



**CZĘSTOCHOWA UNIVERSITY OF TECHNOLOGY**  
**FACULTY OF CIVIL ENGINEERING**  
**CARD OF COURSE DESCRIPTION**

Name of course						Course code	Semester
Computer Modeling of Concrete Structures						WB_BUD_D_I_KMB_07_KBI	full year
Type of class						Level of studies	
Lecture	Classes	Laboratory	Project	Seminar	Exam	BSc programme	ECTS
-	-	2	-	-	-	full-time studies	
Speciality						Type of subject	
Building and Engineering Structures						elective	
Unit:			Department of Building Construction and Engineering				
			Room 94		Phone / fax: +48 (34) 325 09 04		
Teacher			Maksym GRZYWIŃSKI, Ph.D.		mgrzywin@bud.pcz.czest.pl		

### I. CARD OF COURSE

#### SUBJECT OBJECTIVES

O1	Knowledge of selected methods used in solving problems of modelling concrete structures.
O2	The ability to perform static calculations and dimensioning of the components of structural elements in Autodesk Robot Structural Analysis Professional.
O3	Skills in graphic presentation design using Autodesk AutoCAD.

#### PREREQUISITE & ADDITIONAL REQUIREMENTS

R1	Knowledge of Structural Mechanics and Concrete Structures.
R2	The ability of analytical calculation of static building structures.
R3	The ability of analytical dimensioning of reinforced concrete structures .

#### LEARNING OUTCOMES

S1	Student has knowledge of dimensioning and computer modeling and calculation of complex building structures.
<b>General skills</b>	
S2	Students can obtain information from the literature and other materials.
<b>Basic engineering skills</b>	
S3	Student can apply the selected computer programs for modeling the structure and define the output parameters for the given assumptions.
<b>Personal and social competences</b>	
S4	Able to work independently and in a team.

#### CONTENTS OF STUDY

Type of classes – Laboratory		Number of hours
L01	Issue guidelines for term paper #1	2
L02	General information about the system Autodesk Robot Structural Analysis Professional (ARSAP)	2
L03	Definition of bar structures in the module frame 2D	2
L04	Definition of loads and load combinations	2
L05	Analysis of the results - graphical and tabular	2
L06	Dimensioning of steel structures	2
L07	Dimensioning of reinforced concrete beams , columns and foundations	2
L08	Defense of term paper #1 and issue guidelines for term paper #2	2
L09	The definition of the geometry of reinforced concrete slabs	2
L10	Supports in slabs of reinforced concrete	2

<b>L11</b>	Meshing plate structures	2
<b>L12</b>	Load slabs	2
<b>L13</b>	Results for plate structures	2
<b>L14</b>	Reinforcement theoretical and actual reinforced concrete slabs	2
<b>L15</b>	Defense of term paper #2	2
<b>Total:</b>		<b>30</b>

<b>TEACHING TOOLS</b>	
1.	Laboratory classes with CAD software.
2.	Author's teaching aids.
3.	Literature.

<b>METHODS OF ASSESSMENT ( F – FORMATIVE, P – SUMMARY)</b>	
<b>F1</b>	Assessment to prepare for classes.
<b>P1</b>	Assessment of the knowledge and ability to apply computational procedures .
<b>P2</b>	Rating read the detailed knowledge and its theoretical foundations in the context of connection with the calculation procedures .

<b>STUDENT'S WORKLOAD</b>			
No..	Activity	Averaged workload	
		Hours	[ECTS]
1.	<b>Classes – laboratory.</b>	30	3
2.	Read the indicated literature.	5	1
3.	Contact hours of teacher.	5	
<b>Total:</b>		<b>40</b>	<b>4</b>

<b>BASIC AND SUPPLEMENTARY LITERATURE</b>	
1.	Starosolski W.: <i>Komputerowe modelowanie betonowych ustrojów inżynierskich</i> , Politechnika Śląska, 2009
2.	Sieczkowski J.: <i>Podstawy komputerowego modelowania konstrukcji budowlanych</i> , Oficyna Wydawnicza Politechniki Wrocławskiej, 2001
3.	Autodesk Robot Structural Analysis 2010 - Manual, Autodesk, 2010
4.	Rombach G.A.: <i>Finite element design of concrete structures</i> , Thomas Telford Publishing, 2004

