



MODULE SPECIFICATION

Module code	
Module title in Polish	• <i>Ujęcia wód podziemnych i powierzchniowych</i>
Module title in English	Underground and Surface Water Intakes
Module running from the academic year	2017/2018

A. MODULE IN THE CONTEXT OF THE PROGRAMME OF STUDY

Field of study	Environmental Engineering First-cycle full-time programme
Level of qualification	1st degree (first cycle, second cycle)
Programme type	academic (academic/practical)
Mode of study	Full-time (full-time/part-time)
Specialism	Water Supply, Treatment of Wastewater and Solid Waste
Organisational unit responsible for module delivery	Department of Water and Wastewater Technology
Module co-ordinator	Jarosław Gawdzik, PhD hab.
Approved by:	Lidia Dąbek, PhD hab., Professor of the University

B. MODULE OVERVIEW

Module type	core module (core/programme-specific/elective HES*)
Module status	optional module (compulsory/optional)
Language of module delivery	
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	(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
---------------------	----------	---------	--------------	---------	--------



Politechnika Świętokrzyska

WYDZIAŁ INŻYNIERII ŚRODOWISKA, GEOMATYKI I ENERGETYKI

Total hours per semester	15			45	
--------------------------	----	--	--	----	--



C. LEARNING OUTCOMES AND ASSESSMENT METHODS

Module aims	The aim of the module is to familiarise students with the characteristics of the types of water intakes as well as the fundamentals of their realisation. During project classes students learn the principles of designing the selected intake systems as regards underground and surface waters.
--------------------	--

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 fundamental knowledge as regards intake methods of surface and underground waters.	l/p	IŚ_W01 IŚ_W07 IŚ_W09	T1A_W01 T1A_W03 T1A_W04 T1A_W05 T1A_W06 T1A_W07
W_02	A student knows exploitation conditions of surface and underground water intakes.	l/p	IŚ_W09 IŚ_W10 IŚ_W15	T1A_W04 T1A_W05 T1A_W06 T1A_W07
W_03	A student knows the guidelines of designing surface and underground water intakes.	l/p	IŚ_W02 IŚ_W09	T1A_W02 T1A_W04 T1A_W05 T1A_W06 T1A_W07
W_04	A student knows the selected computer programs supporting designing.	p	IŚ_W05	T1A_W07
W_05	A student has fundamental knowledge on hydraulics and fluid mechanics.	p	IŚ_W12	T1A_W03
U_01	A student can obtain information from the literature on the subject, databases, and other sources; a student can also evaluate these sources.	l/p	IŚ_U02	T1A_U01; T1A_U05 T1A_U07
U_02	A student is capable of self-education, i.e. in order to raise his/her professional qualifications.	l/p	IŚ_U07	T1A_U05
U_03	A student can design water intake devices and realise this project using appropriate methods.	l/p	IŚ_U16	T1A_U03; T1A_U05 T1A_U07 T1A_U08; T1A_U09 T1A_U10; T1A_U11 T1A_U13; T1A_U14 T1A_U15 T1A_U16
K_01	A student can work independently and in a team. Moreover, a student can organise the work of the team which will realise a given task. In addition, a student can divide work among team members according to their competences.	p	IŚ_K01 IŚ_K05 IŚ_K07	T1A_K03 T1A_K04 T1A_K05 T1A_K01 T1A_K07
K_02	A student can formulate conclusions and describe the results of the obtained work. A student is responsible for the reliability of the obtained results.	p	IŚ_K02 IŚ_K05 IŚ_K07	T1A_K02 T1A_K05 T1A_K04 T1A_K05 T1A_K01 T1A_K07
K_03	A student is aware of technical progress and the necessity of implementing modern systems of water treatment.	l/p	IŚ_K09	T1A_K02



K_04	A student acts according to the principles of ethics.	p	IŚ_K08	T1A_K05
------	---	---	--------	---------

Module content:

