

Environmental Technologies II (Water Protection)

Code: MK5KVT2K03K117-EN

ECTS Credit Points: 3

Evaluation: exam

Year, Semester: 2nd year/2nd semester

Number of teaching hours/week (lecture + practice): 2+1

Topics:

Completing the course, students will be familiar with the actual issues and challenges, as well as programs, laws, and technical solutions concerning qualitative and quantitative water resource protection and environmental damage prevention, particularly for water. Considering water demand and supply characteristic, the course includes related elements of urban water management. The teaching material deals with the urban hydrology, water withdrawal aspects, water and wastewater treatment technologies and by-product management.

Completing the practice, students will gain skills on water analytical methods, they will understand and be able to apply modelling of water technological monitoring.

Literature:

Required:

- Mackenzie L. Davis: Water and Wastewater Engineering, Design Principles and Practice, McGraw-Hill Companies, Inc. New York, 2010, ISBN: 978-0-07-171385-6

Recommended:

- Frank R. Spellman: Handbook of Water and Wastewater Treatment Plant Operations (Third Edition), CRC Press by Taylor & Francis Group, Boca Raton, 2014, ISBN-13: 978-1-4665-5338-5 (eBook - PDF)
- Jerry A. Nathanson, Richard A. Schneider: Basic Environmental Technology (Sixth Edition), PEARSON, USA, 2015, ISBN: 978-0-13-284014-9

Schedule

1 st week Registration week	
2nd week: Lecture: The origin and quality of water, water resources, water demand, water use issues. The natural and artificial cycle of water. Practice: Practices in blocks!0	3rd week: Lecture: The composition of waters, their pollutants, water quality control/protection. Water quality control. Practice: -
4th week: Lecture: Urban hydrology: Climatic characteristics in urban environments. The impact of urbanization on water management. Problems, present solutions. Practice: -	5th week: Lecture: Urban water management. Water demand, water withdrawal. Practice: -
6th week: Lecture: Drinking water treatment, waterworks operations. Practice: -	7th week: Lecture: Wastewaters, its collection systems. Wastewater treatment technology, methods I Practice: -
8th week: Lecture: Wastewater treatment technology, methods II Practice: -	9th week: Lecture: Natural water treatment processes. Treated wastewater disposal. By-products management of water treatment. Practice: -
10th week: Lecture: Future challenges of urban hydrology. The role of green infrastructures in urban	

water management. Remote sensing and GIS in urban hydrology.

Practice: -

Practices in blocks!

Laboratory work and safety training

Schedule of Laboratory Practice:

- Application of breakpoint chlorination for ammonium removal from water (**BPC**)
- Modelling of coagulation-flocculation in water treatment using a flocculator (Jar-test) (**COAG**)
- Examination of the microbiological characteristics of waters (**MBT**)

Laboratory task schedule:

Blocked practices, 3 occasions (3 hours);

Laboratory E218. (2nd floor) (Faculty of Engineering, 2-4, Otemeto Street)

Requirements

A, for a signature and lab grade:

The lab grade is prerequisite of the signature!

Participation at practice classes is compulsory. Students must attend practice classes and may not miss any practice class during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Being late is equivalent with an absence. In case of absence due to health issues, a medical certification needs to be presented. Missed practice classes must be made up for at a later date, being discussed with the tutor. The weekly syllabus covers the particular topics and gives a full description of the experiments.

Each week the laboratory session begins or closes with a short test (no more than 20 minutes) based exclusively on the preparatory material of that week of the experiments carried out. There are three short tests during the semester. Lab grading is based on a five-level scale: 1 (fail), 2 (pass), 3 (satisfactory), 4 (good), 5 (excellent) calculated as an average of the tests' results and measurement reports. The minimum requirement for the short tests is 50%.

B, for an exam grade:

The theoretical part ends in oral exam based on predetermined topic list. The signature is prerequisite of the oral exam! The oral examination shall be assessed on a five-grade scale. If oral exam is failed, students can retake it in conformity with the EDUCATION AND EXAMINATION RULES AND REGULATIONS.

The course ends in exam grade, the grade for the theoretical part counts is 66.66% and the lab grade counts is 33.33% (Satisfactory level is the criterion in both parts).