COURSE DESCRIPTION CARD – HEAT EXCHANGERS

<table>
<tr><td colspan="10">Faculty of Mechanical Engineering</td></tr>
<tr><td>Field of study</td><td colspan="6"></td><td colspan="2">Degree level and programme type</td><td>Bachelor'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">Heat exchangers</td><td colspan="2">Course code</td><td>IS-FME-00279S</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 colspan="2">Semester</td><td>summer</td></tr>
<tr><td>30</td><td>15</td><td>15</td><td></td><td></td><td></td><td></td><td colspan="2">No. of ECTS credits</td><td>6</td></tr>
<tr><td>Entry requirements</td><td colspan="9">Heat transfer, Fluid mechanics</td></tr>
<tr><td>Course objectives</td><td colspan="9">Acquirement of skills and qualifications in: thermal analysis of heat exchangers and evaluation of performance and applications of heat exchangers</td></tr>
<tr><td>Course content</td><td colspan="9">Lecture: Heat exchanger classifications. Flow arrangements of heat exchangers; counter-, parallel-, multipass- and cross- flow arrangements. Methods of heat exchanger analysis: log mean temperature difference, effectiveness vs. NTU method. Compact heat exchangers. Analysis of regenerators.
Classes: …….
Laboratory classes: Measurements of temperature, pressure, flow velocity, flow rate, heat, thermal power, heat transfer coefficients. Heat exchangers performance measurements. Metrological analysis of the obtained results.</td></tr>
<tr><td>Teaching methods</td><td colspan="9">Oral lectures supplemented by practical classes; laboratory exercises</td></tr>
<tr><td>Assessment method</td><td colspan="9">lecture – two tests
classes - one test
laboratory classes – pre-lab tests, lab reports evaluation, activity in the classroom</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 analysis of heat exchangers by log mean temperature difference method</td><td colspan="2"></td></tr>
<tr><td>LO2</td><td colspan="7">skills in analysis of heat exchangers by effectiveness vs. NTU method</td><td colspan="2"></td></tr>
<tr><td>LO3</td><td colspan="7">skills in analysis of compact heat exchangers</td><td colspan="2"></td></tr>
<tr><td>LO4</td><td colspan="7">skills in analysis of regenerators</td><td colspan="2"></td></tr>
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LO5	skills in selection of heat exchangers for specific applications	
LO6	skills in computational analysis of heat exchangers	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
LO1	written tests, pre-lab tests, lab reports evaluation, activity in the classroom	L, C, LC
LO2	written tests	L, C
LO3	written tests, pre-lab tests, lab reports evaluation, activity in the classroom	L, C, LC
LO4	written tests	L, C
LO5	written tests	L, C
LO6	written tests	L
Student workload (in hours)		No. of hours
Calculation	lecture attendance	30
	preparation for lecture tests	30
	participation in classes and laboratory classes	30
	preparation for classes	25
	preparation to pass the laboratory classes	30
	participation in student-teacher sessions	5
	TOTAL:	150

Quantitative indicators	HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation	65	2,6
Student workload – practical activities	85	3,4

Basic references	1. Çengel Y.A., Cimbala J.M.: Fluid mechanics: fundamentals and applications, McGraw-Hill Education, Singapore 2014. 2. Munson B. R. [et al.]: Fundamentals of fluid mechanics: international student version, Wiley, New York 2009. 3. Çengel Y., Heat and Mass Transfer, McGraw-Hill Education - Europe, 2014 4. Çengel Y.A., Boles M.A., Thermodynamics. An Engineering Approach, McGraw-Hill Book, 2015. 5. Moran, M., Shapiro H.N., Fundamentals of engineering thermodynamics SI version, Wiley J., 2006.
Supplementary references	1. Fox R, Pritchard P., McDonald A., Introduction to fluid mechanics, Hoboken: John Wiley a. Sons, 2010 2. Nellis G., Klein S.A., Heat transfer, Cambridge University Press, 2009. 3. Myer Kutz Ed., Heat-transfer calculations, New York : McGraw-Hill, 2006.

Organisational unit conducting the course	Department of Thermal Engineering	Date of issuing the programme

Author of the programme		**2025-02-7**

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