

## COURSE DESCRIPTION CARD

Białystok University of Technology									
Field of study	Civil Engineering							Degree level and programme type	Bachelor's degree
Specialization/ diploma path								Study profile	academic profile
Course name	Foundation							Course code	ENB06445
								Course type	obligatory
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	6
	30			30				No. of ECTS credits	4
Entry requirements	Strength of materials, Structural mechanics, Soil mechanics, Concrete structures								
Course objectives	Acquiring the knowledge necessary for the design and execution of shallow and deep foundations in various soil - water conditions according to Eurocode 7. Learning the basis of designing a retaining wall, embedded and slurry walls, soil improvement. Learning the principles of controlling groundwater level and excavations.								
Course content	<p><u>Lectures:</u> Classification of foundations. Shallow foundations: pad footings, strip foundations, mat and plate foundations. Control of groundwater. Excavations. Deep foundations: pile foundations. Gravity, embedded and slurry walls. Soil improvement: replacement, preloading, vertical drains, stone columns, jet grouting, dynamic replacement. Reinforced soil, soil nails and anchors.</p> <p><u>Projects:</u> Designing of pad footings and cantilever retaining walls in accordance with the appropriate Standards for given actions and soil - water conditions.</p>								
Teaching methods	Lecture, design - individual projects								
Assessment method	lecture – written exam, project – partial verification of the projects, two projects completion, presentation and discussion								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
LO1	Knows the basic types of foundations and can select the optimal foundation for buildings for specific soil and water conditions.							K_B1_W03 K_B1_W05 K_B1_W06	
LO2	Knows technologies for making sheet piling and diaphragm walls and their use for drainage and secure excavations in geotechnics.							K_B1_W03 K_B1_W06 K_B1_U06	

<b>LO3</b>	Knows modern methods of improving weak subsoil and performing special works.	K_B1_W05 K_B1_W06 K_B1_U01 K_B1_U03
<b>LO4</b>	Knows the issues of soil reinforcement	K_B1_W05 K_B1_W06 K_B1_U01 K_B1_U03 K_B1_U05
<b>LO5</b>	Is able to design a pad footing and retaining wall in accordance with applicable standards in the field of geotechnics and reinforced concrete structures.	K_B1_W03 K_B1_W05 K_B1_U03 K_B1_U05
<b>LO6</b>	Is ready to critically evaluate his knowledge and defend the adopted solutions.	K_B1_K01 K_B1_K06
<b>Symbol of learning outcome</b>	<b>Methods of assessing the learning outcomes</b>	<b>Type of tuition during which the outcome is assessed</b>
<b>LO1</b>	Written exam, defence of the projects	L, P
<b>LO2</b>	Written exam.	L
<b>LO3</b>	Written exam.	L
<b>LO4</b>	Written exam.	L
<b>LO5</b>	Written exam, execution and defence of the projects	L, P
<b>LO6</b>	Defence of the projects	P
<b>Student workload (in hours)</b>		<b>No. of hours</b>
<b>Calculation</b>	lecture attendance	30
	participation in projects classes,	30
	execution of the projects	20
	preparation for defense and discussion on the project	10
	preparation for and participation in exams (18h + 2h exam)	20
	participation in student-teacher sessions related to the project classes	5
	<b>TOTAL:</b>	<b>115</b>
<b>Quantitative indicators</b>		<b>HOURS</b>
<b>Student workload – activities that require direct teacher participation</b>		<b>67</b>
<b>Student workload – practical activities</b>		<b>65</b>
<b>Basic references</b>	1. Eurocode 7: Geotechnical Design. Part 1. 2. Eurocode 2: Design of concrete structures. Part 1-1: General rules and rules for buildings. 3. Bond A., Harris A.: Decoding Eurocode 7. Taylor & Francis, 2008. 4. Atkinson J.H.: The mechanics of soils and foundations. Taylor & Francis, New York, 2007. 5. Bowles J.E.: Foundation Analysis and Design. New York, McGraw-Hill, 1982.	

<b>Supplementary references</b>	<ol style="list-style-type: none"> <li>1. Poulos H.G., Davis E.H.: Pile foundation analysis and design. New York, John Wiley, 1980.</li> <li>2. Das B.M.: Fundamentals of Geotechnical Engineering. CENGAGE Learning, 2013.</li> <li>3. Powers J. P., Corwin A. B., Schmall P. C., Kaeck W.E.: Construction Dewatering and Groundwater Control: New Methods and Applications. John Wiley &amp; Sons, Canada, New Jersey, 2007.</li> <li>4. Ou Ch.-Y.: Deep Excavations: Theory and practice. CRC Press, Taylor &amp; Francis, 2006.</li> <li>5. Day R.: Foundation Engineering Handbook. McGraw-Hill, 2010.</li> </ol>	
<b>Organisational unit conducting the course</b>	Department of Geotechnics and Structural Mechanics	<b>Date of issuing the programme</b>
<b>Author of the programme</b>	Zenon Szypcio DSc, PhD, Eng Katarzyna Dołżyk - Szypcio PhD, Eng	24.02.2020

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work,  
S – seminar