COURSE DESCRIPTION CARD - SYLLABUS

Course name
Computer measurement systems [S2Eltech1E>KSP]

Course

Field of study
Electrical Engineering

Year/Semester
1/2

Area of study (specialization)
Electrical Systems in Industry and Vehicles

Profile of study
general academic

Level of study
second-cycle

Course offered in
English

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Basic knowledge in the scope of electrotechnics, electronics, computer science and metrology. Ability of the efficient self-education in the area concerned with a chosen field of studies. Awareness of the necessity of competence broadening and ability to show a readiness to work as a team.

Course objective

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

Course-related learning outcomes

Knowledge:
1. Expanded knowledge in the scope of structure and design of complex microprocessor systems, especially for applications in measurements and control.
2. Expanded knowledge in the scope of measurements of electrical quantities.

Skills:
1. Ability to acquire information from the literature, data bases and other sources; ability to integrate,

interpret and critically evaluate the obtained information.
2. Ability to prepare the detailed documentation depending on realization of a given experiment, project task or research task.
3. Ability to plan and realize measurements of the basic electrical parameters including extraction of parameters specifying electrical systems.

Social competences:
1. The student is aware of the limitations of his knowledge and the need to constantly improve it resulting from the social role of a technical university graduate.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures: evaluation of the knowledge related to the content of lectures (test, computational and problem questions, 5 to 10 questions, 50% pass threshold), awarding attendance in lectures, activity and quality of perception.
Laboratory: assessment of knowledge and skills related to the implementation of a laboratory task, assessment of the report made in class or at home. Rewarding insights regarding the improvement of the content of teaching materials.

Programme content

Lecture: classification and structure of measurement systems, communication interfaces used in measurement devices, SCPI recommendations, remote control of devices from a PC, application of VISA libraries.
Laboratory: planning and execution of tasks related to building computer-based measurement systems, working with technical documentation of measuring instruments, remote control of devices from a PC, programming.

Course topics

Lectures: classification, functional structure of measurements systems. Characteristics of selected communication interfaces used in measuring devices. SCPI recommendations, instrument model, device identification, recognition of the device status, hierarchical structure of commands system, programming functions. Remote control with PC computer- overview with examples for a multimeter, oscilloscope, generator, power supply. Application of VISA libraries.
Laboratory: planning and implementation of tasks in the field of building a computer measuring system, working with technical documentation of a measuring instrument, remote operation of the device using the manufacturer's application and an application written during classes in a programming environment, phased implementation of a computer measuring station with USB or Ethernet control. Implementation of the application and user panel, configuration, work in a loop, measurement and formatting of results, registration, operation of the board, graphical presentation of the results.

Teaching methods

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).
Laboratory: individual or team work, discussion of various methods and aspects of problem solving. Detailed review of the documentation from the laboratory by the teacher.

Bibliography

Basic:
1. Nawrocki W., Komputerowe systemy pomiarowe, WKŁ, 2007
2. Winiecki W., Organizacja komputerowych systemów pomiarowych, Oficyna Wydawnicza Politechniki Warszawskiej, 2006
3. Tumański S., Technika pomiarowa, Wydawnictwo WNT, 2013
4. Krawiecki Z., Odon A.: Wspomagane komputerowo stanowisko laboratoryjne do badania właściwości metrologicznych multimetrów na zakresach napięć przemiennych, Pomiary Automatyka Kontrola, 2007, vol. 53, nr 9 bis, s. 710-712

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

Breakdown of average student's workload

	Hours	ECTS
Total workload	55	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	25	1,00