

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Automation and Control in Installations		Code 1010314391010314854
Field of study Electrical Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 5 / 9
Elective path/specialty Distribution Devices and Electrical	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) part-time	
No. of hours Lecture: 9 Classes: - Laboratory: 9 Project/seminars: -		No. of credits 2
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art		ECTS distribution (number and %)
Responsible for subject / lecturer: prof. dr hab. Aniela Kamińska-Benmechernene, prof. nadzw. email: anIELa.kaminska@put.poznan.pl tel. 61 665 26 67 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge on control algorithms, automation, information technology, electrical devices and installation.
2	Skills	Able to perform mathematical analysis of simple electrical circuits and read electrical wiring schemes.
3	Social competencies	A sense of the need to broaden the competence and willingness to work together in a team.
Assumptions and objectives of the course: Knowledge of rules and possibilities of building installation control directed towards on energy efficiency and improving comfort of building utilization. Purchase of skills to design simple building controlled installation using PLC and building automation systems, especially KNX system. Purchase of skills programming and testing simple building installation.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Knows the rules of operation, realization and programming simple installation controlled using PLC and selected building automation systems. - [K_W07 ++, K_W10 ++, K_W22+++] 2. Knows the basic rules of installation apparatus and controller selection for specific algorithm of lighting, heating and blind control. - [K_W10 ++, K_W11 ++, K_W22+++]		
Skills:		
1. Able to develop the control methods of selected installation and devices, select controller allowing realization of this control. - [K_U01++] 2. Able to perform wire scheme of electrical installation controlled using PLC and KNX devices. - [KU_17+++, K_U11 +++,] 3. Able to programming and testing the simple installation controlled using PLC and KNX system. - [K_U19+++, K_U15+++, K_U13+++]		
Social competencies:		
1. A sense of need for application and development of building automation systems directed towards on energy efficiency, improving comfort and security of building using. - [K_K02 +++, K_K03+++] 2. Able to work in team developing complex electrical installation and control. - [K_K02 +++, K_K03 +++]		
Assessment methods of study outcomes		

<p>Lecture:</p> <ul style="list-style-type: none"> - skills assessment of general rules of operation and control algorithms of selected devices and building installation, - skills assessment of control rules using contactors, PLC and KNX system, - skills assessment of developing control system for selected installation and assumptions. <p>Laboratory exercises:</p> <p>Skills assessment of:</p> <ul style="list-style-type: none"> - knowledge of devices selection and developing connection for application specified by teacher, - knowledge of realization of devices connection in specified application, - controller programming for specified application, - application functionality and testing. <p>Getting extra points for the activity during seminar, and in particular for:</p> <ul style="list-style-type: none"> - individual or teamwork design complex control systems for selected building, - realization and programming of selected application in laboratory, - testing of application. 		
Course description		
<p>Simple control systems of motor using contactor. Selected systems of automatic safety. General rules of lighting, heating and blind control. The principles of construction, operation and programming of PLC. Principles functions realized using PLC. Exemplary PLC using to control building installations. General information about building automation systems. System KNX: principle of operation, topology, communication and devices.</p> <p>Update 2017: ETS5 - commissioning, programming and diagnostics of KNX system</p> <p>Applied methods of education: lectures with multimedia presentation, interactive lecture with questions to student group and initiation of discussion</p>		
Basic bibliography:		
<ol style="list-style-type: none"> 1. J. Kasprzyk, Programowanie sterowników przemysłowych WNT, Warszawa 2012 2. A. Ruda, R. Olesiński, Sterowniki programowalne PLC, COSiW SEP, Warszawa 2008 3. A. Kamińska A, L. Muszyński, Z. Boruta, R. Radajewski, Nowoczesne techniki w projektowaniu energooszczędnych instalacji budynkowych w systemie KNX, POIG.02.02.00-00-018/08-00, Warszawa 2011 (przekazywane studentom nieodpłatnie) 4. A. Kamińska, L. Muszyński, KNX Kurs Podstawowy. ETS5 ? Uruchamianie, Projektowanie i Diagnostyka, Materiały Certyfikowanego Centrum Szkolenia KNX, Politechnika Poznańska, 2016 		
Additional bibliography:		
<ol style="list-style-type: none"> 1. Norma IEC61131 ? Programmable Controllers 2. Norma IEC 61131 ? 3: Standardy programowania sterowników PLC 3. Easy i MDF Titan w praktyce ? Przykłady aplikacji dla przekaźnika programowalnego easy Moeller Electric Sp z o.o. 4. Siemens AG: Podręcznik Logo! Siemens, wydanie 8, Warszawa 2005 		
Result of average student's workload		
Activity	Time (working hours)	
1. participation in the class lecture	9	
2. participation in the laboratory exercises	9	
3. participation in the consulting on the lecture and laboratory exercises	2	
4. preparation to the laboratory exercises	8	
5. preparation of practical exercises report	8	
6. preparation to the written exam	16	
7. participation in the exam	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	54	2
Contact hours	22	1
Practical activities	17	1