VILNIUS GEDIMINAS TECHNICAL UNIVERSITY STUDY MODULE CARD

Department of Environment Protection and Water Engineering

A dalis

Modulio pavadinimas
Aplinkos chemija

Module title
Environmental Chemistry

Modulio grupė	Studijų dalyko
Modulio blokas	Doktorantūros specialybės dalykai
Priklausomybė	Katedros

Mokslo krypties ir srities kodas		**Studijos**
T 004	**T 000**	**Doktorantūros**

Module code

Faculty	Department	B, A, M, I, D	Module No.*
A	P A V	D	24003

* modulio registracijos numeris katedroje

Credits

Total	Iš jų: KD, KS, KP
6	0

Form of evaluation

Į, E1, E2, E, BE, BD, TD, A	KD, KS, KP
E	

Studijų forma		Paskaitoms	Lab. darbams	Pratyboms	Aud. darbui	Sav. darbui	Iš viso
Nuolatinės studijos	F	36	0	0	36	124	160
Ištęstinės studijos	I						

Modulio tikslas

Supažindinti su aplinkoje natūraliai egzistuojančiomis cheminėmis medžiagomis ir vykstančiais cheminiais procesais, su cheminiais teršalais, susidarančiais vykstant antropogeniniams cheminiams procesams, teršalų migracija ir poveikiu žmogui bei kitie

Aim of module

To get aquanted with the chemicals and chemical proceses naturally existing in the environment, with chemical pollutants formed in the environment, with their influence on people and other living organisms. To be aquanted with the modern methods used

Suteikiamos žinios ir gebėjimai

Suteikiamos žinios apie Žemės atmosferoje, ypač jos žemutiniuose sluoksniuose (troposferoje ir stratosferoje), gamtiniuose vandens telkiniuose (hidrosferoje) bei kietos Žemės plutos viršutiniame sluoksnyje (pedosferoje) natūraliai, kai nėra teršalų čia paminėtuose biosferos sluoksniuose, egzistuojančias chemines medžiagas ir natūraliai vykstančius cheminius procesus; apie antropogeninius cheminius procesus ir jiems vykstant susidarančias chemines medžiagas, teršiančias aplinką ir dėl to neigiamai veikiančias žmogų ir kitus gyvus organizmus, taip pat ir chemines medžiagas, sukeliančias neigia

Provided knowledge and skills

The doctoral students will be provided with knowledge about the naturally existing chemicals and about the natural chemical processes that are going on in the Earth's atmosphere, especially in it's lower layers (troposphere and stratosphere), and as well in the natural waters (hydrosphere) and in the upper Earth's crust layer (pedosphere); about the anthropogenical chemical processes and as result of these processes generated pollutants that pollute environment and negativelly effect on human and other living organisms, and about the generated chemicals that cause negative changes in the glob

Modulio anotacija

Žemės atmosferoje, ypač jos žemutiniuose sluoksniuose (troposferoje ir stratosferoje), gamtiniuose vandens telkiniuose (hidrosferoje) bei kietos Žemės plutos viršutiniame sluoksnyje (pedosferoje) natūraliai egzistuojančios cheminės medžiagos ir natūraliai vykstantys cheminiai procesai; antropogeniniai cheminiai procesai ir jiems vykstant susidarančios cheminės medžiagos, teršiančios aplinką ir dėl to neigiamai veikiančios žmogų ir kitus gyvus organizmus; antropogeninės medžiagos, sukeliančios neigiamus globalius aplinkos pokyčius (ozono irimą stratosferoje, globalų klimato atšilimą); šiuolaikiniai metodai teršalų susidarymui stabdyti ir jiems šalinti.

Module annotation

Chemicals naturally existing and the natural chemical processes that are going on in the Earth's atmosphere, especially in it's lower layers (troposphere and stratosphere), as well in the natural waters (hydrosphere) and in the Earth's crust upper layer (pedosphere); anthropogenical chemical processes and as of it's consequence generated chemical substances that pollute envirinment and negativelly effect on human and other living organisms; pollutants that cause negative changes in the global environment (decomposition of ozone in the stratosphere, global warming); the modern methods used for decrease the pollutants generation and for its removal.

Literature (author, title of publication, publisher, year)

1. Muhammad A. Hanif, Farwa Nadeem,Ijaz Ahmad Bhatti,and Hafiz Muhammad Tauqeer. Environmental Chemistry: A Comprehensive Approach. 2020. 652 p. https://ebookcentral.proquest.com/lib/vgtulibrary-ebooks/reader.action?docID=6371927
2. Stanley Manahan. Environmental Chemistry. 10th edition. Taylor & Francis Group. 2017. 784 p. https://vdoc.pub/download/environmental-chemistry-51lshd4l2qa0
3. William F. Bleam. Soil and Environmental Chemistry. Academic Press. 2016. 586 p.
4. Béla, T.; Timothy, D. Green chemistry: an inclusive approach. 2018. 1044 p. https://www.sciencedirect.com/book/9780128092705/green-chemistry
5. Qu, Ke; Dan, Dezhong. Environmental Analytical Chemistry. 2023. 293 p. https://www.sciencedirect.com/book/9780443219665/environmental-analytical-chemistry?via=ihub=
6. Hill, M. K. Understanding environmental pollution. Fourth edition. Cambridge University Press. 2020. 449 p.
7. Straipsniai mokslo žurnaluose: Journal of Hazardous Materials; Journal of Colloid ant Interface Science; Water Research; European Journal of Soil Science; Ecotoxicology and Environmental Safety; Environmental Science & Technology; Journal of Environmental Management.

