MODULE INFORMATION SHEET

Name of Module Unit	**Municipal Solid Waste Treatment Technology**
Name in polish language	Technologia unieszkodliwiania odpadów komunalnych
Module type	compulsory / ~~elective~~
Form of studying	full-time day courses
Level of study	graduate course (M.Sc. level)
Type of study (for extra-mural courses)	-
Programme	Environmental Engineering
Speciality	Environment Protection Engineering
Responsible department	Chair of Environmental Protection and Management
Responsible person	dr inż. Piotr Manczarski

Semester	Lectures(E)	Tutorials	Laboratory	Computer Exercises	Projects	ECTS
2	30E				15	3

Learning outcomes (knowledge, skills, competences)

The introduction into the problem of municipal solid waste (MSW) treatment technology (incl.: characteristic of quantity and composition of MSW, designing of MSW stream, technological bases of recycling, reuse and treatment methods: biological, mechanical, thermal and land disposal).

Prerequisites

Environmental Management, Urban and Regional Planning, Irrigation and Drainage.

Rules for integrated grade setting

Lecture: The written examination
Guided projects: The presence, the realization of the project, passing the project
Integrated mark = lecture mark x 60% + project mark x 40%

Recommended readings

Decision Makers' Guide to solid waste management, vol. I & II. US EPA 1995
Disposal of refuse and other waste J. Skitt, 1972
Solid waste management technology assessment, 1975
Solid waste management. D. G. Wilson
Solid Waste Management, Hagerthy Joseph D., Pawoni Joseph L., Heer John E., Litton Educational Publishing, Inc., New York, 1973.
Environmental Biotechnology, Jordening Hans-Joachim, Winter Joseph, Wiley-VCH Verlag GmbH, Weinheim (Germany), 2008.
Solid Waste Technology and Management, Christensen Thomas H., A John Wiley and Sons, Ltd, Publication, United Kingdom, 2011.

Contents of lectures (syllabus)

	Topics	Time (hrs.)	Scope (S / Ex)
1	Introduction: waste definition, basic terms, classification of waste, the influence of waste on the environment.	2	S
2	Legal bases of MSW treatment.	4	S
3	Quantity and quality characteristic of MSW	2	Ex
4	The hierarchy of waste management.	1	S
5	Municipal waste. Basic characteristic of technology of: reuse, recovery, recycling,	4	S
6	Unit operations in solid waste treatment.	2	S
7	Composting and mechanical-biological treatment of bio-waste and municipal waste in oxygenic conditions: basic processes during composting, systems of composting and mechanical-biological treatment, technologies, defects and advantages, designing incl. calculation.	3	S
8	Fermentation and mechanical-biological treatment of bio-waste and municipal waste in anaerobic conditions: basic processes during methane fermentation, technologies and systems, defects and advantages, designing incl. calculation.	3	S
9	Thermal methods: basic processes during combustion, gasification technologies, the production of fuel from waste, defects and advantages, designing incl. calculation.	4	S
10	Land disposal: basic processes, the potential influence of landfilling on the environment, protection methods, designing incl. calculation.	4	S
11	The comparison of MSW treatment methods.	1	Ex
	Total	**30**	**hours**

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

Lecturers

dr inż. Piotr Manczarski / dr inż. Krystyna Lelicińska-Serafin / dr inż. Anna Rolewicz-Kalińska / mgr inż. Urszula Pieniak

Assessment method

Written exam

Contents of guided projects

	Topics	Time (hrs.)	Scope (S / Ex)
1	The discussion of rules and the range of the project	1	Ex
2	Introduction: principles of the designing of treatment technology.	8	S
3	The discussion of technological calculations	4	S
4	Technological projects within the range of integrated MSW treatment made by students (in teams) – for chosen town or region. Consultations.	2	Ex
	Total	**15**	**hours**

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

Persons responsible for guided projects

dr inż. Piotr Manczarski / dr inż. Krystyna Lelicińska-Serafin / dr inż. Anna Rolewicz-Kalińska / mgr inż. Urszula Pieniak

Assessment method for guided projects

The presence, the realization of the project, passing the project.