STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Fundamentals of computer measuring systems**		Code **1010341751010329413**
Field of study **Mathematics in technology**	Profile of study (general academic, practical) **(brak)**	Year /Semester **3 / 5**
Elective path/specialty **-**	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: **30** Classes: **-** Laboratory: **30** Project/seminars: **-**	No. of credits **5**

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 %**)** **5 100%** **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.
2	**Skills**	Ability of the efficient self-education in the area concerned with a chosen field of studies.
3	**Social competencies**	Awareness of the necessity of competence broadening and ability to show a readiness to work as a team.

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_W15, K_W24]

2. Expanded knowledge in the scope of measurements of electrical quantities - [K_W12]

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_U18]

2. Ability to plan and realize measurements of the basic electrical parameters including extraction of parameters specifying electrical systems. - [K_U19, K_U22]

Social competencies:

1. Ability to think and act creatively and enterprisingly in the area of computer systems. - [K_K03]

2. Ability to think and act in the enterprising way in the area of measuring engineering. - [K_K02, K_K04]

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 DAQ cards in measuring systems - structure, functions, parameters, configuration.

Basic bibliography:

1. W. Winiecki, Organizacja komputerowych systemów pomiarowych, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1997.

2. P. Lesiak, D. Świsulski, Komputerowa technika pomiarowa, Agenda Wydawnicza Pomiary Automatyka Kontrola, Warszawa 2002.

3. W. Nawrocki, Komputerowe systemy pomiarowe, WKŁ, Warszawa 2007.

Additional bibliography:

1. W. Nawrocki, Rozproszone systemy pomiarowe, WKŁ, Warszawa 2006.

2. Cysewska-Sobusiak A., Podstawy metrologii i inżynierii pomiarowej, Wyd. PP, Poznań 2010.

3. Mielczarek W., Urządzenia pomiarowe i systemy kompatybilne ze standardem SCPI, Wydawnictwo Helion, Gliwice 1999.

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