

MODULE INFORMATION SHEET

Name of Module Unit	Municipal and industrial wastewater treatment
Name in polish language	Oczyszczanie ścieków miejskich i przemysłowych
Module type	compulsory / elective
Form of studying	full-time day courses
Level of study	undergraduate course (B.Sc. level)
Type of study (for extra-mural courses)	-
Programme	Environmental Engineering
Speciality	Environmental Engineering
Responsible department	Department of Water Supply and Sewage Disposal Systems
Responsible person	dr hab. inż. Monika Żubrowska-Sudoł, prof. uczelni

Semester	Lectures(E)	Tutorials	Laboratory	Computer Exercises	Projects	ECTS
6	15		30			4

Objectives (summary)

The objective of this module is to present the whole range of possible methods of municipal and selected topics from industrial wastewater treatment. It will include: mechanical treatment, biological treatment by means of trickling filter and activated sludge, sludge dewatering and biological stabilisation.

Prerequisites

Environmental chemistry

Rules of integrated grade setting

Average of lectures grade and laboratory grade

Recommended readings

Hense M. at all: Wastewater treatment, 1997

Metcalf & Eddy; Wastewater Engineering. Treatment and Reuse, 2003

Contents of lectures (syllabus)

	Topics	Time (hrs.)	Scope (S / Ex)
1	Wastewater - groups, volumes and composition. Characteristic of municipal wastewater, five main components: BOD, COD, suspended solids, nitrogen and phosphorus	1	S
2	Basic mechanical processes: screening, sand removal, fat removal. Basic chemical processes.	1	S
3	Biological processes: microorganisms, their selection and growth	1	S
4	Biological processes: trickling filters , activated sludge, hybrid system	1	S
5	Main parameters of trickling filters : hydraulic and organic loading. Oxygen supply	1	S
6	Main parameters of activated sludge: organic loading per g of dry substance and per m ³ of tank volume, Sludge Volume Index, sludge age, retention time, possibility of aeration	1	S
7	Removal of nitrogen in activated sludge process	1	S
8	Removal of phosphorus in activated sludge process	1	S
9	Wastewater sludge: volume, characteristic and treatment possibilities. Sludge dewatering and biological stabilization in aerobic and anaerobic condition.	1	S
10	Industrial wastewater - groups, volumes and composition.	1	
11	Basic processes for industrial wastewater treatment	1	
12	Chemical processes for industrial wastewater	1	
13	Biological processes for industrial wastewater – anaerobic reactors	1	
14	Test	2	
Total		15	hours

S – topics listed in the legal study programme standards from 12.07.2007

Ex – extended topics

Lecturers

dr hab. inż. Monika Żubrowska-Sudoł, prof. uczelni, dr inż. Katarzyna Umiejewska, prof. uczelni, dr inż. Beata Karolinczak, dr inż. Justyna Walczak. mgr inż. Katarzyna Sytek-Szmeichel

Assessment method

Written test

Contents of laboratory

	Topics	Time (hrs.)	Scope (S / Ex)
1	Introduction	2	S
2	Characteristic of municipal wastewater	4	S
3	Mechanical treatment	4	S
4	Chemical treatment	4	S
6	Biological treatment in activated sludge process	4	S
7	Study visit	6	S
8	Presentation and Discussion	6	S
Total		30	hours

S – topics listed in the legal study programme standards from 12.07.2007

Ex – extended topics

Persons responsible for laboratory

dr hab. inż. Monika Żubrowska-Sudoł, prof. uczelni, dr inż. Katarzyna Umiejewska, prof. uczelni, dr inż. Beata Karolinczak, dr inż. Justyna Walczak, mgr inż. Katarzyna Sytek-Szmeichel

Assessment method for laboratory

Introduction before each lab; Presentation; Discussion