University of Gdańsk

Subject card

Subject name and code	Hydrological Modelling - laboratory classes, PG_00201425		
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	credit
Conducting unit	Department of Hydrology -> Faculty of Oceanography and Geography -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	Patrycja Mikos-Studnicka	
	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	2.0	43.0	75

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-K08] The student knows and understands 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-U02] The student can 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-U03] The student has the ability 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
[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, 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-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	[SK5] implementation of a problem task
[GWOZWL3-U08] The student can 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-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 relations between available data	[SW5] implementation of a problem task

	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	[SW5] implementation of a problem task

Subject contents

1. Statistical evaluation of hydrological forecast results

2. Simple catchment runoff model

3. Rainfall-runoff model (HEC-HMS)

4. Flow curve construction, capacity analysis

5. Flood wave transformation model (HEC-RAS)

6. Calculation of water levels with a specified probability of exceedance

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, WGSR UW, Warszawa.
Soczyńska U. (red.), 1997, Hydrologia dynamiczna, Wyd. Naukowe PWN, Warszawa
Byczkowski A., 1999. Hydrologia, t. 1 i 2, Wydawnictwo SGGW

Gąsiorowski D., Szymkiewicz R., 2016. Podstawy hydrologii dynamicznej. Wydawnictwa Naukowo Techniczne,

Warszawa.
Banasik K., 2009, Wyznaczanie wezbrań powodziowych w małych zlewniach zurbanizowanych, SGGW, Warszawa

	Supplementary literature	Lesson plans (provided to students for selected exercises). 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 Bajkiewicz-Grabowska E., Mikulski Z., 2008. Hydrologia ogólna, Wyd. Naukowe PWN. HEC family software documentation available on the website: http:// www.hec.usace.army.mil/publications/pub_download.html
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

Document generated electronically. Does not require a seal or signature.