

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	Hydraulics and hydrology							Course code	ENB1S21016
								Course type	obligatory
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	2
	15			15				No. of ECTS credits	3
Entry requirements	Mathematics I, Physics I, Engineering geology and petrography								
Course objectives	Knowledge and understanding the basics of: statics and dynamics of liquids and gases, static and dynamic interaction of liquids and gas on buildings and their elements, ground water flow, design of pipe systems and open channels, basis of hydrology and water management.								
Course content	<p><u>Lectures:</u> Physical and mechanical properties of liquids and gases. Liquid pressure on straight, inclined and curved walls. Fluid pressure. Equilibrium of bodies completely or partially submerged in liquid. Laminar and turbulent movement. Bernoulli's equation for ideal and real liquids. The principle of keeping the moments at the flow of liquids and gases in pipes. Ground water flow. Open channels. Protection and sealing of open channels. Light of bridges and culverts. Water cycle in nature. Watercourse and catchment. Catchment water balance. Basics of hydrometry and hydrography. Water management.</p> <p><u>Project:</u> Examples of fluid pressure on vertical, inclined and curved walls. Calculations of energy grade line (EGL) and hydraulic grade line (HGL) at liquids flow in the pipes. Design principles for simple and complex open channels. Exemplary project of a ring drainage of a small building.</p>								
Teaching methods	Problem lecture, informative lecture, project exercises								
Assessment method	Lecture - colloquium, Project - execution and defence of three projects								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
LO1	Knows the basic physical and mechanical properties of liquids and gases as well as static and dynamic effect of liquids on structural elements.							K_B1_W01 K_B1_W03	
LO2	Knows and understands the laws of fluid movement in pipes and open channels.							K_B1_W05 K_B1_U01	

LO3	Knows and understands the issues of water circulation in nature and ground water flow in the soil.	K_B1_W01	
LO4	Knows the basic issues of hydrology and hydrometry and water management.	K_B1_W01	
LO5	Is able to present diagrams of liquid pressure on vertical, inclined and curved walls.	K_B1_W01 K_B1_U01	
LO6	Is able to calculate the parameters of liquid movement in pipes and open channels.	K_B1_W01 K_B1_U01 K_B1_U05	
LO7	Is able to design the elements of horizontal drainage.	K_B1_W01 K_B1_U01 K_B1_U05	
LO8	He is ready to the critical evaluation his knowledge and possibilities of its continuous widen.	K_B1_U15 K_B1_K01	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
LO1	written colloquium	L	
LO2	written colloquium, project tasks	L, P	
LO3	written colloquium, project tasks	L, P	
LO4	written colloquium	L	
LO5	project tasks	P	
LO6	written colloquium, project tasks	L, P	
LO7	written colloquium, project tasks	L, P	
LO8	defense of project tasks	P	
Student workload (in hours)		No. of hours	
Calculation	lecture attendance	15	
	participation in projects classes	15	
	preparation and execution of the projects	20	
	preparation for and participation in colloquium /tests	20	
	preparation for defense and projects defense	5	
	participation in student-teacher sessions related to the project classes	5	
	TOTAL:	80	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		40	1,5
Student workload – practical activities		65	2,5
Basic references	<ol style="list-style-type: none"> 1. Bedinet P.B., Huber W.C.: Hydrology and floodplain analysis. Addison-Wesley Publishing Company, USA, 1988. 2. Featherstone R.E., Nalluri C.: Civil Engineering Hydraulics. Wiley-Blackwell, 2007. 3. Mott R.L.: Applied Fluid Mechanics. Pearson Education Limited, 2016. 		

	4. Marriott M. J., Featherstone R.E., Nalluri C.: Civil engineering hydraulics, 5th edition, John Willey & Sons, Ltd., UK, 2009.	
Supplementary references	1. Knight D.W., Mc Gahey C., Lamb R., Samuels P.G.: Practical Channel Hydraulics. Taylor & Francis Group, 2010. 2. Sokołowski J., Żbikowski A.: Odwodnienia budowlane i osiedlowe. Wyd. SGGW, Warszawa, 1993 (in Polish). 3. Kubrak J.: Hydraulika techniczna. Wyd. SGGW, Warszawa, 1998 (in Polish)	
Organisational unit conducting the course	Department of Geotechnics and Structural Mechanics	Date of issuing the programme
Author of the programme	Zenon Szypcio, DSc, PhD, Eng Katarzyna Dołyk – Szypcio, PhD, Eng	24.02.2020

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