STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Industrial automatics	**1010341751010322645**

Field of study	Profile of study (general academic, practical)	Year /Semester
Mathematics in Technology	**general academic**	**3 / 5**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**elective**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies (Polish Qualifications Framework level six)	**full-time**

No. of hours	No. of credits
Lecture: **30** Classes: **30** Laboratory: **15** Project/seminars: **-**	**5**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
major	**University-wide**

Education areas and fields of science and art	ECTS distribution (number and %)
Technical sciences	**5 100%**
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Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge of mathematics, physics and electrical metrology [K_W03 (PS6_WG)].
2	**Skills**	Assembly of simple measuring circuit on the ground of circuit diagrams. Ability to evaluation of measurement results [K_U07 (P6S_UW)].
3	**Social competencies**	Ability to effective cooperation in team [K_K03 (PS6_KO)].

Assumptions and objectives of the course:

Knowledge in scope of mathematical describe and structure of control systems
and also in scope of programming and using of programmable logic controllers

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

Knowledge:

1. Basic knowledge in scope of automatics and control [K_W04 (PS6_WG)].
2. Basic knowledge in scope of programmable logic controllers, sensors and interfaces in industrial automatics [K_W08 (PS6_WG)].

Skills:

1. Can design of simply algorithm of control and also know of programming languages and debugging tools in scope of industrial automatics [K_U04 (P6S_UW), K_U09 (P6S_UW)].
2. During the tests of control system can acquire of specialistics knowledge from catalogs [K_U06 (P6S_UW)].

Social competencies:

1. Can ask a precisely questions with the purpose of understanding of problems [K_K01 (P6S_KK), K_K02 (P6S_KK)].
2. Can correctly solve a problems connection with his profession [K_K05 (P6S_KR)].

Assessment methods of study outcomes

Lecture: Examination in writing.

Classes: Currently estimating of knowledge and skills. Final test in writing.

Laboratories: Currently estimating of knowledge and skills. Evaluation of prepared reports from laboratories.

Course description

Last update 2018

Methods of education are orientated to students to motivate them to participate actively in education process by discussion and reports.

Lectures: Multimedia presentations expanded by examples shown on a board. Activity of students is taken into consideration in final students evaluation. Theoretical questions are presented in the exact reference to the practice.

Laboratory: Detailed reviewing of particular exercises reports. Realization of laboratory tasks in teams. Specific computational experiments.

Basic diagram of control system with examples. Regulators with direct action. Transformation of block diagrams of control systems. Linear and continuous control systems: mathematics description, application of Lagrange equation to obtain mathematic description of elements of control systems, static and dynamic properties of elements of control systems, stability of control system. Linear and discrete control system: mathematics description, bilinear transform, stability of discrete control system. Nonlinear control systems. The systems of industrial automatics with programmable logic controllers. Principle of operation and programming languages of PLC controllers. The devices of industrial automatics: stepper motors, DC-motors, servo-mechanisms. Sensors of physicals parameters and communications interfaces in scope of industrial automatics. Imaging of control systems. The systems of digital automatics.

Basic bibliography:

1. Kaczorek T., Dzieliński A., Dąbrowski W., Łopatka R., Podstawy teorii sterowania, WNT Warszawa 2008.
2. Urbaniak A., Podstawy automatyki, Wyd. Politechniki Poznańskiej, Poznań 2008.
3. Chmiel K. Teoria układów logicznych. Wyd. Politechniki Poznańskiej, Poznań 1995.
3. Kwaśniewski J., Sterowniki PLC w praktyce inżynierskiej, Wyd. BTC, Warszawa 2008.

Additional bibliography:

1. Mielczarek W., Szeregowe interfejsy cyfrowe, Wyd. Helion, Gliwice 1993.
2. Nawrocki W., Komputerowe systemy pomiarowe, WKiŁ, Warszawa 2006.
3. Zieliński T., Cyfrowe przetwarzanie sygnałów. WKiŁ, Warszawa 2005.

Result of average student's workload

Activity	Time (working hours)
1. Lectures	30
2. Classes	30
3. Laboratories	15
4. Consultations	8
5. Preparation of reports from laboratories	8
6. Preparation for the laboratories	10
7. Preparation for the classes	5
8. Preparation for the examination	20
9. Examination	2

Student’s workload

Source of workload	hours	ECTS
Total workload	128	5
Contact hours	85	3
Practical activities	33	1