



MODULE SPECIFICATION

Module code	
Module title in Polish	Eksploracja stacji uzdatniania wody i oczyszczalni ścieków
Module title in English	Maintenance (MRO) of Water Treatment Stations and Wastewater Treatment Plants
Module running from the academic year	2016/2017

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	Water Supply, Neutralisation of Sewage and Waste
Organisational unit responsible for module delivery	The Department of Engineering and Environmental Protection
Module co-ordinator	Lidia Bartkiewicz, PhD, Eng. Jarosław Gawdzik, PhD hab, Eng.
Approved by:	Lidia Dąbek, PhD hab., Professor of the Kielce University of Technology

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	7th semester
Semester in the academic year in which the module is taught	Winter semester (winter / summer)
Pre-requisites	module code (module code/module title, where appropriate)
Examination required	No (Yes/No)
ECTS credits	2

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

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



Politechnika Świętokrzyska

WYDZIAŁ INŻYNIERII ŚRODOWISKA, GEOMATYKI I ENERGETYKI



C. LEARNING OUTCOMES AND ASSESSMENT METHODS

Module aims	On completion of the lectures, graduates will be prepared for rational exploitation of water and sewage treatment plants as well as for acting in the event of failures.
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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 knows OHS regulation while working on water and sewage objects.	I	IŚ_W08	T1A_W03 T1A_W04
W_02	A student is familiar with risk analysis, the reliability theory and application of information system in managing water and sewage systems.	I	IŚ_W12	T1A_W03 T1A_W04 T1A_W07
W_03	A student knows the principles of exploiting technical devices applied water and sewage treatment plants (a systemic approach) together with the applied methods of diagnosing the correctness of their operation.	I	IŚ_W07 IŚ_W14	T1A_W01 T1A_W02 T1A_W03 T1A_W06 T1A_W08
W_04	A student knows the principles of economic calculation applied during the exploitation of objects connected with water and sewage systems.	I	IŚ_W08	T1A_W03 T1A_W04
W_05	A student knows the fundamentals of GIS systems utilised in managing water and sewage infrastructure.	I	IŚ_W07	T1A_W01 T1A_W03 T1A_W08
U_01	A student can determine the causes of emergency states of devices and the operation of technical systems.	I	IŚ_U10 IŚ_U13	T1A_U02 T1A_U03 T1A_U05 T1A_U07 T1A_U10 T1A_U12 T1A_U15
U_02	A student is able to determine exploitation costs of water and sewage systems.	I	IŚ_U07	T1A_U05
U_03	A student can prepare technical objects as well as the organisation of work with the application of the systems theory.	I	IŚ_U19	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 understands the necessity of implementing information techniques to manage water and sewage systems.	I	IŚ_K03	T1A_K01 T1A_K02 T1A_K04
K_02	A student understands the necessity of economic calculation during the exploitation of water and sewage systems.	I	IŚ_K03 IŚ_K06	T1A_K01 T1A_K02 T1A_K04 T1A_K06 T1A_K07
K_03	A student understands the necessity of self-education to increase his/her professional competences.	I	IŚ_K03 IŚ_K06	T1A_K01 T1A_K02 T1A_K04 T1A_K06 T1A_K07

Module content:

1. Topics to be covered in the lectures

No.	Topics	Module outcome code
1	Basic information of labour law. The rights and duties of an employer as well as an employee. Work in hazardous conditions. The principles of granting leave to employers. Accidents at a workplace.	W_01 U_01 K_03
2	The selected issues as regards OHS. The principles of determining the explosion hazard zones. Hazards associated with hydrogen sulphides and deoxygenated air in water and sewage systems. Chemical reagents in water treatment as well as the principles of transporting, storing, and dosing them. The principles of first aid.	W_01 U_01 K_03
3	The analyses of reliability and technical safety. Renovation methods of technical devices.	W_02 U_01 K_03
4	Operation and maintenance manual. Technical overhauls. Supervision of the Office of Technical Inspection.	W_03 U_01 K_03
5	Chemical reagent management. The charts of chemical products. Balancing chemical reagents. The properties of the selected chemical reagents applied in the processes of water and sewage treatment.	W_03 U_01 K_03
6	Controlling the composition of underground waters in order to determine the reasons of change in their quality. The causes of occurrence iron-manganese catastrophes. The intrusion of salt waters.	W_03 U_01 K_03
7	Quality control of surface water. Determining optimal dosages.	W_03 U_01 K_03
8	The methods of managing rinsates and deposits occurring during water treatment.	W_03 U_01 K_03



9	Sanitary supervision in pipeline plants. The problems of chemical and biological stability in pipeline systems.	W_02 U_03 K_03
10	The selected issues as regards the exploitation of settling tanks, filters, pumping plants, ionic exchangers, and neutralisation stations.	W_03 U_01 U_03 K_03
11	Counselling systems and their creation on the basis of case study. Data mining methods.	W_02 U_01 K_01 K_02 K_03
12	The expansion of the active deposit. The causes and methods of diagnosing causes, the methods of limiting this phenomenon and generating foam in active deposit chambers.	W_03 U_01 K_03
13	Determining charges for sewage and rainwater. The methods of preparing the results of controlling the composition of sewage and waters for exploitation purposes.	W_04 U_02 K_01 K_02
14	GIS in managing pipeline and sewage systems.	W_05 U_01

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
U_01	A test
U_02	A test
U_03	A test
K_01	A test
K_02	A test
K_03	A test



D. 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	
4	Contact hours: attendance at office hours (2-3 appointments per semester)	4
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	34 <i>(sum)</i>
10	Number of ECTS credits for contact hours <i>(1 ECTS credit = 25-30 hours of study time)</i>	1.36
11	Private study hours: background reading for lectures	10
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	6
19		
20	Number of private study hours	16 <i>(sum)</i>
21	Number of ECTS credits for private study hours <i>(1 ECTS credit = 25-30 hours of study time)</i>	0.64
22	Total study time	50
23	Total ECTS credits for the module <i>(1 ECTS credit = 25-30 hours of study time)</i>	2.0
24	Number of practice-based hours <i>Total practice-based hours</i>	0
25	Number of ECTS credits for practice-based hours <i>(1 ECTS credit = 25-30 hours of study time)</i>	0

E. READING LIST



References	<p>1. <i>Rumana Riffat: "Fundamentals of Wastewater Treatment and Engineering" by CRC Press, 2012.</i></p> <p>2. D. G. Rao, R. Senthilkumar, J. Anthony Byrne, S. Feroz,: „Wastewater Treatment: Advanced Processes and Technologies” by CRC Press 2012.</p> <p>3. Nicholas P. Cheremisinoff: „Handbook of Water and Wastewater Treatment Technology" by CRC Press, 1994.</p> <p>4. Droste, L. Ronald: „Theory and practice of water and wastewater treatment” New York: John Wiley & Sons, 1997.</p> <p>5. Shun Dar Lin, C. Lee: “Water and Wastewater Calculations Manual “ McGraw Hill Professional, 2007.</p> <p>6. McGraw Hill Professional „Water Treatment Plant Design, Fifth” Edition American Water Works Association, American Society of Civil Engineers, 2012.</p> <p>7. A.D. Patwardhan: „Industrial waste water treatment” PHI Learning Pvt. Ltd., 2008.</p> <p>8. J.Edzwald „Water Quality & Treatment: A Handbook on Drinking” Water American Water Works Association, Mcgraw - hill, 2010.</p> <p>9. Gray N.F.: „Water Technology: An Introduction for Environmental Scientists and Engineers, 3rd Edition”, Butterworth-Heinemann, 2010.</p>
Module website	