Level: Bachelor

Course title: Basic concepts of environmental chemistry

Status: obligatory

ECTS: 8

Requirements: none

Learning objectives

To provide fundamental knowledge about the chemical and physico-chemical principles required for understanding the behaviour of pollutants in the environment.

Learning outcomes

General knowledge and understanding of chemical bonds and molecular structure, intermolecular interactions, physico-chemical properties of organic compounds, their reactivity and reaction mechanisms that occur in the environment.

Syllabus

Theoretical instruction

Chemical bonding and structure of molecules, hybridization and 3D structures. Physical properties and structure of molecules. Molar volume, the electrical properties of molecules – dipole moment, polarizability, molar refraction, optical activity, absorption of light. UV-VIS and IR spectroscopy. Intermolecular interactions and thermodynamics. Thermodynamic principles of single-component systems and solutions. General conditions of phase equilibrium, phase diagrams, phase transitions. Solutions, solubility in water, activity coefficient, solubility of gases. Partition law. Organic compounds in the environment (hydrocarbons, organohalogens, oxygen-containing functional groups, nitrogen-containing functional groups, sulfur-containing functional groups, phosphorus-containing functional groups). Functional groups and their reactivity. Important mechanisms of transformation reactions of organic compounds.

Practical instruction

Experimental and computational tasks from the major topics in the curriculum.

Weekly teaching load				Other: -
Lectures: 3 (45)	Exercises: 3 (45)	Other forms of teaching: 1 (15)	Student research: -	