COURSE DESCRIPTION CARD – SPECIMEN

<table>
<tr><td colspan="10">Faculty of Civil Engineering and Environmental Sciences</td></tr>
<tr><td>Field of study</td><td colspan="5">Environmental Engineering</td><td colspan="2">Degree level and programme type</td><td colspan="2">Bachelor's degree</td></tr>
<tr><td>Specialization/ diploma path</td><td colspan="5">International School of Engineering</td><td colspan="2">Study profile</td><td colspan="2">Academic profile</td></tr>
<tr><td rowspan="2">Course name</td><td colspan="5" rowspan="2">Mechanical equipment in environmental engineering</td><td colspan="2">Course code</td><td colspan="2">19284210H/IS1S41025</td></tr>
<tr><td colspan="2">Course type</td><td colspan="2">Obligatory</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 colspan="2">VI</td></tr>
<tr><td>1</td><td>-</td><td>1</td><td>1</td><td>-</td><td>-</td><td>-</td><td colspan="2">No. of ECTS credits</td><td colspan="2">4</td></tr>
<tr><td>Entry requirements</td><td colspan="9">Mathematics, Physics</td></tr>
<tr><td>Course content</td><td colspan="9">Pumps: pump hydraulics, system head curve, operating point for pump, pump selection, pump curves, mechanical and electrical power, parallel and series pumps selection, cavitation in pumps, pump operation, hydraulic calculations . Ventilators and compressor: construction, system curve, ventilator selection.</td></tr>
<tr><td>Teaching methods</td><td colspan="9">Lectures, Laboratory classes (working independently, in pairs or as part of a small team), Project</td></tr>
<tr><td>Assessment method</td><td colspan="9">discussion of obtained research results during classes; written reports in research; written tests checking the learning outcomes, project - project completion, presentation and discussion;</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">has an elementary knowledge of pumps, ventilators and compressors.</td><td colspan="2">IS1_W04
IS1_W05</td></tr>
<tr><td>LO2</td><td colspan="7">understand the basic physical phenomena in the mechanical appliances in Environmental Engineering</td><td colspan="2">IS1_W04
IS1_W05</td></tr>
<tr><td>LO3</td><td colspan="7">able to selection of pump using computer program</td><td colspan="2">IS1_W05</td></tr>
<tr><td>LO4</td><td colspan="7">know the basic knowledge, standards pump selection</td><td colspan="2">IS1_U12
S1_U14</td></tr>
<tr><td>LO5</td><td colspan="7">able to prepare and present a presentation of the results of measurement</td><td colspan="2">IS1_U07</td></tr>
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LO6	able to calculate and measure pump and ventilators and parameter and curves	**IS1_U07 IS1_K01**
Symbol of learning outcome	**Methods of assessing the learning outcomes**	**Type of tuition during which the outcome is assessed**
LO1	written colloquia or test from lecture and report from laboratory classes	**L, LC**
LO2	written colloquia or test from lecture and report from laboratory classes	**L, LC**
LO3	discussions during classes, report from project	**P**
LO4	discussions during classes, report from project	**P**
LO5	discussions during classes, report from laboratory classes	**LC**
LO6	discussions during classes, report from laboratory classes	**LC**
Student workload (in hours)		**No. of hours**
Calculation	lecture attendance	**16**
	participation in classes, laboratory classes	**32**
	preparation for raport laboratory classes, project	**32**
	working on projects, reports, etc.	**16**
	participation in student-teacher sessions related to the project/ laboratory classes	**5**
	implementation of project tasks	**16**
	TOTAL:	**117**
Quantitative indicators	**HOURS**	**No. of ECTS credits**
Student workload – activities that require direct teacher participation	**53**	**2,1**
Student workload – practical activities	**101**	**4,0**
Basic references	**1. Karassik I., Messina J., Cooper P., Heald Ch., Pump Handbook 4th Edition, 2008 2. Sulzer Pumps, Centrifugal Pump Handbook 3rd Edition, Butterworth-Heinemann, 2010 3. Pelikan B.: The Pump Book, 2010**	
Supplementary references	**1. Robert X. Perez., Operator's Guide to Centrifugal Pumps, 2008 2. Tyler G. Hicks, Handbook of Mechanical Engineering Calculations, Second Edition, McGraw-Hill Education, 2006 3. Chadwick A., Morfett J., Borthwick M., Hydraulics in Civil and Environmental Engineering 5th Edition, CRC Press,2013**	
Organisational unit conducting the course	**Department of technology in environmental engineering**	**Date of issuing the programme**
Author of the programme	**Tomasz Teleszewski DSc, Phd, Eng.**	**2022**

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