УНИВЕРЗИТЕТ У БАЊОЈ ЛУЦИ
UNIVERSITY OF BANJA LUKA
ПРИРОДНО-МАТЕМАТИЧКИ ФАКУЛТЕТ
FACULTY OF NATURAL SCIENCES AND MATHEMATICS

CHEMISTRY DEPARTMENT	PhD STUDIES

Course name	**Quality Management Systems in Analytical Laboratories**			
Course code	**Course status**	**Semester**	**Hours of instruction**	**ECTS**
DHEM23SUK	**elective**	**I or III**	**5+0**	**10**
Teacher(s)	**Prof. Ivan Špánik, PhD**			

Prerequisite course(s)	**Entry requirements**
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Course goals

The subject aims to provide a brief overview of the quality management system used in analytical laboratories, general requirements for QA&QC in laboratories, method validation, sources of uncertainties and their minimization, calculation of uncertainties, and statistical methods used in analytical testing laboratories.

Learning outcomes

Obtained knowledge about quality management systems applied for ensuring quality of results provided by testing, and metrology aspects, as well as gaining advanced knowledge about principles and procedures used in quality control.

Course content

1. Quality management systems, Basic terms used in quality and quality control
2. Quality management systems according to good laboratory practice, HACCP, ISO 9000, ISO 1400, zero-defect method
3. Quality management system in analytical laboratories according to ISO 17025: Management requirements
4. Quality management system in analytical laboratories according to ISO 17025: Technical requirements
5. Validation and verification of analytical methods
6. Quality assurance: Checksheets, Process flow diagram, Cause and effects diagrams, Histogram, Scatter plot, Pareto plot
7. Quality assurance: Control charts
8. Measurement traceability, calibration, and verification of equipment, reference materials, and certified reference materials
9. Uncertainty of measurements and their calculation
10. Accreditation and certification of quality management systems

Teaching methods

Lectures, Case studies

Books and other learning materials

1. ISO 17025
2. Ilaria Altieri et all: Traceability, Validation and Measurement Uncertainty in Chemistry: Vol. 1
3. Ljudmila Benedik et all: Practical examples of Traceability, Validation and Measurement Uncertainty in Chemistry

Course activities and grading method

Oral exam

Class attendance	**10**		
Colloquium	**30**	**Final exam**	**60**

Additional course notes

Name of the teacher who prepared this form	**Ivan Špánik**

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