

**86S1-PODMCH**

**FUNDAMENTALS OF CHEMICAL METROLOGY**

**ECTS: 3.0**

**HOURS PER SEMESTER/WEEK:** LECTURES: -/-; CLASSES: 45/3

**FIELD OF THE STUDY:** Chemistry

**Level of study:** First-cycle (Bachelor's degree) program

**Course status:** optional \*

**Year of the study:** II

**COURSE CONTENTS**

**LECTURES:** -

**CLASSES:** Basics of chemical metrology, principles of measurement, validation of measurement procedures, evaluation of uncertainty of chemical measurement results, requirements included in the ISO/IEC 17025:2005 standard. Selection of the measurement procedure and methods of analytical procedure to the needs and requirements of the analysis. Selection of reference materials for calibration, validation and to ensure measurement traceability. Determination of analytical parameters for the validation process of the proposed measurement procedure. Determination of parameters characterizing the analytical result. Evaluation of the parameters of the measurement procedure. Building a validation report.

**EDUCATIONAL PURPOSE:** Familiarization with the basic issues related to the use of the principles of metrology in chemical measurements.

**LEARNING OUTCOMES**

**Knowledge.** The student knows the basics of chemical metrology and computational methods used for statistical processing of results. Knows and understands the legal principles related to the requirements of the ISO/IEC 17025:2005 standard.

**Skills.** The student is able to choose the method of analytical procedure to the requirements of the analysis. Demonstrates the ability to validate measurement procedures and assess the uncertainty of chemical measurement results, as well as the ability to document and present these results.

**Social competences.** The student is ready for independent and reliable assessment of the obtained parameters of the measurement procedure.

**TEACHING FORMS AND METHODS**

**Lectures.** -

**Classes.** Students (work in groups) will carry out research projects in the laboratory, including validation of the parameters of the analytical procedure.

**FORM AND CONDITIONS FOR VERIFICATION OF LEARNING OUTCOMES**

**Lectures.** -

**Classes.** Preparation of a multimedia presentation describing the assumptions and results of the completed project.

**BASIC LITERATURE**

1) Bulska E., Metrology in Chemistry, Springer Cham, 2018. (English translation of the original Polish edition published by Wydawnictwo Malamut, Warszawa, 2012)

**ADDITIONAL LITERATURE**

1) Neidhart B., Wegscheider W. (eds.) Quality in Chemical Measurements. Training Concepts and Teaching Materials. Springer-Verlag, Berlin Heidelberg, 2001. Available on-line: <https://link.springer.com/book/10.1007/978-3-642-56604-2>

**THE TEACHER/TEACHERS CONDUCTING THE CLASSES:**

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