

Course Unit Descriptor

Study Programme: Bachelor Academic Studies in Chemistry - Quality Control and Environmental Management, Bachelor Academic Studies in Environmental Protection – Environmental Protection Analyst			
Course Unit Title: Fundamentals of Waste Management			
Course Unit Code: OZZS-602			
Name of Lecturer(s): Associate Professor Snežana Maletić, Assistant Professor Đurđa Kerkez			
Type and Level of Studies: Bachelor of Science Degree			
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: 7			
Prerequisites: None			
Course Aims: Introducing students to waste characterization and categorization. Introduction to the basic principles of waste management and understanding the need for the application of a waste management hierarchy (prevention of waste, recovery of waste material or energy consumption), and disposal in sanitary landfills with all control measures.			
Learning Outcomes: Systematic knowledge about the character of waste, utilization of waste as a source of secondary raw materials, the importance of recycling, waste separation and disposal at the landfill.			
Syllabus: <i>Theory</i> The term solid waste. Origin and types of waste. Characterization and classification of waste. Municipal waste as a global problem. Separation and utilization of different recyclable materials from municipal waste or getting fuel from waste. Recycling and its importance. Systematized basic knowledge about the processes of incineration, pyrolysis, gasification, anaerobic digestion and composting of waste. Waste disposal and process control in closed landfills. Other wastes those are harmful to the environment due to possessing one or more hazardous characteristic. <i>Practice</i> Determination of the waste type and classification of waste according to the waste catalog. Solid waste sampling. Methods of quartering the waste samples. Morphological composition of municipal waste, inorganic and organic components. Introduction to the separation of secondary raw materials from mixed municipal waste. Potential of municipal waste for biological treatment. Solid waste anaerobic digestion. Solid waste composting. Stabilization of waste. Characterization of waste by leaching tests. Methodology of waste disposal. Calculation - Calculation of waste composition. Calculations related to the collection and transport of municipal waste. Calculations related to waste pre-treatment. Calculations related to recycling, thermal, aerobic and anaerobic treatment of waste. Calculations related to the disposal of waste. Calculations related to the energy value of waste.			
Required Reading: 1. J. Pichtel: Waste Management Practices, Municipal, Hazardous and Industrial, Taylor and Francis, Boca Raton/Singapore, 2005. 2. N. Cheremisinoff: Handbook of Solid Waste Management and Waste Minimization Technologies, BH, Amsterdam-Tokyo, 2003. 3. T. Christensen: Solid Waste Technology and Management- Volume 1 i 2, Wiley, 2010.			
Weekly Contact Hours: 6	Lectures: 3	Practical work: 2+1	
Teaching Methods: Lectures, laboratory work			
Knowledge Assessment (maximum of 100 points): 100			
Pre-exam obligations	points	Final exam	points
Active class participation	5	Written exam	40
Practical work	15	Oral exam	20
Preliminary exam(s)	20		