

FACULTY OF ELECTRICAL  
ENGINEERING**SUBJECT CARD**

Name in Polish: **Automatyzacja procesów produkcyjnych**  
 Name in English: **Automation of Production Processes**  
 Main field of study (if applicable): **Electrical Engineering**  
 Specialization (if applicable):  
 Level and form of studies: **1st level, full-time**  
 Kind of subject: **optional**  
 Subject code: **ELR053205**  
 Group of courses: **NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):			30		
Number of hours of total student workload (CNPS):			60		
Form of crediting:			crediting with grade		
For group of courses mark (X) final course:					
Number of ECTS points:			2		
including number of ECTS points for practical (P) classes :			2		
including number of ECTS points for direct teacher-student contact (BK) classes:			1.40		

**PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

1. It has a basic knowledge in the field of analog and digital electronic circuits.
2. It has a basic knowledge of electrical engineering (knows the basic rights and claims, understands and knows the control rules of the basic electrical devices).
3. Able to correctly read and interpret electrical circuit diagrams, knows how to design a simple control system using relays and contactors.
4. It can wire the control system on the basis of the attached schematic.
5. Understands the need and knows the possibilities of the continuous training, improving the professional, personal and social competencies.

**SUBJECT OBJECTIVES**

- C1. Acquire skills PLC programming in FBD and LD languages for the implementation of typical control systems.  
 C2. Acquiring skills: wiring, commissioning and testing of the control system.

**SUBJECT LEARNING OUTCOMES***relating to knowledge:**relating to skills:*

PEU\_U01 He can develop a control algorithm of the selected industrial process.

PEU\_U02 He can configure and program the PLC in the selected language, using dedicated software tools.

*relating to social competences:*

PEU\_K01 It has a sense of responsibility for their own work and a willingness to comply with the principles of teamwork.

PROGRAMME CONTENT		
Form of classes - laboratory		Number of hours:
Lab 1	Introduction to the Rules and Regulations of internal safety lab. Establish rules for passing. General familiarization with laboratory equipment. Discussion of the laboratory exercises.	2
Lab 2	Practical learning of software tool for SIMATIC PLCs. Getting to know the software function library.	2
Lab 3	Programming of basic logic structures (functions: AND, OR, NOT, XOR, RS and SR flip-flops, edge detectors).	2
Lab 4	Programming of basic timers and counters (timers: TON, TOF, TP, counters: CTU, CTD, CTUD, comparators).	2
Lab 5	Programming of models of electric drives in various operating states - Part 1.	2
Lab 6	Programming of models of electric drives in various operating states - Part 2.	2
Lab 7	Programming of models of electric drives in various operating states - Part 3.	2
Lab 8	Programming of models of the various industrial processes - Part 1.	2
Lab 9	Programming of models of the various industrial processes - Part 2.	2
Lab 10	Programming of models of the various industrial processes - Part 3.	2
Lab 11	Programming of models of the various industrial processes - Part 4.	2
Lab 12	Programming models of industrial machinery and devices - Part 1.	2
Lab 13	Programming models of industrial machinery and devices - Part 2.	2
Lab 14	Programming models of industrial machinery and devices - Part 3.	2
Lab 15	Giving reports, summary and pass the lab.	2
Total hours:		<b>30</b>

TEACHING TOOLS USED
N1. The laboratory is carried out in the traditional manner in student groups. Laboratory is equipped with: PCs, PLCs and the models of machinery, equipment and industrial processes.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT		
Evaluation <i>F - forming (during semester)</i> <i>P - concluding (at semester end)</i>	Educational effect number	Way of evaluating educational effect achievement
F1(L)	PEU_U01 PEU_U02	Assessment of prepare for laboratory exercises.
F2(L)	PEU_U01 PEU_U02 PEU_K01	Activity in laboratory classes.
F3(L)	PEU_U01 PEU_U02	Rating of reports of completed projects.
P(L)	$P = 0,3 \cdot F1 + 0,4 \cdot F2 + 0,3 \cdot F3$	

PRIMARY AND SECONDARY LITERATURE
<b>PRIMARY LITERATURE:</b> [1] Kasprzyk J., Programowanie sterowników przemysłowych, WNT [2] Legierski T., Wyrwał J., Programowanie sterowników PLC, Wyd. Pracowni Komputerowej J. Skalmierskiego, Gliwice 1998 [3] Pawlak M., Sterowniki Programowalne, e-skrypt, Wyd. Politechnika Wrocławska, Wrocław 2010, dostępny w Dolnośląskiej Bibliotece Cyfrowej <b>SECONDARY LITERATURE:</b> [1] Janusz Kwaśniewski, Sterowniki PLC w praktyce inżynierskiej, BTC [2] Laboratory instruction set, auxiliary materials for lectures and technical documentation of PLCs [3] Flaga S., Programowanie sterowników PLC w języku drabinkowym, BTC, Legionowo 2010 [4] Sałat R., Korpysz K., Obstawski P., Wstęp do programowania sterowników PLC, WKŁ, Warszawa 2010

SUBJECT SUPERVISOR
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