Savarankiško darbo turinys

Užduoties pavadinimas	Sav. darbo apimtis vienai užduočiai					Užduočių skaičius				Iš viso valandų			
	Rėžis	Priimta				NL(S)	I(S)	I(T)	NL(T)	NL(S)	I(S)	I(T)	NL(T)
		NL(S)	I(S)	I(T)	NL(T)								
Pasirengimas atsiskaitymui	16-40	40				1				40			
Mokslinis seminaras	20-60	32				1				32			
Mokslo tiriamasis darbas	40-280	52				1				52			

Savarankiško darbo grafikas

Užduoties tipas			užduoties pateikimo(*) ir atssikaitymo(+) savaitė																		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Nuolatinė	Mokslo tiriamasis darbas	*					1															
		+															1					

Modulio sudarytojai (vardas,pavardė)	**Module examiners** (name, surname):	**Katedros vedėjas** (vardas, pavardė):
Dainius Paliulis	Dainius Paliulis Vaida Šerevičienė	Aušra Zigmontienė

Doktorantūros komisijos nutarimas

1. Modulis atestuojamas				
2. Modulis skirtas mokslo krypčiai:	**Aplinkos inžinerija**			
3. Modulio atestacija galioja: nuo	2024-05-28		iki	2029-05-28

Modulį atestavo
Mokslo krypties doktorantūros komisijos pirmininkas (vardas, pavardė)

Saulius Vasarevičius Data 2024-06-26

VILNIUS GEDIMINAS TECHNICAL UNIVERSITY STUDY MODULE CARD

Aplinkos apsaugos ir vandens inžinerijos katedra

B dalis

Modulio pavadinimas
Aplinkos chemija

Module title
Environmental Chemistry

Modulio kodas						**Kreditai**		**Atsiskaitymo forma**	
Fakultetas		Katedra		B, A, M, I, D	Modulio Nr.*	Iš viso:	Iš jų: KD, KS, KP	Į, E1, E2, E, BE, BD, TD, A	KD, KS, KP
A	P	A	V	D	24003	6	0	E	

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Studijų forma		Paskaitoms	Lab. darbams	Pratyboms	Aud. darbui	Sav. darbui	Iš viso
Nuolatinės studijos	F	36	0	0	36	124	160
Ištęstinės studijos	I						

List of the Course lecture topics

Lecture topics	Number of hours			
	NL(S)	I(S)	I(S)	NL(T)
1. The emergence of chemical elements as a sequence of nuclear reactions that took place during the Solar System formation; chemical elements generated during spontaneous and	2			
2. The distribution of chemical elements in the Solar System, Earth's crust and soil as a fuction of their atomic number. The estimation of the most probable concentration of the	2			
3. The physical and chemical processes naturally ongoing in the ozone layer of the stratosphere. Naturally ongoing ozone formation and decomposition cycle. The Chapman	1			
4. The catalysts that increase ozone destruction. Catalytic ozone destruction processes. The emitted to environment anthropogenic materials that cause ozone decomposition. The	2			
5. The gases that naturally exist in the Earth's surface weather, their amounts and Henri constants. The chemical and photochemical processes of the interaction between these	1			
6. The antropogenic pollutants (carbon, nitrogenium and sulfur oxides, as well various hydrocarbons and etc.) released into weather. The theoretical basis of the photochemical	2			
7. The gases (greenhouse gases) and aerosols that absorb infrared rays. The mechanism of greenhouse effect occurance. The physical, physico-chemical and chemical processes	2			
8. The theoretical basis of the stability and of the induction of coaguliation of aerosol-like pollutants, formed from liquid and solid colloidal particles, and as well as of overall other	2			
9. The weathering of the silicate, carbonate, sulphide and gypsum rocks. The chemical materials formed during weathering and getting of these materials into the water bodies	2			
10. Inorganic chemical substances (including microelements) naturally existing in the soil and processes taking place in the presence of these substances. The materials that cause	2			
11. The carbon cycle in the soil, starting from reduction of carbon of CO2 (entered into soil from weather) and transition of the reduced carbon to the composition of organic	2			
12. Organic substances in soil. Formation of humus, its chemical composition and influence on the properties of soil. Ion exchange processes. Accumulation of pollutants	2			
13. The oxydation and reduction processes that are going on in water having oxygen and other oxidizers and as well iron compounds solved in it. Pourbaix diagrams describing	2			
14. The chemical materials that fall into the soil during fertilization (the chemical components of fertilizers), during pest extermination (pesticides and herbicides) and from	2			

15. The inorganic (clay) and organic colloidal impurities existing in the natural water. The theoratical basis of these impurities coagulation and removal.	2			
16. The chemical materials that falls into the soil through the burial of the hausehold and industrial wastes, including toxic wastes, and resulting from the decomposition of such	2			
17. The pathways for the getting into natural water bodies of the mostly polluting anthropogenic organic and inorganic chemical materials. Theoretical basis of the removal	2			
18. The chemical substances generated during splitting by burning and by other destruction methods of the hausehold and industrial wastes (polymeric materials, oil	2			
19. The sources of pollution of environment by toxic heavy metals (Hg, Pb, Cd, Cr) and as well by toxic metalloid (As). The chemical methods for the decontamination of these	2			
In total:	**36**			

Compilers of the module (name,surnaı**Modulio egzaminuotojai** (vardas, pavardė): **Katedros vedėjas** (vardas, pavardė):

Dainius Paliulis Dainius Paliulis Aušra Zigmontienė
Vaida Šerevičienė

Doktorantūros komisijos nutarimas

1. Modulis atestuojamas				
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Modulį atestavo
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Saulius Vasarevičius Data 2024-06-26