

# MEĐIMURJE POLYTECHNIC IN ČAKOVAC



## POLYTECHNIC OF MEĐIMURJE AND ČAKOVEC

### SYLLABUS COURSE

ACADEMIC YEAR: 2020/2021

#### 1. GENERAL INFORMATION ABOUT THE COURSE

<b>1.1. Course title</b>	<b>Sizing of concrete and masonry structures</b>			
<b>1.2. Study program (s)</b>	Undergraduate professional study Sustainable Development			
<b>1.3. Course status (O, I)</b>	Mandatory	<b>1.6. Teaching methods (number of hours)</b>	<b>Lectures</b>	30
<b>1.4. Course code</b>			<b>Exercises</b>	30
<b>1.5. Course abbreviation</b>	DBiZK		<b>Seminar</b>	
<b>1.6. Semester</b>	IV		<b>E-learning</b>	
<b>1.7. Credit value (ECTS)</b>	5	<b>1.7. Place and time of classes</b>	Premises of the Polytechnic of Međimurje in Čakovec, according to the schedule published on the website	

#### 2. TEACHING STAFF

<b>2.1. Carrier</b>	mr. sc. Vladimir Križaić	<b>2.4. Assistant (s)</b>	mr. sc. Vladimir Križaić, Dražen Hranj
<b>2.2. Calling</b>	v. lecturer	<b>2.5. Title (s)</b>	s. lecturer lecturer
<b>2.3. Contact</b>	vkrizaic @ mev.hr	<b>2.9. Contact</b>	vkrizaic @ mev.hr dhranj@mev.hr

#### 3. COURSE DESCRIPTION

<b>3.1. Course objectives</b>	Acquisition of basic design knowledge required for the design of smaller buildings. To enable students to dimension complex structures of reinforced concrete and brick with a thorough acquaintance with the specifications of materials, performance, resistance and design situations. To enable students to dimension slab, beam and wall reinforced concrete structures. Include durability and fire resistance of reinforced concrete and masonry structures. Fundamentals of spatial stability of reinforced concrete and masonry structures of smaller residential buildings. To enable the student to participate in the supervision and construction of ab. And masonry structures.
<b>3.2. Requirements for enrollment and taking the course</b>	Passed course Load-bearing capacity of structures and Mechanics and resistance of structures.
<b>3.3. Learning outcomes</b>	<b>After successfully completing the course, students will be able to:</b> 1. Use, determine and apply statics and basics of spatial stability in classification ab. And masonry smaller building structures in the

