

COURSE DESCRIPTION CARD – SPECIMEN

Faculty of Electrical Engineering									
Field of study	Electrical and Electronics Engineering							Degree level and programme type	Bachelor's degree,
Specialization/ diploma path	-							Study profile	-
Course name	Control of Electrical Drives 1							Course code	IS-FEE-10003W
								Course type	elective
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	winter
	15	-	15	30	-	-	-	No. of ECTS credits	5
Entry requirements	-								
Course objectives	The construction and the features of the electrical drives in steady state and in transitional states. Operating point and the basic parameters of the selected electric drives systems. Students develop the practical experience on energy conversion in open loop and closed loop automatically controlled electric drives.								
Course content	<p>Lecture: Control characteristic of motor and power converter. Torque - speed characteristics of electrical motors and generators. Multi-quadrant operation of the electric motors and the converter controlled DC and AC drives. Power flow and energy losses. Structure and synthesis of simple drive system subsystems. Quality control assessment.</p> <p>Laboratory classes: Investigation into speed control system with DC servomotor motor drive, investigation into steady state and transient features. Investigation into position measurement system with resolver in the sine – cosine operating mode. Investigation into position measurement system with resolver in the phase shifter operating mode. Investigation into control characteristic of variable speed control system with induction motor, DC/AC converter and frequency adjustment.</p> <p>Project: The student designs and simulates in Matlab the automatically controlled electric servodrive.</p>								
Teaching methods	lecture, laboratory experiments, demonstration, problem-based learning, small group teaching, work on a project								
Assessment method	lecture – oral test, laboratory classes – evaluation of reports, project – evaluation of project								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
L01	recognizes basic functional blocks in structure of electric drive system								
L02	analyzes power flow and energy losses in a simple drive system								

L03	determines the basic properties of electric drive		
L04	designs and simulates of simple electric drive		
L05			
L06			
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
L01	tests on lecture content	L	
L02	assessment of the drive operation, evaluating of the student's reports and performance in classes	LC	
L03	assessment of the drive operation, evaluating the student's reports and performance in classes	LC	
L04	evaluating the student's project	P	
L05			
L06			
Student workload (in hours)		No. of hours	
Calculation	lecture attendance	15h	
	participation in laboratory classes	15h	
	participation in project	30h	
	preparation for laboratory classes, project	30h	
	working on reports, project	30h	
	preparation for exam	10h	
	TOTAL:	130h	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		60h	3
Student workload – practical activities		90h	3
Basic references	1. Weidauer Jens: "Electrical drives: principles, planning, applications, solutions", Erlangen: Publicis Publishing, 2014. 2. Mohan N.: "Advanced electric drives: analysis, control and modeling using MATLAB/Simulink", Hoboken: John Willey and sons, 2014. 3. Seung-Ki Sul: "Control of Electric Machine Drive Systems", IEEE Press, A John Willey and sons, INC, Publication, USA, 2011. 4. Alahakoon Sanath: "Digital Control Techniques for Sensorless Electrical Drives", VDM Verlag Dr Muller, Germany, 2009. 5. Wilamowski B. M., Irwin J.D. "Control and Mechatronics", Taylor and Francis, USA, 2011.		
Supplementary references	1. Seung-Ki Sul: „Control of Electric Machine Drive Systems”, IEEE Press, A John Willey and sons, INC, Publication, USA, 2011. 2. Leonard W. "Control of Elektric Drives", 3rd Edition, Springer-Verlag, Berlin, 2001. 3. Alahakoon Sanath: „Digital Control Techniques for Sensorless Electrical Drives”, VDM Verlag Dr Muller, Germany, 2009. 4. Wilamowski B. M., Irwin J.D. „ Control and Mechatronics”, Taylor \$ Francis, USA, 2011. 5. Vukosavic S. N.: „Digital Control of Electric Drives, Sringer, 2007.		

Organisational unit conducting the course	Department of Electrotechnics, Power Electronics and Power Engineering	Date of issuing the programme
Author of the programme	Andrzej Andrzejewski, PhD Eng.	26.02.2021

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

S – seminar