STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Automation for monitoring the security threat		**1011101231010534958**
Field of study	Profile of study (general academic, practical)	Year /Semester
Safety Engineering - Full-time studies - First-	**(brak)**	**2 / 3**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**
Cycle of study:	Form of study (full-time,part-time)	
First-cycle studies	**full-time**	
No. of hours		No. of credits
Lecture: **15** Classes: **-** Laboratory: **15** Project/seminars: **-**		**2**
Status of the course in the study program (Basic, major, other)	(university-wide, from another field)	
(brak)	**(brak)**	
Education areas and fields of science and art		ECTS distribution (number and %)

Responsible for subject / lecturer:

dr inż. Mariusz Nowak
email: Mariusz.Nowak@put.poznan.pl
tel. +48 (61) 6652921
Wydział Informatyki
ul. Piotrowo, 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge of mathematics, physics and informatics.
2	**Skills**	Logical thinking, use of computer modelling and simulation systems.
3	**Social competencies**	Awareness of the need for continuous learning and acquiring new knowledge.

Assumptions and objectives of the course:

Transfer of basic information in the area of automation computer control and monitoring and visualization processes. Developing problem-solving skills in the field of design of automation systems for monitoring of security threats.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Student has the structured, underpinned by theoretical knowledge of the methods measuring environmental factors - [K1A_W08]
2. Student knows the basic methods of design and analysis of automatic control systems used in industrial processes - [K1A_W20]
3. Student knows the methods of design control, monitoring and visualization systems using to minimize security risks, devices, structures, systems and technical systems - [K1A_W09, K1A_W19]

Skills:

1. Students can to select sensors and transducers to specific of automation systems - [K1A_U08]
2. Students can to design automatic control systems used in industrial processes to meet specific requirements and performing specific functions - [K1A_U08]
3. Student can to evaluate the economic aspect of the solution in the selection of the control parameters and the design of the monitoring and visualization systems of security threats people, machines, equipment and processes - [K1A_U13]

Social competencies:

1. Student understands the need for permanent training and sharing understandable information with the immediate environment for professional activities - [K1A_K01]
2. Student understands the non-technical, including of the environmental consequences their actions and the impact on the environment, and demonstrates a willingness to teamwork - [KA_K03, KA_K04]

Assessment methods of study outcomes

Forming score:

Lecture: continuous assessment during the lectures (favouring of the presence and activity in the answers to questions)

Laboratory: based on assessments performed for every laboratory exercise.

Summary score:

Lecture: final test consisting of 10 questions.

Laboratory: realization of all the laboratory together with the realization of the final project that requires the use of acquired skills to design the automation system.

Course description

Lecture: signals, sensors and signal converters used in automation. Object-modeling technique, mathematical models of systems. Linearization, Laplace transform, transfer function. Basic elements of control and time ? frequency analysis (characteristics in frequency and time domain). Automatic control systems, the basic control algorithms, tuning of classical controllers, quality control, stability of automatic control systems. Security for industrial automation and control systems. Safety of control process, risk assessment and categories of security of monitoring control systems.

Laboratory: Modeling of control object, modeling of actuator in Matlab Simulink. Time - frequency analysis for selected of automation systems. Modeling and simulation for automatic control. Implementation of the selected control algorithms for the PLC. Implementation of the monitoring and visualization system of the industrial process in the security context.

Basic bibliography:

1. Mazurek J., Vogt H., Żydanowicz W., Podstawy automatyki, Oficyna wyd. PW, Warszawa 2006.
2. Urbaniak A., Podstawy automatyki, Wyd. PP, Poznań 2007.

Additional bibliography:

1. Brzózka J., Regulatory i układy automatyki, Wyd. Mikom, Warszawa, 2004.
2. Markowski A., Kostro J., Lewandowski A., Automatyka w pytaniach i odpowiedziach, Wyd. WNT, Warszawa 1985.

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	15
2. Participation in laboratory	15
3. Preparation for laboratory exercises	8
4. Preparation for written lecture test	7
5. Preparation laboratory reports	5

Student's workload

Source of workload	hours	ECTS
Total workload	50	2
Contact hours	30	1
Practical activities	15	1