

MODULE SPECIFICATION

Module code	
Module title in Polish	Hydraulika i Hydrologia
Module title in English	Hydraulics and Hydrology
Module running from the academic year	2016/2017

A. MODULE IN THE CONTEXT OF THE PROGRAMME OF STUDY

Field of study	Civil Engineering
Level of qualification	First cycle <i>(first cycle, second cycle)</i>
Studies profile	Academic <i>(academic/practical)</i>
Mode of study	Full-time <i>(full-time / part-time)</i>
Specialism	
Organisational unit responsible for module delivery	The Department of Geotechnical and Hydraulic Engineering
Module co-ordinator	Łukasz Bąk, PhD, Eng.
Approved by	Marek Iwański, Professor

B. MODULE OVERVIEW

Module type	Core module <i>(core/programme-specific/elective HES*)</i>
Module status	Compulsory module <i>(compulsory / non-compulsory)</i>
Language of module delivery	English
Semester in the programme of study in which the module is taught	Semester 3
Semester in the academic year in which the module is taught	Winter semester <i>(winter / summer)</i>
Pre-requisites	None <i>(module code/module title, where appropriate)</i>
Examination required	No <i>(yes / no)</i>
ECTS credits	3

Mode of instruction	lectures	classes	laboratories	project	others
Total hours per semester	30		15		

* elective HES – elective modules in the Humanities and Economic and Social Sciences

C. LEARNING OUTCOMES AND ASSESSMENT METHODS

Module aims	The aim of the module is to familiarise students with: basic information on hydrological phenomena (their literal and mutual connections) as well as loads of building structures and devices which result from the operation of liquids; basic knowledge on calculations and dimensioning hydraulic ducts, channels as well as calculations: the drainage of building structure and developed areas; clear spans of bridges and passages.
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Module outcome code	Module learning outcomes	Mode of instruction (l/c/lab/p/ others)	Corresponding programme outcome code	Corresponding discipline-specific outcome code
W_01	A student has general knowledge as regards fluid mechanics in terms of assessing liquid properties.	l	B_W20	T1A_W02
W_02	A student knows basic laws and phenomena describing the behaviour of a liquid in static equilibrium conditions.	l	B_W20	T1A_W02
W_03	A student knows basic phenomena and laws ruling the flow of liquids in pressure and gravitational installations.	l	B_W20	T1A_W02
W_04	A student has general knowledge on water circulation in nature; hydrogeological phenomena in the drainage area; in addition, a student is knowledgeable about the hydrogeological balance of the drainage area and the river basin.	l	B_W20	T1A_W02
W_05	A student has fundamental knowledge as regards the methods and devices applied to measure states, flow intensity as well as water rate. Moreover, a student knows the methods of preparing water-gauge results as well as the factors influencing their variability in time.	l	B_W20	T1A_W02
W_06	A student has general knowledge concerning the methods applied to determine characteristic and probable flows in the conditions of long observation sequences (as well as in the case of lack of them).	l	B_W20	T1A_W02
U_01	A student knows fundamental dependencies which facilitate making calculations of hydraulic passages, overfalls, channels, and pipelines.	l	B_U15	T1A_U14 T1A_U16
U_02	A student can prepare basic hydrological data; a student can also analyse the obtained results and formulate conclusion on the basis of them.	l	B_U29	T1A_U01 T1A_U03 T1A_U04 T1A_U05 T1A_U06 T1A_U07 T1A_U10
K_01	A student can work responsibly on the assigned issue.	l	B_K01	T1A_K01 T1A_K03 T1A_K04
K_02	A student is able to interpret the obtained results in a substantive manner.	l	B_K02	T1A_K02 T1A_K05 T1A_K07

Module content:

1. Topics to be covered in the lectures

No.	Topics	Module outcome code

1	The properties of fluid bodies and the branches of fluid mechanics. Theoretical mechanics in relations to hydraulics.	W_01
2	Hydrostatic interaction of a liquid on a solid body. Calculating the thrust of a liquid.	W_02
3	The elements of liquid kinematics. Constitutive models in liquid mechanics. Liquid dynamics and its fundamentals.	W_03
4-5	The motion of a liquid in closed ducts, Bernoulli's equation, calculating flows, pressure and energy lines.	W_03
6	Flows in open channels; the parameters of flow curve; table water systems.	W_03
7	Flows through bores; overfalls. Clear span of bridges and passages.	W_03
8	Water movement in soil, filtration. Darcy's equation.	W_03
9-10	Drainage elements: ditches and wells. Drainage of constructional excavations.	W_03
11	Hydrology and its branches. Water circulation and the hydrological cycle.	W_04
12	Hydrography. Hydrometry. Basic types of hydrometric measurements.	W_05
13	Flow curve. The hydrograms of state and flows. Characteristic states and flows.	W_06
14-15	Water balance and its components.	W_04

2. Topics to be covered in the classes

3. Topics to be covered in the laboratories

No.	Topics	Module outcome code
1	Familiarising students with the OHS principles binding in the Hydraulic Laboratory. Determining mean flow velocity in the channel on the basis of the following: the measurements of water table system as well as with Chézy, Manning, Colebrook-White, Bazin formulas.	U_01 K_01 K_02
2	Measuring flow volume in open channels with a hydrometric mill. Determining mean velocity values in a vertical with two methods: tachoids and theorems.	U_01 K_01 K_02
3	Determining the coefficient of triangular and rectangular overflow discharge with sharp edge.	U_01 K_01 K_02
4	Determining the coefficient of local and linear losses.	U_01 K_01 K_02
5-8	Preparing the results of water-gauge observations: the curve of sums concerning duration of states including lower and higher states; creating the consumption curve. Creating flow mass curve in the rectangular system.	U_02 K_01 K_02

4. Topics to be covered in the projects

Assessment methods

Module outcome code	Assessment methods <i>(Method of assessment; for module skills – reference to specific project, laboratory and similar tasks)</i>
W_01	A test
W_02	A test
W_03	A test
W_04	A test
W_05	A test
W_06	A test

U_01	A report
U_02	A report
K_01	A test and a report
K_02	A test and a report

C. STUDENT LEARNING ACTIVITIES

ECTS summary		
	Type of learning activity	Study time/ credits
1	Contact hours: participation in lectures	30
2	Contact hours: participation in classes	
3	Contact hours: participation in laboratories	15
4	Contact hours: attendance at office hours (2-3 appointments per semester)	3
5	Contact hours: participation in project-based classes	
6	Contact hours: meetings with a project module leader	
7	Contact hours: attendance at an examination	2
8		
9	Number of contact hours	50 <i>(total)</i>
10	Number of ECTS credits for contact hours <i>(1 ECTS credit =25-30 hours of study time)</i>	2
11	Private study hours: background reading for lectures	5
12	Private study hours: preparation for classes	
13	Private study hours: preparation for tests	
14	Private study hours: preparation for laboratories	10
15	Private study hours: writing reports	5
16	Private study hours: preparation for a final test in laboratories	5
17	Private study hours: preparation of a project/a design specification	
18	Private study hours: preparation for an examination	
19		
20	Number of private study hours	25 <i>(total)</i>
21	Number of ECTS credits for private study hours <i>(1 ECTS credit =25-30 hours of study time)</i>	1.0
22	Total study time	75
23	Total ECTS credits for the module <i>(1 ECTS credit =25-30 hours of study time)</i>	3.0
24	Number of practice-based hours <i>Total practice-based hours</i>	33
25	Number of ECTS credits for practice-based hours <i>(1 ECTS credit =25-30 hours of study time)</i>	1.3