



## Subject card

Subject name and code	Hydraulics I, PG_00043532						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2021/2022		
Education level	first-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	2	Language of instruction			Polish		
Semester of study	3	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	prof. dr hab. inż. Jerzy Sawicki					
	Teachers	dr inż. Patrycja Mikos-Studnicka dr inż. Natalia Gietka					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	0.0	0.0	45
	E-learning hours included: 0.0						
	Adresy na platformie eNauczanie: HYDRAULIKA I SAN ZIMA 2021 - Moodle ID: 19125 <a href="https://enauzanie.pg.edu.pl/moodle/course/view.php?id=19125">https://enauzanie.pg.edu.pl/moodle/course/view.php?id=19125</a>						
Additional information: films with the lecturer comments, manuscripts of lectures, lessons on-line.							
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	4.0	51.0	100		
Subject objectives	The goal of the subject is presentation of fundamental in environmental engineering problems of hydraulics. The following particular issues are presented: Bernoulli theorem, orifices and overflows, pressure conduits flows (uniform and steady flows - simple pipelines, Darcy-Weisbach formula, pumps, pipe networks,; nonuniform and steady flows; nonuniform and unsteady flows - water hammer), and finally - fundamentals of porous media flows (filtration).						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U02] can work individually and in a team; knows how to estimate the time needed to complete the task ordered; is able to develop and implement a work schedule that ensures deadlines	Student is able to work individually and in a task-team, according to the work time-table.	
	[K6_W15] knows and understands the methods of measuring basic quantities characteristic for fluid mechanics and hydraulics, hydrology; knows the calculation methods and IT tools necessary to analyze the results of laboratory and field work	Student knows, understands and is able to apply the methods of measurement of main hydraulic quantities, and procedures of the results analysis as well.	
	[K6_U08] can use properly selected methods and devices of hydraulics and hydrology, enabling determination of basic quantities characterizing the flow of water in open channels and rivers, pipelines and flow objects of environmental engineering	Student has an arranged and deepen knowledge in the scope of hydraulics. He makes use of technical methods of calculations and solves the problems of hydraulics.	
	[K6_W05] knows the theoretical basis of hydromechanics and its practical models, necessary to solve technical problems in the field of environmental engineering (sanitary engineering, water melioration, water management and flood protection, pollution spread)	Student has an arranged and deepen knowledge in the scope of hydraulics. He makes use of technical methods of calculations and solves the problems of hydraulics.	
[K6_K01] can think and act in a creative and enterprising way; can set priorities for the implementation of an individual or group task; understands the need for continuous training and professional responsibility for their activities and team	Student is able to cooperate in a task-team. He understands the question of responsibility in his professional labor.		
Subject contents	Bernoulli theorem, mechanical energy losses, orifices and overflows, simple pressure conduits, syphon and syphon bottle, pumps and reservoirs, confuser and diffuser, pipe with a side-outflow, water hammer, basic concepts of filtration, Darcy law		
Prerequisites and co-requisites	polytechnical course of mathematics (I and II semester), course of fluid mechanics (II semester)		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	credits	60.0%	20.0%
	exam	60.0%	80.0%
Recommended reading	Basic literature	J.M. Sawicki, "Mechanika przepływów", Wydawnictwo PG, Gdansk 2009.  Z. Orzechowski, J. Prywer., R.Zarzycki, "Mechanika płynów w inżynierii środowiska", WNT, Warsaw 1997.	
	Supplementary literature	Cz. Grabarczyk, "Przepływy cieczy w przewodach. Metody obliczeniowe", Envirotech, Posen 1997.  E. Kubrak, J.Kubrak, "Hydraulika techniczna", SGGW, Warsaw 2004.	
	eResources addresses	HYDRAULIKA I SAN ZIMA 2021 - Moodle ID: 19125 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=19125">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=19125</a>	

Example issues/ example questions/ tasks being completed	Hydraulic dimensioning of orifices and overflows.  Hydraulic designing of pipelines.  Cooperation of conduits and pumps.  Technofobia aspects of water hammer.
Work placement	Not applicable