



MODULE SPECIFICATION

Module code	
Module title in Polish	Systemy odwodnieniowe
Module title in English	Drainage Systems
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	Sanitary Pipelines and Systems Water Supply, Treatment of Wastewater and Solid Waste
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	Programme-specific module (core/programme-specific/elective HES*)
Module status	Optional (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	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				



Politechnika Świętokrzyska

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C. LEARNING OUTCOMES AND ASSESSMENT METHODS

Module aims	The subject matter of the module covers discussing the needs and tasks of agricultural, urban, and industrial areas drainage. The lectures also cover the characteristics of drainage systems and their elements (horizontal and vertical drains; head, ring, regular, and edge, etc. drains) as well as the principles of selecting technical solutions, the methods of hydrogeological calculations (together the principles of realisation and exploitation).
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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 basic principles of selecting an appropriate drainage system which is appropriate for given water-soil conditions.	I	IŚ_W11 IŚ_W13	T1A_W03 T1A_W05
W_02	A student is knowledgeable about hydraulic and hydrogeological basic types of drainage systems.	I	IŚ_W05 IŚ_W12	T1A_W07 T1A_W03
W_03	A student knows the methods and principles of selecting devices, technical objects, appropriate materials influencing their length and their exploitation conditions.	I	IŚ_W10 IŚ_W15	T1A_W04 T1A_W05 T1A_W06 T1A_W07
U_01	A student can independently select and provide dimensions as regards the appropriate drainage type depending on its purpose and location.	I	IŚ_U01 IŚ_U06 IŚ_U11 IŚ_U26	T1A_U01 T1A_U05 T1A_U08 T1A_U09 T1A_U15
K_01	A student is aware of raising his/her professional and personal competences. A student independently improves and broadens his/her knowledge as regards modern processes and technologies in environmental engineering.	I	IŚ_K03	T1A_K01 T1A_K02
K_02	A student understands the significance of technical progress and the necessity of implementing new technical solutions in environmental engineering.	I	IŚ_K09	T1A_K02

Module content:

1. Topics to be covered in the lectures

No.	Topics	Module outcome code
1	Drainage needs. The types of deep groundwaters and surface water. The necessary scope of hydrogeological examinations. Drainage (introduction to tasks and drainage methods as well as their roles in the environment).	W_01
2	The principles of designing and realising regular, irregular, open, collective, and drainage ditches, etc. Water receivers and the methods of removing water to receivers (paths, absorbing wells, and containers).	W_01 W_02 W_03 U_01 K_01
3	Hydraulic and hydrogeological calculations. Formal and legal requirements.	W_02 W_03 U_01 K_01
4	The drainage of developed area: the principles of designing routes, slopes, and drain depth values.	W_02 W_03 U_01 K_01



5	Drainage networks and their location. Drainage structures and protections.	W_01 W_02 W_03 U_01 K_01 K_02
6	The drainage of agricultural areas.	W_02 U_01 K_01
7-8	Drainage of constructional trenches.	W_02 W_03 U_01 K_01 K_02

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
U_01	A test
K_01	A test
K_02	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)	-
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	15 <i>(total)</i>
10	Number of ECTS credits for contact hours <i>(1 ECTS credit = 25-30 hours of study time)</i>	0.6
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	5
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20	Number of private study hours	10 <i>(total)</i>
21	Number of ECTS credits for private study hours <i>(1 ECTS credit = 25-30 hours of study time)</i>	0.4
22	Total study time	25
23	Total ECTS credits for the module <i>(1 ECTS credit = 25-30 hours of study time)</i>	1.0
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	<ol style="list-style-type: none">1. Current regulations (www.gov.sejm.pl)2. Smedena LK., Vlotman WF., Rycroft DW., 2004. Modern Land Drainage. Planning, Design and Management of Agricultural Drainage Systems. Taylor & Francis Group, London, UK.3. Butler D., Davies J., 2010. Urban Drainage. CRC Press.4. U.S. Department of Transportation, Federal Highway Administration, 2015. Urban Drainage Design Manual Paperback.5. Pitman P., 2001. External Works, Roads and Drainage: A Practical Guide. Spons Architecture Price Book.6. Zevenbergen C., Cashman A., Evelpidou N., Pasche E., Garvin S., Ashley R., 2010. Urban Flood Management. CRC Press
Module website	