

2026/2027

**UČNI NAČRT PREDMETA / COURSE SYLLABUS**

Predmet:	Organska kemija
Course title:	Organic Chemistry

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Farmacija, 2. stopnja		2.	3.
Pharmacy, 2. level		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
45	15	15			105	6

Nosilec predmeta / Lecturer: Izr. prof. dr. Sebastijan Kovačič

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

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

Znanje splošne kemije. Knowledge of general chemistry.

Vsebina:	Content (Syllabus outline):
<ul style="list-style-type: none"> <li>• <b>Struktura, nomenklatura in reaktivnost organskih spojin:</b> atomske in molekularne orbitale; vezi v organskih spojinah; resonanca in aromatičnost; izomerije; osnove stereokemije (kiralnost, optična aktivnost, enantiomere, diastereo(izo)mere)</li> <li>• <b>Reakcijski mehanizmi in intermediati:</b> vrste reakcij; elektronski efekti; kisline in baze; tautomerija; substitucije; eliminacije; adicije; radikalske reakcije; oksidacije in redukcije; reakcijski intermediati (karbokationi, karbanioni, radikali, karbeni).</li> <li>• <b>Organske reakcije:</b> Radikalske reakcije; nukleofilne substitucije in eliminacije na <math>sp^3</math> C atomu; reakcije alkenov (elektrofilne in radikalske adicije); elektrofilne in nukleofilne aromatske substitucije (aktivacijski in deaktivacijski vplivi skupin); nukleofilne acilne adicije in substitucije.</li> <li>• <b>Bioorganske spojine:</b> ogljikovi hidrati, aminokisliline, peptidi, beljakovine</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Structure, nomenclature and reactivity of organic compounds:</b> atomic and molecular orbitals; bonds in organic compounds; resonance and aromaticity; isomerism; basic stereochemistry (chirality, optical activity, enantiomers, diastereo(iso)mers)</li> <li>• <b>Reaction mechanisms and intermediates:</b> Types of reactions; electronic effects; acidity and basicity; tautomerism; substitutions; eliminations; additions; radical reactions; oxidation and reduction; reaction intermediates (carbocations, carbanions, radicals, carbenes)</li> <li>• <b>Organic reactions:</b> Radical reactions; Nucleophilic substitutions and eliminations at <math>sp^3</math> C atom; reactions of alkenes (electrophilic and radical additions); electrophilic and nucleophilic aromatic substitutions (activated or deactivated effects of different substituent); nucleophilic acyl additions and substitutions.</li> <li>• <b>Bioorganic compounds:</b> carbohydrates, amino acids, peptides and proteins</li> </ul>

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**Temeljni literatura in viri / Readings:**

**TEMELJNA LITERATURA:**

1. D. R. Klein, Organic Chemistry 4th Edition, Wiley; 4th edition, 2020.
2. M. Tišler, Organska kemija, FKKT UL, 2013.

**DODATNA LITERATURA:**

1. J. Clayden et al., Organic Chemistry 2nd Edition, Oxford University Press; 2nd edition, 2012.
2. D. R. Klein, Organic Chemistry as a Second Language: First Semester Topics, Wiley; 5th edition, 2019.
3. P. Y. Bruice, Organic chemistry 8th, Pearson, 2016.

**Cilji in kompetence:**

Cilji predmeta Organska kemija so spoznati vlogo znanja tega predmeta v poznavanju procesov žive in nežive narave ter procesov v družbi, pridobiti širše in poglobljeno znanje o strukturi organskih spojin in o njenem določanju ter pridobiti širše znanje o reaktivnosti organskih spojin; poznati IUPAC nomenklaturu organskih spojin je prav tako cilj predmeta.

**Predvideni študijski rezultati:**

Znanje in razumevanje:

*Po uspešnem zaključku predmeta Organska kemija bo študent sposoben:*

- prepoznati, brati in razumeti različne zapise struktur različnih organskih spojin;
- razumeti, kako se določi empirična, molekulska in strukturna (tudi prostorska) formula organske snovi;
- poznati sistematično ter sintezo in preosnove organskih spojin ter njihovo nomenklaturu;
- identificirati osnovne tipe organskih reakcij;
- poznati nekatere strukturne posebnosti organskih spojin (medmolekulske sile, kislinske lastnosti, tautomerija, resonanca);
- poznati osnovne organske reakcije in razumeti njihove mehanizme.

