

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Materials Technology		Code 1010101231010130898
Field of study Environmental Engineering First-cycle Studies	Profile of study (general academic, practical) (brak)	Year /Semester 2 / 3
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 30 Classes: - Laboratory: 30 Project/seminars: -		No. of credits 4
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences		ECTS distribution (number and %) 4 100%
Responsible for subject / lecturer: dr inż. Tomasz Schiller email: tomasz.schiller@put.poznan.pl tel. 616652078 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Chemistry and physics: basic terms related to properties of solids and liquids.
2	Skills	Ability to read technical drawings.
3	Social competencies	Awareness of need to constantly update and supplement knowledge and skills.
Assumptions and objectives of the course: Acquire of basic knowledge and skills in materials technology and fittings techniques essential to solving typical practical problems appear in environmental engineering.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Student knows basic chemical, physical, mechanical and technological features of materials used in environmental engineering and understand their significance (effect achieved during lectures) - [K_W02, K_W05, K_W07]		
2. Student has a basic knowledge concerning of using metals and alloys, polymers and sanitary ware in environmental engineering (effect achieved during lectures) - [K_W02, K_W05, K_W07]		
3. Student has a basic knowledge concerning of using various kind of fittings in accordance with piping materials (effect achieved during lectures) - [K_W02, K_W05, K_W07]		
4. Student knows and understands principle of various kind of valves (effect achieved during lectures) - [K_W02, K_W05, K_W07]		
5. Student has a knowledge concerning of materials resistance at external factors (effect achieved during lectures) - [K_W02, K_W05, K_W07]		
6. Student understands the need for appropriate selection of materials in accordance with their properties (effect achieved during lectures) - [K_W02, K_W05, K_W07]		
7. Student knows and understands limitations of fitting techniques used in environmental engineering (effect achieved during lectures) - [K_W02, K_W05, K_W07]		
Skills:		

1. Student can show possible application of individual materials in environmental engineering (effect achieved during laboratories) - [K_U01, K_U013]
2. Student can select material for projects for technical subjects at next years of studies (effect achieved during laboratories) - [K_U01, K_U05, K_U013]
3. Student can point at possible kind of jointing for individual materials (effect achieved during laboratories) - [K_U01, K_U013]
4. Student can show application of individual kind of valves (fittings) (effect achieved during laboratories) - [K_U01, K_U013]
Social competencies:
1. Student understands the need for teamwork in solving theoretical and practical problems (effect achieved during laboratories) - [K_K03, K_K04]
2. Student is aware of the advantages, disadvantages and limitations technical solutions applied (effect achieved during laboratories) - [K_K01, K_K05]
3. Student sees the need for systematic increasing his skills and competences (effect achieved during laboratories) - [K_K01]
4. Student is aware of fundamental principles of industrial safety during installation work (effect achieved during laboratories) - [K_K01, K_K04, K_K05]

Assessment methods of study outcomes
<p>Lectures</p> <p>Written final multianswer test (effects W1 to W7). Mark scale (percentage / mark): 0-50 ndst, 51-60 dst, 61-70 dst+, 71-80 db, 81-90 db+, 91-100 bdb</p> <p>Laboratory in two modules (work in groups - effects K1, K2, K3, U1, U2).</p> <p>The first module consist of 11 classes, final multianswer test (threshold to pass 50%). The second module consist of 4 classes, final test with open questions (threshold to pass 50%). Effects K2, K3, K4, U1, U3, U4.</p> <p>Final mark calculated as mean. Weight of an mean - 11/15 from first module, 4/15 - from second module. It is necessary to obtain minimum 3,0 form each module.</p>
Course description
<p>Basic chemical, physical, mechanical and technological properties of materials used in environmental engineering.</p> <p>Group of materials used in environmental engineering: iron alloys, copper, copper alloys, other metals and their alloys, polymers, sanitary ware. Advantages, disadvantages and limitations in using of individual materials. Possible interactions between different materials or between them and environment. Classification of materials due to their properties, production technology etc. Materials marking methods. Methods and technologies for materials jointing. Tools and equipment used in various jointing technologies.</p> <p>Valves (fittings) used in environmental engineering (classification, applications, advantages, disadvantages and limitations in using).</p> <p>Special technical solutions of sanitary installations.</p> <p>Practical exercise:</p> <ol style="list-style-type: none">1. Sorts and dimensionig of instalation element joints2. Screwed connection of steel pipes3. Soldered connections of copper pipes4. Glued connections, welded and clamped connections of plastic pipes5. Corrosion process of selected metals and their alloys6. Fittings7. Identification of polymers, properties of mineral materials <p>Education method</p> <p>Lectures (conversatory and problem elements of lectures) using multimedia presentation.</p> <p>Laboratory classes with demonstration and assembly of instalation elements.</p>
Basic bibliography:
<ol style="list-style-type: none">1. Bagiński J., Materiałoznawstwo instalacyjne, Wydawnictwo Politechniki Poznańskiej, Poznań 19852. Bagiński J., Materiałoznawstwo instalacyjne, Wydawnictwo Politechniki Poznańskiej, Poznań 19853. Pluciennik M., Zimmer J., Projektowanie instalacji wodociągowych wody zimnej i ciepłej, Instytut Techniki Budowlanej, Warszawa 20124. Adamski M., Materiałoznawstwo instalacyjne. Ćwiczenia laboratoryjne, Wydawnictwo Politechniki Białostockiej, Białystok 2006

Additional bibliography:		
1. Lars-Eric J., Rury z tworzy sztucznych do zaopatrzenia w wodę i odprowadzania ścieków, Polskie Stowarzyszenie Producentów Rur i Kształtek z Tworzyw Sztucznych, Toruń 2010		
2. Hyla I., Tworzywa sztuczne. Własności-przetwórstwo-zastosowanie, Wydawnictwo Politechniki Śląskiej, Gliwice 2004		
3. Lars-Eric J., Rury z tworzy sztucznych do zaopatrzenia w wodę i odprowadzania ścieków, Polskie Stowarzyszenie Producentów Rur i Kształtek z Tworzyw Sztucznych, Toruń 2010		
4. Hyla I., Tworzywa sztuczne. Własności-przetwórstwo-zastosowanie, Wydawnictwo Politechniki Śląskiej, Gliwice 2004		
Result of average student's workload		
Activity	Time (working hours)	
1. Participation in lectures	30	
2. Participation in practical exercises	30	
3. Participation in consultations related to practical exercises	1	
4. Preparation for the practical exercises	15	
5. Preparation for the exam	22	
6. Presence at the exam	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	100	4
Contact hours	65	2
Practical activities	45	2