



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



CHEMISTRY DEPARTMENT

PhD STUDIES

Course name	<b>Advanced Electrochemical Methods</b>			
Course code	Course status	Semester	Hours of instruction	ECTS
<b>DHEM23NEM</b>	elective	I, II, III or IV	5+0	10
Teacher(s)	<b>Prof. Biljana Šljukić Paunković, PhD</b>			

Prerequisite course(s)	Entry requirements
none	/

**Course goals**

Introduction to the basic principles of modern electrochemical methods and the possibility of applying these methods in the analysis of various systems, both in research and in practice.

**Learning outcomes**

Upon successful completion of this course, the student should be able to independently select the appropriate electrochemical method; independently perform electrochemical measurements in an aqueous or non-aqueous electrolyte, describe the electrochemical behavior of the tested system, and determine the mechanism of the electrochemical process based on evaluated kinetic parameters.

**Course content**

Electrochemical cells. Types of electrodes. The structure of the double layer. Potentials in electrochemical cells. Thermodynamics and kinetics in electrochemistry. Kinetics of electrode processes. Potential "step" method. Potential "sweep" method. Cyclic voltammetry. Controlled current techniques. Electrolysis-based techniques. Hydrodynamic techniques. Impedance measurements. Electro-spectrometric tests. Electrochemical Impedance Spectroscopy (EIS).

**Teaching methods**

Lectures, essays, and laboratory work

**Books and other learning materials**

1. S. Mentus, Electrochemistry, Faculty of Physical Chemistry, Belgrade, 2008.
2. I. Stojkovic Simatovic, B. Šljukić Paunković, Electrochemistry Theory and Application, Faculty of Physical Chemistry, Belgrade, 2018, ISBN 978-86-82139-71-3.
3. D. Minić, Applied Electrochemistry, Faculty of Physical Chemistry, Belgrade, 2010.
4. A. J. Bard, L. R. Faulkner, Electrochemical Methods: Fundamentals and Applications, 2nd ed., Wiley, 2000. ISBN: 978-0-471-04372-0
5. R. G. Compton, C. E. Banks, Understanding Voltammetry, 3rd ed., World Scientific, 2018. ISBN: 1786345285, 9781786345288

**Course activities and grading method**

Laboratory work	15		
Essay	25	Final exam	60

**Additional course notes**

Name of the teacher who prepared this form **Biljana Šljukić Paunković**