COURSE DESCRIPTION CARD – Technology of energy machines

<table>
<tr><td colspan="10">Faculty of Mechanical Engineering</td></tr>
<tr><td>Field of study</td><td colspan="6">Power engineering</td><td>Degree level and programme type</td><td>Bachelor's degree</td></tr>
<tr><td>Specialization/ diploma path</td><td colspan="6"></td><td>Study profile</td><td></td></tr>
<tr><td rowspan="2">Course name</td><td colspan="6" rowspan="2">Technology of energy machines</td><td>Course code</td><td>IS-MER0052W</td></tr>
<tr><td>Course type</td><td></td></tr>
<tr><td rowspan="2">Forms and number of hours of tuition</td><td>L</td><td>C</td><td>LC</td><td>P</td><td>SW</td><td>FW</td><td>S</td><td>Semester</td><td>winter</td></tr>
<tr><td>30</td><td>15</td><td>-</td><td>-</td><td>-</td><td></td><td></td><td>No. of ECTS credits</td><td>3</td></tr>
<tr><td>Entry requirements</td><td colspan="9">Applied thermodynamics, Fluid mechanics</td></tr>
<tr><td>Course objectives</td><td colspan="9">Acquirement of skills and qualifications in: (a)application of energy machines and utilities; (b) analysis of energy conversion processes; (c) assessment of efficiency of energy machines and limitations</td></tr>
<tr><td>Course content</td><td colspan="9">Forms of energy and energy resourses. Energy balance equation for CV. Basic energy conversion technologies: heat machines –piston internal combustion engines, spark and compress ignition engines and their efficiency, engine fuels, turbocharging, gas turbines and high efficiency gas turbines systems, steam power systems, hydraulic machines, wind machines</td></tr>
<tr><td>Teaching methods</td><td colspan="9">Oral lectures supplemented by pratical classes</td></tr>
<tr><td>Assessment method</td><td colspan="9">Written tests (2 for oral lectures, 1 for practical lectures))</td></tr>
<tr><td>Symbol of learning outcome</td><td colspan="7">Learning outcomes</td><td colspan="2">Reference to the learning outcomes for the field of study</td></tr>
<tr><td>LO1</td><td colspan="7">skills in energy balance formulation for energy conversion machines</td><td colspan="2"></td></tr>
<tr><td>LO2</td><td colspan="7">skills in assessment of efficiency of the heat machines</td><td colspan="2"></td></tr>
<tr><td>LO3</td><td colspan="7">skills in analysis of energy conversion in spark ignition engines</td><td colspan="2"></td></tr>
<tr><td>LO4</td><td colspan="7">skills in analysis of energy conversion in compress ignition engines</td><td colspan="2"></td></tr>
<tr><td>LO5</td><td colspan="7">skills in analysis of energy conversion in gas turbines</td><td colspan="2"></td></tr>
<tr><td>LO6</td><td colspan="7">skills in analysis of energy conversion in hydraulic and wind machines</td><td colspan="2"></td></tr>
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Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
LO1	Test 1	oral
LO2	Test 1	oral
LO3	Test 1	oral
LO4	Test 2	oral
LO5	Test 2	oral
LO6	Test	practical lectures

Student workload (in hours)		No. of hours
Calculation	Lecture attendance	30
	Practical lectures attendance	15
	Preparation for tests	8
	TOTAL:	53

Quantitative indicators	HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation	15	3
Student workload – practical activities	15	

Basic references	1. Eastop T. D., Croft D. R., Energy Efficciency for Engineers and Technologists, Longan Scientific& Technical, 1990. 2. Kiameh P.: Power Generation Handbook, McGraw-Hill, New York, 2012. 3. Liley P. E., 2000 Solved Problems In Mechanical Engineering Thermodynamics, Schaum's Solved Problems Series, McGraw-Hill Publishing, 1989. 4. Kakaç S., Boilers, evaporators and condensers, Wiley&Sons, 1991.
Supplementary references	1. Çengel Y. A., Boles M.A.: Termodynamics: An Engineering Approach, McGraw-Hill, New York, 1989.

Organisational unit conducting the course	Dept. of Machinery Design and Thermal Engineering	Date of issuing the programme
Author of the programme	Prof. Teodor Skiepko	22.03.2019

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work, S – seminar

Please notice!
Depending on number of students enrolled for the subject hours of tuition are as follows (for each 30 hours given in course description card):
1 – 2 students - 5 hours of tuition hours;

3 – 4 students - 8 hours of tuition;
5 – 6 students - 11 hours of tuition;
7 – 8 students - 15 hours of tuition;
9 and more students - hours of tuition given by a teacher as regular classes.