

SYLLABUS ¹

1. Information about the program

1.1 Higher education institution	Politehnica University Timisoara
1.2 Faculty ² / Department ³	Faculty of Civil Engineering / Department of Civil Engineering and Building Services
1.3 Chair	—
1.4 Field of study (name/code ⁴)	Civil Engineering / 80
1.5 Study cycle	bachelor
1.6 Study program (name/code/qualification)	Civil Engineering in English / 10 / Engineer

2. Information about the discipline

2.1 Name of discipline/ formative category ⁵	High Performance Concrete and Composites / DS						
2.2 Coordinator (holder) of course activities	Prof.dr.ing. NAGY-GYÖRGY Tamás						
2.3 Coordinator (holder) of applied activities ⁶	Prof.dr.ing. NAGY-GYÖRGY Tamás						
2.4 Year of study ⁷	4	2.5 Semester	7	2.6 Type of evaluation	D	2.7 Type of discipline ⁸	DO

3. Total estimated time – hours / semester: direct teaching activities (fully assisted or partly assisted) and individual training activities (unassisted) ⁹

3.1 Number of fully assisted hours / week	4 of which:	3.2 course	2	3.3 seminar / laboratory / project	2
3.1* Total number of fully assisted hours / semester	56 of which:	3.2* course	28	3.3* seminar / laboratory / project	28
3.4 Number of hours partially assisted / week	of which:	3.5 training		3.6 hours for diploma project elaboration	
3.4* Total number of hours partially assisted / semester	of which:	3.5* training		3.6* hours for diploma project elaboration	
3.7 Number of hours of unassisted activities / week	2 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			
		hours of individual study after manual, course support, bibliography and notes			1
		training seminars / laboratories, homework and papers, portfolios and essays			1
3.7* Number of hours of unassisted activities / semester	28 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			
		hours of individual study after manual, course support, bibliography and notes			14
		training seminars / laboratories, homework and papers, portfolios and essays			14
3.8 Total hours / week ¹⁰	6				
3.8* Total hours /semester	84				
3.9 Number of credits	5				

¹ The form corresponds to the Discipline File promoted by OMECTS 5703 / 18.12.2011 and to the requirements of the ARACIS Specific Standards valid from 01.10.2017.

² The name of the faculty which manages the educational curriculum to which the discipline belongs

³ The name of the department entrusted with the discipline, and to which the course coordinator/holder belongs.

⁴ The code provided in HG no.140 / 16.03.2017 or similar HGs updated annually shall be entered.

⁵ Discipline falls under the educational curriculum in one of the following formative disciplines: Basic Discipline (DF), Domain Discipline (DD), Specialist Discipline (DS) or Complementary Discipline (DC).

⁶ Application activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr).

⁷ Year of studies in which the discipline is provided in the curriculum.

⁸ Discipline may have one of the following regimes: imposed discipline (DI), optional discipline (DO) or optional discipline (Df).

⁹ The number of hours in the headings 3.1 *, 3.2 *, ..., 3.8 * is obtained by multiplying by 14 (weeks) the number of hours in headings 3.1, 3.2, ..., 3.8. The information in sections 3.1, 3.4 and 3.7 is the verification keys used by ARACIS as: (3.1) + (3.4) ≥ 28 hours / wk. and (3.8) ≤ 40 hours / wk.

¹⁰ The total number of hours / week is obtained by summing up the number of hours in points 3.1, 3.4 and 3.7.

4. Prerequisites (where applicable)

4.1 Curriculum	<ul style="list-style-type: none"> Material Science 1&2, Concrete 1&2
4.2 Competencies	<ul style="list-style-type: none"> Stress analysis, cross section design with HPC and Composites.

5. Conditions (where applicable)

5.1 of the course	<ul style="list-style-type: none"> Classroom with min 30 person capacity, laptop, projector, whiteboard
5.2 to conduct practical activities	<ul style="list-style-type: none"> Classroom with min 30 person capacity, laptop, projector, whiteboard, equipped laboratory

6. Specific competencies acquired through this discipline

Specific competencies	<ul style="list-style-type: none"> Acquire knowledge about basics of high performance concrete and composites
Professional competencies ascribed to the specific competencies	<ul style="list-style-type: none"> Recognizing typical structures and structural elements, specific to the graduated study programme Design of structural elements in civil engineering, specific to graduated study programme
Transversal competencies ascribed to the specific competencies	<ul style="list-style-type: none"> Documentation in Romanian and foreign language, in view of professional and personal development, via continuous learning and efficient adaptation to the new technical specifications

7. Objectives of the discipline (based on the grid of specific competencies acquired - pct.6)

7.1 The general objective of the discipline	<ul style="list-style-type: none"> Acquire knowledge about basics of high performance concrete and composites. Design of structural elements using HPC and Composites.
7.2 Specific objectives	<ul style="list-style-type: none"> Design characteristics of HPC and Composites, behaviour, calculation models and detailing rules. Acquire skills of theoretical and practical calculation. Documentation in foreign languages and adaptability to new technical specifications.

