



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Remote controlled measurement systems [S2Elmob1>ZSSP]

Course

Field of study

Electromobility

Year/Semester

1/1

Area of study (specialization)

–

Profile of study

general academic

Level of study

second-cycle

Course offered in

Polish

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 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. The student has extensive knowledge in the acquisition and processing of measurement signals.
2. The student has extensive knowledge in the field of remote measurements of electrical quantities.

Skills:

1. The student is able to acquire and process data using advanced programming techniques.
2. The student is able to use the appropriate tools and measuring equipment to carry out an experiment,

engineering or research task.

3. The student is able to plan the process of self-education in the area of modern measurement systems.

Social competences:

1. The student is aware of the need for professional development as a graduate of a technical university.

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: verification of preparation for the implementation of tasks, assessment of knowledge and skills related to the implementation of measurement tasks in oral or written form, 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 in measuring devices, SCPI recommendations, programming functions, remote operation of devices from a PC, use of VISA libraries.

Laboratory: remote operation of the device with application manufacturer's application and an application written during classes in a programming environment, step-by-step implementation of a computer measurement station with control via USB or Ethernet, implementation of the application and user panel, configuration, work in a loop, registration of results.

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 using LabVIEW software - 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 the LabVIEW 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 in LabVIEW.

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).

Lecture conducted on-line with using synchronous access methods.

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. Availability of a student version of LabVIEW software for solving problems.

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