Course Unit Descriptor

Study Programme: Environmental Engineering And Occupational Safety Engineering
Course Unit Title: Analysis of environmental protection systems
Course Unit Code: MPK005
Name of Lecturer(s): Turk-Sekulić Maja, Radonić Jelena, Adamović Dragan
Type and Level of Studies: master
Course Status (compulsory/elective): compulsory
Semester (winter/ summer): summer
Language of instruction: english
Mode of course unit delivery (face-to-face/distance learning): face-to-face
Number of ECTS Allocated: 6
Prerequisites: none
Course Aims:. - To introduce the basic knowledge, engineering competencies and academic skills on data analysis in the field of engineering necessary protection of water, air and land, to the students. - To train students in using modern methods of experiment design. - To develop knowledge about green and low-cost technologies used in the separation treatment of waste streams. - To introduce the basic principles of the adsorption process, as well as the process of synthesis and practical using of an alternative adsorption media, to the students. - To train students in using chromatography and spectrophotometry in order to quantify residues of pollutants before and after the treatment. - To train students in successful processing and analysis of experimental data.
Learning Outcomes: After completing the course and passing the exam, the student will be able to: 1. Analyze data on water, air and soil contamination. 2. Plan experimental research. 3. List and describe the green and 'low-cost' technologies used in waste stream treatment. 4. Use instrumental methods (chromatography and spectrophotometry) as a tool for the quantification of of residues of pollutants. 5. Process and interpret experimental results. 6. Apply alternative adsorption media for the treatment of waste streams.
Syllabus. Properties and behavior of gases solid and liquid substances. Dispersed systems. Solutions. Physical and chemical adsorption, heat ofadsorption, adsorption equilibrium and kinetics. Engineered adsorption processes. Catalysis, catalytic reactions, the theory of heterogeneous catalysis, homogeneous catalysis. An experiment in practice. approach to experimental research, planing of experiment.Types of errors. Systematic errors. Random errors. Rough experimental errors. The accuracy and precision of the experimental results.Processing of the experimental results. Graphical analysis of the experimental results. Statistical analysis of the experimental results.Analytical methods. Green and 'low-cost' technologies used in waste stream treatment. Instrumental analysis as a tool required for thequantification of residues of pollutants before and after the treatment of waste streams. Chromatography. Spectrophotometry.
Required Reading: Relevant literature in English, tbd

Weekly Contact Hours: 2	**Lectures: 2**	**Practical work: 2**

Teaching Methods: Lectures. Laboratory and Computing Practice. Consultations – individual and group. During the semester, students are required to attend lectures, laboratory and computing classes. After successfully realized examination prerequisites, students take the final

exam in written(computing part) and oral form (theoretical part). Written part of the exam can be quarterly taken through the two colloquiums.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Attendance			
Computer exercises			
Tests (4x)			