8. Content ¹¹

8.1 Course	Number of hours	Teaching methods ¹²
HPC – technology, properties, domains of use	2	projections, discussions,

¹¹ It details all the didactic activities foreseen in the curriculum (lectures and seminar themes, the list of laboratory works, the content of the stages of project preparation, the theme of each practice stage). The titles of the laboratory work carried out on the stands shall be accompanied by the notation "(*)".

¹² Presentation of the teaching methods will include the use of new technologies (e-mail, personalized web page, electronic resources etc.).

Reactive powders for concrete – technology, properties, domains of use	2	demonstrations
Special industrial concrete - Composition, properties, applications.	8	
Fiber Reinforced Concrete – Composition, properties, applications	2	
FRP composites – domain of use	1	
Strengthening using FRP composites – systems, design aspects, applications	12	
Reinforcing with FRP rebars – design and detailing	1	
Bibliography ¹³		
1. ACI 440.2R-08, Guide for the design and construction of externally bonded FRP systems for strengthening concrete structures, American Concrete Institute, 2008.		
2. CNR 200-2012, Guide for the Design and Construction of Externally Bonded FRP Systems for Strengthening Existing Structures, Italian National Research Council, 2012		
3. Bulletin 40, FRP reinforcement in RC structures, International Federation for Structural Concrete, 2007		
4. Stoian V., Nagy-György T., Dan D., Gergely J., Daescu C., Materiale compozite pentru constructii, Ed. Politehnica, Timișoara, ISBN 978-973-625-948-7, 2009, pg 315		
5. Buchman I. – Betoane de ultra inalte performante, Editura Orizonturi Universitare, Timisoara, 1999		
6. High performance concrete structural designers' guide, 2008		
7. Ultra-High Performance Concrete: A State-of-the-Art Report for the Bridge Community, Publication no. FHWA-HRT-13-060, 2013		
8.2 Applied activities¹⁴	Number of hours	Teaching methods
HPC – composition and technological aspects.	2	projections,
Reactive powders for concrete – Compositions and technology.	2	conversations,
Special industrial concrete - Composition, preparation, characteristics	8	demonstrations,
Fiber Reinforced Concrete – Composition, preparation, characteristics	2	experimental test,
Self-compacting Concrete - Composition, preparation, characteristics	1	referees
Strengthening using FRP composites: systems, design of strengthening for a structural element, application of the designed FRP, testing of the strengthened element, assessment of the results	14	

¹³ At least one title must belong to the discipline team and at least one title should refer to a reference work for discipline, national and international circulation, existing in the UPT library.

¹⁴ Types of application activities are those specified in footnote 5. If the discipline contains several types of applicative activities then they are sequentially in the lines of the table below. The type of activity will be in a distinct line as: "Seminar:", "Laboratory:", "Project:" and / or "Practice/training".

Bibliography¹⁵

1. ACI 440.2R-08, Guide for the design and construction of externally bonded FRP systems for strengthening concrete structures, American Concrete Institute, 2008.
2. CNR 200-2012, Guide for the Design and Construction of Externally Bonded FRP Systems for Strengthening Existing Structures, Italian National Research Council, 2012
3. Bulletin 40, FRP reinforcement in RC structures, International Federation for Structural Concrete, 2007
4. Stoian V., Nagy-György T., Dan D., Gergely J., Daescu C., Materiale compozite pentru constructii, Ed. Politehnica, Timișoara, ISBN 978-973-625-948-7, 2009, pg 315
5. Buchman I. – Betoane de ultra inalte performante, Editura Orizonturi Universitare, Timisoara, 1999
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9. Corroboration of the content of the discipline with the expectations of the main representatives of the epistemic community, professional associations and employers in the field afferent to the program

- Compatibility with educational programs of Universite de Liege, Lulea University of Technology, University of Patras, Faculty of Civil Engineering

10. Evaluation

Type of activity	10.1 Evaluation criteria ¹⁶	10.2 Evaluation methods	10.3 Share of the final grade
10.4 Course	Quality of the theoretical subjects	Written: theoretical subjects Oral: theoretical subjects	50%
10.5 Applied activities	S:		
	L:		
	P ¹⁷ : Accuracy of calculations	Oral defend	50%
	Pr:		
10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified ¹⁸)			
<ul style="list-style-type: none"> • Minimum grade : 5 			

Date of completion

15.01.2018

**Head of Department
(signature)**

.....

**Course coordinator
(signature)**

**Date of approval in the Faculty
Council**¹⁹

12.02.2018

**Coordinator of applied activities
(signature)**

**Dean
(signature)**

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¹⁵ At least one title must belong to the discipline team.

¹⁶ Syllabus must contain the procedure for assessing the discipline, specifying the criteria, methods and forms of assessment, as well as specifying the weightings assigned to them in the final grade. The evaluation criteria shall be formulated separately for each activity foreseen in the curriculum (course, seminar, laboratory, project). They will also refer to the forms of verification (homework, papers, etc.)

¹⁷ In the case where the project is not a distinct discipline, this section also specifies how the outcome of the project evaluation makes the admission of the student conditional on the final assessment within the discipline.

¹⁸ It will not explain how the promotion mark is awarded.

¹⁹ The endorsement is preceded by the discussion of the board's view of the study program on the discipline record.