



MODULE SPECIFICATION

Module code	
Module title in Polish	Hydrogeologia 1
Module title in English	Hydrogeology 1
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	
Organisational unit responsible for module delivery	The Department of Geotechnical, Geomatics and Waste Management
Module co-ordinator	Bartosz Szelaąg, 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	3

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



Politechnika Świętokrzyska

WYDZIAŁ INŻYNIERII ŚRODOWISKA, GEOMATYKI I ENERGETYKI

Mode of instruction	lectures	classes	laboratories	project	others
Total hours per semester	15			15	



C. LEARNING OUTCOMES AND ASSESSMENT METHODS

Module aims	The aim of the module is to familiarise students with basic knowledge as regards hydrogeology (which covers information on the origin of underground water, hydrogeological properties of rocks, and discussing laws of underground water motion). Other aims concern discussing basic laws and parameters of flow of underground water, introducing to the issues connected with mathematical modelling in hydrogeology.
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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 has general knowledge as regards hydrogeology, hydrology, and geotechnics.	l	IŚ_W13	T1A_W03 T1A_W04 T1A_W07
W_02	A student knows basic engineering problems of hydraulic management.	l	IŚ_W11	T1A_W03 T1A_W04 T1A_W05
W_03	A student has basic knowledge as regards the dynamics of underground waters.	l	IŚ_W12 IŚ_W13	T1A_W03 T1A_W04 T1A_W07
W_04	A student knows basic principles of making hydrogeological maps as well as utilizing them in designing hydrogeological works.	p	IŚ_W13	T1A_W03 T1A_W04 T1A_W07
U_01	A student is capable of utilising hydrogeological maps; a student can also interpret basic data from maps.	l/p	IŚ_U03 IŚ_U11	T1A_U02 T1A_U07 T1A_U08
U_02	A student can analyse research terrain and design appropriate types of hydrogeological and hydrogeochemical works in order to assess the impact investments on water and soil environment.	l/p	IŚ_U03 IŚ_U16	T1A_U02 T1A_U03 T1A_U05 T1A_U07 T1A_U08 T1A_U09 T1A_U10 T1A_U11 T1A_U13 T1A_U14 T1A_U15 T1A_U16
U_03	A student can correctly interpret and present the impact of a man's activity on the environment (including hydraulic management).	l/p	IŚ_U09	T1A_U01 T1A_U04 T1A_U10
K_01	A student can work independently and co-operate in a team on the assigned task; a student is also aware of the responsibility for his/her own work; in addition, a student is ready to comply with the principles of teamwork and bearing responsibility for the collectively realised tasks.	p	IŚ_K01 IŚ_K05	T1A_K03 T1A_K04
K_02	A student is responsible for the reliability of the obtained results of his/her works (as well as their interpretation). A student is aware of independently increasing his/her professional competences.	l/p	IŚ_K02	T1A_K02 T1A_K05



K_03	A student is aware of the necessity of raising his/her professional and personal competences; a student also independently improves and broadens his/her knowledge on hydrogeology.	l/p	IŚ_K03	T1A_K01 T1A_K02 T1A_K04
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Module content:

1. Topics to be covered in the lectures

No.	Topics	Module outcome code
1	Introduction to the subject; basic issues and definitions applied in hydrogeology; the origin of underground waters; infiltration and the factors having an impact on them.	W_01 K_03
2	Water in the aeration and saturation zone; hydrogeological properties of rocks.	W_01 W_03 K_03
3-4	Hydrogeological characteristics of underground water occurrence. The forms of aquiferous centres; hydrogeological zones; hydrogeological systematicity of underground waters.	W_01 K_02 K_03
5	Hydrogeological maps, projection methods, the types of hydrogeological maps; the description and interpretation of hydrogeological maps.	W_01 U_01 U_02 U_03 K_02 K_03
6-7	The elements of dynamics as regards underground waters; basic laws and parameters concerning the flow of underground waters. Hydrogeological examinations; the methods of determining the coefficient of filtration.	W_01 W_02 W_03 W_04 K_02 K_03
8	Mathematical modelling of flow of underground waters; analogue and numerical methods.	W_01 K_02 K_03

2. Topics to be covered in the project

No.	Topics	Module outcome code
1	Introduction to the subject; the principles of preparing projects concerning hydrogeological works in relation with designing national roads and motorways; detailed requirements with respect to the projects of hydrogeological works; the principles of submitting the projects of geological works.	U_02 K_02 K_03
2-3	The realisation of a project of geological works for hydrogeological documentation determining hydrogeological conditions in connection with designing an investment which could pollute underground waters.	U_02 K_01 K_02 K_03
4-5	The interpretation of monitoring examinations concerning the quality of underground waters; the analysis of geological structure and hydrogeological conditions in the area of the designed works. The analysis of geological and hydrogeological maps.	U_01 U_02 U_03 K_01 K_02 K_03
6-7	Hydrogeological and sozological mapping for the needs of hydrogeological projects and	U_01



	documentations.	U_02 U_03 K_01 K_02 K_03
8	Project calculations designing hydrogeological, hydrogeological test boreholes, drilling, geological and laboratory works.	W_04 U_01 U_02 U_03 K_01 K_02 K_03

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 and a project
W_05	A test and a project
U_01	A test and a project
U_02	A test and a project
U_03	A test and a project
K_01	A test and 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)	3
5	Contact hours: participation in project-based classes	15
6	Contact hours: meetings with a project module leader	4
7	Contact hours: attendance at an examination	-
8		
9	Number of contact hours	37 <i>(total)</i>



10	Number of ECTS credits for contact hours <i>(1 ECTS credit = 25-30 hours of study time)</i>	1.48
11	Private study hours: background reading for lectures	18
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	38 <i>(total)</i>
21	Number of ECTS credits for private study hours <i>(1 ECTS credit = 25-30 hours of study time)</i>	1.52
22	Total study time	75
23	Total ECTS credits for the module <i>(1 ECTS credit = 25-30 hours of study time)</i>	3.0
24	Number of practice-based hours <i>Total practice-based hours</i>	39
25	Number of ECTS credits for practice-based hours <i>(1 ECTS credit = 25-30 hours of study time)</i>	1.56

E. READING LIST

References	<ol style="list-style-type: none">1. E. Gilli (2012). Hydrogeology: Objectives, Methods, Applications. CRC Press2. Charles R. Fitts (2012). Groundwater Science, 2nd Edition. Elsevier3. A. Zuber, P. Maloszewski (2012). Groundwater Quality Sustainability. CRC Press4. K. R. Rushton (2003). Groundwater Hydrology: Conceptual and Computational Models. Wiley.5. G. F. Pinder (2002). Groundwater Modeling Using Geographical Information Systems. Wiley.
Module website	