

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet: Organska sinteza
Course title: Organic synthesis

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	/	3	Zimski autumn
Five-year master's degree program Subject Teacher	/		

Vrsta predmeta / Course type

Izbirni / Elective

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Lab. vaje Lab. work	Druge oblike študija	Samost. delo Individ. work	ECTS
15			15		60	3

Nosilec predmeta / Lecturer:

Sebastijan Kovačič

**Jeziki /
Languages:**

**Predavanja /
Lectures:**

Vaje / Tutorial:

slovenski / slovene

slovenski / slovene

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

POGOJ ZA PRISTOP K IZPITU
Opravljen zaključni kolokvij iz laboratorijskih vaj

ŠTUDIJSKE OBVEZNOSTI ŠTUDENTOV

- 100% prisotnost na laboratorijskih vajah.

Izpitni rok sestavljata pisni in ustni izpit ki tvorita celoto.

Prerequisites:

CONDITIONS FOR TAKING THE EXAM
Passed final examination in laboratory exercises

STUDY OBLIGATIONS OF STUDENTS

- 100% attendance at laboratory work.

The exam period consists of a written and an oral exam, which together form a whole.

Vsebina:

Content (Syllabus outline):

• Načrtovanje organskih sintez s termičnimi metodami. Retrosintezna analiza – osnove: sintoni, sintezni ekvivalenti, konverzija funkcionalnih skupin (FGI), dodajanje funkcionalnih skupin (FGA), vrstni red transformacij, sprememba polarnosti, kemo-, stereo- in regioselektivnost, zaščitne skupine. Retrosintezna analiza – primeri osnovnih sinteznih metod v organski kemiji; - cepitve na aromatskih sistemih - cepitve ene skupine (RCO-X in RX cepitve) - cepitve ene skupine (C-C cepitve – alkohol) - cepitve ene skupine (C-C cepitve – ketoni) Seminarji: V okviru seminarjev bodo obdelani primeri sinteze nekaterih enostavnejših organskih spojin.	Planning of organic synthesis via thermal methods. Retrosynthetic analysis – basic: sintons, synthetic equivalents, functional group interconversion (FGI), functional group addition (FGA), changing the polarity, chemo-, stereo- and regioselectivity, protecting groups. Retrosynthetic analysis – basic cases of used synthetic methods in organic chemistry: - the disconnections on aromatic systems - one group disconnections (RCO-X and RX disconnections) - one group disconnections (C-C disconnections – alcohols) - one group disconnections (C-C disconnections – ketones) Seminars: The synthesis of selected organic compounds will be performed during seminars.
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Temeljni literatura in viri / Readings:

- Warren S., Organic Synthesis: The Disconnection Approach, 2^{ne} Ed., Wiley 2008, chapters 1-5, 8-15-
- Warren S., Wyatt P., Workbook for Organic Synthesis: The Disconnection Approach, Wiley, 2009.

Dopolnilna literatura:

J. Clayden, N. Graves, S., Warren: Organic Chemistry, 2nd Ed., Oxford University Press, 2012.

Cilji in kompetence:

Spoznati metodo retrosintetske analize.
Biti sposoben načrtovati sintezo organskih molekul iz preprostejših prekurzorjev.

Objectives and competences:

To know: The method of retrosynthetic approach to organic synthesis.
To be able to plan the synthesis of organic molecules from less complex molecules.

Predvideni študijski rezultati:

Študent bo sposoben:

- Razložiti posamezne mehanizme organskih reakcij
- Uporabiti metodo retrosintetske analize

Načrtovati sintezo enostavnih ciljnih molekul

Prenesljive/ključne spretnosti in drugi atributi:

Intended learning outcomes:

Student will be able to:

- Explain the mechanisms of organic reactions
- Use the principles of retrosynthetic analysis

Plan the synthesis of basic target molecules

Načrtovanje organskih sintez.	Transferable/Key Skills and other attributes: Planing of organic synthesis.
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Metode poučevanja in učenja: Predavanja, laboratorijske vaje, seminar	Learning and teaching methods: Predavanja, laboratorijske vaje, seminar
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Delež (v %) / Weight (in %)		Assessment:
Načini ocenjevanja:		
• Pisni izpit • Ustni izpit	40 60	• Written exam • Oral exam

MARKOVIČ, Aleksander Saša, LIEVENS, Siebe, HANOZIN, Emeline, VELIMIROVIC, Milica, PINTAR, Albin, **KOVAČIČ, Sebastijan**. High-porosity conjugated polyelectrolytes synthesized via Sonogashira–Hagihara coupling in concentrated emulsions: robust adsorptive–photocatalytic hydrogels for water pollutant removal. *Macromolecules* 2026, 59, 901–912.

KOTNIK, Tomaž, DEBUIGNE, Antoine, DE WINTER, Julien, HUŠ, Matej, PINTAR, Albin, **KOVAČIČ, Sebastijan**. Unlocking the potential of azide-phosphine Staudinger reaction for the synthesis of poly(arylene iminophosphorane)s and materials therefrom. *Communications chemistry*. 2025, 8. DOI: 10.1038/s42004-024-01362-5.

KOTNIK, Tomaž, **KOVAČIČ, Sebastijan**. Modern methods for conjugated polymers preparation: a concept of transition metal-free synthesis. *European Journal of Organic Chemistry* 2025, 28, e202400874. DOI: 10.1002/ejoc.202400874.

MARKOVIČ, Aleksander Saša, KOTNIK, Tomaž, **KOVAČIČ, Sebastijan**. Zwitterionic, ion-in-conjugation porous polymer networks : synthesis and photooxidation of bisphenol A in water. *Polymer*, 2025, 332, 128574.