Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Organska kemija 1**
Course title:	**Organic chemistry 1**

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Enovit magistrski študijski program druge stopnje Predmetni učitelj	**/**	**2.**	**3.**
Five-year master's degree program Subject Teacher	**/**	**2.**	**3**

Vrsta predmeta / Course type Obvezni / Obligatory

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial			Klinične vaje Clinical training	Druge oblike študija Other forms of study	Samost. delo Individual work	ECTS
		AV	LV	RV				
45							75	4

Nosilec predmeta / Lecturer: Peter KRAJNC

Jeziki / Languages:
Predavanja / Lectures: slovenski / slovene
Vaje / Tutorial: slovenski / slovene

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

Znanje splošne kemije.

Prerequisits:

Knowledge of general chemistry.

Vsebina (kratek pregled učnega načrta):

Content (Syllabus outline):

Uvod: definicija, področja, namen in cilji organske kemije. Osnovni tipi organskih spojin- tvorba vezi. Osnovni tipi organskih spojin-funkcionalne skupine.IUPAC nomenklatura organskih spojin. Izomerija, stereokemija, tavtomerija. Resonanca in vplivi substituentov. Tipične reakcije organskih spojin-predstavitev. Proton transfer-kisline in baze, pomen pKa, pKa lestvica. Kaj je reakcijski mehanizem; intermediati, kinetika in termodinamika v organski kemiji. Spektroskopija organskih molekul Načini priprav organskih makromolekul.	Introduction: definition, fields, goals of organic chemistry. Types of organic compounds-bond formation . Types of organic compounds-functional groups. IUPAC nomenclature of organic compounds. Isomery, stereochemistry, tautomery. Resonance and influence of substituents. Typical organic reactions-introduction. Proton transfer-acids and bases, pKa meaning and table. Reaction mechanism; reaction intermediates, kinetics and thermodynamics in organic chemisry. Spectroscopy of organic molecules Methods for preparation of organic macromolecules. arbonyl group,

1.	1.

Temeljni literatura in viri / Reading materials:

- John McMurry, Organic Chemistry, Cengage Learning, Boston, 2016.
- M. Tišler, Organska kemija, Ljubljana: Fakulteta za kemijo in kemijsko tehnologijo, Ljubljana, 2013.
- M. A. Fox, J. K. Whitesell, Organic Chemistry, Jones and Barlett, Boston, 2004.

Dodatna priporočena literatura:

- P. Y. Bruice, Organic chemistry, Prentice Hall, 2006.
- K.P.C. Vollhardt, N.E. Schore, Organic Chemistry - Structure and Function, W. H. Freeman, 2018.

Cilji in kompetence:	**Objectives and competences:**
Spoznati obseg in cilje organske kemije ter vpetost vede v procese žive in nežive narave. Poznati principe povezovanja atomov v organskih molekulah ter tipe geometrije organskih molekul. Poznati nomenklaturo organskih spojin, v skladu z IUPAC pravili znati poimenovati spojino ter narisati ustrezno formulo, razpoznati različne izomere. Razumeti vplive skupin na reaktivnost molekule in predvidevati spremembe nastale zaradi spremenjene strukture. Poznati osnovne tipe organskih reakcij; substitucije, adicije, eliminacije. Razumeti pomen prenosa protona in vpliv pKa vrednosti. Spoznati spektroskopske metode, ki se uporabljajo za analizo organskih spojin. Spoznati in razumeti osnovne mehanizme priprav organskih makromolekul.	To know: the goals and reach of organic chemistry, its role in living and non-living processes, the principles of atom bonding in organic molecules and types of molecule geometry, the rules of IUPAC nomenclature for organic compounds and to apply them for formulae naming, the differences in isomeric compounds, the basic types of organic reactions; substitutions, additions, eliminations. To understand the influences of functional groups on the molecule stability and reactivity. To understand the proton transfer importance and the influence of pKa value. To be familiarized with basic spectroscopic methods used for the characterization of organic compounds. To know and understand basic mechanisms of the preparation of organic macromolecules.

Predvideni študijski rezultati:	**Intended learning outcomes:**

Znanje in razumevanje: Študent bo sposoben: • opisati principe povezovanja atomov v organskih molekulah, tipe hibridizacij • uporabljati pravila IUPAC nomenklature za organske spojine • opisati vplive skupin na stabilnost in reaktivnost molekul • razlikovati osnovne tipe organskih reakcij • opisati mehanizme kemijskih reakcij priprave • razvrščati organske spojine med kisline in baze ter razume vpliv pKa vrednosti **Prenesljive/ključne spretnosti in drugi atributi:**	**Knowledge and understanding:** Student will be able to: • describe the principles of atom bonding in organic molecules and types of molecule geometry, types of hybridization • apply the rules of IUPAC nomenclature to organic compounds thus naming them appropriately • describe the influences of functional groups on the molecule stability and reactivity • distinguish basic types of organic reactions. • describe the mechanisms of chemical reactions of preparation • classify organic compounds between bases and acids and to undersand the importance of pKa value. **Transferable/Key Skills and other attributes:**

Metode poučevanja in učenja: **Learning and teaching methods:**

Predavanja	Lectures

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Pisni izpit (ali kolokviji) Ustni izpit	6040	Written exam (or partial exams) Oral exam

Reference nosilca / Lecturer's references:

HOBIGER, Viola, PALJEVAC, Muzafera, KRAJNC, Peter. Emulsion templated porous poly(thiol-enes): influence of photopolymerisation, emulsion composition, and phase behaviour on the porous structure and morphology. Polymers. March 2022, vol. 14, iss. 7, 12 str., ilustr. ISSN 2073-4360. DOI: 10.3390/polym14071338.

RAVBAR, Miha, KOLER, Amadeja, PALJEVAC, Muzafera, KRAJNC, Peter, KOLAR, Mitja, ISKRA, Jernej. Reusable Pd-PolyHIPE for Suzuki–Miyaura coupling. ACS omega. 2022, vol. 7, no. 15, str. 12610–12616, ilustr. ISSN 2470-1343. DOI: 10.1021/acsomega.1c06318. [COBISS.SI-ID 104201731]

KOLER, Amadeja, KOLAR, Mitja, JEŘÁBEK, Karel, KRAJNC, Peter. Influence of functional group concentration on hypercrosslinking of poly(vinylbenzyl chloride) PolyHIPEs: upgrading macroporosity with nanoporosity. Polymers. 14 Avg. 2021, vol. 13, iss. 16, str. 1-10, ilustr. ISSN 2073-4360. DOI: 10.3390/polym13162721.

HOBIGER, Viola, ZAHORANOVA, Anna, BAUDIS, Stefan, LISKA, Robert, KRAJNC, Peter. Thiol-Ene cross-linking of Poly(ethylene glycol) within high internal phase emulsions: degradable hydrophilic PolyHIPEs for controlled drug release. Macromolecules. Nov. 23, 2021, vol. 54, iss. 22, str. 10370-10380, ilustr. ISSN 1520-5835. DOI: 10.1021/acs.macromol.1c01240.

KAWADA, Kosuke, OKANO, Koji, ISKRA, Jernej, KRAJNC, Peter, CAHARD, Dominique. SelectfluorTM on a PolyHIPE material as regenerative and reusable polymer-supported electrophilic fluorinating agent.

Advanced Synthesis & Catalysis, ISSN 1615-4150. [Print ed.], 2017, vol. 359, no. 4, str. 584-589, doi: 10.1002/adsc.201601312.
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