Załącznik nr 2 do Zarządzenia Nr 16/2022 Rektora PB

COURSE DESCRIPTION CARD

<table>
<tr><td colspan="11">Bialystok University of Technology
Faculty of Mechanical Engineering</td></tr>
<tr><td>Field of study</td><td colspan="6">Erasmus</td><td colspan="2">Degree level and programme type</td><td>Bachelor’s degree</td></tr>
<tr><td>Specialisation/ 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">Active Vibration Control Methods</td><td colspan="2">Course code</td><td></td></tr>
<tr><td colspan="2">Course type</td><td></td></tr>
<tr><td rowspan="2">Forms and number of hours of educational activities</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>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="10">Computer Methods in Automatics</td></tr>
<tr><td>Course objectives</td><td colspan="10">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="10">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="10">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="10"></td></tr>
<tr><td>Symbol of learning outcome</td><td colspan="8">Learning outcomes</td><td colspan="2">Reference to the learning outcomes for the field of study</td></tr>
<tr><td></td><td colspan="8">Knowledge: the graduate knows and understands</td><td colspan="2"></td></tr>
<tr><td>LO1</td><td colspan="8">Student known collocated and non-collocated systems</td><td colspan="2">K_W21</td></tr>
</table>

LO2	Student describes chosen control methods of the modal model of mechanical structure as well as describes model of the mechanical structure in the steady state form (modal analysis)	**K_W21**
	Skills: the graduate is able to	
LO3	Student have skills related to design of active vibration control systems	**K_U02, K_U04**
LO4	Student using orthogonal methods to determine of minimal model of the structure	**K_U04**
	Social competence: the graduate is ready to	
LO5		
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	evaluation report	**L/P**
LO4	evaluation report	**P**
LO5		
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	**Department of Automation Technology**	**Date of issuing the programme**

course		
Author of the programme	Andrzej Koszewnik, D.Sc	26.02.2025

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