	<p>design methodology and method of construction, especially roof structures .</p> <ol style="list-style-type: none"> <li>Use and apply the resistance of materials in reinforced concrete less demanding residential structures to the geometric and structural system</li> <li>Know the production and select the characteristics and properties of reinforced concrete in construction according to EC1 and EC2 regulations and walls according to EC6 applicable regulations, ie applicable regulations with fire safety</li> <li>Evaluate and select mechanical and fire-retardant properties, ie mechanical strength of reinforced concrete for complex inhomogeneous constructions and masonry structures</li> <li>Analyze , compile and select load analysis on residential horizontal, inclined and vertical structures</li> </ol> <p><b>Sixth</b> calculated and calculation methods used limit states and serviceability (EC1 and EC2) on the housing a horizontal, inclined and vertical structures ies sk onstructed with fittings is in specific areas and parts of the elements ab. structures (longitudinal, transverse reinforcement, positioning, anchoring</p> <ol style="list-style-type: none"> <li>Calculate and use the calculation of the load-bearing capacity limit method on masonry structures (EC6).</li> <li>Use and present the basics of spatial stability of residential structures</li> </ol>																														
<b>3.4. Course content</b>	The course presents contents related to classical and modern technology of construction projects																														
<b>3.5. Types of teaching</b>	<table border="1"> <tr> <td>x</td> <td>Lectures</td> <td>x</td> <td>Exercises</td> <td></td> <td>Blended e-learning</td> <td>x</td> <td>Independent tasks</td> <td></td> <td>Laboratory</td> </tr> <tr> <td></td> <td>Seminars and workshops</td> <td></td> <td>Distance education</td> <td></td> <td>Field work</td> <td>x</td> <td>Multimedia and network</td> <td></td> <td>Mentoring work</td> </tr> <tr> <td></td> <td>Other:</td> <td colspan="8"></td> </tr> </table>	x	Lectures	x	Exercises		Blended e-learning	x	Independent tasks		Laboratory		Seminars and workshops		Distance education		Field work	x	Multimedia and network		Mentoring work		Other:								
x	Lectures	x	Exercises		Blended e-learning	x	Independent tasks		Laboratory																						
	Seminars and workshops		Distance education		Field work	x	Multimedia and network		Mentoring work																						
	Other:																														
<b>Performance language</b>	Croatian																														
<b>3.7. Monitoring student work (enter the number of ECTS credits for each activity so that the total number of ECTS credits corresponds to the credit value of the course, 1 ECTS = 30 hours)</b>	<table border="1"> <tr> <td>2</td> <td>Class attendance</td> <td>0,5</td> <td>Seminar paper</td> <td></td> <td>Essay</td> </tr> <tr> <td>0,5</td> <td>Teaching activity</td> <td></td> <td>Project</td> <td></td> <td>Report</td> </tr> <tr> <td>1,0</td> <td>Colloquia</td> <td></td> <td>Practical work</td> <td></td> <td>Continuous assessment</td> </tr> <tr> <td>1,0</td> <td>Written exam</td> <td></td> <td>Experimental work</td> <td></td> <td></td> </tr> <tr> <td>1,0</td> <td>Oral exam</td> <td></td> <td>Research</td> <td></td> <td></td> </tr> </table>	2	Class attendance	0,5	Seminar paper		Essay	0,5	Teaching activity		Project		Report	1,0	Colloquia		Practical work		Continuous assessment	1,0	Written exam		Experimental work			1,0	Oral exam		Research		
2	Class attendance	0,5	Seminar paper		Essay																										
0,5	Teaching activity		Project		Report																										
1,0	Colloquia		Practical work		Continuous assessment																										
1,0	Written exam		Experimental work																												
1,0	Oral exam		Research																												
<b>3.8. Assessment and evaluation of student work during classes and at the final exam</b>	<table border="1"> <thead> <tr> <th>Activity specification</th> <th>Percentage%</th> <th>points</th> </tr> </thead> <tbody> <tr> <td colspan="3" style="text-align: center;">Evaluation during classes</td> </tr> <tr> <td>Class attendance</td> <td>8%</td> <td>8</td> </tr> <tr> <td>Teaching activity</td> <td>2%</td> <td>2</td> </tr> <tr> <td>Seminar paper</td> <td>18</td> <td>18</td> </tr> <tr> <td>Colloquium 1</td> <td>36 %</td> <td>36</td> </tr> <tr> <td>Colloquium 2</td> <td>36 %</td> <td>36</td> </tr> <tr> <td colspan="3" style="text-align: center;"><i>Evaluation of exam work for students who did not take the colloquium</i></td> </tr> <tr> <td>Written exam</td> <td>90 %</td> <td>90</td> </tr> <tr> <td><b>In total:</b></td> <td><b>100%</b></td> <td><b>100</b></td> </tr> </tbody> </table>	Activity specification	Percentage%	points	Evaluation during classes			Class attendance	8%	8	Teaching activity	2%	2	Seminar paper	18	18	Colloquium 1	36 %	36	Colloquium 2	36 %	36	<i>Evaluation of exam work for students who did not take the colloquium</i>			Written exam	90 %	90	<b>In total:</b>	<b>100%</b>	<b>100</b>
Activity specification	Percentage%	points																													
Evaluation during classes																															
Class attendance	8%	8																													
Teaching activity	2%	2																													
Seminar paper	18	18																													
Colloquium 1	36 %	36																													
Colloquium 2	36 %	36																													
<i>Evaluation of exam work for students who did not take the colloquium</i>																															
Written exam	90 %	90																													
<b>In total:</b>	<b>100%</b>	<b>100</b>																													

