

COURSE DESCRIPTION CARD – SPECIMEN

Faculty of Electrical Engineering									
Field of study	Automatic and Robotics							Degree level and programme type	Bachelor's degree
Specialization/ diploma path	-							Study profile	-
Course name	Process Automation							Course code	IS-FEE-10054W
								Course type	elective
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	winter
	30			30				No. of ECTS credits	6
Entry requirements	-								
Course objectives	This course deals with the study of engineering principles and methodologies used to design and analysis of event driven (discrete) and continuous systems. Emphasis is placed on description methods and software implementation of combination and sequential systems. A structured approach to automation of selected systems, identifies appropriate equipment, production and manufacturing techniques.								
Course content	Automation of event driven systems (discrete) and continuous systems. Finite state machines theory. Melay and Moore machines. Description methods of combination, synchronous and asynchronous sequential systems and their elements. Types and conversion, codes. Diagram; state reduction; state assignment. Grafcet, SFC, Grafpol and Ladder diagram design sequence. PLC-based operative unit programming. Sequential logic implementation. Analysis by signal tracing and timing diagrams. Matlab Stateflow functions. Derivation of state tables and diagrams. True tables. Steps, transitions, connectors, direct links, logical conditions.								
Teaching methods	power-point presentations, Matlab/Simulink software, Matlab/Simulink, Stateflow toolbox, project examples, MathWorks help, text books								
Assessment method	lecture – written exam, project – project completion, presentation and discussion, performance of the project								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
LO1	basic knowledge of sequential and combinational circuits, programming methods, and designing of industrial automation process								
LO2	knowledge of even driven (digital) and continuous control systems hardware, principle of finite state machines, and background of automation systems								
LO3	knowledge of define of automation systems, ability to search, integrate and interpret information from literature and alternative sources								

LO4	practical skills to design of continuous and discrete control systems including their functionality and economic benefit, control systems' hardware selection ability and the self-tuning of controllers' parameters	
LO5	ability and skills to event driven control system design, and to formulate assumptions/conditions for the basic automation batch process	
LO6	demand for permanent education as well as an increased awareness of its vital importance for development	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
LO1	written exam	L
LO2	written exam	L
LO3	written exam	L
LO4	written exam, project evaluation, activity on project classes	L, P
LO5	written exam, project evaluation, activity on project classes	L, P
LO6	written exam, project evaluation, activity on project classes	L, P
Student workload (in hours)		No. of hours
Calculation	lecture attendance	30
	participation in classes, laboratory classes, etc.	30
	preparation for classes, laboratory classes, projects, seminars, working on projects, reports, etc.	25
		45
	participation in student-teacher sessions related to the classes/seminar/project	5
	implementation of project tasks and preparation for and participation in exams/tests	22
TOTAL:		157
Quantitative indicators		HOURS
Student workload – activities that require direct teacher participation		68
Student workload – practical activities		4
Basic references	1. Charles H.Roth, Fundamentals Logic Design, Jaico Publishing, IV edition, 2002. 2. Thomas L. Floyd, Digital Fundamentals, 10th edition, Pearson Education, 2009. 3. Hugh J., Automating Manufacturing Systems with PLCs, E-book, Ver. 5.0, 2007. 4. M. Morris Mano Michael D Ciletti, Digital Design, Pearson Education, 5th edition 2012. 5. The MathWorks, Stateflow Toolbox for Matlab.	
Supplementary references	1. Bequette B.W., Process Control, Modeling, Design and Simulation, Prentice Hall, 2003. 2. Dorf R.C., Bishop R.H., Modern Control Systems, 10th Edition, Prentice Hall, 2005. 3. www.mathworks.com.	
Organisational unit conducting the course	Department of Automatic Control and Electronics	Date of issuing the programme
Author of the programme	Assoc. Prof. Arkadiusz Mystkowski, PhD, DSc, Eng	25.03.2020

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

S – seminar