COURSE DESCRIPTION CARD – Transport phenomena

<table>
<tr><td colspan="10">Faculty of Mechanical Engineering</td></tr>
<tr><td>Field of study</td><td colspan="6">Mechanical engineering</td><td colspan="2">Degree level and programme type</td><td>Master's degree</td></tr>
<tr><td>Specialization/ diploma path</td><td colspan="6"></td><td colspan="2">Study profile</td><td></td></tr>
<tr><td rowspan="2">Course name</td><td colspan="6" rowspan="2">Transport phenomena</td><td colspan="2">Course code</td><td>IS-FME-00258W</td></tr>
<tr><td colspan="2">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">Fluid mechanics, Basic thermodynamics</td></tr>
<tr><td>Course objectives</td><td colspan="9">Acquirement of skills and qualifications in: (a) conversion of conservation laws by the Reynolds transport theorem; (b) derivation of balance equation for the control volume (c) description of the fundamental transport mechanisms: diffusion, convection, radiation; (d) model description of transport of mass, momentum and energy in terms of the control volume.</td></tr>
<tr><td>Course content</td><td colspan="9">Conservation laws; the Reynolds transport theorem; general balance equation for the control volume; fundamental transport mechanisms: diffusion, convection, radiation; model description of transport of mass, momentum and energy in terms of the control volume.</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 understanding of the conservation laws</td><td colspan="2"></td></tr>
<tr><td>LO2</td><td colspan="7">skills in conversion of conservation laws by the Reynolds transport theorem</td><td colspan="2"></td></tr>
<tr><td>LO3</td><td colspan="7">skills in derivation of balance equation for the control volume</td><td colspan="2"></td></tr>
<tr><td>LO4</td><td colspan="7">skills in description of transport mechanisms: diffusion, convection, radiation</td><td colspan="2"></td></tr>
<tr><td>LO5</td><td colspan="7">skills in model description of transport of mass and momentum in terms of the control volume.</td><td colspan="2"></td></tr>
<tr><td>LO6</td><td colspan="7">skills in model description of energy (total, internal, kinetic) transport in terms of the control volume.</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. Bird R. B., W.E. Stewart, E. N. Lightfoot, Transport phenomena, Wiley, New York, 1960 2. Slattery J. C., Advanced Transport Phenomena, Cambridge University Press, 1999. 3. Bennet C. O., Myers J.E., Momentum, heat and mass transfer, 2nd edition, McGraw-Hill, New York (1974). 4. Fahien R. W., Fundamentals of Transport Phenomena, McGraw-Hill, New York (1983).		
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	25.03.2019	

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.