<b>3.9. Evaluation criteria - elaboration by outcomes</b>	<b>Method of passing the outcome</b>						
		<b>Class attendance</b>	<b>Teaching activity</b>	<b>Colloquium 1</b>	<b>Colloquium 2</b>	<b>Practical work</b>	<b>In total</b>
	Outcome 1			10	2.5		12.5
	Outcome 2			10	2.5		12.5
	Outcome 3			10	2.5		12.5
	Outcome 4			10	2.5		12.5
	Outcome 5				10		10
	Outcome 6				10		10
	Outcome 7				10		10
	Outcome 8				10		10
	Outside the outcome	8	2				10
	<b>In total</b>	<b>8</b>	<b>2</b>	<b>40</b>	<b>50</b>	<b>0</b>	<b>100</b>
	<p>Scoring outcomes (in order to pass the colloquium / exam the student must achieve at least 50% points for each learning outcome)</p> <p>Rating Points</p> <p>89 - 100 Excellent (5)</p> <p>76 - 88 Very good (4)</p> <p>63 - 75 Good (3)</p> <p>51 - 62 Sufficient (2)</p> <p>0 - 49 Insufficient (1)</p>						
<b>3.10. Specifics related to taking the course</b>	<p>If a student collects 50% of the points of each outcome, he / she directly takes the exam .</p> <p>If a student does not achieve a sufficient number of points on the midterm exam, he / she cannot take the next midterm exam. A student who does not do a seminar paper-house sizing program cannot colloquize .</p> <p>Once achieved points in intermediate exams for each learning outcome are no longer deleted unless the student decides to correct the result for a particular learning outcome, whereby the points won until then are deleted and newly achieved points for that learning outcome are entered.</p> <p>The final grade is obtained on the exam period and is the sum of points earned during classes.</p> <p>Students who did not take the colloquium access the written part of the exam where all learning outcomes and the program are checked .</p>						
<b>1. Student obligations</b>	<p>Full-time students are required to attend at least 70% of the total number of hours of lectures and exercises in order to exercise the right to take the exam. Part-time students are required to attend at least 30% of the total number of hours of lectures and exercises in order to exercise the right to take the exam. If the student has not fulfilled all the obligations provided by the course, he is obliged to attend the lectures again and meet the conditions for taking the exam.</p> <p>Attendance can be offset by online consultations, organized webinars, and added assignments given by teachers. One lesson lasts 45 minutes, and several hours form a teaching unit. Absence from one teaching unit is counted as one absence. Delays and apologies are recorded separately. In that case, if the student missed more than 50% of classes, and has a justifiable reason / apology, a request should be submitted to the Department Council, which then decides</p>						

