



COURSE UNIT (MODULE) DESCRIPTION

Course unit (module) title	Code
World of Chemical Elements	

Annotation
Lectures on this subject will introduce students to the discovery stories of all 118 chemical elements. Information will be provided on the distribution of chemical elements and their resources in nature, their availability, their cost and the main features of their use in the daily life of humanity and in the development of society. The most interesting properties of chemical elements will also be covered in this lecture cycle. Students will be made aware of the dangers posed by natural pollution and human health due to improper use of chemical elements and their compounds. The lectures will present interesting topics related to the discovery of chemical elements and the social, political, economic and cultural challenges facing society.

Lecturer(s)	Department(s) where the course unit (module) is delivered
Coordinator: prof. Aivaras Kareiva Other(s): Giedrė Nenartavičienė	Faculty of Chemistry and Geosciences, Institute of Chemistry

Study cycle	Type of the course unit (module)
First	Elective

Mode of delivery	Period when the course unit (module) is delivered	Language(s) of instruction
Face to face	Spring semester	English

Requirements for students
Prerequisites: English B1 or B2 level. Additional requirements (if any): -

Course (module) volume in credits	Total student's workload	Contact hours	Self-study hours
5	130	48	82

Purpose of the course unit (module): programme competences to be developed		
Impressive world of chemical elements aims to develop analytical, critical and creative thinking skills in describing and evaluating general chemical processes in nature; technological processes for chemical element production; risks to nature and human health; social, political, economic, and cultural challenges associated with element production.		
Learning outcomes of the course unit (module)	Teaching and learning methods	Assessment methods
Students will be able to identify, formulate and evaluate technological processes influencing the human nature.	Literary studies, active lecture, problematic teaching, comparative analysis.	Colloquium (written answers to mixed questions) - Writing a test, exam.
Students will be able to communicate effectively with individuals and with other groups on issues of nature and environmental problems.	Lectures, self-study, discussions.	Colloquium (written answers to open questions) - Writing a test, exam.
Students will be able to comprehend and critically evaluate the processes of pollution of	Lectures, self-study, discussions.	Colloquium (written answers to mixed questions) - Writing

our environment.		a test, exam.
Students will be able to comprehend and critically evaluate the resources of chemical elements, specific chemical processes for the production of chemical elements and its possible application in human life.	Literature overview, self-study.	Colloquium (written answers to mixed questions) - Writing a test, exam.
Students will understand and be able to use the basic concepts of the history of chemistry.	Lectures, self-study, discussions.	Colloquium (written answers to mixed questions) - Writing a test, exam.

Content: breakdown of the topics	Contact hours							Self-study work: time and assignments	
	Lectures	Tutorials	Seminars	Exercises	Laboratory work	Internship/work placement	Contact hours	Self-study hours	Assignments
1. The discovery of chemical elements of the first period, the origin of names, their distribution in nature, the most important properties, use in human life. Importance of water.	1		1				2	2	Preparation for discussion, answers to open questions.
2. The discovery of chemical elements of the second period, the origin of names, their distribution in nature, the most important properties, use in human life. Carbon compounds and global warming.	3		1				4	5	1. Tom Jackson. The Elements Book: A Visual Encyclopedia of the Periodic Table. DK Publishing, New York, 2017.
3. The discovery of chemical elements of the third period, the origin of names, their distribution in nature, the most important properties, use in human life. Economic importance of aluminium. Silicates and construction industry.	3		2				5	5	2. Theodore Gray. Elements: A Visual Exploration of Every Known Atom in the Universe. Black Dog & Leventhal Publishers, New York, 2012.
4. The discovery of chemical elements of the fourth period, the origin of names, their distribution in nature, the most important properties, use in human life. Calcium and its compounds in medicine. Interesting metallurgy.	4		2				6	5	3. Theodore Gray. Molecules: The Elements and the Architecture of Everything. Black Dog & Leventhal Publishers, New York, 2014. 4. Chemical Elements. http://chemicalelements.com/ . 5. Chemical elements alphabetically listed. https://www.lenntech.com/periodic/name/alphabet.htm 6. David E. Newton. The Chemical Elements. Franklin Watts Inc.,

