MODULE INFORMATION SHEET

Name of Module Unit	**Rationalization of Heat and Energy Use**
Name in polish language	Racjonalizacja zużycia ciepła i energii
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	Department of District Heating and Gas Systems
Responsible person	dr inż. Jerzy Kwiatkowski

Semester	Lectures(E)	Tutorials	Laboratory	Computer Exercises	Projects	ECTS
4	15				30	3

Learning outcomes (knowledge, skills, competences)

The aim of the course is to provide an integrated knowledge of legal requirements, the need and ways of rationalization of energy consumption in buildings and industrial processes. In particular, a means of identifying and reducing loss of heat in buildings and installations are given. The rational criteria for evaluation and selection of the tasks of rationalizing the use of heat are also given. The methods of reduction of the greenhouse gasses emission is also given.

Prerequisites

Thermodynamics, Economics and law in environmental engineering, Energy systems and environment

Rules for integrated grade setting

Arithmetic average of the test from lectures and test from guided project.

Recommended readings

Turner “Energy Management Handbook”
Thurmann, Menta “Handbook of Energy Engineering”
Directives on renewable energy sources
CIBSE – CIBSE Guide F – Energy Efficiency in Buildings
NEDO – Japanese Technologies for Energy Savings/GHG Emissions Reduction

Contents of lectures (syllabus)

	Topics	Time (hrs.)	Scope (S / Ex)
1	The need to rationalize the use of heat. Legal and economic instruments to promote the rationalization of energy use.	2	Ex
2	Planning and energy management at local level	2	Ex
3	Economics of the rationalization of energy consumption in buildings	2	Ex
4	Modernization of ventilation systems (heat recovery) and passive use of solar energy	2	Ex
5	Rationalization of use of heat in the industry, diagnostics, use of waste heat	2	Ex
6	Modernization of production and distribution of heat in buildings	2	Ex
7	Preparation of investment in the field of rationalization of energy use (feasibility study, business plan)	2	Ex
8	Test	1	S
	Total	**15**	**hours**

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

Lecturers

Dr inż. Jerzy Kwiatkowski

Assessment method

Over 50% of the points in the multiple-choice test.

Contents of guided projects

	Topics	Time (hrs.)	Scope (S / Ex)
1	The principle of operation and design of ground heat exchanger	4	Ex
2	Ways to improve the efficiency of DHW - Heat losses in distributing installation	4	Ex
3	RETScreen exercises	8	Ex
4	Determination of emission factors of greenhouse gases	2	Ex
5	Methods for reducing greenhouse gas emissions	2	Ex
6	Heat and cold storage	2	Ex
7	Estimating the efficiency of solar collectors - sizing system for DHW	4	Ex
8	Heat balance of windows	2	Ex
9	Test	2	S
	Total	**30**	**hours**

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

Persons responsible for guided projects

Dr inż. Jerzy Kwiatkowski

Assessment method for guided projects

The presence of the exercises, test from guided project