MODULE INFORMATION SHEET

Name of Module Unit	**Solid Waste Management**
Name in polish language	Gospodarka odpadami
Module type	compulsory
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 Environmental Protection and Management
Responsible person	dr inż. Piotr Manczarski / dr inż. Krystyna Lelicińska-Serafin

Semester	Lectures(E)	Tutorials	Laboratory	Computer Exercises	Projects	ECTS
5	30				15	3

Objectives (summary)

Basic information about solid waste management with particular reference to generation, collection, transfer, recycling, treatment of waste. The introduction into the problem of waste management technology – research strategy of municipal waste, methods of research, characteristic of quantity and composition of municipal waste, estimating future waste generation, technological bases of treatment methods.

Prerequisites

Physics, chemistry, biology, ecology, environmental protection, building and engineering constructions, engineering hydrogeology.

Rules of integrated grade setting

Integrated grade = lecture grade x 60% + project grade 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

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, the problem of environmental protection against waste.	2	S
2	Legal bases within the range of waste management.	2	S
3	Gaining of the information about waste, source of information, statistic data.	1	Ex
4	Characteristics of generation sources of municipal waste, industrial waste and waste from sewage treatment.	2	S
5	Technological properties of municipal waste.	1	Ex
6	The hierarchy of waste management.	1	S
7	Treatment methods of chosen industrial waste.	4	S
8	The methodology of waste research, designing of waste research program, factors having the influence on the range of research. Research of technological properties. Research of the waste influence on the environment. Methods of research. Sampling techniques. Taking the samples to laboratory research. Preparation the samples for analysis.	1	Ex
9	Municipal waste research: the range of research, methods, characteristic of quantity and composition of municipal waste.	2	Ex
10	Municipal waste. Characteristic of treatment methods incl.: recovery, recycling, biochemical methods (composting, methane fermentation, mechanical-biological treatment), combustion, landfilling.	2	S
11	Processes and operations in waste treatment.	1	S
12	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.	3	S
13	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.	2	S
14	Thermal methods: basic processes during combustion, gasification technologies, the production of fuel from waste, defects and advantages.	3	S
15	Landfill disposal: basic processes, legal aspects, the potential influence of landfilling on the environment, protection methods.	2	S
16	The comparison of municipal waste 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 / mgr inż. Urszula Pieniak

Assessment method

The written examination

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 incl.: collection (including selective collection), transfer and treatment methods (landfill disposal).	8	S
3	The discussion of technological calculations	4	S
4	Technological projects within the range of waste treatment made by students (in teams) – for chosen technology and 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 / mgr inż. Urszula Pieniak

Assessment method for guided projects

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