Course Unit Descriptor

Study Programme: Environmental Engineering

Course Unit Title: Waste to energy technologies

Course Unit Code: ZC047B

Name of Lecturer(s): Dejan Ubavin

Type and Level of Studies: Bachelor level

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:

Qualifying students for considering the whole cycle of waste management and troubleshooting of the waste to energy segment. Goal of the course is to enable solving the problems of waste management with energy utilization based on analysis of basic and new technologies.

Learning Outcomes:

Students gain the necessary knowledge to solve specific problems of optimum solutions selection of waste utilization in order to obtain energy. Students will be able to do analysis, design and optimization of waste treatment facility.

Syllabus:

Theoretical study: The concept of waste, quantities and composition of municipal solid waste, National and EU legislation, disposal of waste, waste utilization technologies, mechanical-biological waste treatment, anaerobic digestion, combustion of waste, landfill gas management Practical lessons: At the exercises examples are processed where students are trained to solve specific problems in the field of waste management: waste management systems planning, work on software tools for landfill gas production modeling and determination of landfill energy potential.

Required Reading: Relevant literature in English, tbd

Weekly Contact Hours: 6	**Lectures: 3**	**Practical work: 3**

Teaching Methods:

Lectures, auditory exercises, computer exercises and consultations. At the lectures, theoretical part of teaching material followed by appropriate practical examples for easy understanding and adoption of material. The auditory exercises deal with teaching material in detail with active student participation. At computer exercises software tools are used to simulate the processes within the landfill. Beside lectures and exercises, consultations are held on a regular basis. written part of the examination may be taken through the form of two colloquia.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Group Assignment		Examination Assignment	
Exercises			

Test			
Test			
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			