

## MODULE INFORMATION SHEET

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|--|--|
| <b>Name of Module Unit</b>               | <b>Monitoring of Environment</b>                 |
| Name in polish language                  | Monitoring środowiska                            |
| 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 hab inż. Małgorzata Loga                      |

| Semester | Lectures(E) | Tutorials | Laboratory | Computer Exercises | Projects | ECTS |
|----------|-------------|-----------|------------|--------------------|----------|------|
| 1        | 15          |           |            |                    | 15       | 2    |

### Learning outcomes (knowledge, skills, competences)

The aim of the module is to present students with the DPSIR model of environmental management – major tool in environmental monitoring. After introducing details on indicators of environmental quality, methods and techniques used in monitoring major components of environment are shown in detail. The main stress is put on European legislation concerning monitoring of environment. Examples of monitoring systems from different countries together with general outline of the corresponding legislation will be given. From the projects exercises, students learn general principles of designing monitoring systems. Considerable stress is put on skills concerning statistical interpretation of monitoring data.

### Prerequisites

Environment protection. Water management. Technologies used in the environmental protection and sewage treatment. Protection of atmospheric air.  
Statistics.

### Rules for integrated grade setting

40% of lecture grade + 60% of mark for guided project

### Recommended readings

MacBerhouex P., L.C. Brown Statistics for Environmental Engineers, 1994, Lewis Publishers  
 Rong Y., Practical Environmental Statistics and Data Analysis 2011 , ILM Publications  
 Zhihua Zhang, Environmental Data Analysis, Methods and Applications, De Gruyter 2017,  
 DOI: <https://doi.org/10.1515/9783110424904>  
[www.epa.gov/emap](http://www.epa.gov/emap)  
<http://www.eea.europa.eu>  
[www.gios.gov.pl](http://www.gios.gov.pl)  
<https://eur-lex.europa.eu/legal-content/EN/TXT>

## Contents of lectures (syllabus)

|              | Topics   | Time (hrs.) | Scope (S / Ex) |
|--------------|--|-------------|----------------|
| 1            | Indices of sustainable development.  | 2           | S              |
| 2            | <b>DPSIR</b> model as a framework for describing the interactions between society and the environment. | 2           | S              |
| 3            | Monitoring system framework.   | 1           | S              |
| 4            | Monitoring of surface waters.  | 2           | S              |
| 5            | Monitoring of ground waters  | 1           | S              |
| 7            | Monitoring of atmospheric air  | 2           | S              |
| 8            | Monitoring of noise  | 2           | S              |
| 9            | Monitoring data in use   | 1           | S              |
| 10           | State of environment   | 1           | S              |
| <b>Total</b> |  | <b>15</b>   | <b>hours</b>   |

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

Ex – extended topics

### Lecturers

dr hab inż. Małgorzata Loga

### Assessment method

Written paper consisting of a multiple choice test and open questions.

## Contents of guided projects

|              | Topics  | Time (hrs.) | Scope (S / Ex) |
|--------------|---|-------------|----------------|
| 1            | Elaboration of chosen aspect of monitoring in case of particular country or region. | 3           | S/Ex           |
| 2            | Presentations of elaborated subjects.   | 3           | S/Ex           |
| 3            | Environmental monitoring data analysis.   | 2           | S/Ex           |
| 4            | Statistical aspects of designing field studies.                                     | 4           | S/Ex           |
| 5            | Water status assessment acc. Water Framework Directive                              | 2           | S/Ex           |
| <b>Total</b> |   | <b>15</b>   | <b>hours</b>   |

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

Ex – extended topics

### Persons responsible for guided projects

dr hab inż. Małgorzata Loga

### Assessment method for guided projects

Assessment of work during tutorials when performing data analysis.  
Presentations shown in the class