STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Introduction to programming of PLC controllers**		Code **1010321361010326915**
Field of study **Electrical Engineering**	Profile of study (general academic, practical) **(brak)**	Year /Semester **3 / 6**
Elective path/specialty **Measurement Systems in Industry and**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time) **full-time**	
No. of hours Lecture: **15** Classes: **-** Laboratory: **30** Project/seminars: **-**		No. of credits **3**
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 **technical sciences** **Technical sciences**		ECTS distribution (number and %) **3 100%** **3 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge in the scope of electrotechnics, metrology and computer science Basic knowledge in the scope of electronics, including electronic analog and digital circuits
2	**Skills**	Ability of the efficient self-education within the scope of PLC controllers programming
3	**Social competencies**	Awareness of the necessity of broadening of the competencies in the field of electrical engineering and willingness to cooperate in a team

Assumptions and objectives of the course:

- Basic knowledge of programming of the selected PLC controllers
- Knowledge of interdisciplinary achievements related to industrial applications of PLC controllers

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

Knowledge:

1. Ability to describe importance and application possibilities of the modern measuring systems - [K_W05 +]
2. Ability to explain the principles and techiques of measuring signal acquisition for industrial applications - [K_W07 +++]

Skills:

1. Ability to work independently and as a team in the design and construction companies as well as in the industrial centres - [K_U05 +, K_U23 +]
2. Ability to design the measuring systems creatively, using possibilities offered by new technologies - [K_U22 +]

Social competencies:

1. Ability to think and act enterprisingly in the area of measuring systems used in industry - [K_K01 +]
2. Understanding the necessity of broad popularization of the knowledge concerned with the simple and complex measuring systems - [K_K05 +]

Assessment methods of study outcomes

Lectures:

- evaluation of the knowledge related to the content of lectures (test, computational and problem questions), awarding marks in laboratory exercises)
- continuous estimation in all classes (awarding attendance in lectures, activity and quality of perception).

Laboratory exercises:

- continuous estimating with the tests,
- awarding the skill increase,
- the evaluation of knowledge and skills connected with the measuring tasks and prepared reports.

Course description

- Structure of the measuring systems using PLC controllers.
- Programming languages of PLC controllers: diagrams and instructions.
- Fundamentals of programming, operations on tha data, signal processing, controllers communications.
- Examples of measuring systems configurations with the use of a PLC controller.

Basic bibliography:

1. R. Sałat, K. Korpysz, P. Obstawski, Wstęp do programowania sterowników PLC, WKŁ, Warszawa 2010.
2. J. Kasprzyk, Programowanie sterowników przemysłowych, WNT, Warszawa 2006.
3. A. Król, J. Moczko-Król, S5/S7 Windows Programowanie i symulacja sterowników PLC firmy Siemens, Nakom, Poznań 2002.

Additional bibliography:

1. U. Tietze, Ch. Schenck, Układy półprzewodnikowe, WNT, Warszawa 1993.
2. J. Bogusz, Lokalne interfejsy szeregowe w systemach cyfrowych, Wyd. BTC, Warszawa 2004.

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	15
2. Participation in laboratory exercises	30
3. Participation in consulting with lecturers	10
4. Preparation to laboratory exetrcises and preparation of the reports	14
5. Preparation to the credit	16

Student’s workload

Source of workload	hours	ECTS
Total workload	85	3
Contact hours	55	2
Practical activities	44	2