timely submission of papers (project). (b) Project mark (P): min. 5 (five); P – it's recorded in the electronic catalog (c) Mark to problem (Pr): min. 5 (five) (d) Theory note (T): min. 5 (five) $E = 0.50 \cdot (T) + 0.20 \cdot (Pr) + 0.30 \cdot (P)$; E – it's registered in the electronic catalog Promotion / credit condition: $E \geq 5$, if $T \geq 5$, $P \geq 5$ and $Pr \geq 5$			

OBS:

The final grade evaluation will take into account also the student's involvement during the semester: participation in debates, scientific sessions, frequency, etc.

Date of filling in:		Title Surname Name	Signature
	Lecturer	Sl.Dr.Ing. Olar Radu-Ioan	
	Teachers in charge of application	Asist.Dr.Ing. Moldovan Dumitru Vasile	

Date of approval in the department	Head of department
18/06/2025	conf.dr.ing. Attila Puskas
Date of approval in the faculty	Dean
25/06/2025	prof.dr.ing Daniela MANEA