



MODULE SPECIFICATION

Module code	
Module title in Polish	Hydrologia
Module title in English	Hydrology
Module running from the academic year	2017/2018

A. MODULE IN THE CONTEXT OF THE PROGRAMME OF STUDY

Field of study	Environmental Engineering
Level of qualification	First cycle (first cycle, second cycle)
Programme type	Academic (academic/practical)
Mode of study	Full-time (full-time/part-time)
Specialism	
Organisational unit responsible for module delivery	The Department of Geotechnical, Geomatics and Waste Management
Module co-ordinator	Łukasz Bąk, PhD, Eng.
Approved by:	Maria Żygadło, Professor, PhD hab., Eng.

B. MODULE OVERVIEW

Module type	Core module (core/programme-specific/elective HES*)
Module status	Compulsory module (compulsory/optional)
Language of module delivery	Polish/English
Semester in the programme of study in which the module is taught	Semester 4
Semester in the academic year in which the module is taught	Summer semester (winter semester/summer semester)
Pre-requisites	None (module code/module title, where appropriate)
Examination required	Yes (Yes/No)
ECTS credits	4

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

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



C. LEARNING OUTCOMES AND ASSESSMENT METHODS

Module aims	The aim of the module is to acquaint students with hydrological phenomena, their mutual relationship, water circulation in nature (as regards type and quality). This knowledge constitutes the foundation for projects concerning aqueous environment, engineering activities in the environment as regards water supply, water management, sewage systems and water engineering.
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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 on water circulation in nature, hydrological phenomena in the drainage area, hydrological balance of the drainage area and drainage basin.	l/c/p	IŚ_W01 IŚ_W011 IŚ_W017	T1A_W01 T1A_W03 T1A_W05 T1A_W07 T1A_W08
W_02	A student has basic knowledge on the methods of devices applied to measure states, flow intensity as well as water velocity. Furthermore, a student knows the methods of preparing factors influencing their variability in time.	l/p	IŚ_W01 IŚ_W011 IŚ_W017	T1A_W01 T1A_W03 T1A_W05 T1A_W07 T1A_W08
W_03	A student has general knowledge on the methods applied to determine characteristic and probable flows in the conditions of long time span of observations (as well as in the case of their lack).	l/c/p	IŚ_W01 IŚ_W011	T1A_W01 T1A_W03 T1A_W05
W_04	A student has basic knowledge on riverbed processes as well as the methods of determining transport intensity of the carried and dragged material.	l/p	IŚ_W01	T1A_W01
U_01	A student can, draw a drainage divide and calculate basic physiographic characteristics of the drainage area on the cartographic background.	c	IŚ_U10	T1A_U07
U_02	A student can draw the polygons of equal precipitation, isohyets on the basis of linear interpretation; a student can also calculate mean precipitation in the drainage area; moreover, a student can solve simple calculation tasks.	p	IŚ_U11 IŚ_U26	T1A_U08 T1A_U09 T1A_U19
U_03	A student can prepare basic hydrological data; moreover, a student can analyse the obtained results and formulate conclusions on their basis.	c/p	IŚ_U01	T1A_U01
U_04	A student can apply a simple statistical apparatus to process hydrological data.	p	IŚ_U11	T1A_U08 T1A_U09
U_05	A student can clearly present the results of the conducted calculations and analyses.	c/p	IŚ_U11	T1A_U08 T1A_U09
U_06	A student can prepare a simple precipitation-outflow model of the drainage area; a student can also determine the outflow layer from the drainage area.	c	IŚ_U01 IŚ_U11	T1A_U01 T1A_U08 T1A_U09
U_07	A student is capable of obtaining and utilising information from the literature on the subject and other sources.	c/p	IŚ_U01	T1A_U01
K_01	A student can work responsibly on the assigned subject (both in a team and individually).	c/p	IŚ_K01	T1A_K03
K_02	A student can formulate conclusions in a substantive manner.	c/p	IŚ_K07	T1A_K01 T1A_K07
K_03	A student is aware of the progress and necessity of	l/c/p	IŚ_K09	T1A_K02



implementing new solutions.			
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Module content:

