



### MODULE SPECIFICATION

Module code	
Module title in Polish	Tworzywa sztuczne w inżynierii środowiska
Module title in English	Polymers in Environmental Engineering
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	Sanitary Pipelines and Systems
Organisational unit responsible for module delivery	Department of Piped Utility Systems
Module co-ordinator	Urszula Kubicka, PhD, Eng.
Approved by:	Prof. Andrzej Kuliczowski, PhD hab., Eng.

### B. MODULE OVERVIEW

Module type	programme-specific module (core/programme-specific/elective HES*)
Module status	optional module (compulsory/optional)
Language of module delivery	<b>Polish/English</b>
Semester in the programme of study in which the module is taught	semester 6
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	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				



### C. LEARNING OUTCOMES AND ASSESSMENT METHODS

<b>Module aims</b>	The aim of the module is to acquaint students with the knowledge of material properties, the types, and basic assortment of plastic pipes as well as the possibilities of applying them in plastics networks.
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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 types of plastics applied in the structures of underground pipelines. In addition, a student is knowledgeable about basic physico-chemical properties as well as specific properties determining their design.	l	IS_W01 IS_W06	T1A_W01 T1A_W02 T1A_W03 T1A_W04 T1A_W05 T1A_W07
W_02	A student has knowledge concerning the methods of plastic pipe and fitting joints applied in underground infrastructure.	l	IS_W01 IS_W06	T1A_W01 T1A_W02 T1A_W03 T1A_W04 T1A_W05 T1A_W07
U_01	A student is capable of identifying typical plastic pipes for sending water, sewage, and gas.	l	IS_U15	T1A_U07 T1A_U10 T1A_U14 T1A_U15
U_02	A student knows the disadvantages and advantages of plastic pipes as well as possible areas of applying them.	l	IS_U15	T1A_U07 T1A_U10 T1A_U14 T1A_U15
K_01	A student is aware of the necessity of self-education in new, dynamically developing, branches of engineering.	l	IS_K03	T1A_K01 T1A_K02 T1A_K04

#### Module content:

1. Topics to be covered in the lectures

No.	Topics	Module outcome code
1-2	Introduction to plastics. The types of plastics. Familiarising students with specific properties of plastics.	W_01 U_01 K_01
3	Mechanical and physicochemical properties of plastics. Comparing the properties of plastics and elastic materials.	W_01 U_01 U_02
4-5	The application of plastics to build pressure and gravitational pipelines. Possible applications to build ducts with trenchless and traditional method.	W_01 U_01 U_02
6-7	The methods of joining plastic pipelines. Mechanical joints. Butt, cup, electrofusion heat-sealed, welded, and other joints.	W_02 K_01
8	Specific properties of plastic pipes determining their design.	W_01 U_02 K_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
U_01	A test
U_02	A test
K_01	Discussion during the lecture

### 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	
6	Contact hours: meetings with a project module leader	
7	Contact hours: attendance at an examination	
8		
9	<b>Number of contact hours</b>	<b>18</b> <i>(total)</i>
10	<b>Number of ECTS credits for contact hours</b> <i>(1 ECTS credit = 25-30 hours of study time)</i>	<b>0.72</b>
11	Private study hours: background reading for lectures	2
12	Private study hours: preparation for classes	
13	Private study hours: preparation for tests	5
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	
19		
20	<b>Number of private study hours</b>	<b>7</b> <i>(total)</i>
21	<b>Number of ECTS credits for private study hours</b> <i>(1 ECTS credit = 25-30 hours of study time)</i>	<b>0.28</b>
22	<b>Total study time</b>	<b>25</b>
23	<b>Total ECTS credits for the module</b> <i>(1 ECTS credit = 25-30 hours of study time)</i>	<b>1</b>
24	<b>Number of practice-based hours</b> <i>Total practice-based hours</i>	
25	<b>Number of ECTS credits for practice-based hours</b> <i>(1 ECTS credit = 25-30 hours of study time)</i>	

### E. READING LIST



References	<ol style="list-style-type: none"><li>1. Farshad M.: Plastic Pipe Systems: Failure Investigation and Diagnosis, Elsevier Science; 1 edition , April 19, 2011;</li><li>2. Fletcher L. Groves III: The Pipeline: A Picture of Homebuilding Production - Second Edition, Virtualbookworm.com Publishing; 2 edition, January 18, 2016;</li><li>3. Menon S. :Pipeline Planning and Construction Field Manual, Professional Publishing; 1 edition, May 26, 2011;</li><li>4. PVC Pipe Design and Installation (M23): AWWA Manual of Practice (AWWA Manuals), Publisher: American Water Works Association; 2 edition, June 1, 2002;</li><li>5. Sanders Ch. A.: The PVC Project Book: 101 Uses for PVC Pipe in the Home, Garden, Farm and Workshop, Publisher: Burford Books, January 13, 2005;</li><li>6. Technical Manual: Plastic Pipe Used In Embankment Dams - Best Practices for Design, Construction, Problem Identification and Evaluation, Inspection by U. S. Department of Homeland Security and Federal Emergency Management Agency, Create Space Independent Publishing Platform, March 9, 2013;</li><li>7. The Plastics Pipe Institute: Handbook of Polyethylene Pipe, by The Plastics Pipe Institute, 2006;</li></ol>
Module website	