

Environmental Chemistry and Environmental Toxicity

Code: MK5KKTOK04KX17-EN

ECTS Credit Points: 4

Evaluation: exam

Year, Semester: 1st year/2nd semester

Number of teaching hours/week (lecture + practice): 2+2

Topics:

Within the environmental chemistry part of the course, students will learn about the significance, tasks and basic concepts of environmental chemistry, environmental elements and compounds. We are discussing the biogeochemical cycle of some important elements in the environment. The curriculum covers the typical effects of the pollutants on the environment, their reaction mechanisms, their sources, their spreads, their limits. The characteristics of different spheres (their structure, composition and properties) and the effects of any anthropogenic contaminants on these spheres are also presented. The curriculum covers the relationship between environmental chemistry and environmental analytics, the role of environmental analytical methods.

In the environmental toxicity we discuss the basic knowledge of toxicology, the grouping options of the poison and the poisoning, and the mechanism of the action of the poisons. Furthermore, we present the students to the role and the significance of environmental toxicology and ecotoxicology in the environmental engineering training. We describe the methods, tasks and the possibilities of carrying out of the different types of eco toxicological tests (single species and multispecies) and we discuss the risk of environmental toxicity and chemicals and risk assessment possibilities.

Literature:

Required:

- Lecture and Practice Notes by the instructors (Presentation materials will be available in the Moodle system. Available at: <https://elearning.unideb.hu/>)
- M. Doble, A. Kumar Kruthiventi: Green Chemistry and Engineering, Elsevier, USA, 2007; ISBN 987-0-12-372532-5
- Donald W. Sparling: Basics of Ecotoxicology (CRC Press Taylor & Francis Group, Boca Raton, USA, 2017. ISBN13: 9781138031715)
- Erik Jorgensen: Ecotoxicology (Cambridge, Academic Press, USA, 2010. ISBN13: 9780444536280)

Recommended:

- D. M. Whitacre: Reviews of Environmental Contamination and Toxicology (Springer, New York, 2013. ISBN: 978-1-4614-6898-1)

Schedule

1st week Registration week

2nd week:

Lecture: The significance, tasks and basic concepts of environmental chemistry.

Practice: The history, the definition, and the classification possibilities of toxicology.

4th week:

Lecture: Characterization of biogeochemical circles. Contaminants in the environment.

Practice: The definition, the scope, the importance and the classification possibilities of ecotoxicology

3rd week:

Lecture: Environment-building elements and compounds. The cycle of some important elements in the environment.

Practice: The classification possibilities of the poison and poisoning.

5th week:

Lecture: Pollutants in the environment, their characteristic effects, reaction mechanisms, source, spread, limits.

Practice: Description of the ecological test using a

Categorization of the contaminants. The role and the location of environmental toxicology in the environmental protection.

6th week:

Lecture: The structure, composition and properties of the atmosphere.

Practice: The methods and the tasks of ecotoxicological tests.

8th week: 1st drawing week, Mid-term exam (1st test)

9th week:

Lecture: Characterization of the hydrosphere, circulation of water.

Practice: Description of the ecological test using a single species: algae, plants test animal test.

11th week:

Lecture: Characterization of the lithosphere and soil chemistry. Anthropogenic contaminants in the pedosphere.

Practice: Description of the ecological test using multispecies: field trials and biomonitoring.

13th week:

Lecture: Methods for the analysis of inorganic pollutants in environmental samples.

Practice: Environmental management decisions based on the ecotoxicological results.

15th week: 2nd drawing week

single species: acute and chronic test.

7th week:

Lecture: Anthropogenic pollutants in the atmosphere.

Practice: Mid-term exam (1st test) from environmental toxicity part.

10th week:

Lecture: Anthropogenic contaminants in the hydrosphere.

Practice: Description of the ecological test using multispecies: microcosm and mesocosm tests.

12th week:

Lecture: Basic concepts of environmental analytics. The process and characteristics of the analysis.

Practice Ecotoxicology and the risk of chemicals.

14th week:

Lecture: Methods for the analysis of organic pollutants in environmental samples.

Practice: End-term exam (2nd test) from environmental toxicity part.

Requirements

A, for a signature:

Participation at practice classes is compulsory. Students have to attend lectures or practices and may not miss more than three lectures or practices during the semester. In case a student misses more than three, the subject will not be signed and the student must repeat the course. Attendance at lectures and practice classes will be recorded by the practice leader. Being late counts as an absence. In case of further absences, a medical certificate needs to be presented. Students are required to bring a calculator and the printed materials of the lectures with them to each lecture and practice class. Active participation is evaluated by the teacher in every class. If a student's behaviour or conduct does not meet the requirements of active participation, the teacher may evaluate his/her participation as an absence due to the lack of active participation in class.

During the semester there are two tests: a mid-term test in the 8th week and an end-term test in the 14th week. A student can retake both tests once, if it is necessary.

B, for an exam grade:

The minimum requirement of the written exam test is 60% separately. The grade for each test is given according to the following (score/grade): 0-59 = fail (1); 60-69 = pass (2); 70-79 = satisfactory (3); 80-89 = good (4); 90-100 = excellent (5).

If the score of any test is below 60%, the student once can take a retake test of the whole semester material.