									UK, 2000. 7. Hugh Aldersey-Williams. Periodic Tales: A Cultural History of the Elements, from Arsenic to Zinc. ECCO, New York, 2012. 8. David Heiserman. Exploring Chemical Elements and Their Compounds. McGraw-Hill, New York, 1991.
Preparation for Colloquium								20	Study of compulsory literature
5. The discovery of chemical elements of the fifth period, the origin of names, their distribution in nature, the most important properties, use in human life. The most expensive elements.	4		2				6	5	1. Tom Jackson. The Elements Book: A Visual Encyclopedia of the Periodic Table. DK Publishing, New York, 2017.
6. The discovery of lanthanides, the origin of names, their distribution in nature, the most important properties, use in human life. The similarity of lanthanides.	4		2				6	5	2. Theodore Gray. Elements: A Visual Exploration of Every Known Atom in the Universe. Black Dog & Leventhal Publishers, New York, 2012.
7. The discovery of chemical elements of the sixth period, the origin of names, their distribution in nature, the most important properties, use in human life. The specificity.	5		2				7	5	3. Theodore Gray. Molecules: The Elements and the Architecture of Everything. Black Dog & Leventhal Publishers, New York, 2014.
8. The discovery of actinides, the origin of names, their distribution in nature, the most important properties, use in human life. Importance of nobel metals in social life.	4		2				6	5	4. Chemical Elements. http://chemicalelements.com/ .
9. The discovery of chemical elements of the seventh period, the origin of names, their distribution in nature, the most important properties, use in human life. The discovery of metals and politics.	4		2				6	5	5. Chemical elements alphabetically listed. https://www.lenntech.com/periodic/name/alphabetical.htm 6. David E. Newton. The Chemical Elements. Franklin Watts Inc., UK, 2000. 7. Hugh Aldersey-Williams. Periodic Tales: A

									Cultural History of the Elements, from Arsenic to Zinc. ECCO, New York, 2012. David Heiserman. Exploring Chemical Elements and Their Compounds. McGraw-Hill, New York, 1991.
Preparation for Exam								20	Study of compulsory literature
Total	32		16				48	82	

Assessment strategy	Weight, %	Deadline	Assessment criteria
Colloquium (written answers to mixed questions) - Writing a test.	50	8th semester week.	Answers to mixed questions on the topics covered. Colloquium questions include the topics covered in the first part of the course, lectures and discussions. It is necessary to answer 10 questions, each of which is evaluated by 1 point (evaluation criteria below) and the general assessment summarizes individual questions. 10 points consist of 33.3% of total grade of Exam. Evaluation Criteria: 1 point evaluates the answer, giving a detailed and clear answer to a question based not only on lecture material but also on its own, substantiated reasoning. The 0.5 point evaluates the answer in detail, but not very accurately. A score of 0.25 is considered the answer to be vague or incomplete, with several major errors. 0 points no answer or it's completely wrong.
Exam (written answers to mixed questions) - Writing a test.	50	During exam session	Answers to mixed questions on the topics covered. Exam questions include the topics covered in the first part of the course, lectures and discussions. It is necessary to answer 10 questions, each of which is evaluated by 1 point (evaluation criteria below) and the general assessment summarizes individual questions. 10 points consist of 33.4% of total grade of Exam. Evaluation Criteria: 1 point evaluates the answer, giving a detailed and clear answer to a question based not only on lecture material but also on its own, substantiated reasoning. The 0.5 point evaluates the answer in detail, but not very accurately. A score of 0.25 is considered the answer to be vague or incomplete, with several major errors. 0 points no answer or it's completely wrong.
Exam assessment is a summative assessment, summed from colloquium and exam assessments. To pass exam, the student has obtained minimum grade 5.			

Author	Year of publication	Title	Issue of a periodical or volume of a publication	Publishing place and house or web link
Compulsory reading				

T. Jackson	2017	The Elements Book: A Visual Encyclopedia of the Periodic Table.		DK Publishing, New York
T. Gray	2012	Elements: A Visual Exploration of Every Known Atom in the Universe.		Black Dog & Leventhal Publishers, New York
	2019	Chemical elements alphabetically listed.		https://www.lenntech.com/periodic/name/alphabetic.htm
D. E. Newton.	2000	The Chemical Elements		Franklin Watts Inc., UK, London.
	2019			https://www.rsc.org/periodic-table/
Optional reading				
T. Gray	2014	Molecules: The Elements and the Architecture of Everything		Black Dog & Leventhal Publishers, New York
	2019	Chemical Elements.		http://chemicalelements.com/
A.W. Hugh	2012	Periodic Tales: A Cultural History of the Elements, from Arsenic to Zinc.		ECCO, New York
D. Heiserman.	1991	Exploring Chemical Elements and Their Compounds		McGraw-Hill, New York
	2019			https://www.merriam-webster.com/dictionary
	2019			https://www.lenntech.com/periodic/elements
	2019			https://www.webelements.com