Informačný list predmetu

Vysoká škola: Žilinská univerzita	
Fakulta: Strojnícka fakulta	
Kód predmetu: 2Y004	**Názov predmetu:** Technical Chemistry (TCH_E)
Druh, rozsah a metóda vzdelávacích činností: 1 - 1 - 1 (prednášky-cvičenia-lab.cv.) hodín za týždeň, kombinovaná metóda výučby.	
Počet kreditov: 5.0	
Odporúčaný semester/trimester štúdia: 1 semester	
Stupeň štúdia: 4	
Podmieňujúce predmety:	

Podmienky na absolvovanie predmetu:
Priebežné hodnotenie:

Záverečné hodnotenie:
Written and oral exam.
Final classification of the subject:
Evaluation A: 93 - 100 points
Evaluation B: 85 - 92 points
Evaluation C: 77 - 84 points
Evaluation D: 69 - 76 points
Evaluation E: 61 - 68 points
FX Evaluation: Less than 61 points
Minimálny počet bodov pre prihlásenie na skúšku nie je zadaný

Výsledky vzdelávania:
The subject explains the nature of chemical properties of substances, deals with relationships between chemical bonds, structure and physical properties of substances. It explains energetic background of chemical processes and mechanisms of their realization. Students will acquire skills in working with chemicals and in developing experimental apparatus for chemical processes. The course is intended mainly for engineering and electrotechnical study projects.

Stručná osnova predmetu:
• Introduction - the subject of chemistry, basic laws and concepts in chemistry. Law of conservation of mass, energy, terms - substance, chemically pure substance, mixture, element, compound, atom, molecule, chemical formula,chemical reaction, chemical equation, reactants, products.
• Atom structure. Atomic nucleus, current concept of electron shell construction - wave mechanical concept of electron.
• Periodic system of elements and its relation to the electron structure of atoms. Periodic law, description and characteristics of PSP groups and periods.
• Chemical bonds. The essence of ionic, covalent and metal bonding. Polar covalent bond, dipole moment and molecular structure. Intermolecular action - van der Waals forces, hydrogen bond.
• Matter states of substances. Solid state - crystalline and amorphous substances, types of crystals according to the type of chemical bonds, polymorphism, isomorphia. Liquid state - surface tension, viscosity. Gaseous state - ideal gas, laws, equation of state, real gas, critical state.
• Fundamentals of chemical thermodynamics - state functions - internal energy, enthalpy, entropy, Gibbs energy, spontaneous chemical processes, thermodynamic equilibrium conditions.
• Thermochemical laws.
• Kinetics of chemical reactions - rate of chemical reactions, its dependence on concentration, temperature, catalysts, kinetics of chemical equilibrium.

• Homogeneous systems - solutions - liquid right solutions, types of solvents, dissolution, solubility. Aqueous solutions - electrolytes, pH, acids, bases - Bronsted and Lewis theory, acid-base indicators.
• Heterogeneous systems - phase, component, degree of freedom, Gibbs law of phases, 1,2,3-component systems.
• Oxidation-reduction processes - terms oxidation, reduction, oxidation number, redox reactions, reactions of metals in water, acidic and alkaline solutions.
• Processes in heterogeneous electrochemical systems. Electrode reactions, electrolysis, Faraday's laws.

Odporúčaná literatúra:

Zatkalíková, V. - Liptáková, T. 2013. Základy chémie pre technikov. 1. vyd. Žilina: EDIS 2013.
Atkins, P. – De Paula, J. 2009. Atkins' Physical Chemistry , Oxford University Press 2009.
Novák, J. a kol. 2007. Fyzikální chemie. VŠCHT Praha 2007.

Jazyk, ktorého znalosť je potrebná na absolvovanie predmetu: English

Poznámky:

Hodnotenie predmetov:
Celkový počet hodnotených študentov:

A	B	C	D	E	FX

Vyučujúci:
prof. RNDr. Tatiana Liptáková, PhD.

Dátum poslednej zmeny: 2022-12-07

Schválil: prof. Ing. Eva Tillová, PhD.