COURSE DESCRIPTION CARD – SPECIMEN

Faculty of Civil Engineering and Environmental Science									
Field of study	**Environmental Engineering**						**Degree level and programme type**	**Master's degree**	
Specialization/ diploma path	**International School of Engineering**						**Study profile**	**Academic profile**	
Course name	**Application of computer systems in environmental engineering**						**Course code**	**EEM11009**	
							Course type	**obligatory**	
Forms and number of hours of tuition	**L**	**C**	**LC**	**P**	**SW**	**FW**	**S**	**Semester**	**I**
				3				**No. of ECTS credits**	**2**
Entry requirements	Computer fundamentals of design, Fundamentals of water supply, Fundamentals of sewerage								
Course objectives	To introduce advanced elements of modelling of water distribution systems using computer technology. Modelling of a storage and equalization tank, modelling of a zonal pumping station.								
Course content	Drawing up a model of a water distribution system on an example land use sub-plot with a storage and equalization reservoir. Modelling of the system for different reservoir sizes. Modelling of a water distribution system with a zonal pumping station. Preparation of tabular and graphical results of computer simulations.								
Teaching methods	Project method, numerical and computational methods								
Assessment method	Carrying out calculations and design using simulation software, printing and defending the design.								
Symbol of learning outcome	**Learning outcomes**							**Reference to the learning outcomes for the field of study**	
LO1	He/she knows and classifies quantities and design principles of water supply systems. He/she knows the construction, principles of functioning and operation of water supply and sewage systems							**IS2_W02 IS2_W03 IS2_W04**	
LO2	Correctly enters data into the programme, calibrates and performs calculations.							**IS2_U08**	
LO3	Is ready to analyse content obtained from a variety of sources and to critically evaluate and be able to use it in professional work. Is able to interpret results and verify calculations.							**IS2_K01 IS2_K02**	

	Is ready to analyse, critically evaluate and make professional use of knowledge and information in the field of water supply and sewage systems.	
LO4	Is able to perform optimisation of a modelled process or facility. Is able to evaluate water supply and sewerage technologies.	**IS2_U08**
LO5	Is able to perform optimisation of a modelled process or facility. Is able to evaluate water supply and sewerage technologies.	**IS2_W08** **IS2_U07**
LO6	Graduates are able to use their knowledge to critically analyse, synthesise, creatively interpret and present environmental engineering issues of water supply and sewage systems. They are able to critically evaluate the results of calculations and propose an alternative solution.	**IS2_U02**
LO7	Is able to work in a team.	**IS2_U12**
LO8	The graduate knows and understands to an in-depth degree the latest developments and technologies occurring in environmental engineering. The graduates will be familiar with selected phenomena, processes and objects, constituting advanced knowledge in the field of water supply and sewage systems.	**IS2_W01** **IS2_W05** **IS2_W06**
Symbol of learning outcome	**Methods of assessing the learning outcomes**	**Type of tuition during which the outcome is assessed**
LO1	observation of work in class	**SW**
LO2	project documentation + attached file with calculations and presentation	**SW**
LO3	project documentation + attached file with calculations and presentation	**SW**
LO4	project documentation + attached file with calculations and presentation	**SW**
LO5	project documentation + attached file with calculations and presentation	**SW**
LO6	project documentation + attached file with calculations and presentation	**SW**
LO7	Discussion of the project	**SW**
LO8	Defence of the drafted project	**SW**
Student workload (in hours)		**No. of hours**
Calculation	Participation in project exercises	30
	Participation in consultations related to exercises	15
	TOTAL:	**45**

Quantitative indicators	HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation	**25**	**1**
Student workload – practical activities	**25**	**1**
Basic references	1. Jacek Dawidowicz, Maria Walery, Wojciech Kruszyński, Zurab Gvishiani: Modelling of Water distribution systems using EPANET 2.2. Introduction and set of exercises. Agencja Wydawnicza Ekopress, Białystok 2021. **2.** Rossman L.A., EPANET 2 User's manual, EPA/600/R-00/057, National RiskManagement Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, OH,USA 2000.		
Supplementary references	**1.** Rossman, Lewis A., Robert M. Clark, and Walter M. Grayman. "Modeling chlorine residuals in drinking-water distribution systems." *Journal of environmental engineering* 120.4 (1994): 803-820.		
Organisational unit conducting the course	**Department of Water Supply and Sewage Systems**	**Date of issuing the programme**
Author of the programme	**Jacek Dawidowicz, PhD, DSc Eng.**	**10.10.2023**

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

S – seminar