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

CHEMISTRY DEPARTMENT | PhD STUDIES

Course name	Chemistry of Potentially Toxic Elements			
Course code	**Course status**	**Semester**	**Hours of instruction**	**ECTS**
DHEM23HTE	**elective**	**I, II, III or IV**	**5+0**	**10**
Teacher(s)	**Prof. Dijana Mihajlovic, PhD**			

Prerequisite course(s)	**Entry requirements**
none	**/**

Course goals

The aim of this module is to expand and upgrade previously acquired knowledge about potentially toxic elements (PTE), with an emphasis on their presence, origin, and chemical forms, as well as analytical procedures and instrumental techniques for their determination.

Learning outcomes

Students will expand and upgrade previously acquired knowledge about PTE by learning about its presence, chemical forms, mobility, bioavailability, specific characteristics, and impact on the health of living beings. Also, students will gain knowledge about analytical procedures for determining PET in different samples, with an emphasis on modern methods of instrumental analysis. The final result will be a logical connection and understanding of the cognitions about the origin, forms, and mobility of PTE, possible harmful effects, and modern analytical techniques for monitoring their presence.

Course content

Potentially toxic elements (PTE): definition and basic characteristics. Origin, natural and anthropogenic sources. Presence in water and groundwaters, atmosphere, rocks, and soil. Presence of PTE in primary agricultural production and various industrial products. Chemical forms and bioavailability of PTE. Biogeochemical processes that regulate PTE mobility. Specific characteristics and chemical forms of the individual elements: As, Hg, Pb, Cd, Cr, Cu, Zn, Ni, Se, Co, etc. Impact of PTE on the living beings' health. Analytical procedures and techniques for determining the PTE: sampling and preparation of the various samples for chemical analysis. Modern instrumental techniques used for PTE determination: AAS, mercury hydride technique for determination of the volatile metals (Hg, As, etc.), ICP MS, XRD.

Teaching methods

Lectures, Seminars, Consultations, Laboratory practice.

Books and other learning materials

1. H.B. Bradl (2005): *Heavy metals in the environment*, Elsevier, Academic Press.
2. V.P. Evangelou (1998): *Environmental soil and water chemistry*, Wiley-Interscience Publication.
3. Hooda, P.A. (2010): *Trace Elements in Soils*, Blackwell Publishing Ltd.
4. Kabata-Pendias, A., Pendias, H. (2011): *Trace elements in soils and plants*, 4th ed., Boca Raton, FL, CRC Press LLC.
5. J.R. Dean (2007): *Bioavailability, bioaccessibility and mobility of environmental contaminants*, Wiley-Interscience Publication.

Course activities and grading method

Individual project presentation, Final oral exam.

		Individual project presentation	40
		Final exam	**60**

Additional course notes

Name of the teacher who prepared this form	**Dijana Mihajlović**

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