STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Fundamentals of computer measuring systems	**1010341751010329413**

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**	**obligatory**

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: **-** Laboratory: **30** 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%**
Technical sciences	**5 100%**

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 mathematics, electrotechnics, computer science. [K_W03 (P6S_WG)], [K_W04 (P6S_WG)]
2	**Skills**	Ability of the efficient self-education in the area concerned with a chosen field of studies. [K_U06 (P6S_UW)]
3	**Social competencies**	Awareness of the necessity of competence broadening and ability to show a readiness to work as a team. [K_K02 (P6S_KK)]

Assumptions and objectives of the course:

- Knowledge of the modern methods of measuring process automation.
- Knowledge of the remote control of devices, data acquisition and processing in computer measurement systems.
- Knowledge of the modern measurement systems, including biophysical studies.

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

Knowledge:

1. Expanded knowledge in the scope of structure and design of complex microprocessor systems, especially for applications in measurements and control. [K_W03 (P6S_WG)], [K_W08 (P6S_WG)]
2. Expanded knowledge in the scope of measurements of electrical quantities. [K_W07 (P6_WG)]

Skills:

1. Ability to acquire information from the literature, data bases and other sources; ability to integrate, interpret and critically evaluate the obtained information. [K_U06 (P6S_UW)], [K_U12 (P6S_UK)]
2. Ability to plan and realize measurements of the basic electrical parameters including extraction of parameters specifying electrical systems. [K_U05 (P6S_UW)], [K_U07 (P6S_UW)], [K_U09 (P6S_UW)]

Social competencies:

1. Ability to think and act creatively and enterprisingly in the area of computer systems. [K_K03 (P6S_KO)]
2. Ability to think and act in the enterprising way in the area of measuring engineering. [K_K04 (P6S_KR)]

Assessment methods of study outcomes

Lectures:

- evaluation of the knowledge related to the content of lectures (test, computational and problem questions), awarding marks in projects
- awarding attendance in lectures, activity and quality of perception).

Laboratories:

- evaluation of the knowledge and skills concerned with realization of independent or group projects,
- evaluation of the project reports .

Course description

General information, classification, functional structure and dynamics of measurements systems. Characteristics of different kinds of communication interfaces used in measuring devices. SCPI standard, model of a device, recognition of the device status, hierarchical structure of commands system, programming functions. Remote control of devices with PC computer, examples of a multimeter and generator. Application of multifunction I/O devices in measuring systems - structure, functions, parameters, configuration. The use of mathematical functions implemented in measuring instruments. Processing results from a series of measurements. Basic information about PLC programmable controllers.

Updating 2017 and 2018

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

Applied methods of education:

Lectures:

Lecture with multimedia presentation supplemented by examples on the board, initiation of discussions in relation to the subject, presentation of a new topic preceded by a reminder of the previous lecture (main issues).

Projects:

Groups of students work as teams. Discussion on different methods and aspects of problem solutions. Detailed reviewing of particular projects documentation.

Basic bibliography:

1. W. Winiecki, Organizacja komputerowych systemów pomiarowych, Oficyna Wydawnicza Politechniki Warszawskiej, 2006.
2. W. Nawrocki, Komputerowe systemy pomiarowe, WKŁ, 2007.
3. S. Tumański, Technika pomiarowa, Wydawnictwo WNT, 2013.

Additional bibliography:

1. W. Nawrocki, Rozproszone systemy pomiarowe, WKŁ, 2006.
2. P. Lesiak, D. Świsulski, Komputerowa technika pomiarowa w przykładach, Agenda Wydawnicza PAK, 2002.

Result of average student's workload

Activity	Time (working hours)
1. participation in lecture classes	30
2. participation in laboratory classes	30
3. consultations	15
4. preparation of laboratory classes reports and presentation problematic tasks	15
5. preparation for laboratory exercises	13
6. familiarization with the indicated literature / teaching materials (10 pages of scientific text = 1 hr.)	10
7. exam preparation and exam	12

Student's workload

Source of workload	hours	ECTS
Total workload	125	5
Contact hours	77	3
Practical activities	60	2