



University of Presov in Presov Faculty of Humanities and Natural Sciences, Department of Ecology

## **COURSE DESCRIPTION**

Code: 2EKO/JENVTE/15	Title: Environmental Technologies			
Field of study: 4.1.4 G programme: Ecology	eneral ecology and ecolog	y of individuals and populatio	ns <b>Study</b>	
Guarantee: prof. Dr. Ivan Salamon		Lecturer: prof. Dr. Ivan Salamon		
Semester:	Forms of teaching: Lecture seminars	ires,	Number of credits:	
Summer	Recommended number of Per week: 2/2	of hours: Total per study: 26/26	4	
Prerequisites: Organic chemistry				
Assessment: Preferent Course assessment: Ac Final assessment: Crec	ial – orientated to occupat ctive participation in lectur dit evaluated based on prot	ion es and seminars tocols, seminars and final test	:	
Learning outcomes: Students will require challenge-oriented a which underpin the o a sustainable future.	e in the field of environ approach to solutions the development and applicated	mental technology & inno hat bring together excelle ition of technologies, to un	ovation focuses on a ont natural sciences, derstand and deliver	

Main knowledge of education will be concentrated to the extensive possibilities of zeolites are mainly due to the specific physicochemical zeolite properties (high ion exchange selectivity, reversible hydration and dehydration, high gas sorption capacity, high thermostability resistance to aggressive media) and phyto-remediations.

The practical working will be in regard to cooperation with the company Zeocem, Co. in Bystre, the East Slovakia.





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## Course content:

Introduction to environmental chemistry with orientation to zeolite

Structures of zeolites (three-dimensional grid which consists of Silicate tetrahedrite SiO<sub>4</sub><sup>4-</sup> each interconnected via oxygen atoms; the atoms of silicon is replaced by Aluminum AlO<sub>4</sub><sup>5-</sup> way, creating a characteristic spatial structure with a significant incidence of cavities, interconnected by channels, in which metal cations, or water molecules are stored)

Application in agriculture (animal breeding as feed additive, soil conditioners for hydration and retention of soil nutrients)

Application in building (building mixtures such as plasters and adhesives with sulphate resistance, reduction of hexavalent chromium /Cr<sup>VI</sup>/ and anti-corrosive admixture of cement)

Application in environmental protection (excellent filtration and sorption material: adsorbs dioxins and heavy metals, ensure water purity and suitability, increasing biological activity of the purification process, air and gas filtration and the creation of filter barriers in the construction)

Application in the transport engines (catalytic converters – processes of reduction toxic gases and pollutants in exhaust gas from an internal combustion engine into less-toxic pollutants by catalysing a redox reaction)

Introduction to environmental chemistry with orientation to phytoremediation - application to polluted soil or static water environment Processes (interpretation):

Phytoextraction Phytostabilization Phytodegradation Phytostimulation Phytovolatilization Rhizofiltration Biological hydraulic containment Phytodesalination

## Literature:

MISAELIDES, P.: Application of natural zeolites in environmental remediation. In:

Microporous and Mesoporous Materials, Vol. 144, Iss. 1–3, 2011, p. 15-35

KULASEKARAN, R., DENDI D. R.: Zeolites and Their Potential Uses in Agriculture. In: Advances in Agronomy, Vol. 113, 2011, p. 219-241

MASAROVICOVA, E., KRALOVA, K., KUMMEROVA, M.: Principles of classification of medicinal plants as hyperaccumulators or excluders. In: Acta Physiologiae Plantarum, Vol. 32, 2010, p. 823–829

Language the course is taught in:	Signature of guarantee and date of last	
	edition:	
English	September 22, 2020	