

SYLLABUS

Name: Metrology
Name in Polish: Metrologia
Name in English: Metrology

Information on course:

Course offered by department: Faculty of Organisation and Management
Course for department: Silesian University of Technology
Study level and form: Bachelor's degree, Full-time
Term: winter semester 2024/2025
Coordinator of course edition: Prof. SUT Stanislaw Gil, DSc, PhD, Eng.

Default type of course examination report:

Zal

Language:

English

Course homepage:

<https://platforma.polsl.pl/roz/>

ECTS

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Short description:

Basic concepts. Units of measured quantities. Workshop measurements. Measurement of basic physical quantities and their uncertainties. Statistical analysis of measurement results.

Description:

Lectures:

1. Definition of metrology. Classification in metrology. Basic concepts. Units of measured quantities.
2. Planning experiments. Selected workshop measurements.
3. Calibration of measurement equipment. Description of errors in measurements. Measurement uncertainties and their estimation.
4. Temperature measurement. Contact and non-contact methods.
5. Pressure Measurement.
6. Measurement of substance flow.
7. Humidity measurement.
8. Measuring sensors and transducers.
9. Virtual measuring instruments.
10. Statistical analysis of measurement results.

Laboratory:

1. Integration of used unit systems.
2. Workshop measurements.
3. Presenting measurement results.
4. Measurement uncertainties and their estimation.
5. Selected methods of temperature measurement.
6. Determining the stream of substances by measuring dynamic pressure.
7. Humidity measurement.
8. Measurements of selected electrical quantities.
9. Determination of the control characteristics of a DC motor.
10. Hardness measurement.
11. Tensile test, determination of Young's modulus.
12. Statistical analysis of measurement results.
13. Checking the linearity of the measurement sensor.
14. Statistical analysis of measurement results.

Bibliography:

1. Taylor J.R.: An Introduction to Error Analysis. University Science Books Sausalito, California 1997.
2. Ammar Grous: Applied Metrology for Manufacturing Engineering. Wiley-ISTE, Quebec 2011.
3. Krishnamurthy L., Raghavendra N. V.: . Engineering Metrology and Measurements. Oxford University Press, Oxford 2013.
4. Czichos H., Saito T., Smith L.: Springer Handbook of Metrology and Testing. Springer-Verlag, Heidelberg 2011.
5. Bucher J.L. (Editor): The Metrology Handbook. Infotech Standards, New Delhi 2015.
6. Metrology and Measurement Systems. Journal of Committee on Metrology and Scientific Instrumentation of the Polish Academy of Sciences.

Measurement. Journal of the International Measurement Confederation. Elsevier.

Learning outcomes:

1. He/she has a basic knowledge of the principles of measurement and of the development of physical measurement results, the types of measurement uncertainties, and how to determine and express them (K1A_W1).
2. Can perform simple physical measurements and produce and present results in a readable manner, in particular: (a) assemble a simple measuring system using standard measuring instruments according to a defined scheme and specification, (b) determine the results and uncertainties of direct and indirect measurements and record them in an appropriate form, evaluate the reliability of the results obtained and interpret them on the basis of physical knowledge (K1A_U3, K1A7).
3. Can understand the need for continuous learning, above all to improve his/hers professional and personal competencies (K1A_K1).

Assessment methods and assessment criteria:

Based on the results of reports during the semester and Final Colloquium. The content of the laboratory is evaluated on the basis of the report prepared according to the teacher's instructions provided during classes. The total note for this subject is a standard mean of notes from lectures and laboratories. Both parts must be positive (≥ 3.0).

Practical placement:

Not applicable