

Subject card

Subject name and code	Hydrological modelling - laboratory exercises, PG_00091479						
Field of study	Water Management and Protection of Water Resources						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study Subject group related to practical vocational preparation		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		3.0		
Learning profile	practical		Assessment form				
Conducting unit	Pracownia Hydrologii -> Department of Hydrology -> Faculty of Oceanography and Geography -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Marzenna Sztobryn				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	0.0	0.0	30
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	30		5.0		35.0	70
Subject objectives	To learn the basic methods of hydrological analysis and forecasting methods. To be able to preprocess hydrological data used for model calibration. Learning the principles of calibration of simple hydrological models (statistical, numerical). This course prepares the student for independent modeling of basic hydrological processes.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[GWOZWL3-W01] in advanced basic biological, physical and chemical processes and phenomena, as well as analyzes their mutual relations and course in relation to natural environment and socio-ecological systems	K_W01 Correct analysis of hydrological phenomena and relations between available data	[SW5] implementation of a problem task
	[GWOZWL3-U08] use basic mathematical and statistical methods to analyze data and describe phenomena and processes occurring in the environment, as well as methods of information technology to assess the risk of threats to the of the environment, especially the hydrosphere	K_U08, use and appropriately apply the basic methods of mathematical hydrological modeling (statistical, physical, genetic or empirical) to elucidate a mathematical description of the phenomenon or process under study, together with the ability to assess the risk of hydrological hazards	[SU5] implementation of a problem task
	[GWOZWL3-U05] formulate opinions on basic environmental engineering issues, and explain and justify the necessity of land reclamation and construction of hydrotechnical facilities	K_U05, present and justify the basic need for hydrotechnical and environmental engineering works resulting from the modeling carried out	[SU5] implementation of a problem task
	[GWOZWL3-U02] select and independently apply basic research techniques and tools, with adhering to established analytical procedures in the field of environmental research in water management, adequately to the considered research problem	K-U02 - is able to evaluate, select and apply the method of hydrological modeling to the described process, in accordance with the established methodology of procedures	[SU5] implementation of a problem task
	[GWOZWL3-K08] engage in professional work in preparation or implementation of projects for the benefit of society	K_K08 is ready to implement with the preparation of projects for the benefit of the public resulting from the results of the conducted hydrological modeling, in particular for the benefit of the public	[SK5] implementation of a problem task
	[GWOZWL3-K05] take responsibility for the safety of their own work and that of others, dealing with emergencies, exercising caution in the laboratory and in the field, responsibility for entrusted equipment and apparatus	K_K05, is ready to take responsibility for social obligations and initiate actions resulting from his work, especially in the public interest	[SK5] implementation of a problem task
	[GWOZWL3-U03] observe and describe the changes taking place in water management and predict further directions of its development as well as conduct a critical analysis of: case studies of problems of water management and protection of water resources in terms of impact on ecological, social and economic systems natural valorization and assessment of quality of the environment	K_U03, carry out a critical analysis of the data and information at hand and the methods that can be applied to a given study of a hydrological phenomenon	[SU5] implementation of a problem task

	Course outcome	Subject outcome	Method of verification
	[GWOZW3-W04] research techniques, methods and tools currently used in water management and protection of water resources both in the field of natural sciences and social sciences, including basic statistical and information technology tools that make it possible to describe, model and interpret data on phenomena and processes occurring in the aquatic environment, as well as tools for describing relationships in social-ecological systems	K_W04 Correct mathematical notation of hydrological processes with their interpretation	[SW5] implementation of a problem task
Subject contents	1.Selection of modeling method 2.Construction of a simple statistical model 3.Calibration of simple models 4.Construction of a flow curve, 5.Calculation of water levels with specified exceedance probability 6.Basic indicators of modeling quality and their calculation		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	implementation of the problem task	51.0%	100.0%
Recommended reading	Basic literature	Ozga-Zielińska M., Brzeziński J., 1994, Hydrologia stosowana, Wyd. Naukowe PWN, Warszawa. Soczyńska U., 1995, Modelowanie systemów naturalnych, WGRS UW, Warszawa. Soczyńska U. (red.), 1997, Hydrologia dynamiczna, Wyd. Naukowe PWN, Warszawa Byczkowski A., 1999. Hydrologia, t. 1 i 2, Wydawnictwo SGGW Sztobryn M., (red.) i in.. 2010. Metodyka obliczania poziomów wody, o określonym prawdopodobieństwie wystąpienia, w ujściowych odcinkach rzek wpadających do Bałtyku. Gdynia BPH. 2010. zatwierdzona przez KZGW	

	Supplementary literature	Konspekty do zajęć (dostarczane studentom na wybranych ćwiczeniach). Dokumentacja oprogramowania z rodziny MIKE dostępna na stronie: dhi Sztobryn M., Kowalska B., Stanisławczyk I., Krzysztofik K. Wezbrania sztormowe geneza, tendencje i skutki działania w strefie brzegowej Bałtyku. Rozdz. w monografii- projekt KLIMAT. T3. Klęski żywiołowe, a bezpieczeństwo wewnętrzne kraju. Red. Lorenc H. IMGW PIB, Warszawa 2012 Sztobryn M., Stepko W., Zdunek R., Kowalska B. 2005, KONTROLA JAKOŚCI DANYCH (POZIOMY MORZA) W CZASIE RZECZYWISTYM, Metody kontroli jakości dla polskiej Państwowej Służby Hydrologiczno-Meteorologicznej, IMGW Warszawa, seria: Monografie -2005 Bajkiewicz-Grabowska E., Mikulski Z., 2008. Hydrologia ogólna, Wyd. Naukowe PWN. Dokumentacja oprogramowania z rodziny HEC dostępna na stronie: http://www.hec.usace.army.mil/publications/pub_download.html
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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