STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Distributed Measurement Systems**		Code **1010832121010830993**
Field of study **Electronics and Telecommunications**	Profile of study (general academic, practical) **general academic**	Year /Semester **1 / 2**
Elective path/specialty **Telecommunication Systems**	Subject offered in: **Polish**	Course (compulsory, elective) **elective**
Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time) **full-time**	
No. of hours Lecture: **2** Classes: **-** Laboratory: **2** Project/seminars: **-**		No. of credits **5**
Status of the course in the study program (Basic, major, other) **other**	(university-wide, from another field) **from field**	
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**	Students know fundamentals of telecommunications, circuits theory, electrical metrology and measurement systems on the basic level. Students know basics of programming.
2	**Skills**	Students can use in laboratory such instruments like multimeters, oscillatots and oscilloscopes. Students can create a software for computer-based measurement systems Students know rules for safe work in a laboratory (K1_U27)
3	**Social competencies**	1. Students know limitations of their current knowledge and skills; they committed to further self-study. (K1_K01) 2. They are able to participate in collaborative projects. (K1_K02)

Assumptions and objectives of the course:

To get knowledge of a structure of distributed measurement systems and their components. To get knowledge of interface standards used in distributed measurement systems Rozwinięcie w praktyce laboratoryjnej najważniejszych języków LabVIEW i VEE, wykorzystywanych do programowania rozproszonych systemów pomiarowych.

To get knowledge of sensors frequently used in industrial distributed measurement systems: temperaturę sensors and stress sensors

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

Knowledge:

1. Students have knowledge concerning fundamentals of computer-based measurement systems, in particulary - distributed measurement systems - [-(K2_W1)]

2. Students have knowledge concerning sensors and devices in distributed measurement systems - [-(K2_W2)]

Skills:

1. Students are able to choose a right configuration of a distributed measurement system (DMS). - [- (K2_U01)]

2. Students are able to choose sensors and other components of a distributed measurement systems (computer, data acquisition card, instruments, interface standard) - [-(K2_U03)]

3. Students are able to create and to run a distributed measurements system. - [-(K2_U05)]

4. Students are able for self learning in the future - [- (K2_U7)]

Social competencies:

1. Students know limitations of their current knowledge and skills; they committed to further self-study. (K1_K01). - [-(K2_K02)]

Assessment methods of study outcomes

- Exam.
- To pass the full laboratory programme.
- Tests of knowledge before experiments in laboratory.
- Reports from experiments in laboratory.

Course description

? Meaning of a distributed measurement system (DMS), its structure and components
? Dynamics of distributed measurement systemns
? Signals and interferences in tranmission channels of DMS
? Distributed systems with a modem in a PSTN telecommunication network under a RS232C standard
? Distributed systems with radio modems
? istributed measuremen systems with tramossion according to IEEE 802.15 standards(Bluetooth, ZigBee)
? Data transmission in wehicles: CAN, FlaxRay, MOST sstandards
? Sensors for temperaturę measurements in inductrial DMSs
? Sensors for stress and preassure meassurements in industry
? Measurement systems with a GSM transmission
? Measurement systems with a LAN network
? Components of a monitoring system

Basic bibliography:

1. Measurement Systems and Sensors, Nawrocki W., Artech House, London - Boston 2005
2. Rozproszone systemy pomiarowe, Nawrocki W., WKiŁ, Warszawa 2006
3. Komputerowe systemy pomiarowe. Ćwiczenia laboratoryjne, Wydawnictwo PP, Poznań 2007
4. Practical Data Acquisition for Instromentation and Control Systems, Park J. Mackey S., Elsevier, 2003

Additional bibliography:

1. Technika pomiarowa, Tumański S., WNT, Warszawa 2007
2. Sensory i systemy pomiarowe, Nawrocki W., Wydawnictwo PP, Poznań 2006

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	62
2. Experiments in a laboratory	25
3. Reports from laboratory activities	19
4. Exam	14

Student's workload

Source of workload	hours	ECTS
Total workload	125	5
Contact hours	65	3
Practical activities	70	2