University of Gdańsk

Subject card

Subject name and code	Hydrological Modelling - lecture, PG_00201426		
Field of study	Water Management and Protection of Water Resources		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2027/2028
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	exam
Conducting unit	Department of Hydrology -> Faculty of Oceanography and Geography -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Michał Szydłowski	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	0.0	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	2.0	43.0	75

Subject objectives

Acquire basic knowledge of modeling hydrological processes, including: inland, coastal and marine hydrology. To acquire skills in the application of different types of modeling with the correct selection of basic modeled parameters and initial and boundary conditions. To acquire the ability to model basic hydrological processes using Excel. To learn the main objectives of using hydrological modeling. To obtain the ability to evaluate the results of different types of modeling (including forecasting, simulation).

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GWOZWL3-W04] The student is familiar with advanced research techniques, methods and tools currently used in water management and the protection of water resources, in both the natural and social sciences, including advanced statistical and IT tools enabling the description, modelling and interpretation of data concerning phenomena and processes occurring in the aquatic environment, as well as tools for describing relationships within socio-ecological systems.	K_W04 Correct mathematical notation of hydrological processes with their interpretation	[SW4] test/exam - oral or written
[GWOZWL3-W01] The student knows and understands 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 relationships between available data	[SW4] test/exam - oral or written
[GWOZWL3-K05] The student has the ability 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	[SK4] test/exam - oral or written
[GWOZWL3-U05] The student can formulate opinions on basic environmental engineering issues, and explain and justify the necessity of land reclamation and construction of hydrotechnical facilities.	K_U05 is able to present and justify the basic need for hydrological and environmental engineering works resulting from the modelling carried out	[SU4] test/exam - oral or written
[GWOZWL3-W02] The student knows and understands the importance of advanced knowledge in the sciences allowing to understand the processes and phenomena occurring in the hydrosphere, as well as knowledge of the social sciences and of the Earth's geographic environment - as a a system of interrelated and interacting components.	K_W02 Understanding of hydrological processes and their mathematical and physical notation	[SW4] test/exam - oral or written

Subject contents

1. Subject of hydrological modeling - Modeled hydrological processes and parameters, Objectives of hydrological modeling. 2. Principles and methods of modeling hydrological phenomena 3. Statistical-empirical models 4. Rainfall-runoff model 5. Flood wave transformation models 6. Evaluation of the quality of modeling depending on its use
7.Numerical models - description of basic models (HEC-RAS, MIKE)

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
test	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, WGSR 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	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.
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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