POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Metrology [S1Eltech1>Metr1]

Course

Field of study
Electrical Engineering

Year/Semester
1/2

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

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Prerequisites

Basic knowledge of mathematics, physics, electrotechnics and electronics. Ability to realize efficient self education in the area related to the chosen field of study. Awareness of the necessity of broadening of the competences in the field of electrical engineering and willingness to work as a team .

Course objective

Knowledge of measurement methodology, attributes of modern measuring devices and equipment, principles of using analog and digital measuring devices, and evaluation of measurement results.

Course-related learning outcomes

Knowledge:
1. Ability to indicate the basic principles of electrical quantities measurements made with analog and digital devices.
2. Ability to describe the technical attributes of measuring equipment.

3. Ability to explain a principle of the proper choice of elements of a simple set for measurements of electrical quantities.

Skills:
1. Ability to use the basic electrical measuring devices in accordance with operating manuals and to explain appropriate operation of the simple measuring systems.
2. Ability to made a simple measuring task and evaluate the inaccuracy of the obtained results.

Social competences:
1. Ability to think and act in the enterprising way in the area of measuring engineering, ability to work as a team.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lecture: Assessment of the knowledge demonstrated at the written or oral test on the content of the lectures at the last lecture. Passing threshold: 50% of points. Rewarding the presence, activity and quality of perception during the lecture.

Programme content

Lecture:
Theoretical issues presented in close connection with practice include:
1. Measurement methodology: definitions, concepts, standards, units of measurement.
2. Applicable standards and recommendations. Types of experiments.
3. Planning and implementation of the measurement task.
4. Elements of the theory of errors and uncertainty of measurement results.
5. Oscilloscope measurements.
6. Measurement methods.
7. Electromechanical and electronic measuring instruments.
8. Analog and digital measurements of electrical quantities.

Teaching methods

Lectures: Multimedia presentations expanded by examples shown on a board.

Bibliography

Basic
1. A. Cysewska-Sobusiak - Podstawy metrologii i inżynierii pomiarowej, Wyd. Politechniki Poznańskiej, Poznań 2010.
2. A. Chwaleba, M. Poniński, A. Siedlecki - Metrologia elektryczna, WNT, Warszawa 2014.
3. J. Rydzewski - Pomiary oscyloskopowe, WNT, Warszawa 2007.
4. A. Cysewska-Sobusiak, Z. Krawiecki, A. Odon, P. Otomański, D. Turzeniecka, G. Wiczyński - Laboratorium z metrologii elektrycznej i elektronicznej, Wydawnictwo Politechniki Poznańskiej, Poznań 2000.
5. P. Otomański, Z. Krawiecki: Wykorzystanie środowiska LabVIEW do oceny niepewności rozszerzonej wyniku pomiaru rezystancji, Pomiary Automatyka Kontrola nr 12/2011, str. 1561 – 1563, 2011.
6. P. Otomański, M. Lepczyk: Niepewność rozszerzona jako miara niedokładności w pomiarach wybranych wielkości elektrycznych, Poznan University of Technology Academic Journals, Electrical Engineering, vol. 89, pp. 249 – 258, 2017.
7. Hulewicz A., Rozwiązania układowe oraz parametry detektorów wartości szczytowej, Elektronika, nr 7 2014, s. 149-153.
8. Hulewicz A., Krawiecki Z., Narzędzia statystyczne w procesie normalizacji wyników pomiarów, Poznan University of Technology Academic Journals, Electrical Engineering No 88, Computer Applications in Electrical Engineering 2016, Poznan 2016, s. 251-260.
Additional
1. S. Bolkowski - Elektrotechnika, Wydawnictwa Szkolne i Pedagogiczne, Warszawa 2009
2. S. Tumański - Technika pomiarowa, WNT, Warszawa 2007
3. T. Zieliński - Cyfrowe przetwarzanie sygnałów. Od teorii do zastosowań, WKŁ, Warszawa 2007

4. T. Skubis, Podstawy metrologicznej interpretacji wyników pomiarów, Wydawnictwo Politechniki Śląskiej, Gliwice, 2004
5. Międzynarodowy Słownik Podstawowych i Ogólnych Terminów Metrologii, Główny Urząd Miar, Warszawa, 1996
6. www.bipm.org
7. www.gum.gov.pl

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	35	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	15	1,00