MODULE SPECIFICATION

Module code	
Module title in Polish	**Inżynieria wodna**
Module title in English	**Hydro Engineering**
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	**All**
Organisational unit responsible for module delivery	**The Department of Geotechnical, Geomatics and Waste Management**
Module co-ordinator	**Jarosław Górski, 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	**English**
Semester in the programme of study in which the module is taught	**Semester 5**
Semester in the academic year in which the module is taught	**Winter semester** (winter semester/summer semester)
Pre-requisites	**None** (module code/module title, where appropriate)
Examination required	**No** (Yes/No)
ECTS credits	**3**

* 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**			**30**	

C. LEARNING OUTCOMES AND ASSESSMENT METHODS

Module aims	The aim of the module is to familiarise students with basic knowledge on water engineering which covers information on national water resources, the necessity of managing water and its distribution, the tasks of engineering in water management, protection against extreme phenomena (floods, droughts), the types and purpose of water structures, the impact of the structure on the environment and the conditions concerning the buildings and water engineering devices.

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 engineering in relation to water as well as environmental engineering.	l	IŚ_W11	T1A_W03 T1A_W04 T1A_W05
W_02	A student knows the types of water structures, their purpose, classification methods and role they play in water engineering and flood protection.	l/p	IŚ_W11	T1A_W03 T1A_W04 T1A_W05
W_03	A student is knowledgeable about the principles of hydrodynamics, hydrology, and soil mechanics facilitating dimensioning and providing calculations of the selected buildings and hydrotechnical objects (with respect to current formal and legal regulations).	l/p	IŚ_W12 IŚ_W13	T1A_W03 T1A_W04 T1A_W07
W_04	A student is familiar with the principles of changes taking place in water environment caused by a man's activity and the resultant consequences with respect to, among other things, flood protection.	l	IŚ_W16	T1A_W03 T1A_W05 T1A_W07 T1A_W08
W_05	A student knows the most commonly applied materials in water engineering; a student is also knowledgeable about the use and appropriate exploitation of hydrotechnical objects.	l	IŚ_W06 IŚ_W15	T1A_W03 T1A_W04 T1A_W05 T1A_W06 T1A_W07
U_01	A student can select an appropriate hydraulic diagram which is indispensable to calculate the selected hydrotechnical object or its element (depending on formal and legal requirements).	l/p	IŚ_U01 IŚ_U02 IŚ_U06 IŚ_U21 IŚ_U22	T1A_U01 T1A_U02 T1A_U03 T1A_U05 T1A_U07 T1A_U08 T1A_U09 T1A_U14 T1A_U15 T1A_U16
U_02	A student can calculate loads interacting with the selected elements of a water structure.	l/p	IŚ_U01 IŚ_U02 IŚ_U06 IŚ_U14 IŚ_U21	T1A_U01 T1A_U02 T1A_U03 T1A_U05 T1A_U07 T1A_U08 T1A_U09 T1A_U14 T1A_U16
U_03	A student can correctly interpret and present the impact of the activity of the man on the environment and (as a result) water management.	l	IŚ_U08	T1A_U01 T1A_U04 T1A_U10
K_01	A student can independently solve simple engineering tasks; a student can correctly formulate conclusions.	p	IŚ_K01 IŚ_K07	T1A_K03 T1A_K07
K_02	A student is aware of raising his/her professional qualification individually.	l/p	IŚ_K03	T1A_K01 T1A_K02 T1A_K04

K_03	A student is aware of the responsibility for the realised engineering activities.	l/p	IŚ_K05	T1A_K03 T1A_K04

Module content:

1. Topics to be covered in the lectures

No.	Topics	Module outcome code
1	Large-area water management; the aims and needs of technical management devices. Water civil engineering and its specificity with respect on other branches of civil engineering.	W_01 W_04 U_03 K_02
2-3	The types of buildings and water devices. Water containers, their tasks and characteristics. Technical requirements and formal as well as legal regulations.	W_02 W_04 U_03 K_02 K_03
4	The classification of buildings and water devices (the classes of buildings and design flows).	W_02 W_03 K_02 K_03
5	Damming structures; solid and moveable weirs (technical and constructional solutions).	W_02 W_03 K_02 K_03
6	Dams (their types, structures, and application). Ground dams (the principles of designing them). Tight elements in bodies and in soil. The drainage of hydrotechnical structures.	W_02 W_03 W_05 K_02 K_03
7-8	Dikes (their types, structures, and dimensioning). Analysing the reasons of catastrophes concerning water structures.	W_04 U_03 K_02 K_03

2. Topics to be covered in the project

No.	Topics	Module outcome code
1-2	Introduction to classes. Making hydraulic diagrams of a weir in the conditions of normal damming and a transition of a reliable flow.	U_01 U_02 K_01 K_02 K_03
3-6	Calculating and designing clear space and holes of a weir.	U_01 U_02 K_01 K_02 K_03
7-10	Calculating the position of water table dammed at the reliable and control flow transition point.	U_01 U_02 K_01 K_02 K_03
11-13	Providing calculations which concern dispersing the energy of water stream	U_01 U_02

	behind the weir.	K_01 K_02 K_03
14-15	Calculating filtration under the weir; making an underground drawing of a weir and calculating buoyant force.	U_01 U_02 K_01 K_02 K_03

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 and a project
W_03	A test and a project
W_04	A test
W_05	A test
U_01	A test and a project
U_02	A test and a project
U_03	A project
K_01	A project
K_02	A test and a project
K_03	A test and a project

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)	**2**
5	Contact hours: participation in project-based classes	**30**
6	Contact hours: meetings with a project module leader	**3**
7	Contact hours: attendance at an examination	**-**
8		
9	**Number of contact hours**	**50** *(total)*
10	**Number of ECTS credits for contact hours**	**2.0**

	(1 ECTS credit =25-30 hours of study time)	
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	**20**
18	Private study hours: preparation for an examination	**-**
19		
20	**Number of private study hours**	**25** *(total)*
21	**Number of ECTS credits for private study hours** *(1 ECTS credit =25-30 hours of study time)*	**1.0**
22	**Total study time**	**75**
23	**Total ECTS credits for the module** *(1 ECTS credit =25-30 hours of study time)*	**3.0**
24	**Number of practice-based hours** *Total practice-based hours*	**50**
25	**Number of ECTS credits for practice-based hours** *(1 ECTS credit =25-30 hours of study time)*	**2.0**

E. READING LIST

References	1. Current regulations (www.qov.sejm.pl) 2. Water Framework Directive 2000/60/WE 3. Fell R., MacGregor P., Stapledon D., Bell G., 2005. Geotechnical engineering of dams. Taylor & Francis Group, London, UK. 4. Tanĉev L., 2005. Dams and Appurtenant Hydraulic Structures. Taylor & Francis Group, London, UK. 5. Boiten W., 2008. Hydrometry. 3rd Edition. A comprehensive introduction to the measurement of flow in open channels. Taylor & Francis Group, London, UK. 6. Vischer DL., Hager WH., 1998. Dam Hydraulics. Wiley, England.
Module website	