

Study program: IT in Mechanical engineering, Engineering management			
Type and level of studies: Undergraduate Academic Studies			
Course unit: Renewable Energy Sources			
Teacher in charge: Snežana Dragičević; Teaching assistant Milan Marjanović			
Language of instruction: English			
ECTS: 6			
Prerequisites: -			
Semester: Winter			
Course unit objective: This course aims to provide knowledge about the potentials of renewable energy sources (RES) and familiarize students with the state of energy resources, their potentials, technologies for heat and electricity production, and limitations. The main objective is to acquaint students with solar energy, wind energy, geothermal energy, hydro energy, and biomass energy. The goal is to enable students to understand the basic utilization methods of RES for obtaining heat and electricity, to introduce them to the prospects for the application and development of RES and related technologies, and to acquire skills for the practical application of RES.			
Learning outcomes of Course unit: Upon completion of the course, students will be able to: analyze the potentials of RES; define the fundamental properties of different RES and technologies for their utilization; describe the main elements of technical systems for utilizing RES; explain the interrelation of operational and design parameters within RES systems; interpret the advantages and disadvantages of various RES; select an engineering approach to problem-solving for the implementation of RES projects.			
Course unit contents: Theoretical classes Energy and energy transformations; Solar energy: solar radiation, solar thermal receivers, conversion of solar radiation into electrical energy; Wind energy: potential, types of wind turbines, wind turbine control; Geothermal energy: geothermal sources, geothermal energy technologies; Hydro energy: resources, exploitation of water power, assessment of available energy, hydropower plants; Biomass: types, technologies and systems for biomass utilization (combustion, gasification, pyrolysis), biofuels. Practical classes Students solve problems related to utilizing RES in systems for generating thermal and electrical energy, analyzing case studies from practical applications. Part of the practical sessions takes place in the laboratory, involving analysis of measurements of global solar radiation and energy production, as well as hands-on work in a laboratory-based solar power plant.			
Literature: 1. John Twidell, Tony weir, Renewable energy resources, 2nd edition, by Taylor & Francis, 2006. 2. Luque Antonio, Hegedus Steven, Handbook of Photovoltaic Science and Engineering, A John Wiley and Sons, Ltd. Publication, ISBN 978-0-470-72169-8, 2011. 3. Gerard M. Crawley, Solar Energy, World Scientific Publish.Comp., ISBN 978-981468949, 2016.			
Number of active teaching hours: 4		Lectures: 2	Practice: 2
Teaching methods: Verbal presentations using computers, presentations, demonstrations, and discussions. Practical sessions encompass exercises, individual student work, and computer-based tasks. Individual consultations with students take place during the completion of assignments and seminar work.			
Evaluation (maximum number of points 100)			
Exam prerequisites:	No. of points:	Final exam:	No. of points:
Activities during teaching process	30	Final exam (written):	30
Practical teaching	20	Final exam (oral):	20