

## MODULE INFORMATION SHEET

<b>Name of Module Unit</b>	<b>Environmental Risk Assessment</b>
Name in polish language	Ocena Ryzyka Środowiskowego
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 Biology
Responsible person	dr Katarzyna Affek

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

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

After successful completion of the course the students have detailed knowledge about wastewater and solid waste which are hazardous for water and soil ecosystems. They know the toxicity classification systems for wastewater and leachates, which are used in the European Union and the world. Students have also knowledge about deterministic and probabilistic methods for hazard and risk assessment in the environment.

Completing the course allows students to acquire following skills:

- they can use modern laboratory techniques in the field of ecotoxicology to assess structural and functional changes in water and soil ecosystems which are caused by pollutants contained in wastewater and solid wastes.
- they can use computational, experimental and analytical methods, used in ecotoxicology, to determine Predicted No-Effect Concentration of wastewater and leachates discharged to surface waters and soil.
- they are able to identify hazard and assess the risk associated with the discharge of wastewater and leachates to surface waters and soil.

Completing the course allows students to acquire following competences:

- they are able to work in a team and are aware of the responsibility for jointly performed tasks.
- they understand the need for continuous training and increasing professional and personal competencies.
- they are aware of the importance of non-technical aspects and effects of engineering activities, including its impact on the environment and the related responsibility for decisions.

### Prerequisites

Biological Techniques for Environmental Monitoring

### Rules for integrated grade setting

60% lecture grade, 40% laboratory grade

## Recommended readings

Hoffman D.J., Rattner B.A., Burton G.A.Jr., Cairns J., Jr., "Handbook of Ecotoxicology" Second Edition, CRC Press, 2002.  
 Newman M.C. "Fundamentals of Ecotoxicology" Second Edition, CRC Press, 2002.  
 Posthuma, G.W. Suter II, T.P. Traas, (eds). (2002) Species Sensitivity Distributions in Ecotoxicology. Lewis Publishers, A CRC Press Company.  
 Sparks T. (2000). Statistics in ecotoxicology. Wiley & Sons 1st ed.  
 Affek K., Załęska-Radziwiłł M., Duskocz N., Łebkowska M. Ecotoxicology. Laboratory exercises. Oficyna Wydawnicza Politechniki Warszawskiej.

## Contents of lectures (syllabus)

	Topics	Time (hrs.)	Scope (S / Ex)
1	Introduction to ecotoxicological studies.	2	Ex
2	Pollutants in industrial wastewater and solid waste which are hazardous for aquatic and terrestrial ecosystems.	2	
3	Contaminants of emerging concern. The interactions of xenobiotics in mixtures.	2	
4	Bioassays used to test wastewater and waste toxicity. Analysis of toxicological results - determination of TUa and TUc. Toxicity classification systems according to US EPA and EU. Toxicity classification system with microbioassays for natural waters and wastewaters according to Persoone.	2	
5	Toxicity limits and comparison of toxicity potential. Methods for determination of Predicted No-Effect Concentration (PNEC) in the environment.	2	
6	Procedures related to the minimization of the pollution – Toxicity Identification & Reduction Evaluation (TIE/TRE).	2	
7	Multi-species ecotoxicity tests.	2	
8	Risk and hazard assessment related to wastewater and leachates discharge to surface waters and soil - Toxicity to Exposure Ratio (TER), Risk Quotient (RQ) and Hazard Quotient (HQ). Determination of the likelihood of toxic effects on the species exposed to new substances.	2	
9	Written exam	1	
<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 Katarzyna Affek

## Assessment method

written exam

## Contents of laboratory

	Topics	Time (hrs.)	Scope (S / Ex)
1	Single-species ecotoxicity tests of industrial wastewater using representatives of producers, consumers and decomposers.	10	Ex

2	Determination of ecotoxicity classes and risk assessment related to the discharge of wastewater into the aquatic ecosystem, determination of wastewater concentrations according to EPA (meeting the criteria of 0.3 TUa and TUc), hazard assessment according to Persoone.	4	
3	Written test	2	
4	Verification of safe concentrations of wastewater determined in single-species tests - in multi-species tests, analysis of structural and functional changes in ecosystems based on physico-chemical, microbiological and hydrobiological analyzes, risk assessment.	12	
7	Oral presentation of research results.	2	
<b>Total</b>		<b>30</b>	<b>hours</b>

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

Ex – extended topics

**Persons responsible for laboratory**

dr Nina Doskocz, dr Katarzyna Affek

**Assessment method for laboratory**

written test, oral presentation of research results