

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	KEMIJA
Course title:	CHEMISTRY

Študijski program Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
INŽENIRING IN VOZILA	-	prvi	prvi
ENGINEERING AND VEHICLES	-	first	first

Vrsta predmeta / Course type

Obvezni / Obligatory

Univerzitetna koda predmeta / University course code:

VS_11003

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
45	-	5	25	-	75	5

Nosilec predmeta / Lecturer:

doc. dr. Igor Simonič

**Jeziki /
Languages:**

**Predavanja /
Lectures:**
Vaje / Tutorial:

Slovenski / Slovenian
Slovenski / Slovenian

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Prerequisites:

- vpis v prvi letnik študija

- enrolment in the first year of studies

Vsebina:

Content (Syllabus outline):

Predavanja: Osnovni kemijski pojmi in stehiometrija. Struktura molekul in kemijska vez. Energijske spremembe v kemijskih sistemih. Raztopine. Kisline, baze, soli. Kemijske reakcije (nevtralizacija, hidroliza, redoks reakcije) in njihova praktična uporaba. Baterije, akumulatorji, gorivni členi. Osnove kemijske kinetike. Aplikacije v industriji. Kovine, pregled lastnosti in uporabe nekaterih.
Zgradba organskih spojin. Ogljikovodiki, alkoholi, aldehidi, ketoni, kisline, etri, estri, organske dušikove spojine (amini, nitrili, nitrati, aminokislina, peptidi, proteini), heterociklične spojine. Pomen in uporaba kemijskih tehnologij.
Vaje: Priprava raztopin. Merjenje gostote tekočih goriv. Določanje koncentracije kislin oz. baz., merjenje vrednosti pH. Priprava galvanskih členov, merjenje potenciala. Kemijska karakterizacija biodizla.

Lectures: Basic chemical terminology and stoichiometry. Structure of molecules and chemical bonds. Energy changes in chemical systems. Solutions. Acids, bases, salts. Chemical reactions (neutralization, hydrolysis, redox reactions) and their practical use. Batteries, accumulators, fuel cells. Fundamentals of chemical kinetics. Applications in industry. Metals, review of properties and employability of some of them.
Structure of organic compounds. Hydrocarbons, alcohols, aldehydes, ketones, ethers, esters, organic nitrogen compounds, heterocyclic compounds. The importance of chemical technologies and their recent development.
Laboratory practice: Solutions preparation. Measurement of fuel density. Determination of concentration of acids and bases, pH measurements. Preparing of galvanic cells, measurement of electric potential. Chemical characterization of bio diesel.

Velja od: 1. 10. 2019

Sprejel: Senat FINI Novo mesto

Temeljni literatura in viri / Readings:

OBVEZNA / OBLIGATORY

- Atkins, P. W., Clugston, M. J., Frazer, M. J., Jones, R. A. Y., 1995. KEMIJA, Zakonitosti in uporaba. Tehniška založba Slovenije. Ljubljana, 543 s.
- Rudan Tasič D., Klofutar C. 2011. VAJE IZ KEMIJE. Fakulteta za industrijski inženiring. Novo mesto.
- Vrtačnik, M., Zupančič Brouwer, N., 2002. Organska kemija. Tehniška založba Slovenije. Ljubljana, 240 s.
- E-gradiva predmeta / E-Course material

PRIPOROČLJIVA / RECOMMENDED

- Austin, George T., 1985. Shreve's Chemical Process Industries, International Students Edition, McGraw-Hill, 859 p.
- Čeh, B., 2005. SPLOŠNA IN ANORGANSKA KEMIJA-zbirka pojmov, vprašanj in nalog z odgovori. Univerza v Ljubljani, Fakulteta za kemijo in kemijsko tehnologijo. Ljubljana, 240 s.
- Green, Mark M. / Witcoff, Harold A., 2003. Organic Chemistry Principles and Industrial Practice. VCH, ISBN 3-527-30289-1.
- Solomons, G., Fryhle, C. B., 2000. Organic Chemistry, Seventh Edition. John Wiley and Sons, Inc. New York, p 1258 s.
- Tišler, M., 2005. Organska kemija, 3. popravljena in dopolnjena izdaja, Državna založba Slovenije, Ljubljana.