Prenesljive/ključne spretnosti in drugi atributi:

- pisno reševanje nalog; ustni zagovor naučenega gradiva.

**Metode poučevanja in učenja:**

Predavanja  
Seminar  
Vaje (demonstracije, laboratorijski poskusi)

**Objectives and competences:**

The objectives of Organic chemistry course are to become aware of the role of the knowledge on this subject in the processes in the living and non-living nature as well as in the society, to acquire broader and deeper knowledge on the structure of organic compounds and about its determination, and to acquire wider knowledge on reactivity of organic compounds; familiarity with IUPAC nomenclature for organic compounds is the objective of the course as well.

**Intended learning outcomes:**

Knowledge and understanding:

*Upon successful completion of the Organic chemistry course the student will be able to:*

- recognise, read and understand various ways of writing of the various structures of the organic compounds
- understand how empirical, molecular and structural (also stereo) formula of the organic compound is determined;
- know the systematic, syntheses, reactions and nomenclature of organic compounds;
- identify the basic type of organic reactions;
- know some speciality of organic compounds (intermolecular bonds, acid-base properties, tautomerism, resonance);
- know the basic organic reactions and understand their mechanisms.

Transferable/Key Skills and other attributes:

- written way of solving exams; oral examination of the learned matter.

**Learning and teaching methods:**

Lectures  
Seminars  
Tutorial (demonstrations, lab experiments)

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V okviru seminarjev se bodo obravnavale aktualne teme s področja predmeta

The seminars will cover trending topics in the subject area

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
<p>Način (pisni izpit, ustno izpraševanje, naloge, projekt)</p> <ul style="list-style-type: none"> <li>• Pisni izpit</li> <li>• Laboratorijsko delo</li> </ul> <p>ŠTUDIJSKE OBVEZNOSTI ŠTUDENTOV</p> <ul style="list-style-type: none"> <li>• 80% prisotnost na seminarjih in vajah.</li> </ul> <p>POGOJ ZA PRISTOP K IZPITU</p> <ul style="list-style-type: none"> <li>• Opravljeno laboratorijsko delo.</li> </ul>	<p>80%</p> <p>20%</p>	<p>Type (examination, oral, coursework, project):</p> <ul style="list-style-type: none"> <li>• Written exam</li> <li>• Laboratory work</li> </ul> <p>STUDY OBLIGATIONS OF STUDENTS</p> <ul style="list-style-type: none"> <li>• 80% attendance at seminars and laboratory work.</li> </ul> <p>CONDITIONS FOR TAKING THE EXAM</p> <ul style="list-style-type: none"> <li>• Passed laboratory work.</li> </ul>

**Reference nosilca / Lecturer's references:**

1. KOTNIK, Tomaž, ŽERJAV, Gregor, NOVAK, Zoran, PINTAR, Albin, KOVAČIČ, Sebastijan. Sustainable in-water synthesis of aliphatic porous polyazines : a versatile platform for conjugated aerogels, polyHIPEs, or carbon foams. *Macromolecules*. 7 Jul. 2023, vol. 56, str. 5642–5650.
2. MAJER KOVAČIČ, Janja, CIRINGER, Terezija, AMBROŽIČ-DOLINŠEK, Jana, KOVAČIČ, Sebastijan. Use of emulsion-templated, highly porous polyelectrolytes for in vitro germination of chickpea embryos : a new substrate for soilless cultivation. *Biomacromolecules*. 2022, vol. 23, iss. 8, str. 3452-3457.
3. KOTNIK, Tomaž, ŽERJAV, Gregor, PINTAR, Albin, ŽAGAR, Ema, KOVAČIČ, Sebastijan. Azine- and imine-linked conjugated polyHIPEs through Schiff-base condensation reaction. *Polymer chemistry*. [Online ed.]. 28 Jan. 2022, vol. 13, no. 4, str. 474-478.