MODULE INFORMATION SHEET

Name of Module Unit	**Meteorological Measurements and Remote Sensing**
Name in polish language	Pomiary meteorologiczne i teledetekcja
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 Environmental Protection and Management
Responsible person	Dr inż. Małgorzata Zdunek

Semester	Lectures(E)	Tutorials	Laboratory	Computer Exercises	Projects	ECTS
6	15	-	15	-	-	3

Objectives (summary)

The purpose of this course is to provide students with an understanding of the concepts involved in making meteorological measurements and to give them basic information on historical and modern instrumentation. The students will learn about the limitations of instruments and how to interpret instrument specifications and identify the major errors associated with measurement output.
The second part of the course will provide students with an understanding of the theory and application of remote sensing techniques, so that they will be able to interpret and utilize these data for operational and/or research applications.

Prerequisites

Meteorology

Rules of integrated grade setting

60% of lectures grade, 40% of laboratory grade

Recommended readings

Brock F. V., Richardson S. J., 2001: *Meteorological Measurement Systems.* Oxford University Press, New York, USA
DeFelice T. P., 1998: *An Introduction to Meteorological Instrumentation and Measurement.* Prentice Hall
Kidder S. Q. and Vonder Haar T. H., 1995: *Satellite Meteorology: An Introduction.* Academic Press
Conway E. D., 1997: *An introduction to satellite image interpretation.* Johns Hopkins University Press, Baltimore, USA

Contents of lectures (syllabus)

	Topics	Time (hrs.)	Scope (S / Ex)
1	Introduction: functional model of a simple measurement system, performance characteristics, sources of error, exposure standards, interpretation of sensor specifications.	2	Ex
2	Conventional meteorological measurements (part 1): temperature and humidity.	2	Ex
3	Conventional meteorological measurements (part 2): wind and atmospheric pressure.	2	Ex
4	Conventional meteorological measurements (part 3): evaporation and precipitation	1	Ex
5	Measurement of Solar and Earth radiation, visbility and cloud height.	2	Ex
6	Remote sensing systems: radar, lidar, sodar.	2	Ex
7	Satellite measurements (part 1): basic principles - radiative transfer theory, satellite orbits and instrumentations.	2	Ex
8	Satellite measurements (part 2): interpretation of images for meteorological and air quality applications.	2	Ex
	Total	**15**	**hours**

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

Lecturers

Dr inż. Małgorzata Zdunek

Assessment method

Written test

Contents of laboratory

	Topics	Time (hrs.)	Scope (S / Ex)
1	Temperature measurements: liquid-in-glass thermometers – determination of static sensitivity and time constant;	2	Ex
2	Electrical resistance sensors - basic characteristics. Bimetallic thermograph	2	Ex
3	Wind measurements: testing performance of various cup anemometers in wind tunnel	1	Ex
4	Atmosheric pressure measurements: mercury barometer – calculation of station pressure; aneroid barometers – determination of rate of pressure change with height	1	Ex
5	Humidity measurements: determination of relative humidity with psychrometers and hygrometers. Evaporation and precipitation measurements	2	Ex
6	Satellite images interpretation – land and sea surface temperature	2	Ex

7	Satellite images interpretation – meteorological applications: rainfall	2	Ex
8	Satellite images interpretation – meteorological applications: wind field determination	2	Ex
	Total	**15**	**hours**

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

Persons responsible for laboratory

Dr inż. Małgorzata Zdunek

Assessment method for laboratory

Lab reports