



Subject card

Subject name and code	Protection Against Floods , PG_00048023						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2022/2023		
Education level	second-cycle studies	Subject group			Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	Part-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Hydraulic Engineering -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Dariusz Gąsiorowski					
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	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	4.0		70.0		104
Subject objectives	Mastering the methods for forecasting flood phenomena and rules for limiting floods and its consequences.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W09] has deepened, ordered, theoretically developed knowledge related to: hydrology, drainage, water management, flood protection or resource and water intake or water and sewage management	Student knows the basic hydrological processes causing floods.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	[K7_W01] has broadened and deepened knowledge of selected mathematics sections, including statistics components and optimization methods, and mathematical and numerical methods necessary for: 1) modeling and analysis of water supply systems and their physical phenomena; 2) description and analysis of flood protection systems; 3) functional analysis, optimization and reliability of sanitary engineering systems; 4) description of phenomena related to the flow of water in the environment, in pipes and open channels, filtration, migration of pollutants	Student knows the basics of mathematical modeling of the transformation of the flood wave through the reservoir and the propagation of the flood wave in the flood plain.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	[K7_U14] can technically and economically analyze and evaluate the solutions and functioning of facilities and systems in the sanitary engineering or flood protection, water intakes and water infrastructure or water and wastewater treatment plants; can assess the suitability and potential of using new achievements in materials, fixtures, devices and methodologies for designing and modeling the analyzed technical infrastructure and industrial objects, including innovative solutions	Student knows the principles of forecasting flood phenomena and methods for limiting floods and its effects.	[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
[K7_W06] has deepened, structured and theoretical knowledge related to hydraulics used in the construction, operation, operation of networks and plumbing, sewage, heating, ventilation or water treatment plants and wastewater treatment facilities	Student knows the methods of calculating the capacity of compound channel.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge	
Subject contents	<p>LECTURE: Floods - genesis and classification. Flood protection - basic concepts, tasks. Propagation of flood waves in river channels. Elements of hydrological forecasting. Technical means of flood protection. The role of retention reservoirs in limiting the effects of floods. The impact of river basin management on the flood potential of the river. Non-technical flood protection measures. Determination of flood hazard zones. Rules for the development of floodplains. Methods of limiting the effects of floods. Legal aspects of flood protection. Organization of flood protection services in Poland. Flood risk assessment. Principles of preparation of the flood hazard and the flood risk maps.</p> <p>TUTORIALS: Basics of computational simulation of flood wave propagation in open channels. Application of simplified flood wave transformation equations: retention equation, cascade equation of linear reservoirs, Muskingum equation. Controlling the operation of the retention reservoir during the passage of a surge wave. Determination of the impact of polders on the reduction of flood waves. Analysis of the influence of the embankment spacing on the flood wave propagation. Analysis of the reservoirs operation. Determination of the value of potential flood losses.</p>		
Prerequisites and co-requisites	Knowledge in hydraulics, hydrology, mathematics, basics of computer science.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Tutorial test	60.0%	25.0%
	Lecture test	60.0%	50.0%
	Homework	50.0%	25.0%
Recommended reading	Basic literature	[1] Chadwick A. and Morfet J.: Hydraulics in Civil and Environmental Engineering. E&FN Spon, London and New York 1999.	

	Supplementary literature	[1] Szymkiewicz R., Suiliang Huang, Szymkiewicz A.: Introduction to Computational Engineering Hydraulics, Gdańsk University of Technology, Gdańsk 2016
	eResources addresses	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Determination of the impact of development in floodplain on the capacity of the river 2. Analysis of the flood wave transformation during passage through the reservoir. 3. Determination of the value of potential flood losses. 	
Work placement	Not applicable	