

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Building automation systems</b>		Code <b>1010315341010316104</b>
Field of study <b>Electrical Engineering</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>2 / 4</b>
Elective path/specialty <b>Distribution Devices and Electrical</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>Second-cycle studies</b>	Form of study (full-time,part-time) <b>part-time</b>	
No. of hours Lecture: <b>9</b> Classes: <b>-</b> Laboratory: <b>9</b> Project/seminars: <b>-</b>		No. of credits <b>2</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art		ECTS distribution (number and %)
<b>Responsible for subject / lecturer:</b>  prof. dr hab. Aniela Kamińska-Benmechernene email: anIELa.kamInska@put.poznan.pl tel. 61 665 26 67 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Basic knowledge on control algorithms, automation, information technology, electrical devices and installation.
2	<b>Skills</b>	Able to perform mathematical analysis of simple electrical circuits and read electrical wiring schemes.
3	<b>Social competencies</b>	A sense of the need to broaden the competence and willingness to work together in a team.
<b>Assumptions and objectives of the course:</b> 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 building automation systems (BAS), security management systems (SMS) and its integration (BMS). Purchase of skills to programming and testing simple building installation on the example of KNX system.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. Knows the rules of operation, realization and programming selected building automation systems, especially KNX system. - [K_W03 ++, K_W08 +++]		
2. Knows the basic rules of operation and designing security management systems: Intrusion System, Fire Alarm System, Access Control and CCTV. - [K_W03 ++, K_W08 +++]		
3. Knows the basic rules of integration of BAS and SMS. - [K_W08 ++]		
<b>Skills:</b>		
1. Able to perform the control methods of selected installation and devices, select KNX devices allowing realization of this control. - [K_U13+++, K_U15+++]		
2. Able to perform the security systems and its configuration depending on the specific characteristic of building. - [K_U13+++, KU_15+++]		
3. Able to programming and testing the applications of KNX system and develop integration with selected security system of building. - [K_U10+++, K_U13+++]		
<b>Social competencies:</b>		
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_K01+++]		
2. Able to work in team developing complex electrical installation and control. - [K_K02 ++]		

<b>Assessment methods of study outcomes</b>	
<p>Lecture:  Skills assessment of:</p> <ul style="list-style-type: none"> <li>- general rules of operation, realization and programming building automation systems, especially KNX system,</li> <li>- general rules of operation and designing building security systems,</li> <li>- building automation and security systems developing and integration for given assumptions.</li> </ul> <p>Laboratory exercises:  Assessment of:</p> <ul style="list-style-type: none"> <li>- knowledge of devices selection and developing connection for application specified by teacher,</li> <li>- knowledge realization of devices connection in specified application,</li> <li>- controller programming for specified application,</li> <li>- application functionality and testing.</li> </ul> <p>Getting extra points for the activity during seminar, and in particular for:</p> <ul style="list-style-type: none"> <li>- individual or teamwork design complex automation and security systems for selected building,</li> <li>- realization and programming selected application in laboratory,</li> <li>- testing of application.</li> </ul>	
<b>Course description</b>	
<p>Characteristics of building automation systems. Lighting, heating and blind control using KNX system ? principles of functioning, designing and programming. Rules of operation and designing Intrusion System, Fire Alarm System, Access Control and CCTV. Integration of automation system and security system.</p> <p>Update 2017: Energy efficiency of lighting installation</p> <p>Applied methods of education: lectures with multimedia presentation, interactive lecture with questions to student group and initiation of discussion</p>	
<b>Basic bibliography:</b>	
<ol style="list-style-type: none"> <li>1. 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)</li> <li>2. PN-EN 15193-1:2017-08 - (wersja angielska) Efektywność energetyczna budynków ? Wymagania energetyczne dotyczące oświetlenia ? Część 1</li> <li>3. PrEN 15193: Energy performance of buildings ? Energy requirements for lighting</li> <li>4. A. Ryczer, Klasyfikacja systemów alarmowych sygnalizacji włamania, Zabezpieczenia 2/2003</li> <li>5. S. J. Siudalski, Wybrane zagadnienia związane z ochroną osób i mienia, Ochrona i bezpieczeństwo, 2005</li> <li>6. R. Stanisławek, Integracja systemów bezpieczeństwa w obiekcie, Systemy Alarmowe 3/2002</li> <li>7. J. Mikulik, System telewizji dozorowej ? STVD, Facility Manager 2(11)/2005</li> <li>8. R. Stanisławek, Integracja systemów bezpieczeństwa z systemami automatyki budynkowej, Systemy alarmowe 5/2002</li> <li>9. T. Gruszczynski, S. Osowski, Zintegrowane systemy zarządzania budynkiem, Budowlany informator techniczny 11/2001</li> <li>10. J. Ciszewski, Wstęp do automatycznych systemów sygnalizacji pożaru, Centrum Naukowo?Badawcze Ochrony Przeciwpożarowej, Józefów, 1996</li> <li>11. W. Markowski, Zasady doboru rodzaju czujek pożarowych (cz. III). Ochrona przeciwpożarowa. Czasopismo Stowarzyszenia Inżynierów i Techników Pożarnictwa, czerwiec 2/2007 (20)</li> </ol>	
<b>Additional bibliography:</b>	
<ol style="list-style-type: none"> <li>1. A. Kamińska, R. Radajewski, Obiekt i układy do badania wpływu sterowania instalacją grzewczą na zużycie energii, Przegląd Elektrotechniczny, 11, 2010</li> <li>2. A. Kamińska, R. Radajewski, Instalacja do badania algorytmów sterowania oświetleniem, Przegląd Elektrotechniczny, 10, 2010</li> <li>3. L. Muszyński, A. Kamińska, Pomiary i wizualizacja światła dziennego w systemie KNX, Przegląd Elektrotechniczny, Vol. 2017, No 10, 2017</li> <li>4. PN-EN 50131-1:2009 Systemy alarmowe -- Systemy sygnalizacji włamania i napadu -- Część 1: Wymagania systemowe</li> </ol>	
<b>Result of average student's workload</b>	
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	10	
6. preparation to the written exam	16	
7. participation in the exam	2	
<b>Student's workload</b>		
<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	56	2
Contact hours	22	1
Practical activities	19	1