



OPIS PREDMETA / SUBJECT SPECIFICATION

<b>Predmet:</b> <b>Subject Title:</b>	Organska kemija 1  Organic chemistry 1
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Študijski program Study programme	Študijska smer Study field	Letnik Year	Semester Semester
Izobraževalna kemija Educational Chemistry		2	Zimski Autumn

Univerzitetna koda predmeta / University subject code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. Vaje Lab. Work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
60	15		45		240	12

Nosilec predmeta / Lecturer:

<b>Jeziki /</b> <b>Languages:</b>	<b>Predavanja / Lecture:</b>	slovenski / Slovenian
	<b>Vaje / Tutorial:</b>	slovenski / Slovenian

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

**Prerequisites:**

Znanje splošne kemije.

Knowledge of general chemistry.

**Vsebina:**

**Contents (Syllabus outline):**

Uvod: definicija, področja, namen in cilji organske kemije.  
Osnovni tipi organskih spojin- tvorba vezi (hibridizacija in teorija molekularnih orbital).  
Osnovni tipi organskih spojin-funkcionalne skupine. IUPAC nomenklatura organskih spojin.  
Izomerija, stereokemija, tautomerija.  
Resonanca in vplivi substituentov.  
Tipične reakcije organskih spojin-predstavitev.  
Proton transfer-kislina in baze, pomen pKa, pKa lestvica. Lewisove kisline in baze.  
Kaj je reakcijski mehanizem; intermediati, kinetika in termodinamika.  
Organske reakcije: nukleofilne adicije na karbonilno skupino, nukleofilne substitucije in eliminacije na karbonilni skupini, nukleofilne substitucije in eliminacije na sp<sup>3</sup> C atomu, polarne adicije.  
  
Laboratorijske vaje:  
1. del: čiščenje organskih spojin, določanje fizikalnih konstant.  
2. del: organska analitika- atomarna sestava, funkcionalne skupine, kromatografija.

Introduction: definition, fields, goals of organic chemistry.  
Types of organic compounds-bond formation (hybridization and MO theory).  
Types of organic compounds-functional groups. IUPAC nomenclature of organic compounds.  
Isomerism, stereochemistry, tautomerism.  
Resonance and influence of substituents.  
Typical organic reactions-introduction.  
Proton transfer-acids and bases, pKa meaning and table. Lewis acids and bases.  
Reaction mechanism; reaction intermediates, kinetics and thermodynamics.  
Organic reactions: Nu additions to carbonyl group, Nu substitutions and eliminations to carbonyl group, Nu substitutions and eliminations to sp<sup>3</sup> C atom, Polar additions.  
  
Experimental course:  
1. part: purification of organic compounds, determination of physical constants.  
2. part: organic analytics- elemental and functional consistency, chromatography.

**Temeljni študijski viri / Textbooks:**

1. M. Tišler, Organska kemija, DZS Ljubljana, 1982.
2. S. Pine, Organic chemistry, McGraw-Hill, New York, 1987.
3. M. A. Fox, J. K. Whitesell, Organic Chemistry, Jones and Barlett, Boston, 1997.
4. P. Y. Bruice, Organic chemistry, Prentice Hall, 2006.
5. P. Krajnc, Navodila za vaje iz organske kemije, Maribor, 2007.

**Cilji:**

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 nomenklaturu 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.

**Predvideni študijski rezultati:**

Znanje in razumevanje:  
Študent pozna obseg in cilje organske kemije.  
Pozna principe povezovanja atomov v organskih molekulah, tipe hibridizacij.  
Zna uporabljati pravila IUPAC nomenklature za organske spojine.  
Razume vplive skupin na stabilnost in reaktivnost molekul.  
Pozna osnovne tipe organskih reakcij.  
Razume mehanizme kemijskih reakcij priprave.  
Zna razvrščati organske spojine med kisline in baze ter razume vpliv pKa vrednosti.

Prenesljive/ključne spretnosti in drugi atributi:

**Metode poučevanja in učenja:****Objectives:**

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.

**Intended learning outcomes:**

Knowledge and Understanding:  
Student knows the goals and reach of organic chemistry. Knows the principles of atom bonding in organic molecules and types of molecule geometry, types of hybridization. Student can apply the rules of IUPAC nomenclature to organic compounds thus naming them appropriately.  
Understands the influences of functional groups on the molecule stability and reactivity. Student is able to place organic compounds between bases and acids and realizes the importance of pKa value.

Transferable/Key Skills and other attributes

**Learning and teaching methods:**

Predavanja, seminarsko delo, laboratorijske vaje.

Lectures, seminar work, laboratory experiments.

**Načini ocenjevanja:**

Delež (v %) /  
Weight (in %)

**Assessment:**

Pisni izpit (ali kolokviji)	50	Written exam (or partial exams)
Ustni izpit	30	Oral exam
Laboratorijske vaje	20	Lab work

**Materialni pogoji za izvedbo predmeta :**

- Predavalnica
- Laboratorij

**Material conditions for subject realization**

- Lecture hall
- Laboratory

**Obveznosti študentov:**

*(pisni, ustni izpit, naloge, projekti)*

- Ustni izpit
- Pisni izpit (ali kolokviji)
- Laboratorijske vaje

**Students' commitments:**

*(written, oral examination, coursework, projects):*

- Oral exam
- Written exam (or partial exams)
- Lab work