

**DOCTORAL SCHOOL OF WROCLAW UNIVERSITY OF SCIENCE AND  
TECHNOLOGY**

**SUPERVISOR/TEAM/ DECLARING/CONDUCTING COURSE:**  
prof. dr hab. inż. Katarzyna Chojnacka, dr inż. Małgorzata Mironiuk  
**DEPARTMENT: Chemical Department**  
**SCIENTIFIC DISCIPLINE: Chemical Engineering**

**COURSE CARD**

**Course name in Polish:** Praktyczne aspekty funkcjonowania akredytowanego laboratorium badawczego  
**Course name in English:** Practical aspects of accredited activity of testing laboratory  
**Course language Polish / English\***

**University-wide general course type\*: Yes/ No**

- 1) ~~basic course~~
- 2) ~~specialist course~~
- 3) ~~seminar~~
- 4) ~~humanistic course~~
- 5) ~~language~~

**Subject code: CIQ100101W**

\* delete as applicable

	Lecture	Foreign language course	Seminar	Mixed forms
Number of hours of organized classes in university (ZZU)	30			
Grading	Exam, inspection, evaluation classes	Exam	Oral presentation	
Number of ECTS points	0			

**PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

1. Knowledge of basic issues related to management systems
2. Basic knowledge of analytical chemistry
3. Knowledge of basic chemical calculations (conversion of concentrations, etc.)

**COURSE OBJECTIVES**

- C1 To acquaint PhD students with the accreditation system of testing laboratories in Poland and with the basic requirements of the PN-EN ISO 17025 accreditation standard
- C2 Showing the practical aspects of an accredited testing laboratory
- C3 Acquaint the PhD student with modern methods of analysis using modern measurement equipment
- C4. Acquaint the PhD student with the methods of ensuring the quality of tests and obtaining reliable, reliable and useful test results
- C5. Preparation of a PhD student for work in the PN-EN ISO 17025 management system

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**PROGRAM CONTENTS**

<b>Form of classes – mixed forms (mix)</b>		<b>Number of hours</b>
Mix1	<b>Lecture</b> - introduction to issues related to the management system by PN-EN ISO 17025, discussion of the accreditation system in Poland, operating principles of the testing laboratory in the accreditation system (conducting arrangements with the client; validation of research methods, sampling and preparation of test samples; quality control tests; measurements traceability, certified reference materials, proficiency testing and interlaboratory comparisons; internal audits)	4
Mix2	<b>Practical classes in the laboratory</b> - collection and preparation of samples for testing; sample digestion using microwaves; ICP-OES technique - calibration, sample preparation, qualitative and quantitative analysis; AAS method with amalgamation technique - sample preparation, quantitative analysis; elemental analysis method - sample preparation, calculation of daily correction factor, quantitative analysis of C and N; titration methods for the determination of nitrogen content - sample preparation, quantitative analysis.	24
Mix3	<b>Reporting Session</b> - presentation and interpretation of the test results obtained during practical classes	2
<b>Total hours</b>		<b>30</b>

**TEACHING TOOLS USED**

- N1. Lecture with multimedia presentation  
 N2. Scientific discussion  
 N3. Classes in the testing laboratory (performing tests)

**ACHIEVED SUBJECT LEARNING OUTCOMES**

Type of learning outcome	Code of learning outcome	Assessment of learning outcome
Knowledge	P8S_WG	Exam
Skills	P8S_UW	Report in the form of a multimedia presentation, observation and evaluation of work during classes
Skills	P8S_UO	
Skills	P8S_UK	
Social competence	P8U_K	Report in the form of multimedia presentations, group work
Social competence	P8S_KK	
Social competence	P8S_KR	

**PRIMARY AND SECONDARY LITERATURE**

**PRIMARY LITERATURE:**

- [1] Szczepaniak W. Metody instrumentalne w analizie chemicznej, PWN, Warszawa, 1996.
- [2] Cygański A. Chemiczne metody analizy ilościowej. Wydawnictwo WNT, Warszawa 2013
- [3] Namieśnik J., Łukasiak J., Jamrógiewicz Z.: Pobieranie próbek środowiskowych do analizy. Wydawnictwo Naukowe PWN, Warszawa 1995;
- [4] Namieśnik J., Jamrógiewicz Z., Pilarczyk M., Torres L.: Przygotowanie próbek środowiskowych do analizy. WNT, Warszawa 2000;
- [5] Bulska E., Metrologia Chemiczna Sztuka Prowadzenia Pomiarów. Wydawnictwo Malamut, Warszawa 2008
- [6] Dokumenty Polskiego centrum Akredytacji: DA-01, DA-02, DA-05, DA-06, DA-08, DAB-07 /available online/

**SECONDARY LITERATURE:**

- [1] Scientific and technical journals
- [2] Minczewski J., Marczenko Z. Chemia Analityczna, PWN, Warszawa, 1997, t:1-3;

**SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)**

**prof. dr hab. inż. Katarzyna Chojnacka**  
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