

Course description

Course abbreviation:	UECHI/C251	Page:	1 / 3
Course name:	Environmental Chemistry		
Academic Year:	2023/2024	Printed:	05.06.2024 13:11

Department/Unit /	UECHI / C251			Academic Year	2023/2024
Title	Environmental Chemistry			Type of completion	Examination
Accredited/Credits	Yes, 4 Cred.			Type of completion	Combined
Number of hours	Lecture 3 [HRS/WEEK]				
Occ/max	Status A	Status B	Status C	Course credit prior to	NO
Summer semester	2 / -	2 / -	0 / -	Counted into average	YES
Winter semester	0 / -	0 / -	0 / -	Min. (B+C) students	not determined
Timetable	Yes			Repeated registration	NO
Language of instruction	Czech			Semester taught	Summer semester
Optional course	Yes			Internship duration	0
Evaluation scale	A B C D E F				
No. of hours of on-premise	0				
Auto acc. of credit	No				
Periodicity	K				
Substituted course	None				
Preclusive courses	N/A				
Prerequisite courses	N/A				
Informally recommended courses	N/A				
Courses depending on this Course	N/A				

Course objectives:

The aim of the subject is:

- to submit a description of the chemical substances, their risks and their fate in the environment,
- to clarify the physical, chemical and biochemical processes in the environment and its interfaces (balance, transport, transformation),
- to characterize the properties of the environmental compartments and put them into context with the occurrence and fate of chemicals in these compartments.

Requirements on student

The final exam has written and oral part.

Content

Chemicals and their environmental risks. Environmental compartments.
 Biogeochemical cycles. Hydrological cycle.
 Structure of chemicals and their reactivity. Transport relations: transformations, concepts and relations. Environmental borderlines and chemical equilibrium
 Parameters of characterization of properties of substances and environmental properties. Solubility. Dissociation. Partition coefficients. Influencing chemical factors.
 Transport of chemicals in the environment. Diffusion. Fick's laws. Dispersion, advection, deposition, volatilization, sedimentation, phase separation, elution, biofeeding, elimination.
 Abiotic environmental balance: air-water-soil-biota equilibrium. Biotic environmental balance: bioaccumulation, bio-enrichment, food intake, intake from sediment, combined intake from water, food and sediments.
 Abiotic transformations of chemicals: non-reductive reactions, redox reactions, photochemical processes.
 Biotic transformations of chemicals: biodegradation, biotransformation (reactions, mechanisms, kinetics).
 Models of distribution of chemicals in the environment.
 Hydrosphere: basic description, properties (pH, conductivity, redox potential, solubility, buffering and neutralizing capacity),

chemical composition, chemical reactions in water.

Pedosphere: formation of soil, component of soil system, chemical composition of soils, sorption capacity, transport and reaction of chemicals in pedosphere.

Atmosphere: basic description (composition, temperature profile, air pressure, energy balance). Mechanisms of Atmosphere fall. Pollution, aerosols, radicals, atmospheres. reaction. Greenhouse effect. Ozone. Smog.

Biosphere: basic characteristics, exposure of organs, its consequences.

Prerequisites - other information about course preconditions

Basic knowledge of inorganic, organic, physical and analytical chemistry is required.

Competences acquired

Students are able after completing the course to orientate in the physical, chemical and biochemical processes occurring in the environmental compartments and their borderlines. They have a comprehensive overview of the chemicals, their fate in environmental and affecting factors. They are able to assess the risks associated with the spread of chemicals in the environment and its compartments.

This qualification is essential for specialists to provide the technological aspects of the production and disposal of waste, quality control in chemical laboratories and administrative management institutions in the field of environmental protection.

Fields of study

Guarantors and lecturers

- **Guarantors:** doc. Ing. Anna Krejčová, Ph.D.
- **Lecturer:** doc. Ing. Anna Krejčová, Ph.D. (100%)

Literature

- **Basic:** Anděl Petr. *Ekotoxikologie, bioindikace a biomonitoring*.
- **Basic:** Manahan. *Fundamentals of environmental chemistry*.
- **Basic:** Pitter. *Hydrochemie*.
- **Recommended:** Blažej Anton. *Chemické aspekty životního prostředí*.

Teaching methods

Monologic (reading, lecture, briefing)

Assessment methods

Oral examination
Written examination

Course is included in study programmes:

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Chemistry and Technology of Environment Protection	Bachelor	Full-time	Chemistry and Technology of Environment Protection	1	2020	2023	povinné předměty	A	2	LS
Chemistry and Technology of Environment Protection	Bachelor	Full-time	Chemistry and Technology of Environment Protection	1	2021	2023	povinné předměty	A	2	LS
Chemistry and Technology of Environment Protection	Bachelor	Full-time	Chemistry and Technology of Environment Protection	1	2022	2023	povinné předměty	A	2	LS

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Chemistry and Technology of Environment Protection	Bachelor	Full-time	Chemistry and Technology of Environment Protection	1	2023	2023	povinné předměty	A	2	LS
Evaluation and Analysis of Foodstuffs	Bachelor	Full-time	Evaluation and Analysis of Foodstuffs	1	2022	2023	povinně volitelné předměty 3	B	2	LS
Evaluation and Analysis of Foodstuffs	Bachelor	Full-time	Evaluation and Analysis of Foodstuffs	1	2020	2023	povinně volitelné předměty 3	B	2	LS
Evaluation and Analysis of Foodstuffs	Bachelor	Full-time	Evaluation and Analysis of Foodstuffs	1	2021	2023	povinně volitelné předměty 3	B	2	LS
Evaluation and Analysis of Foodstuffs	Bachelor	Full-time	Evaluation and Analysis of Foodstuffs	1	2023	2023	povinně volitelné předměty 3	B	2	LS