

(faculty stamp)

**COURSE DESCRIPTION**

Z1-PU7

WYDANIE N1

Strona 1 z 2

<b>1. Course title: PROGRAM-BASED DIGITAL CONTROL SYSTEMS</b>		<b>2. Course code PDCS</b>		
<b>3. Validity of course description: 2012/2013</b>				
<b>4. Level of studies: BA, BSc programme / MA, MSc programme lub 1<sup>st</sup> cycle / 2<sup>nd</sup> cycle of higher education</b>				
<b>5. Mode of studies: intramural studies</b>				
<b>6. Field of study: ELECTRONIC ENGINEERING</b>		AEII		
<b>7. Profile of studies: ???</b>				
<b>8. Programme: ???</b>				
<b>9. Semester: ???</b>				
<b>10. Faculty teaching the course: Institute of Electronics</b>				
<b>11. Course instructor: Robert Czerwiński, Mirosław Chmiel</b>				
<b>12. Course classification: specialization</b>				
<b>13. Course status: elective</b>				
<b>14. Language of instruction: English</b>				
<b>15. Pre-requisite qualifications:</b> It is assumed that the student has a basic knowledge of microprocessors (including programmable logic controllers), and has the ability to program in C/C++.				
<b>16. Course objectives:</b> The aim of the course is to acquaint students with the methods of implementation of digital control systems. The course focuses on the subject of software solutions, with particular emphasis on systems built using microcontrollers and programmable logic controllers.				
<b>17. Description of learning outcomes:</b>				
Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1.	Student has ordered knowledge of programming methodologies and techniques	Execution of laboratory exercises	Laboratory	
2.	Student has detailed knowledge of software architecture and microprocessor systems (languages of high and low level)	Execution of laboratory exercises	Laboratory	
3.	Student is able to evaluate and compare design solutions, due to the set of criteria useful	Execution of laboratory exercises	Laboratory	
4.	Student is able to think and act in a creative and enterprising way	Execution of laboratory exercises	Laboratory	
5.				
6.				
7.				
8.				
<b>18. Teaching modes and hours</b>				
<b>Laboratory</b>				
Sem ??? - 30 h.				
<b>19. Syllabus description:</b>				
1. Microprocessors: microprocessor functional blocks, work cycles, pipelining, addressing modes, the system interrupts, etc.				
2. Microcontrollers: characteristics, peripheral blocks.				
3. Programmable controllers S7-200 (S7-300/400): characteristics, specifications, programming languages.				
4. Designing algorithms, decomposition of complex problems into smaller, programming techniques.				
5. Blocks of data, local and global variables, declarations.				

- 6. Functions, passing parameters to / from functions.
- 7. Cyclic operation, interrupts.
- 8. I/O support, peripheral block support.
- 9. Programs executions: monitoring of the program, the location of faults, monitoring variables.

**20. Examination: no**

**21. Primary sources:**

Grabowski J., Kościłacz S.: Podstawy i praktyka programowania mikroprocesorów, WNT, Warszawa, 19872.  
 Legierski T., Kasprzyk J., Wyrwał J., Hajda J.: Programowanie sterowników PLC, Wydawnictwo Komputerowe Jacka Skalmierskiego, Gliwice, 20083.  
 Siemens: „Micro automation – Simatic S7-200”, Podręcznik Siemens, Warszawa, 20074.  
 Yiu J.: The Definitive Guide to the ARM Cortex-M3, Newnes, 20095.  
 Paprocki K.: Mikrokontrolery STM32 w praktyce, Wydawnictwo BTC, Legionowo, 2009

**22. Secondary sources:**

**23. Total workload required to achieve learning outcomes**

Lp.	Teaching mode :	Contact hours / Student workload hours
1	Lecture	/
2	Classes	/
3	Laboratory	30/25
4	Project	/
5	BA/ MA Seminar	/
6	Other	/
	Total number of hours	30/25

**24. Total hours: 55**

**25. Number of ECTS credits: 2**

**26. Number of ECTS credits allocated for contact hours: 1**

**27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 2**

**26. Comments:**

Approved:

.....  
 (date, Instructor's signature)

.....  
 (date , the Director of the Faculty Unit signature)