	on the justification of student absences with the obligatory opinion of the course leader.			
<b>2. Written works</b>				
<b>3. Required reading</b>				
	1.	I. Tomičić: <i>Betonske konstrukcije</i> , Školska knjiga, Zagreb, 1988 and 1996 ..		
	2.	Zorislav Sorić, Tomislav Kišiček , <i>Concrete Structures 1</i> , Zagreb , Faculty of Civil Engineering, 2014 -		
	3.	J. Radić et al., <i>Betonske konstrukcije 2</i> , Zagreb: <i>Hrvatska sveučilišna naklada: Faculty of Civil Engineering: Secon HDKG: Andris, 2006.</i>		
	4.	J. Radić et al., <i>Betonske konstrukcije 3</i> , Zagreb: <i>Hrvatska sveučilišna naklada: Faculty of Civil Engineering: Secon HDKG: Andris, 200 8 .</i>		
	5.	Z. Sorić: <i>Zidane konstrukcije I</i> , Hrvatski savez građevinskih inženjera, Zagreb, 1999		
<b>3.14. Supplementary literature</b>				
	1.	I. Tomičić: <i>Manual for the calculation of reinforced concrete structures</i> , DHGK, Zagreb, 1993.		
	2.	EC 6 : <i>CALCULATION OF CONCRETE STRUCTURES</i> , Construction Book, Belgrade, 1994		
	3.	EC2: <i>CALCULATION OF MASONRY STRUCTURES</i> ; Construction book, Belgrade, 1994		
<b>4. ADDITIONAL INFORMATION ABOUT THE COURSE</b>				
<b>4.1. Quality control</b>		The quality of the program, teaching process, teaching skills and level of mastery of the material will be established by conducting a written evaluation based on questionnaires, and in other standardized ways and in accordance with the acts of the Polytechnic of Međimurje in Čakovec.		
<b>4 .2. Contacting the teacher</b>		Students can contact the teacher during the consultation period and during classes, while for short questions and explanations they can contact any day during working hours by coming in person or by landline. It is also possible to ask questions by e-mail, which will be answered in 48 hours at the latest. It is desirable that students come to the consultation as often as possible for any ambiguities.		
<b>4 .3. Informing about the course</b>		It is the obligation of each student to be regularly informed about the course. All notifications about the holding or possible postponement of classes will be posted on the bulletin board and on the website of the Polytechnic at least 24 hours in advance.		
<b>4.4. The contribution of the course to the study program</b>		Apply the basics of construction through the creation and design of horizontal, vertical and oblique structures of the house		
<b>5. DEVELOPMENT OF THEMATIC UNITS (the number of elaborated hours is identical to the number of lectures and exercises of the course)</b>				
<b>LECTURES</b>				
<b>Hours</b>	<b>Topic and description of the lecture</b>	<b>Method of work</b> • direct teaching (presentation, instruction, pp presentation)	<b>Lecture learning outcomes</b>	<b>Course learning outcome</b>

		<ul style="list-style-type: none"> <li>• Discovery learning (independent, guided, discussion, debate)</li> <li>• Group / collaborative learning</li> <li>• case study</li> <li>• field teaching...</li> </ul>		
1.	Introduction to the course content, basics of construction	Presentation, pp presentation	Distinguish construction systems	11
2.	General overview of ab building structures: historical development and modern static systems, special attention to less demanding buildings	Presentation, pp presentation	Distinguish ab. and masonry structures	11
3.	Classification of ab building structures and resistance to geometric system, structural system, construction method and design methodology of less demanding buildings.	Presentation, pp presentation	Distinguish the properties of constructive resources	12
4.	Characteristics of concrete and reinforced concrete: production and properties. Advantages and disadvantages of reinforced concrete. features of a brick wall: production and properties.	Presentation, pp presentation	Use construction steel and concrete	13
5.	Features of a brick wall: production and properties.	Presentation, pp presentation	Distinguish types of bricks	13
6.	Fundamentals of fire safety, protection and durability ab. and masonry structures.	Presentation, pp presentation	Apply fire fighting	14
7.	Loads of residential structures with combinations for the load-bearing capacity limit method - GSN according to common (European) standards (EC1,2,6)	Presentation, pp presentation	Distinguish loads on systems	15
8.	Dimensioning of reinforced concrete structures according to the methods of limit states of bearing capacity - GSN and GSU (usability) according to common (European) standards - EC1,2.	Presentation, pp presentation	Apply dimensioning of complex structures	16
9.	Sizing of elements stressed by bending, single-reinforced cross-sections of the slab load-bearing in one direction.	Presentation, pp presentation	Apply dimensioning of complex structures	16
10.	Sizing of bending-stressed elements, single and double-reinforced cross-	Presentation, pp presentation	Apply dimensioning of complex structures	16

