



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



CHEMISTRY DEPARTMENT

PhD STUDIES

Course name	<b>Materials Chemistry</b>			
Course code	Course status	Semester	Hours of instruction	ECTS
DHEM23HMA	elective	I, III	5+0	10
Teacher(s)	<b>Prof. Saša Zeljković, PhD</b>			

Prerequisite course(s)	Entry requirements
none	/

**Course goals**  
The goal is that upon successful completion of the course, students understand the basics of crystal and amorphous structures, defects in crystals, and microstructure development in selected materials. The acquired knowledge should enable an understanding of selected functional materials: metals, ceramics, and composites.

**Learning outcomes**  
Students will understand basic principles of materials science including research methods and procedures. They will learn basic principles of solid-state chemistry and characterization methods. The acquired knowledge will enable students to engineer materials synthesis (metals, ceramics, and composites) with specific functional properties. Students will develop critical thinking in the assessment of experimental and literature data. They will develop communication skills to present research results in the international environment.

**Course content**  
Chemical bonding in solids. Correlation between the structural elements of materials and their properties. Crystal structures and crystal chemistry. Crystal defects and non-stoichiometry. Crystallography and diffraction techniques. X-ray structural analysis. Analysis and calculations based on X-ray diffractograms. Phase equilibrium in solid systems: phase diagrams. Research of materials by microscopy, spectroscopy, and thermal analysis. Strategy to identify, analyze, and characterize 'unknown' solids.

**Teaching methods**  
Lectures, seminars, consultations, laboratory practice

**Books and other learning materials**  
R. West. Solid State Chemistry and Its Applications. John Wiley & Sons (2014). ISBN-13: 978-1119942948.  
W. D. Callister Jr., D. G. Rethwisch. Materials Science and Engineering: An Introduction. John Wiley & Sons (2018). ISBN: 978-1-119-40549-8.

**Course activities and grading method**  
Individual project, Final oral exam.

	Individual project presentation	40
	Final exam	60

**Additional course notes**  
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Name of the teacher who prepared this form      Saša Zeljković