University of Gdańsk

Subject card

Subject name and code	Hydraulics and Hydromechanics - laboratory classes, PG_00201422		
Field of study	Water Management and Protection of Water Resources		
Date of commencement of studies	October 2027	Academic year of realisation of subject	2028/2029
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	1.0
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	mgr Jakub Malicki	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	15.0	0.0	0.0	15

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	15	1.0	9.0	25

Subject objectives

1. To expand students' knowledge of the behavior of water under the action of external forces (laws governing statics or fluid motion).2. To familiarize students with the characteristics of water flow in pipes, open troughs, channels and soil (laws of fluid mechanics).3. To indicate the practical application and use of water and its physical properties in engineering.4. To educate the basics of engineering calculation methods of river hydraulics.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GWOZWL3-W04] research techniques, methods and tools currently used in water management and the protection of water resources, in both the natural and social sciences, including basic 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 - knows and understands research techniques and methods used in hydraulics, including basic statistical tools to describe and interpret data on phenomena and processes in the aquatic environment	[SW1] oral statement/ conversation/discussion
[GWOZWL3-U01] make basic observations of processes and phenomena occurring in the hydrosphere and carry out basic measurements of selected processes of water purification on a laboratory scale.	K_U01 - is able to make basic observations related to fluid mobility and perform basic laboratory measurements	[SU1] oral statement/conversation/ discussion [SU6] demonstration of practical skills
[GWOZWL3-U02] 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 select and independently apply basic techniques and research tools, with established analytical procedures, in the field of fluid mechanics	[SU1] oral statement/conversation/ discussion [SU6] demonstration of practical skills
[GWOZWL3-U07] use literature and other available sources of information, including information technology, multimedia, Internet, databases, and select and critically evaluate information.	K_U07 - can use and critically evaluate information on practical aspects of hydraulics and hydraulic engineering from literature and other available sources of information	[SU1] oral statement/conversation/ discussion [SU6] demonstration of practical skills
[GWOZWL3-U08] 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 basic mathematical and statistical methods used in hydraulics and hydromechanics to analyze data and describe processes and phenomena occurring in the aquatic environment	[SU1] oral statement/conversation/ discussion [SU6] demonstration of practical skills
[GWOZWL3-K03] systematic further education and professional development, updating and expand his knowledge and skills, understands the limitations of his own knowledge in the context of civilization progress and recognizes authorities in the professional and scientific environment.	K_K03 - is ready to systematically update and expand his knowledge and skills	[SK1] oral statement/conversation/ discussion [SK6] demonstration of practical skills

Subject contents

1. Methods of calculation of flow in uncontrolled sections.2. The laws of fluid mechanics in the construction and operation of technical equipment.3. Determination of the soil filtration coefficient - movement of water in a porous medium.4. Calculation of the limiting Reynolds number - flow of viscous fluid in pipelines.5. Determination of water velocity and characteristics in open channels.6. Operation of storage reservoirs - outflow of liquid through openings.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
evaluation of oral statements	51.0%	50.0%
test - presentation of practical skills	51.0%	50.0%

Recommended reading	Basic literature	Jarosz A., 1998, Hydraulika. Hortpress. Jeżowiecka-Kabsch K., Szewczyk H., 2001, Mechanika płynów. Oficyna Wydawnicza PWr, Wrocław. Klugiewicz J., 1999, Hydromechanika i hydrologia inżynierska. Oficyna wydawnicza Projprzem-EKO Bydgoszcz. Weinerowska K. (red.) 2004, Laboratorium z mechaniki płynów i hydrauliki. Politechnika Gdańska, Gdańsk. Rogala R., Machajski J., Rędowicz W., 1991, Hydraulika stosowana: przykłady obliczeń; Wyd. P. Wrocławskiej, Wrocław.
	Supplementary literature	Bukowski J., Kijkowski P., 1980, Kurs mechaniki płynów. PWN Warszawa. Cebulak K., 1963, Budownictwo wodne. Regulacja rzek cz. 1. Państwowe Wydawnictwo Rolnicze i Leśne. Czetwertyński E., Utrysko B., 1969, Hydraulika i hydromechanika. PWN Warszawa. Wyd. P. Krakowskiej, Kraków. Gręplowska Z., 2001, Zbiór zadań z przepływów w przewodach pod ciśnieniem. Prystaj A. 1999, Zadania z hydrostatyki, Wyd. P. Krakowskiej, Kraków. Radlicz-Rühlowa H., Szuster A., 1997, Hydrologia i hydraulika z elementami hydrogeologii. Wyd. Szkol. i Pedagog., Warszawa Kubrak J., 1998, Hydraulika techniczna. Wyd. SGGW, Warszawa. Ozga-Zielińska M., Brzeziński J., 1997, Hydrologia stosowana. PWN Warszawa. Szuster A., Utrysko B., 2008, Hydraulika i hydrologia. Oficyna Wydawnicza Politechniki Warszawskiej. Zieliński A., 2011, Wybrane zagadnienia z mechaniki płynów. Oficyna Wydawnicza PWr, Wrocław. Żmigrodzki Z., Michalski A., Fiedler K., 1961, Budownictwo wodne, wiadomości encyklopedyczne. Wyd. Arkady, Warszawa.
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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