	sections of rectangular and T-section beams.			
11.	Dimensioning of column and wall elements at centric and eccentric pressure.	Presentation, pp presentation	Apply dimensioning of complex structures	17
12.	Limit states of usability of reinforced concrete structures and elements.	Presentation, pp presentation	Apply sizing of simple constructions	17
13.	Boundary condition of cracks. Limit state of deformation - deflection of structures.	Presentation, pp presentation	Apply dimensioning of complex structures	18
14.	Execution drawings of a simpler construction with specifications	Presentation, pp presentation	Explain and read the design project	18
15.	Basic concepts of masonry structures. Non-reinforced and reinforced masonry structures. Wall brackets stressed.	Presentation, pp presentation	Explain and read the design project	18
<b>EXERCISES / SEMINARS</b>				
<b>Hours</b>	<b>Topic and description of the lecture</b>	<b>Method of work</b> <ul style="list-style-type: none"> <li>• direct teaching (presentation, instruction, pp presentation)</li> <li>• Discovery learning (independent, guided, discussion, debate)</li> <li>• Group / collaborative learning</li> <li>• case study</li> <li>• field teaching...</li> </ul>	<b>Lecture learning outcomes</b>	<b>Course learning outcome</b>
1.	General overview of ab building structures: historical development and modern static systems, special attention to less demanding buildings	Presentation, pp presentation	Distinguish ab. and masonry structures	11
2.	Classification of ab building structures and resistance to geometric system, structural system, construction method and design methodology of less demanding buildings.	Guided task, examples of systematic and structural modeling	Distinguish the properties of constructive resources	11
3.	Characteristics of concrete and reinforced concrete: production and properties. Advantages and disadvantages of reinforced concrete. features of a brick wall: production and properties.	Guided task - the roof of the family house	Use construction steel and concrete	12
4.	Features of a brick wall: production and properties.	Guided task - the roof of the family house	Distinguish types of bricks	13

<b>5.</b>	Fundamentals of fire safety, protection and durability ab. and masonry structures.	Guided task - the roof of the family house	Apply fire fighting	13
<b>6.</b>	Loads of residential structures with combinations for the load-bearing capacity limit method - GSN according to common (European) standards (EC1,2,6)	Guided task - the roof of the family house	Distinguish loads on systems	14
<b>7.</b>	Dimensioning of reinforced concrete structures according to the methods of limit states of bearing capacity - GSN and GSU (usability) according to common (European) standards - EC1,2.	Guided task - the roof of the family house	Apply dimensioning of complex structures	15
<b>8.</b>	Sizing of elements stressed by bending, single-reinforced cross-sections of the slab load-bearing in one direction.	Guided task - the roof of the family house	Apply dimensioning of complex structures	16
<b>9.</b>	Sizing of bending-stressed elements, single and double-reinforced cross-sections of rectangular and T-section beams.	Guided task, examples of sizing	Apply dimensioning of complex structures	16
<b>10.</b>	Dimensioning of column and wall elements at centric and eccentric pressure.	Guided task, examples of sizing	Apply dimensioning of complex structures	16
<b>11.</b>	Limit states of usability of reinforced concrete structures and elements.	Guided task, examples of sizing	Apply sizing of simple constructions	17
<b>12.</b>	Boundary condition of cracks. Limit state of deformation - deflection of structures.	Guided task, examples of sizing	Apply dimensioning of complex structures	17
<b>13.</b>	Execution drawings of a simpler construction with specifications	Guided task, examples of sizing	Explain and read the design project	18
<b>14.</b>	Basic concepts of masonry structures. Non-reinforced and reinforced masonry structures. Wall brackets stressed.	Guided task, examples of sizing	Explain and read the design project	18
<b>15.</b>	Submission of papers	Independent production	to rate	