<b>MATRIX OF LEARNING OUTCOME CARRYING OUT</b>					
Learning outcome for the course	Reference to the effect defined for the field of study	Objectives of the course	Contents of study	Teaching tools	Methods of assessment
<b>S1</b>	KBI_W02	O1, O2, O3	L02÷L14	1, 2, 3	F1
<b>S2</b>	K_U12, K_U22	O1, O2, O3	L02÷L14	1, 2, 3	F1, P1, P2
<b>S3</b>	KBI_U04	O1, O2, O3	L02÷L14	1, 2, 3	F1, P1, P2
<b>S4</b>	KBI_K01, KBI_K02	O1, O2, O3	L02÷L14	1, 2, 3	F1

<b>II. METHODS OF ASSESSMENT – DETAILS</b>	
<b>MARKS</b>	<b>LEARNING OUTCOME</b>
<b>S1</b>	
<b>2,0 (F)</b>	Student can not read the file with the correct input.
<b>3,0 (E)</b>	Students can read the file with the correct input.
<b>3,5 (D)</b>	Student is able to correctly build a computational model, but can not correct any erroneous data input .
<b>4,0 (C)</b>	Student is able to correctly build a computational model and can correct any erroneous data input .
<b>4,5 (B)</b>	Moreover, the student can properly interpret the results .
<b>5,0 (A)</b>	Moreover, the student can properly verify the results .
<b>S2</b>	
<b>2,0 (F)</b>	Student does not know the primary sources of literature needed for design .
<b>3,0 (E)</b>	Student knows the basic sources of literature needed for the design .
<b>3,5 (D)</b>	Student knows the applicable set of standards .
<b>4,0 (C)</b>	Student knows the applicable set of standards and can use them independently.
<b>4,5 (B)</b>	Student is able to take advantage of all standards and link them throughout the design process.
<b>5,0 (A)</b>	Moreover, the student completed the messages given in the standards of knowledge given in the textbooks .
<b>S3</b>	
<b>2,0 (F)</b>	Student can not recognize the operating conditions section or structural element on the basis of the static scheme of the structure.
<b>3,0 (E)</b>	Student is able to recognize the working conditions section or structural element on the basis of the static scheme of the structure.
<b>3,5 (D)</b>	Student can also determine the sequence of calculations.
<b>4,0 (C)</b>	Moreover, the student is able to modify the order of evaluation .
<b>4,5 (B)</b>	Moreover, the student can set the output parameters to solve the tasks resulting from its content .
<b>5,0 (A)</b>	Student is able to design optimal design .
<b>S4</b>	
<b>2,0 (F)</b>	Student does not perform its tasks.
<b>3,0 (E)</b>	Student performs tasks assigned to him carefully .
<b>3,5 (D)</b>	Student performs the tasks carefully , but their results are not subjected to discussion.
<b>4,0 (C)</b>	Student notes the need to discuss the result, but it can not properly formulate the problem.
<b>4,5 (B)</b>	Student can discuss the results using the appropriate criteria .
<b>5,0 (A)</b>	Student is aware of the responsibility for the implementation of tasks and understand the non-technical aspects and effects work civil engineer, such as social, economic and environmental impact.

<b>III. OTHER USEFUL INFORMATIONS ABOUT THE SUBJECT</b>	
<b>1.</b>	Information, where and how students may acquaint with literature, author's teaching aids and others: according to the type of materials: <i>According to the type of material – in the classroom, in the teacher's office and university or faculty library</i>
<b>2.</b>	Information about the place of classes: <i>Show-case in the Faculty of Civil Engineering and faculty www page.</i>
<b>3.</b>	Information about time of classes (day and hour): <i>Show-case in the Faculty of Civil Engineering and faculty www page.</i>
<b>4.</b>	Information about consultations (place and hours): <i>The timetable posted on the door of Room 75 at the Faculty of Civil Engineering st. Academic 3 (second floor).</i>