Wastewater 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:							
Dr hab. Inż. Ewa Wiśniowska, prof. PCz., ewa.wisniowska@pcz.pl							

II. COURSE CONTENT		
Course type – Lecture		**Number of hours**
1	Historical background of wastewater treatment. Municipal and industrial wastewater quality nad inflow characteristics	2
2	Sewage collection systems.	2
3	Legislation.	2
4	Overview of wastewater treatment methods.	2
5	Mechanical wastewater treatment.	2
6	Microbiological processes of wastewater treatment. Aerobic vs. Anaerobic processes.	2
7	Biological wastewater treatment - attached growth processes. Technical parameters.	2

8	Biological wastewater treatment - activated sludge. Technical parameters.	2
9-10	Biological nutrient removal.	4
11	How to control wastewater treatment plants - introduction.	3
12	Waste management in wastewater treatment plants. Sewage sludge	2
13	Small wastewater treatment plants.	2
14	Advanced methods of wastewater treatment.	2
15	Final test	1
	TOTAL:	**30**
Course type - Laboratory		**Number of hours**
1	Lab safety training	1
2-3	Analysis of selected parameters of wastewater.	4
4-5	Treatment of wastewater with trickling filters. Technical parameters.	4
6-7	Treatment of wastewater on disc filters	4
8-9	Precipitation of phosphorus.	4
10-11	Treatment of wastewater with activated sludge. Technical parameters.	4
12-13	Biological nutrient removal with activated sludge method.	4
14-15	Visit to a municipal wastewater treatment plant.	5
	TOTAL:	**30**

DIDACTIC METHODS	
1.	Lecture using audiovisual means and/or the PCz e-learning platform
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	final test or test before each laboratory experiment
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	
2.5	Exam Preparation	30
2.6	Reading the literature	
	Total student's self-studies:	**85**
	Overall student workload:	**175**
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:		**3,6**
The number of ECTS credits that the student obtains as part of his/her own work		**3,4**

IV. PRIMARY AND SUPPLEMENTARY LITERATURE	
Primary literature	
1	Cheremisinoff N.P., Handbook of water and wastewater treatment technologies, Butterworth & Heinemann, Woburn 2002, or later edition

2	von Sperling M., Wastewater characteristics, treatment and disposal, IWA Publishing, London 2007
3	Riffad R., Fundamentals of Watsewatertreatment and Engineering, ICRC Press, Boca Raton, 2013,
4	Schutte F., Handbook of the operation of water treatment works, University of Pretoria, 2026
Supplementary literature	

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