1. Topics to be covered in the lectures

No.	Topics	Module outcome code
1.	Discussing the subject matter of the lectures. Discussing the literature on the subject. Legal and formal fundamentals of surface and underground waters.	W_03 U_01 K_03
2.	The division of underground waters. Determining water resources. The conditions of in water intake areas. The equipment and exploitation of intakes. Sanitary protection intake zone.	W_02 U_01 U_02
3.	Water intake with drilled or dug wells. Lever intakes. Water intakes with drains and drainage infiltration galleries (as well as with radial wells).	W_02 U_01 U_03
4.	The methods of water intake from wells (collecting wells). The methods of assessing the efficiency of wells on the basis of initial pumping.	W_02 U_01 U_03
5.	Water intakes from springs. The renovation of underground water intakes. The arrangement of wells, sub-bottom, riparian and under-bed drainage.	W_03 U_01 K_03
6.	The division of surface water intakes. The principles of preparing projects of surface water intakes.	W_02 W_03 U_03
7.	The characteristics of water source. The types of river intakes depending on the condition and amount of the treated water.	W_02 W_03 U_01
8.	The selection of intake location; its structure and conditions of applying particular solutions of water intakes.	W_02 W_03 U_01
9.	Onshore intakes with the inflow channel; infiltration intakes with the gravitational duct (without damming). Threshold intakes. Bottom drain intake.	W_01 W_02 W_03 U_01
10.	The intakes of water from lakes and storage reservoirs. Shaft intakes in a dam body. The zone of sanitary protection as regards surface waters. The requirements concerning sanitary protection of surface waters. The requirements concerning sanitary protection of surface and underground water.	W_03 U_01 U_03 K_03

Module content:

2. Topics to be covered in the project

No.	Topics	Module outcome code
1	Discussing project principles and assumptions. Terrain topography, issuing topographic plans.	W_01 W_02 W_03 W_04 W_05 U_02
2	Assessing demand for water. Preparing the concept of building or developing an intake.	W_01 W_02 W_03 U_02
3	The analysis and assessment of the water taken. Determining the processes	W_01



	of its intake and accepting device selection. Calculating intake efficiency.	W_02 W_03 U_02
4	The concept of the selected type of water intake for a given settlement.	W_01 W_02 W_03 W_04 W_05 U_02
5	The principles of preparing projects of underground water intakes.	W_01 W_02 W_03 U_02 U_03 K_01 K_02 K_03
6	Making a descriptive, computational, and graphical part water intake.	W_01 W_02 W_03 W_04 W_05 U_01 U_02 K_01 K_02 K_03 K_04

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	An examination and a project
W_02	An examination and a project
W_03	An examination and a project
W_04	A project
W_05	A project
U_01	An examination
U_02	A project
U_03	An examination and a project
K_01	A project
K_02	A project
K_03	An examination and a project
K_04	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	45
6	Contact hours: meetings with a project module leader	2
7	Contact hours: attendance at an examination	2
8		
9	Number of contact hours	66 (total)
10	Number of ECTS credits for contact hours <i>(1 ECTS credit = 25-30 hours of study time)</i>	2.6
11	Private study hours: background reading for lectures	2
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	30
18	Private study hours: preparation for an examination	2
19		
20	Number of private study hours	34 (total)
21	Number of ECTS credits for private study hours <i>(1 ECTS credit = 25-30 hours of study time)</i>	1.4
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>	77
25	Number of ECTS credits for practice-based hours <i>(1 ECTS credit = 25-30 hours of study time)</i>	3.1

E. READING LIST

References	<ol style="list-style-type: none"> 1. Joanne E. Drinan, Frank Spellman: "Water and Wastewater Treatment: A Guide for the Nonengineering Professional, Second Edition by CRC Press Tylor & Francis 2012 2. Droste, L. Ronald: „Theory and practice of water and wastewater treatment”. New York: John Wiley & Sons, 1997
------------	---



Politechnika Świętokrzyska

WYDZIAŁ INŻYNIERII ŚRODOWISKA, GEOMATYKI I ENERGETYKI

	<p>3. Shun Dar Lin, C. Lee: "Water and Wastewater Calculations Manual " McGraw Hill Professional, 2007</p> <p>4. McGraw Hill Professional „Water Treatment Plant Design, Fifth” Edition American Water Works Association, American Society of Civil Engineers, 2012</p> <p>5. A.D. Patwardhan: „Industrial waste water treatment” PHI Learning Pvt. Ltd., 2008</p> <p>6. J.Edzwald „Water Quality & Treatment: A Handbook on Drinking” Water American Water Works Association, McGraw - hill, 2010</p> <p>7. Gray N.F.: „Water Technology: An Introduction for Environmental Scientists and Engineers, 3rd Edition”, Butterworth-Heinemann, 2010.</p>
Module website	