COURSE DESCRIPTION CARD – SPECIMEN

<table>
<tr><td colspan="10">Faculty of Mechanical Engineering</td></tr>
<tr><td>Field of study</td><td colspan="6">Erasmus</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">Active Vibration Control Methods</td><td>Course code</td><td>IS-FME-00131S</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>summer</td></tr>
<tr><td>15</td><td></td><td></td><td>30</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">Computer Methods in Automatics, Identification of Control Plants</td></tr>
<tr><td>Course objectives</td><td colspan="9">The main objective of the module is provide students with topic as design of active vibration control systems for flexible structures</td></tr>
<tr><td>Course content</td><td colspan="9">Lecture: Some concepts of structural dynamics, piezoelectric stripes or stick as actuator, magnetorheological dampers, collocated versus non-collocated control, active damping with collocated pairs of actuator and sensors, optimal control Project: determine of the mathematical model of flexible mechanical structure with piezo-elements and next design of active vibration control system with help of Matlab software</td></tr>
<tr><td>Teaching methods</td><td colspan="9">Lectures: blackboard lectures, multimedia presentations and showing some examples, discussions
Project: work in groups, discussion, homework assignments
Self- study under supervision: tutorial sessions with worked examples, discussion, problem solving, homework assignments.</td></tr>
<tr><td>Assessment method</td><td colspan="9">Test/ Evaluation report</td></tr>
<tr><td>Symbol of learning outcome</td><td colspan="8">Learning outcomes</td><td>Reference to the learning outcomes for the field of study</td></tr>
<tr><td>LO1</td><td colspan="8">Student known collocated and non-collocated systems</td><td>K_W21</td></tr>
<tr><td>LO2</td><td colspan="8">Student describes chosen control methods of the modal model of mechanical structure</td><td>K_W21</td></tr>
<tr><td>LO3</td><td colspan="8">Student describes model of the mechanical structure in the steady state form (modal analysis)</td><td>K_W21</td></tr>
<tr><td>LO4</td><td colspan="8">Student have skills related to design of active vibration control</td><td>K_U02, K_U04</td></tr>
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	systems	
LO5	Student using orthogonal methods to determine of minimal model of the structure	**K_U04**
LO6		
Symbol of learning outcome	**Methods of assessing the learning outcomes**	**Type of tuition during which the outcome is assessed**
LO1	Test	**L**
LO2	Test	**L**
LO3	Test and evaluation report	**L/P**
LO4	evaluation report	**P**
LO5	evaluation report	**P**
LO6		
Student workload (in hours)		**No. of hours**
Calculation	Lecture attendance	15
	Participation in classes, laboratory classes	30
	Preparation for classes, laboratory classes, projects	8
	Participation in the student-teacher sessions related to classes/project	10
	Implementation of project task	7
	Working on projects, reports	10
	Preparation for and participation in the exams/test	10
	TOTAL:	**90**

Quantitative indicators	**HOURS**	**No. of ECTS credits**
Student workload – activities that require direct teacher participation	**55**	**2**
Student workload – practical activities	**45**	**2**

Basic references	1. A. Premount Vibration Control of Active Structures, An Introduction, 2nd Edition, Kluwer Academic Publisher, 2002. 2. A. Premount, Twelve Lectures on Structural Dynamics, Springer, 2013. 3. B. Sapiński Real-Time Control of Magnetorheological dampers in Mechanical Systems, AGH Press, 2008.
Supplementary references	S.Y. Chu, T.T. Soong, A.M. Reinhorn, Active hybrid and semi-active structural control, A design and implementation handbook, Wiley, 2005

Organisational unit conducting the course	**Department of Mechatronics System and Robotics**	**Date of issuing the programme**
Author of the programme	**Andrzej Koszewnik, D.Sc**	**19.03.2021**

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.