Cilji in kompetence:

Cilji: <p>Predmet daje študentom teoretične osnove mnogih naravnih pojavov in razlago zakonitosti, na katerih je osnovana kemijska in fizikalno kemijska klasifikacija materije. Predstavljena je povezava med zgradbo snovi in njenim vplivom na kemijske ter fizikalne lastnosti snovi. V okviru predmeta slušatelj spozna nekatere teoretične in eksperimentalne metode, ki so osnova pri reševanju tehnoloških problemov, zlasti v povezavi z njihovo bodočo dejavnostjo v industriji, obrti in storitvah.</p>
Kompetence: <ul style="list-style-type: none">– Sposobnost uporabe pridobljenega teoretičnega znanja v praksi– Usposobljenost za ocenjevanje in vrednotenje merilnih rezultatov– Usposobljenost za načrtovanje in spremljanje tehnoloških procesov

Objectives and competences:

Objectives: <p>The course gives students theoretical basis of several natural phenomena and explanation of principles, on which chemical and physical classification of matter is established. Correlation between substance structure and its effect on chemical and physical properties of the substance is presented. During the course students get to know some theoretical and practical experimental methods that are the basis of solving technological problems, especially in connection with their future industry, trade and service activities.</p>
Competences: <ul style="list-style-type: none">– Ability of using of the gained theoretical knowledge in practical work– Qualification for estimation and evaluation of measuring results– Qualification for planning and monitoring of technological processes

Predvideni študijski rezultati:

Študent/študentka: <ul style="list-style-type: none">– osveži in nadgradi znanje iz kemije z nižjih nivojev šolanja– poglobi razumevanje kemijskih konceptov in tudi njihove medsebojne povezanosti in soodvisnosti– spozna povezave med zgradbo in fizikalno-kemijskimi lastnostmi snovi– spozna nekatere teoretične in eksperimentalne metode, ki so osnova pri

Intended learning outcomes:

Student: <ul style="list-style-type: none">– freshens up and upgrades his/her knowledge in chemistry from lower school levels– deepens his/her understanding of chemical concepts including their interconnectedness and interdependence– understands correlations between structure and physico-chemical properties of substances– comes to know several theoretical and

<p>pripravi, spremljanju, vodenju in razumevanju določenih tehnoloških postopkov.</p> <ul style="list-style-type: none"> – pridobi osnovna praktična in teoretična znanja iz različnih področij kemije (splošna, anorganska, organska, fizikalna, analizna kemija). 	<p>experimental methods that are the basis of preparing, monitoring, managing and understanding of different technological procedures</p> <ul style="list-style-type: none"> – comes to know basic practical and theoretical knowledge of different fields of chemistry (general, inorganic, organic, physical, analytical chemistry).
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Metode poučevanja in učenja:

- predavanja z aktivno udeležbo študentov (razlaga, razprave, odgovori na vprašanja) in prikaz praktičnih primerov s pomočjo sodobnih pedagoških pripomočkov
- individualno in skupinsko delo s študenti v obliki konzultacij
- laboratorijske vaje v ustrezno fizikalno kemijsko opremljenem laboratoriju
- strokovne ekskurzije in ogledi izbranih kemijskih industrij

Predmet je oblikovan na kombinirani način študija, ki vključuje aktivnosti preko elektronskega (on-line) okolja: te aktivnosti so sestavljene iz samostojnih in skupinskih aktivnosti z uporabo učnega okolja Moodle in drugih elektronskih vsebin. Praviloma vključujejo diskusije v forumih, spletne strani, ogled posnetih predavanj in vaj, preverjanje znanja, odgovori na vprašanja, iskanje po spletu (bazah) itd.

Learning and teaching methods:

- lectures with active participation of students (explanation, discussions, answers to questions) and presentation of practical examples with the help of modern teaching aids
- individual and group work with students in the form of consultations
- lab work in well equipped physico-chemical laboratory
- field trips and tours of selected chemical industries

The course is designed as blended learning that includes online activities:

Online activities consist of independent and group activities using the LMS Moodle and other electronic or online content. Activities usually include discussions in forums, websites, viewing of recorded lectures and tutorials, assessments, answering questions, searching the web (databases), etc.

Načini ocenjevanja:

Delež/Weight (%)

Assessment:

<p>Pogoj za pristop k izpitu je pozitivno ocenjen kolokvij iz vaj.</p> <p>Vaje:</p> <ul style="list-style-type: none"> – praktično delo in poročila iz vaj – kolokvij iz vaj <p>Izpit:</p> <ul style="list-style-type: none"> – pisni izpit – ustni izpit <p>Ocenjevalna lestvica je skladna z ECTS in Pravilnikom o preverjanju in ocenjevanju znanja FINI NM.</p>	<p>70 %</p> <p>30 %</p>	<p>Passed colloquium from lab work is needed to enter the final exam.</p> <p>Experimental work:</p> <ul style="list-style-type: none"> – practical work and coursework report – colloquium from lab work <p>Examination:</p> <ul style="list-style-type: none"> – written examination – oral examination <p>Evaluation scale in accordance with ECTS and the Rules on the Evaluation and Assessment of Knowledge FINI NM.</p>
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Reference nosilca / Lecturer's references:

1. STANOVNIK, Branko, SVETE, Jurij, TIŠLER, Miha, ŽORŽ, Lilijana, HVALA, Aleš, SIMONIČ, Igor. Transformation of amines and N-heterorylformamidines into esters of substituted [beta]-amino-[alpha],[beta]dehydro-[alpha]-amino acids. Heterocycles, 1988, vol. 27, no. 4, str. 903-909. [COBISS.SI-ID

Velja od: 1. 10. 2019

Sprejel: Senat FINI Novo mesto

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2. HVALA, Aleš, SIMONIČ, Igor, STANOVNIK, Branko, SVETE, Jurij, TIHI, Jaroslav, TIŠLER, Miha. Methyl 2-benzoylamino-3-dimethylaminopropenoate, a versatile reagent in organic synthesis. The transformation of various heterocyclic amines into methyl 2-benzoylamino-3-heteroarylaminopropenoates. Vestn. Slov. kem. druš., 1989, let. 36, št. 3, str.305-323. [COBISS.SI-ID 11185410]
3. STANOVNIK, Branko, BOVENKAMP, Henry van der, SVETE, Jurij, HVALA, Aleš, SIMONIČ, Igor, TIŠLER, Miha. Methyl 2-benzoylamino-3-dimethylaminopropenoate in the synthesis of heterocyclic systems. An attempt to prepare benzoylamino substituted azolo- and azinopyrimidines with a bridgehead nitrogen atom. J. heterocycl. chem., February 1990, vol. 27, no. 2, str. 359-361. [COBISS.SI-ID 19424261]
4. SIMONIČ, Igor. Synthesis of some new potential biologically active 1,4-dihydropyridines. Acta chim. slov.. [Tiskana izd.], 1997, 44, 1, str. 95-104. [COBISS.SI-ID 19403269]
5. SIMONIČ, Igor, STANOVNIK, Branko. The synthesis of some dialkyl 4-(3-substituted amino)phenyl-1,4-dihydro-2,6-dimethylpyridine 3, 5-dicarboxylates. J. heterocycl. chem., 1997, letn. 34, št. 6, str. 1725-1730. [COBISS.SI-ID 9464537]
6. SIMONIČ, Igor. Hantzscheva sinteza dihidropiridinov. Kem. šoli, oktober 1999, letn. 11, št. 3, str. 17-21. [COBISS.SI-ID 3262025]
7. SIMONIČ, Igor, ZUPANČIČ, Silvo, GOLIČ, Ljubo, STANOVNIK, Branko. Fotokemična pretvorba dietil (E)-4-[2-[2-(tert-butoksikarbonil)vinil]fenil]-2,6-dimetil-1,4-dihidropiridin-3,5-dikarboksilata. V: GLAVIČ, Peter (ur.), BRODNJAK-VONČINA, Darinka (ur.). Slovenski kemijski dnevi 2001, Maribor, 20. in 21. september 2001. Zbornik referatov s posvetovanja. Maribor: Slovensko kemijsko društvo, 2001, str. 339-342. [COBISS.SI-ID 23838469]
8. SIMONIČ, Igor, ZUPANČIČ, Silvo, GOLOBIČ, Amalija, GOLIČ, Ljubo, STANOVNIK, Branko. The crystal structure of lacidipine phototransformation product. Acta chim. slov.. [Tiskana izd.], 2008, vol. 55, no. 2, str. 458-461. [COBISS.SI-ID 29570053]
9. ZUPANČIČ, Vinko, SMRKOLJ, Matej, BENKIČ, Primož, SIMONIČ, Igor, PLEVNIK, Miha, RITLOP, Gregor, KRISTL, Albin, VREČER, Franc. Preformulation investigation of some clopidogrel addition salts. Acta chim. slov.. [Tiskana izd.], 2010, vol. 57, no. 2, str. 376-385. [COBISS.SI-ID 2822769]
10. SIMONIČ, Igor, BENKIČ, Primož, VAJS, Anamarija, KRAMAR, Andrejka, ŠTIMAC, Anton. Process for preparing crystalline form II of orlistat : EP1973893 B1. München: European Patent Office, 2016. [COBISS.SI-ID 4284529]
11. SIMONIČ, Igor, BENKIČ, Primož, ZUPET, Rok, SMRKOLJ, Matej, ŠTUKELJ, Mitja. Process for the synthesis of clopidogrel and new forms of pharmaceutically acceptable salts thereof : EP2078025 B1. München: European Patent Office, 2016. [COBISS.SI-ID 4281969]
12. KOTAR-JORDAN, Berta, SIMONIČ, Igor, ZUPET, Rok, RUŽIČ, Miloš, GRČMAN, Marija, PEČAVAR, Anica. Crystallisation of solid forms of clopidogrel addition salts : EP 1656381 B1 : patent. München: European Patent Office, 2011. [COBISS.SI-ID4281457]