COURSE DESCRIPTION CARD - SYLLABUS

Course name

Metrology and measuring systems

Course

Field of study

Power Engineering

Year/Semester

1 / 2

Area of study (specialization)

Profile of study

general academic

Level of study

Second-cycle studies

Course offered in

polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	15	
Tutorials	Projects/seminars	

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

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Faculty of Automatic, Robotics and Electrical Engineering

Piotrowo 3 Street, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

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

Course objective

Knowledge of the measurement methodology, principles of application of analog and digital devices, and evaluation of measurement results. Knowledge of the principles of construction, desigh and application of measurement systems.

Course-related learning outcomes

Knowledge

Extended and theoretically grounded knowledge in the field of electrical measurements and modern measuring systems, in particular knowledge of the principles of equipment selection and measurement error analysis methods.

Skills

1. Ability to work individually and in a team; can assess the time consuming task; ability to manage a small team in a way that ensures the implementation of the task within the set deadline.

2. Ability to assess the usefulness of methods and tools used in measurements and diagnostics.

Social competences

Ability to critically assess and analyze issues and recognizes the importance of knowledge in solving cognitive and practical problems in the field of power engineering.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures

Evaluation of the knowledge with a written exam related to the content of lectures (test, computational and problem questions). Passing threshold of test equals 50%.

The grade from laboratory and project classes as well as attendance and activities during the lectures are taken into account.

Laboratory

Assessment of knowledge and skills necessary to carry out the laboratory exercise. Assessmeny of the activity and quality of perception during the laboratory exercise. Evaluation of the reports of the exercises performed. Final test in written (passing threshold 50%).

Programme content

Lectures

Planning and realization of a measurement task. Elements of errors theory and uncertainty of measurement results. Cooperation between measuring transducers and devices - signal transmission, interaction. Measurements with oscilloscopes. Measuring bridges. Analog and digital measurements of electrical quantities. Selected examples of measurements of nonelectrical quantities. Introduction to structure and organization of measurement systems. Preparation of the documentation based on the obtained results of measurements.

Laboratory

Planning and implementation of the measurement task. Elements of error theory and uncertainty of measurement results. Measuring transducers: AC voltage detectors, measuring amplifiers, A/D

converters. Analog and digital measurements of electrical quantities. Oscilloscopic measurements. Examples of measurement of electrical quantities and the assesment of their results unaccuracy.

Teaching methods

Lecture

Lectures are performed using multimedia presentations illustrated with simulation examples and necessary mathematical calculations on the blackboard. Theoretical questions are presented in the exact reference to the practice.

Laboratory

Laboratory exercises are carried out in laboratory teams. During the classes, the measuring system is connected, the selected measurements are carried out, the results of the measurements and the reports are prepared.

Bibliography

Basic

1. A. Chwaleba, M Poniński, A. Siedlecki, Metrologia elektryczna, WNT, Warszawa, 2009.

2. A. Cysewska-Sobusiak, Podstawy Metrologii i inżynierii pomiarowej, Wyd. Politechniki Poznańskiej, 2010.

3. W. Nawrocki, Rozproszone systemy pomiarowe, WKiŁ, Warszawa, 2006.

4. J. Rydzewski, Pomiary oscyloskopowe, WNT, Warszawa, 2007.

Additional

1. Międzynarodowy Słownik Podstawowych i Ogólnych Terminów Metrologii, Wydanie polskie, Główny Urząd Miar, Warszawa, 1996.

2. W. Winiecki, Organizacja komputerowych systemów pomiarowych, Ofic. Wyd. PW, Warszawa, 1997.

3. A. Zatorski, R. Sroka, Podstawy metrologii elektrycznej, Wyd. AGH, Kraków 2011.

4. S. Tumański, Technika pomiarowa, WNT 2007.

Breakdown of average student's workload

	Hours	ECTS
Total workload	65	2,0
Classes requiring direct contact with the teacher	39	1,0
Student's own work (literature studies, preparation for laboratory classes, preparation for tests) [1]	26	1,0

[1] delete or add other activities as appropriate