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Responsible for subject / lecturer: Responsible for subject / lecturer: dr hab. in2. Alina Pruss dr hab. in2. Alina Pruss email: alina.pruss@put.poznan.pl email: alina.pruss@put.poznan.pl tel. 61 665 3662 Faculty of Civil and Environmental Engineering Faculty of Civil and Environmental Engineering ul. Berdychowo 4, 60-965 Poznań ul. Piotrowo 5 60-965 Poznań ul. Piotrowo 5 60-965 Poznań Prerequisites in terms of knowledge, skills and social competencies: 1 Knowledge Student should have a basic knowledge mathematics, chemistry, fluid mechanics and general knowledge from environmental engineering. 2 Skills Student should be able to perform mathematical calculations, physical, chemical, mechanics of the fluids. 3 Social competencies Awareness to constantly update and supplement knowledge and skills. Assumptions and objectives of the course: The aim of the course is develop skills for planning and carry out technological research and interpretation of the results. Study outcomes and reference to the educational results for a field of study Knowledge: 1. 1. Student has structure and theoretically founded knowledge of methods of water treatment [[[K2_W03, K2_W04, K2_W07]] 2. Student has an ordered knowledge of design methods of basic technological processes used in the raw water (reatment technology - [K_2_W03, K2_W04, K2_W07]] <td></td> <td></td> <td></td> <td></td> <td></td>						
d' hab. inż. Alina Pruss d' hab. inż. Alina Pruss email: alina.pruss@put.poznan.pl tel. 61 665 34 97 Facułty of Civil and Environmental Engineering tel. 66-3662 gul. Berdychowo 4, 60-965 Poznań Faculty of Civil and Environmental Engineering ul. Berdychowo 4, 60-965 Poznań Ul. Piotrowo 5 60-965 Poznań Prerequisites in terms of knowledge, skills and social competencies: 1 Knowledge 2 Skills 3 Student should have a basic knowledge mathematics, chemistry, fluid mechanics and general knowledge from environmental engineering. 2 Skills 3 Social competencies Awareness to constantly update and supplement knowledge and skills. Assumptions and objectives of the course: The aim of the course is develop skills for planning and carry out technological research and interpretation of the results. Study outcomes and reference to the educational results for a field of study Knowledge: 1. Student has structured and theoretically founded knowledge of methods of water treatment [[[K2_W03, K2_W04, K2_W07]] Skills: 1. Student is able to provide the treatment method and system devices as a function of the quality of water (obtained in lectures and classes) - [K_U03, K_U04, K_U09, K_U10] Social competencies: <td>techr</td> <td>nical sciences</td> <td></td> <td></td> <td>3 100%</td>	techr	nical sciences			3 100%	
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 technology - [K2_W03, K2_W04, K2_W07] Skills: Student is able to provide the treatment method and system devices as a function of the quality of water (obtained in lectures and classes) - [K_U03, K_U04, K_U09, K_U10] Social competencies: Student understands the need for teamwork in solving theoretical and practical problems - [K2_K03] Student understands the different roles in teamwork and the need for information and knowledge exchange in a group wo - [K2_K03, K2_K04] Student understands the need for a systematic deepening and broadening his/her competences - [K2_K01] 				sic technological processes us	ed in the raw water treatment	
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Social competencies: 1. Student understands the need for teamwork in solving theoretical and practical problems - [K2_K03] 2. Student understands the different roles in teamwork and the need for information and knowledge exchange in a group wo - [K2_K03, K2_K04] 3. Student understands the need for a systematic deepening and broadening his/her competences - [K2_K01]	1. Stuc	lent is able to provide		devices as a function of the qu	ality of water (obtained in	
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	2. Stuc	lent understands the o	-			
Assessment methods of study outcomes	3. Stuc	lent understands the r	need for a systematic deepening ar	nd broadening his/her compete	ences - [K2_K01]	
			According to the set	a of study sutcomes		

Lectures	
A two-part written exam within the period stated at the beginning of the semester.	
Part 1. It aims to verify the knowledge and involves answering a few questions. In cases of doubt, exter	ided exam is oral part.
Part 2. Its purpose is to check the skills and relies on solving technological problems.	
Written exam - after 5 questions from each part. A total of 10 open questions. For each question the ma points 10. Criteria of evaluation depending on the number of points obtained:	aximum number of
Number of points - rating	
91 -100 very good (5.0)	
81 - 90 good plus (4,5)	
71 - 80 good (4.0)	
61 - 70 sufficient plus (3,5)	
50 - 60 satisfactory (3.0)	
Below 50 points - insufficient (2.0)	
At each lecture is required for the activity of the students.	
Classes	
45-minute written final test in the last week of the semester.	
Colloquium is to solve several technological problems.	
Continuous assessment for each class (rewarding activity).	
A total of 10 test questions. For each test question the maximum number of points 10. Criteria of evalua number of points obtained:	tion depending on the
Number of points - rating	
91 -100 very good (5.0)	
81 - 90 good plus (4,5)	
71 - 80 good (4.0)	
61 - 70 sufficient plus (3,5)	
50 - 60 satisfactory (3.0)	
Below 50 points - insufficient (2.0)	
Course description	
Methodology selection of technological parameters of water treatment: iron removal and the removal of water (Removal of iron from the water by aeration and filtration, removing iron from water by aeration, a filtration, removing iron from water by aeration dosage of oxidants and filtration, removing manganese fi oxidants.) Removal of water color (Removing color by aerating the water, Removing color by dosing oxi colors by a coagulation of the contact in the filter bed, Removing color by a volume coagulation, removing adsorption in active carbon bed).	Ikalinization and rom water using strong dants, Removing
Basic bibliography:	
1. M.M. Sozański, Peter M. Huck, Badania doświadczalne w rozwoju Technologii Uzdatniania Wody, M Inżynierii Środowiska PAN, vol. 42, Lublin 2007	onografie Komitetu
2. Apolinary L. Kowal, Maria Świderska - Bróż, Oczyszczanie wody, PWN, Warszawa 2009	
Additional bibliography:	
1. MWH, Water Treatment Principles and Design (Secondo Editio, Revised by J. C. Crittenden, R. R. Tr J. Howe and G. Tchobanoglous), John Wiley & Sons, Inc., Hoboken, NY, 200	
Result of average student's workload	
Activity	Time (working hours)
1. Participation in lectures (contact hours)	15
2. Participation in classes (contact hours)	15
3. Consultations (contact hours)	5
4. Preparing for the exercises (working alone)	10
5. Preparation for the final exam (individual work)	30
Student's workload	

Contact hours	30	1
Practical activities	15	1