



## Subject card

Subject name and code	, PG_00059985						
Field of study	Environmental Engineering						
Date of commencement of studies	February 2024			Academic year of realisation of subject		2024/2025	
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	Full-time studies			Mode of delivery		at the university	
Year of study	1			Language of instruction		Polish	
Semester of study	2			ECTS credits		3.0	
Learning profile	general academic profile			Assessment form		exam	
Conducting unit	Department of Geotechnical and Hydraulic Engineering -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor			dr hab. inż. Michał Szydłowski			
	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	15.0	0.0	45
	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	45		5.0		30.0	80
Subject objectives	Getting knowledge about methods in the field of forecasting flood phenomena and rules for limiting floods and its consequences and flood risk management.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K7_W01	Student knows the principles of forecasting floods and methods of reducing floods and its effects.			[SW1] Assessment of factual knowledge		
	[K7_W08] has knowledge necessary to understand the social, economic, legal and other non-technical determinants of engineering activities and their incorporation in engineering practice	Student knows modern methods of flood risk management in accordance with the Polish Water Law and the European Floods Directive.			[SW1] Assessment of factual knowledge		
	K7_U11	Performing flood hazard and risk calculations, student is able to integrate knowledge of hydraulics, hydrology and computational methods, taking into account economic and social aspects.			[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment		
K7_U12	Student is able to determine the transformation of a flood wave in a river and through a retention reservoir and can apply methods of calculating the capacity of multi-part open channels. Student is able to prepare flood hazard and risk maps using a computational model of surface water flow.			[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment			
Subject contents	Floods genesis and classification. Flood risk management basic concepts and strategies. Propagation of flood waves in river beds. Flood risk management in the light of the European Floods Directive and Polish Water Law. Technical means of flood protection active, passive. Designation of flood hazard and risk zones. Rules for the development of floodplains. Methods of reducing the effects of floods. Flood risk assessment.						

Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project presentation	60.0%	25.0%
	Final test (exam)	60.0%	50.0%
	Calculation tasks	60.0%	25.0%
Recommended reading	Basic literature	<p>1] Kubrak J. Nachlik E.: Hydrauliczne podstawy obliczania przepustowości koryt rzecznych, Wydawnictwo SGGW, Warszawa 2003.[2] Lambor J.: Gospodarka wodna na zbiornikach retencyjnych. Warszawa: Arkady 1962.[4] Nachlik E., Kostecki S., Gądek W., Stochmal R.: Strefy zagrożenia powodziowego. Wrocław 2000.[5] Radczuk L. i inni: Wyznaczenie stref zagrożenia powodziowego, Wydawnictwo RM, Wrocław 2001.[6] Szymkiewicz R.: Modelowanie matematyczne przepływów w rzekach i kanałach, Wydawnictwo Naukowe PWN Warszawa 2000.[7] Szymkiewicz r., Gąsiorowski D.: Podstawy hydrologii dynamicznej. Wydawnictwa Naukowo - Techniczne Warszawa 2010.[8] Ven Te Chow: Open-channel hydraulics, McGraw-Hill, 195</p>	
	Supplementary literature	<p>[1] Ciepiewski A.: Podstawy gospodarowania wodą. Warszawa: SGGW 1999.[2] Kubrak E., Kubrak J.: Hydraulika techniczna przykłady obliczeń, Wydawnictwo SGGW, Warszawa 2004.[3] Wołoszyn J. i inni: Regulacja rzek i potoków, Wydawnictwo Akademii Rolniczej we Wrocławiu, Wrocław 1994.[4] Chadwick A., Morfett J.: Hydraulics in civil and environmental engineering, E&amp;FN Spon, London 1999.</p>	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	<p>Determination of the impact of development of the floodplain on the capacity of the riverbed. Analysis of flood wave transformation during passage through the river valey. Determination of flood hazard and risk zones.</p>		
Work placement	Not applicable		