RTU Course "General Chemistry"

14821 Ķīmijas katedra

General data

Code	ĶVĶ109
Course title	General Chemistry
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Undergraduate Studies
Course type	Academic
Field of study	Chemistry and Chemical Technology
Responsible instructor	Valdis Kampars
Academic staff	Jānis Vaivads Jānis Millers Māra Plotniece Nelli Batenko Anastasija Antropa Mārīte Tijāre
Volume of the course: parts and credits points	1 part, 2.0 Credit Points, 3.0 ECTS credits
Language of instruction	LV, EN
Possibility of distance learning	Not planned
Abstract	Thermodynamics. Inner energy of a system and its change. Pure substances, mixtures and materials. Disperse systems and solutions. Water, its use and significance. General properties of metals. Electrochemistry. Galvanic cells. Sources of current - batteries, accumulators. Chemical and electrochemical corrosion of metals. Organic compounds. Classes of compounds.
Goals and objectives of the course in terms of competences and skills	Student has good knowledge of thermodynamic processes and their use, recognises the different types of disperse systems in nature and technologies, student has good skills of the topics of the quality of drinkable water and water for domestic use. Student has gained knowledge of the characteristics of metals used in technology and domestic situations, understands electrochemical processes, can assess the suitability of accumulators and other chemical sources of current for a specific purpose. The student has gained knowledge of alternative energy like the use of hydrogen in car engines.
Structure and tasks of independent studies	Student prepares the labs independent – develop, execute the protocols and acquire the theoretical part. Student prepare independent the home works to several subjects and arrange the colloquiums – assessment of knowledge about the subject.
Recommended literature	1. McQuarrie, D.A., Rock, P.A. General Chemistry. 2nd ed. New York: W.H.Freeman and Company, 1997. 876 p. 2. Chang, R. Chemistry. McGraw-Hill Inc. 1991. 516 p. 3. Kokars, V. Vispārīgā ķīmija. Rīga: RTU, KTF, 1999. 209 lpp. 4. Laboratorijas darbi ķīmijā. Augstskolu inženiertehniskajām specialitātēm, vidusskolām un koledžām. V.Kampars, A.Blūms, V.Brunere, L.Kamzole. Rīga: RTU, 19994. 190 lpp. 5. Laboratorijas darbi ķīmijā. Tehnisko augstskolu studentiem. Sastādījuši: J.Kreicberga, V.Kampars. Rīga, 2002. 111 lpp. 6. Steigens, A. Nākotne sākas šodien. Rīga: Nordik, 1999. 221 lpp. 7. Ansone,I., Kuhare, G., Puriņa,G. Vides zinību terminu skaidrojošā vārdnīca. LR IZM. Rīga: Jumava, 1999. 252 lpp. 8. Kļaviņš, M. Vides piesārņojums un tā iedarbība. Rīga: LU, 2009. 199 lpp. 9. Environmental science. L.Ryden, P.Migula, M.Anderson, M.Lehman. Uppsala: The Baltic University Press, 2003. 824 p.
Course prerequisites	„General chemistry'' or ''Chemistry'' in secondary education programmes

Course outline

Theme	Hours
Thermodynamics. Inner energy of a system and its change. Heat effects of processes.	2
Pure substances, mixtures and materials (FCIT). Chemical kynetics (FET)	2
Disperse systems and solutions. Acids and bases. Water solutions. pH.	2
Water, its use and significance (FCIT). General properties of metals (FET).	2
Electrochemistry. Galvanic cells. Sources of current - batteries, accumulators. Fuel cells and energetic of hydrogen.	2
Principles of electrochemical corrosion of metals and protections methods.	2
Organic compounds.	2
Inorganic compounds.	2
Seminar about the classes of inorganic compounds. Work safety instruction.	2
Nomenclature of inorganic compounds - colloquium.	2
Chemical termodynamics, heat effect of reactions.	2
Quality of water. Control of pH, conductivity, hardness (FCIT). Chemical properties of metals (FET).	2

Chemical properties of metals (FCIT). General properties of metals - colloquium (FET).	2
Electrochemistry. Galvanic cell, electromotive force. Corrosion of metals.	2
Fuel cell. Fuel cell automobile.	2
Organic compounds	2

Learning outcomes and assessment

Learning outcomes	Assessment methods
Student is able: To evaluate processes of thermodynamics, its energetic effects, to compare energetic capacity of substances, to evaluate dynamics of chemical equilibrium	Processing and defence of laboratory works
To give examples of disperse systems in domestic situations and technologies	Processing and defence of laboratory works
To analyse the quality of drinking water and water for use in technological processes, evaluate its contamination	Processing and defence of laboratory works
Illustrate properties of metals and their significance in electrochemical processes	Processing and defence of laboratory works
To evaluate significance of chemical sources of current and suitability for existing situation	Processing and defence of laboratory works

Study subject structure

Part	CP	ECTS	Hours per Week			Tests		
			Lectures	Practical	Lab.	Test	Exam	Work
1.	2.0	3.0	1.0	0.0	1.0	*		