Course Unit Descriptor

Study Programme: Environmental Engineering		
Course Unit Title: Renewable Energy Sources		
Course Unit Code: Z206A		
Name of Lecturer(s): Nakomčić-Smaragdakis Branka		
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: 8		
Prerequisites: None		
Course Aims: Acquisition of knowledge and enabling students for further application and practical work in the field of alternative power Engineering in the domain of Renewable sources of energy.		
Learning Outcomes: Ability to use acquired knowledge in further education and in the future engineering practice in the domain of Renewable sources of energy.		
Syllabus: Power engineering, economy and ecology (general part). Solar energy: resources, solar technologies (photovoltage (PV) technologies, solar heating technologies), solar systems (PV independent and interactive systems; distributed and central receiving system), using thermal energy of the ocean. Wind energy: resources, the use of wind energy, vertical and horizontal wind generators (BAWT, XAWT), Wind energy based systems (independent and interactive), technical problems and solutions. Hydro energy: resources, the use of water driving force, estimation of available energy, impulse and reaction turbines, hydro power plant as a part of PES, small hydro plants, the use of tides and waves. Geothermal energy: types of geothermal sources, resources, technologies and systems for their exploitation (direct and indirect use), consequences on the environment. Biomass: characteristics of biomass, technologies and systems for the use of biomass (combustion, gasification, pyrolysis), biofuel (biodiesel, biogas). Nuclear energy: processes of obtaining nuclear energy, nuclear fuel, nuclear plants (reactors, power plants), nuclear waste (regulations). New technologies (fuel cells, compressed hydrogen…). Energy storage: general part, accumulation of hydro energy, electrochemical energy storage (batteries), process of electrolysis, accumulated energy of compressed hydrogen, accumulation of flywheel energy.		
Required Reading: Relevant literature in English, tbd		
Weekly Contact Hours: 8	**Lectures: 3**	**Practical work: 5**
Teaching Methods: Lectures, Auditory and Computer Practice, Mentor work, Consultations. Students work on the term paper in groups for the chosen field/topic by the mentor and they individually defend their work in front of the colleagues and the professor. Topic selection is in accordance with the student interests. The final examination covers the entire course and it is eliminatory. The final grade is formed based on the success on the term paper, test results and student activity during the lectures.		
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.			