

Water technology								Code of the course	Year / Semester
Type of subject:		Education Profile		The level of education		Form of studies			
Obligatory		General Academic				Stationary			
Type of subject								ECTS	
Lecture	Exercises	Laboratory	Project	Seminar	Practical classes	Exam			
30	-	30	-	-	-	-	7		
Subject coordinator:									
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II. COURSE CONTENT		
Course type – Lecture		Number of hours
1-2	Water contaminants. Water intakes. Law requirements for drinking water and water for industry.	3
3	Treatment of water at the source. Technological schemes of surface and underground water treatment.	2
4	Preliminary treatment of water. Sedimentation and flotation. Mathematical model of sedimentation. Sedimentation tanks. Technological research of sedimentation	3
5-6	Coagulation and flocculation. Colloid systems. Coagulants and flocculants. Mechanism of coagulation process. Technological research	3

	of coagulation process (jar test). Factors affecting coagulation process. Technologies of	
7	Filtration. Processes which take place during filtration. Filtration materials. Kinds of filters. Removal of pollutants with slow and fast filters.	2
8	Adsorption. Adsorption as unit process. Sorbents used in water treatment. Technological schemes of activated carbon use.	2
9	Iron and manganese control. Methods used for Fe and Mn removal. Parameters of iron and manganese removal.	3
10	Advanced oxidation processes. Use of AOP methods in water treatment.	2
11	Disinfection. Law requirements for water safety. Methods of disinfection. Physical and chemical methods of disinfection (effectiveness, advantages and disadvantages of methods). Toxic by-products of disinfection.	3
12	Ion exchange. Treatment of water for industry. Used ion exchangers. Technological schemes used for water softening and demineralization. Softening by precipitation	3
13	Membrane processes.	1
14	Analysis of selected water treatment plants technologies and effectiveness.	2
15	Final test	1
TOTAL:		30
Course type - Laboratory		Number of hours
1	Water and wastewater laboratory safety training	1
1	Analysis of physicochemical properties of water	1
2-3	Sedimentation	4
4-5	Coagulation	4
6-7	Adsorption	4
8-9	Iron control	4
10-11	Ion exchange and water softening	4
12-13	Disinfection	4

13-14	Visit to water treatment plant	4
TOTAL:		30

DIDACTIC METHODS	
1.	Blackboard
2.	Multimedia presentation
3.	Laboratory setup
4.	The literature and instructions for laboratory classes

METHODS OF ASSESSMENTS: (F – FORMATIVE; S – SUMMATIVE)	
F01	activity in classes
F02	evaluation of work during laboratory exercises
S01	Test
S02	evaluation of the laboratory reports

III. STUDENT WORKLOAD		
L.p.	Form of activity	Numer of hours for activity
		[hours]
1. Direct teaching hours:		
1.1	Hours of classes organized by universities – lectures	30
1.2	Hours of classes organized by universities – exercises	
1.3	Hours of classes organized by universities – laboratory	30
1.4	Hours of classes organized by universities – project	
1.5	Hours of classes organized by universities – field activities	
1.6	Hours of classes organized by universities – seminar	
1.7	Exam	
Total direct hours:		60
2. Student's own work		
2.1	Preparation for exercises and for final exams	

2.2	Preparation for laboratory test reports, preparation of individual	55
2.3	Preparing your own project	
2.4	Preparation for the final exam from the lecture	30
2.5	Exam Preparation	
2.6	Reading the literature	
Total student's self-studies:		85
Overall student workload:		
TOTAL NUMBER OF ECTS FOR THE COURSE:		7
The number of ECTS credits that a student obtains in classes requiring the direct participation of the teacher:		3,4
The number of ECTS credits that the student obtains as part of his/her own work		3,6

IV. PRIMARY AND SUPPLEMENTARY LITERATURE		
Primary literature		
1	Pizzi N.: Water Treatment, principles and Practices of Water Supply Operations, AWWA, Denver 2010	
2	Shutte F., Handbook of the Operation of Water Treatment Works, Water Research Commission, 2006.	
3	Hendrics D.: Water Treatment Unit processes. Physical and Chemical, CRC Press, Boca Raton 2006	
Supplementary literature		

VII. OTHER USEFUL INFORMATION ABOUT THE SUBJECT		
1.	Opportunity to review supporting materials and literature: <i>Appropriate to the type of material - in teaching classes, in the TUC Central Library.</i>	
2.	Information on when and where the classes will be held <i>Notice board at the Faculty of Infrastructure and Environment and on the website of the Faculty of Infrastructure and Environment, MSz USOS system.</i>	
3.	Information about the consultation (times + place): <i>the staff consultation schedule is available on the Faculty of Infrastructure and Environment website and on the staff room door.</i>	

