

Information sheet for the course: Energetics and Environment

University: Alexander Dubček University of Trenčín	
Faculty: Faculty of Industrial Technologies in Púchov	
Course unit code: MI-I-PV-9E	Course unit title: Energetics and Environment
Form, scope and method of educational activity:	
Form of study: Lecture / Seminar / Laboratory tutorial	
Recommended number of lessons (hours):	
Weekly: 2 / 2 / 0 During the semester: 24 / 24 / 0 Method of study: attendance method	
Number of credits: 5	
Recommended semester: 2	
Degree of study: The 2nd degree of study	
Course prerequisites: -	
Assessment methods:	
Assessment during the semester:	
Summary assessment of work results during the semester = 40 points	
The student makes a test relating to energy/heat calculations and elaborate a project focused on alternative energy sources. The student will present his/her project during the seminar and answer questions during the discussion. The final written test on the theory can be written by the student who gets at least 20 points in the assessment during the semester.	
Final assessment:	
Assessment of exam results = 60 points	
The student passes the final written test on the theory of energy alternative sources.	
Grading scale:	
Grade A: 91 – 100 points	
Grade B: 81 – 90 points	
Grade C: 71 – 80 points	
Grade D: 61 – 70 points	
Grade E: 55 – 60 points	
Grade FX: less than 55 points	
Learning outcomes of the course unit:	
The student has knowledge about alternative renewable energy sources, knows the connections and relationships between the use of classical and alternative energy sources and the reduction of negative impacts on the environment and human health. He/she knows the basic principles of technological procedures, design solutions and functions of modern devices which use alternative energy sources. He/she knows how to analyze and evaluate the solved problem, he/she knows how to propose solutions to prevent the negative impacts of energy industry on the environment. He/she knows how to use his/her knowledge in solving of energy/heat calculations.	
Course contents:	
Energy sources, classification, definitions. Classical energy sources. Alternative, renewable energy sources.	
Types of alternative energy sources. Solar energy - interaction of solar radiation with the Earth's atmosphere (with the surface of objects), absorbance, transmittance, reflectance.	
Ways of using of solar energy, passive solar energy, basic elements of solar architecture, Trombe wall, properties of materials, thermal capacity, thermal insulation.	
Active solar systems, types of solar collectors, solar thermal electricity production, photovoltaic phenomenon, technologies of photovoltaic modules.	
Wind energy - types of wind power plants, types of wind turbines, description and principle of work.	
The main factors of the efficiency of wind energy, the advantages and disadvantages of wind energy, the impact on environment.	
Water energy - principle of electricity production, types of power plants, description of the	

waterworks. Water turbines - classification, construction and working principle.
Advantages and disadvantages of classic hydropower. Utilization of sea wave energy - description of equipments. Tidal power plants - principle of operation and impact on environment.

Geothermal energy - characteristic of resource. Heat pumps - types of equipments, sources of input energy, principle of work.

Geothermal energy in Slovakia and its use, geothermal energy in the world, impact on environment.

Biomass energy - definition and formation of biomass, methods of energy use of biomass, types of biomass, noble products from biomass, advantages of energy use of biomass.

Recommended of required reading:

PETRÁŠ, D.: Obnoviteľné zdroje energie pre nízko-teplotné systémy. Jaga group, 224 s., 2009. ISBN: 9788080760755.

HASELHUHN, R.: Fotovoltaika. Hel. 2011. ISBN: 9788086167336.

SHINN, L.: Renewable Energy: The Clean Facts. 2018. <https://www.nrdc.org/stories/renewable-energy-clean-facts>.

LANGFELDER, I. a kol.: Energetika chemického a potravinárskeho priemyslu. Bratislava: Alfa, 236 s., 1992. ISBN 80-88914-19-1.

BAFRNCOVÁ, S. a kol.: Chemické inžinierstvo – príklady a úlohy. Bratislava: STU, 1996. ISBN 80-227-0862-3.

TOLGYESSY, J. LESNÝ, J.: Svet hľadá energiu. Bratislava: Obzor, 396 s., 1979. ISBN: 735-21-85/5.

E-learning TnUAD.

Language:

English

Remarks:

Compulsory elective course / Profile course

Evaluation history: 0

Total number of graded students:

A	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0

Lecturers: prof. Ing. Darina Ondrušová, PhD., Ing. Jana Pagáčová, PhD.

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Supervisor: prof. RNDr. Mariana Pajtášová, PhD.