MODULE SPECIFICATION

Module code	
Module title in Polish	**Hydraulika -I**
Module title in English	**Hydraulics - I**
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 2**
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	**No** (Yes/No)
ECTS credits	**1**

* 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**				

C. LEARNING OUTCOMES AND ASSESSMENT METHODS

Module aims	The aim of the module is to acquaint students with theoretical fundamentals of solving issues occurring in designing engineering objects and devices for gathering and sending water and other liquids (e.g. pipelines, drainage systems, pump stations, water reservoir); students are also familiarised with the basics of calculating engineering structures (e.g. spillways, and water intakes).

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 hydraulics in terms of solving issues connected with designing objects and engineering devices.	l	IŚ_W12	T1A_W03 T1A_W04 T1A_W07
W_02	A student has general knowledge as regards horizontal and vertical forces (resulting from water pressure) and having an impact on hydrotechnical structures.	l	IŚ_W12	T1A_W03 T1A_W04 T1A_W07
W_03	A student knows the methods of calculating flow intensity, pressure and energy lines in rods operating under pressure (as well as the interaction of a pipeline with a tank).	l	IŚ_W12	T1A_W03 T1A_W04 T1A_W07
W_04	A student has general knowledge on dimensioning releases and overfalls (and devices to measure flow intensity).	l	IŚ_W12 IŚ_W11	T1A_W03 T1A_W04 T1A_W05 T1A_W07
W_05	A student has fundamental knowledge as regards the movement of surface waters.	l	IŚ_W12	T1A_W03 T1A_W04 T1A_W07
U_01	A student can select and appropriate hydraulic diagram and make basic calculations.	l	IŚ_U22	T1A_U07 T1A_U09 T1A_U15
U_02	A student can assess and compare hydrostatic loads interacting with a hydrotechnical construction.	l	IŚ_U14 IŚ_U22	T1A_U03 T1A_U07 T1A_U08 T1A_U09 T1A_U15
K_01	A student is aware of progress and the necessity of implementing new solutions.	l	IŚ_K09	T1A_K02
K_02	A student is aware of raising his/her professional and personal competences.	l	IŚ_K03	T1A_K01 T1A_K02 T1A_K04

Module content:

Topics to be covered in the lectures

No.	Topics	Module outcome code
1-2	Calculating hydrostatic thrust on structure elements.	W_01 W_02 U_02
3-4	Practical applications of Bernoulli's equation and the equation of liquid flow continuity. The Ancona diagram. Calculating pressure, energy lines and flow intensity in circular pipes with various systems.	W_01 W_03 U_01
5	Calculating the interaction of pipelines with tanks.	W_01 W_03
6	Dimensioning of outlets and spillways. Devices for measuring flow intensity. The hydraulics of surface water intakes.	W_01 W_03 W_04 U_01 U_02
7-8	Wells and drainages (diagrams and patterns for calculations). Suction lines. Cavitation. Release and fill time concerning tanks.	W_01 W_03 W_05 U_01 K_01 K_02

Assessment methods

Module outcome code	**Assessment methods** *(Method of assessment; for module skills – reference to specific project, laboratory and similar tasks)*
W_01	A test
W_02	A test
W_03	A test
W_04	A test
W_05	A test
U_01	A test
U_02	A test
K_01	A test
K_01	A test

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	**-**
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	**-**
6	Contact hours: meetings with a project module leader	**-**
7	Contact hours: attendance at an examination	**-**
8		**-**
9	**Number of contact hours**	**18** *(total)*
10	**Number of ECTS credits for contact hours** *(1 ECTS credit =25-30 hours of study time)*	**0.72**
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	**-**
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	**-**
18	Private study hours: preparation for an examination	**2**
19		
20	**Number of private study hours**	**7** *total)*
21	**Number of ECTS credits for private study hours** *(1 ECTS credit =25-30 hours of study time)*	**0.28**
22	**Total study time**	**25**
23	**Total ECTS credits for the module** *(1 ECTS credit =25-30 hours of study time)*	**1.0**
24	**Number of practice-based hours** *Total practice-based hours*	**0**
25	**Number of ECTS credits for practice-based hours** *(1 ECTS credit =25-30 hours of study time)*	**0**

E. READING LIST

References	1. Daugherty R., Franzini J.B., Finnemore E.J.: 1985. Fluid mechanics with engineering applications. NcGraw-Holl, New York, USA, p. 598. 2. Knight D.W., Mc Gahey C., Lamb R., Samuels P.G.:2010. Practical channel hydraulics. CRC Press, New York, USA, p. 354. 3. Vischer D.L., Hager W.H.:1997. Dam hydraulics. John Wiley & Sons, New York, USA, p. 315.
Module website	