



The Faculty of:	Faculty of Electrical Engineering and Informatics
Field of study:	Automatics and Robotics
Speciality:	Computer Control Systems
Study degree (BSc, MSc):	BSc, full time studies

COURSE UNIT DESCRIPTION

Course title:	Design of microprocessor based and reconfigured control systems
Lecturer responsible for course: Zbigniew Hajduk	
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Department : Department of Computer and Control Engineering	

Semester	Weekly load	Type of classes				Number of ECTS credits
		L Lectures	C Theoretical Classes	Lb Laboratory	P Project	
6	55	25		30		5

Course description
<p>Lecture: Introduction. International programming standard – IEC 61131-3 norm. Programmable Logic Controllers (PLC) and Programmable Automation Controllers (PAC). The construction and the base of activity of PLCs. PLCs hardware: control processing unit (CPU), digital and analog inputs/outputs modules, communications. Programming model according to IEC 61131-3 norm. Rules of PLC programming: program structure, variable declarations, program unit code. Program organization units: functions, function blocks, programs. Data types and variables. PLCs programming languages: Ladder Logic (LD), Function Block Diagram (FBD), Instruction List (IL), Structured Text (ST). Methods of control algorithms synthesis: combinational and sequential logic description, state diagram. Application of binary Petri nets for control algorithm synthesis. Sequential Function Chart. Programming examples.</p>
<p>Classes:</p>
<p>Laboratory: Programming of following controllers: VersaMax (GE Fanuc), Simatic S7-314 (Siemens), TSX Micro (Schneider) and Logo! (Siemens).</p>
<p>Project:</p>

Objectives of the course

Students should obtain basic knowledge referring to PLCs programming.

Examination method

Lecture: Exam. Written solution of selected problems.

Laboratory: Prepared reports of made exercises, written test.

Bibliography

1. Kasprzyk J.: Programowanie sterowników przemysłowych, WNT, Warszawa, 2006.
2. Pietrusiewicz K., Dworak P.: Programowalne sterowniki automatyki PAC, Nakom, Poznań, 2008.
3. Legierski T., Kasprzyk J., Hajda J., Wyrwał J.: Programowanie sterowników PLC, Pracownia Komputerowa J. Skalmierskiego, Gliwice, 1998.
4. Seta Z.: Wprowadzenie do zagadnień sterowania: wykorzystanie programowalnych sterowników logicznych PLC, Mikom, Warszawa, 2002.
5. Collins K.: PLC Programming for Industrial Automation, Exposure Publishing, 2006.
6. Król A., Moczko-Król J.: S5/S7 Windows: programowanie i symulacja sterowników PLC firmy SIEMENS, Nakom, Poznań, 2000.
7. Mikulczyński T., Samsonowicz Z.: Automatyzacja dyskretnych procesów produkcyjnych: metody modelowania procesów dyskretnych i programowania PLC, WNT, Warszawa, 1997.

Lecturer signature	
Head of Department signature	
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