Topics to be covered in the lectures

No.	Topics	Module outcome code
1	Definitions concerning hydrology. Hydrology and its positioning against other branches of science. The division of hydrology. Water in the natural environment of the Earth, water circulation in nature, a block diagram of water circulation on the land cycle.	W_01 K_03
2	Surface drainage area, underground area, physicogeographical parameters of the drainage area, a valley, hydrographical network and river bed. Precipitation: normal precipitation, monthly precipitation, mean precipitation in the drainage area, short-lasting precipitation; precipitation efficiency and intensity.	W_01 K_03
3	Water gauges and their types. Water level, river bed fill, and water depth. The types of water gauge observations and their targets. Flow intensity. Consumption curve, its variability, ice phenomena, the encroachment of river beds, the equations of consumption curve.	W_02 K_03
4	The statistics of states and flows, characteristic states and flows, level zones. Water flow gauges in open channels.	W_02 K_03
5	The probability of maximum and minimum flow at long measurement sections.	W_03 K_03
6	Determining characteristic flows as well as possible maximum ones in the conditions of a lack of and limited hydrological information on flows.	W_03 K_03
7	Hydrographic network: its characteristics and supply. Basic information on river channels and channel processes.	W_04 K_03
8	Elevation and dragging measurements. The carriage of eroded material.	W_04 K_03

Topics to be covered in the classes

No.	Topics	Module outcome code
1	The method of conducting classes and the requirements as regards obtaining a credit. Suggested additional reading list. Basic tasks of engineering hydrology. The sources of hydrological information.	U_07 K_01 K_02
2-4	Determining the boundary of surface watershed and physiogeographical characteristics of drainage areas on the basis of a topographical map and the map of surface deposits.	W_01 U_01 K_01 K_02
5-6	Preparing a precipitation-outflow model.	W_01 U_05 U_06 U_07 K_01 K_02
7-8	The concept of the reliable and control flow. Calculating maximum flows with particular excess probability in drainage areas hydrometrically uncontrolled.	W_03 U_03 U_07 K_01



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Topics to be covered in the project

No.	Topics	Module outcome code
1-4	Preparing the results of water gauge observations: water level duration curve (with higher and lower levels); the structure of the consumption curve and its update; creating the flow mass curve in the rectangular and diagonal system.	W_02 W_03 W_04 U_03 U_05 U_07 K_01 K_02
5	Calculating mean area precipitation.	W_01 U_02 U_05 K_01 K_02
6	The probability of exceeding Q_{\max} for long observation sequences on the basis of the Pearson distribution of quantiles/the quantile method.	W_03 U_04 U_05 K_01 K_02 K_03
7-8	The probability of not reaching Q_{\min} for long observation sequences on the basis of the Fisher-Tippett distribution.	W_03 U_04 U_05 K_01 K_02 K_03

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, a project and a report
W_02	A test and a project
W_03	A test, a project and a report
W_04	A test and a project
U_01	A report
U_02	A project



U_03	A project and a report
U_04	A project
U_05	A project and a report
U_06	A report
U_07	A project and a report
K_01	A project and a report
K_02	A project and a report
K_03	A test, a project and a report

D. STUDENT LEARNING ACTIVITIES

ECTS summary		
	Type of learning activity	Study time/ credits
1	Contact hours: participation in lectures	15
2	Contact hours: participation in classes	15
3	Contact hours: participation in laboratories	-
4	Contact hours: attendance at office hours (2-3 appointments per semester)	3
5	Contact hours: participation in project-based classes	15
6	Contact hours: meetings with a project module leader	3
7	Contact hours: attendance at an examination	2
8		-
9	Number of contact hours	53 <i>(total)</i>
10	Number of ECTS credits for contact hours <i>(1 ECTS credit = 25-30 hours of study time)</i>	2,1
11	Private study hours: background reading for lectures	8
12	Private study hours: preparation for classes	10
13	Private study hours: preparation for tests	5
14	Private study hours: preparation for laboratories	-
15	Private study hours: writing reports	-
16	Private study hours: preparation for a final test in laboratories	-
17	Private study hours: preparation of a project/a design specification	20
18	Private study hours: preparation for an examination	4
19		-
20	Number of private study hours	47 <i>(total)</i>
21	Number of ECTS credits for private study hours <i>(1 ECTS credit = 25-30 hours of study time)</i>	1,9
22	Total study time	100



23	Total ECTS credits for the module <i>(1 ECTS credit = 25-30 hours of study time)</i>	4.0
24	Number of practice-based hours <i>Total practice-based hours</i>	71
25	Number of ECTS credits for practice-based hours <i>(1 ECTS credit = 25-30 hours of study time)</i>	2.84

E. READING LIST

References	<ol style="list-style-type: none">1. Subramanya K.: 1994. Engineering Hydrology. McGraw-Hill Education, New York, USA, p. 392.2. Davie T.: 2008. Fundamentals of hydrology. Routledge, New York, USA, p. 221.3. Valipour M.: 2014. Handbook of hydrologic engineering problems. OMICS Group eBooks, Foster City, USA, p. 167.4. Boiten W.: 2008. Hydrometry. CRC Press, New York, USA, p. 245.
Module website	