STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Introduction to programming of PLC controllers**		Code **1010324381010326915**
Field of study **Electrical Engineering**	Profile of study (general academic, practical) **(brak)**	Year /Semester **4 / 8**
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) **part-time**	
No. of hours Lecture: **9** Classes: **-** Laboratory: **18** 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 **technical sciences** **Technical sciences**		ECTS distribution (number and %) **2 100%** **2 100%**

Responsible for subject / lecturer:

dr inż. Arkadiusz Hulewicz
email: arkadiusz.hulewicz@put.poznan.pl
tel. 616652546
Wydział Elektryczny
ul. Piotrowo 3A 60-965 Poznań

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

Updating 2017:

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, taking into account the specific computational experiments covering:

- 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.
4. Hulewicz A., Sterowniki PLC w systemach zarządzania inteligentnym budynkiem, Przegląd Elektrotechniczny, nr 1a/2013, s. 108-110
5. Hulewicz A., Krawiecki Z., Parzych J., Przykłady niekonwencjonalnych zastosowań sterowników PLC, Poznan University of Technology Academic Journals, Electrical Engineering, No 91, Poznań 2017, s. 81-92

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	9
2. Participation in laboratory exercises	18
3. Participation in consulting with lecturers	3
4. Preparation to laboratory exetrcises and preparation of the reports	18
5. Preparation to the credit	17

Student's workload

Source of workload	hours	ECTS
Total workload	65	2
Contact hours	32	1
Practical activities	30	1