

COURSE DESCRIPTION CARD

Faculty of Civil Engineering and Environmental Science									
Field of study	Environmental Engineering						Degree level and programme type	Bachelor's degree	
Specialization/ diploma path	International School of Engineering						Study profile	Academic profile	
Course name	Water management and protection						Course code	19284214H	
							Course type	Obligatory	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	VI
	15	-	-	15	30	-	-	No. of ECTS credits	4
Entry requirements	Basic knowledge of mathematics, chemistry and hydrology, basic knowledge of information technologies								
Course objectives	The aim of the course is to provide students knowledge about principles of water management and protection, including information on hydrological phenomena and processes, methods of water quality assessment and possibilities of water protection. Practical outcome of the course is ability to perform engineering calculations applied in water protection projects.								
Course content	<p>LECTURES: Water resources and water demand; Hydrologic cycle: water balance, characteristic of hydrologic cycle components and processes; Sources of water pollution; River water quality: processes in rivers, water quality zones; Lakes water quality: physical limnology, biological and chemical characteristics; Groundwater quality: groundwater zones, contaminant transport; Management practices for water protection</p> <p>PROJECT: Engineering calculations used in water protection projects including water quality classification, spread of pollutants in water, time of pollutant migration to watercourses and water reservoirs, release of pollutants into waters</p> <p>SPECIALIZATION WORKSHOP: Influence of wastewater on the quality of surface waters: computer model development, simulations.</p>								
Teaching methods	case study analysis, discussion, technical calculations, teacher-centered instruction, project-based learning								
Assessment method	correctness of engineering calculations, written test								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
LO1	Knowledge concerning water management and protection including water resources, water quality and water protection							IS1_W01	
LO2	Knowledge of processes and phenomena occurring in water environment and during hydrological cycle							IS1_W07	
LO3	Knowledge of possibilities and methods of assessing environmental impact on water quality							IS1_W11	

L04	Is able to plan proper calculation for water management/protection, interpret the results and draw conclusions on their basis	IS1_U02	
L05	Can select and use computer tools to solve complex engineering computational tasks	IS1_U05	
L06	Can use the different kinds of information related to water management and protection	IS1_U14	
L07	Is ready to carry out duties during the specialization workshop and project tasks, takin into consideration the social conditions	IS1_K05	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
L01	written test	L	
L02	written test, engineering calculation	L, P, SW	
L03	written test, engineering calculations	L, P	
L04	interpretation of research results	SW, P	
L05	engineering calculations, evaluation of the correctness of algorithms	SW, P	
L06	engineering calculations	SW, P	
L07	written test, engineering calculations, activity during project	L, SW, P	
Student workload (in hours)		No. of hours	
Calculation	participation in lectures	16	
	participation in project and specialization workshop	48	
	preparation for written test (lecture)	8	
	preparation of project calculations	32	
	preparation for specialization workshop	40	
	participation in student-teacher sessions related to the project/lectures	5	
	TOTAL:	125	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		69	2.5
Student workload – practical activities		125	5
Basic references	1. Pennington K.L., Cech T.V. Introduction to water resources and Environmental Issues. Cambridge University Press, 2015 2. Clausen John C. Introduction to Water resources. Waveland Press, Inc, 2018 3. Sudha Goel. Water and wastewater Engineering. Cambridge University Press, 2019		
Supplementary references	Hadrian F. Cook. The Protection and Conservation of Water Resources, Second Edition. John Wiley & Sons Ltd. 2017 ISBN:9781119970040		
Organisational unit conducting the course	Department of Water Supply and Sewage Systems	Date of issuing the programme	
Author of the programme	dr hab. inż. Izabela Anna Talałaj, prof. PB dr inż. Paweł Biedka	May 2022	

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

S – seminar