

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet: SINTEZNA ORGANSKA KEMIJA
Course Title: ORGANIC CHEMISTRY SYNTHESIS

Študijski program in stopnja Study Programme and Level	Študijska smer Study Field	Letnik Academic Year	Semester Semester
UŠP Kemija, 1. stopnja	/	2.	4.
USP Chemistry, 1 st Cycle	/	2 nd	4 th

Vrsta predmeta / Course Type: izbirni strokovni / Elective Professional

Univerzitetna koda predmeta / University Course Code: KESI2

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje Work	Druge oblike študija	Samost. delo Individual Work	ECTS
15	15	45 LV	/	/	75	5

Nosilec predmeta / Lecturer: izr. prof. dr. Franc Požgan / Dr. Franc Požgan, Associate Professor

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

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

Študent oz. kandidat mora imeti predmet opredeljen kot študijsko obveznost.

Prerequisites:

The course has to be assigned to the student.

Vsebina:

Viri in pridobivanje osnovnih kemikalij.

Sinteza in pretvorbe izbranih skupin organskih spojin:

- alkoholi
- tioli
- amini
- karboksilne kisline in njihovi derivati
- aldehidi, ketoni in njihovi derivati
- alkil halidi
- etri
- sulfidi

Uporabne sintezne tehnike.

V okviru seminarjev in vaj bodo obdelani

Content (Syllabus outline):

Sources and production of bulk chemicals.

Synthesis and transformations of selected classes of organic compounds:

- alcohols
- thiols
- amines
- carboxylic acids and their derivatives
- aldehydes, ketones and their derivatives
- alkyl halides
- ethers
- sulfides

Useful laboratory techniques.

primeri sinteze nekaterih enostavnejših organskih spojin.

The synthesis of selected organic compounds will be performed during seminars and their preparation will be carried out in a laboratory.

Temeljna literatura in viri / Readings:

J. Clayden, N. Greeves, S. Warren, P. Wothers, *Organic Chemistry*, Oxford University Press, Oxford, 2001, 1491 str. (10%)

Dopolnilna literatura:

(a) S. Warren, P. Wyatt: *Organic Synthesis – The Disconnection Approach*, Wiley, 2008

(b) Literatura za vaje: Vaje iz sintezne organske kemije; interno gradivo kot izročki (Literature for laboratory work: Organic chemistry synthesis laboratory work; internal material as handouts)

Cilji in kompetence:

Cilj predmeta je, da se študent na primerih enostavnejših sintez nauči uporabljati znanje pridobljeno pri osnovnem kurzu iz organske kemije. **Kompetence:** Kot nadgradnja Praktikumov iz organske kemije se študent nauči tudi zahtevnejših laboratorijskih tehnik in njihove uporabe.

Objectives and Competences:

Learning outcomes: The ability to use the basic principles of organic chemistry for a directed synthesis of selected classes of organic compounds. **Competences:** The ability to apply more complex laboratory techniques in synthesis.

Predvideni študijski rezultati:

Znanje in razumevanje

Študent zna in razume pretvorbe osnovnih funkcionalnih skupin, s katerimi lahko pripravi določene tipe organskih spojin. Poleg tega poglobi znanje o varnem eksperimentalnem delu.

Uporaba

Študent se nauči izbrati najustreznejšo pot za pripravo neke spojine pri uporabi primernih reagentov in reakcijskih pogojev. Prav tako se študent nauči smiselne uporabe nekaterih novih tehnik laboratorijskega dela.

Refleksija

Zavedanje, da je osnova sintezne organske kemije natančen študij organskih pretvorb in izbira primernih reakcijskih pogojev.

Prenosljive spretnosti

Pri predmetu se študenti z reševanjem različnih problemov izurijo v uporabi organskih reakcij in analitičnega razmišljanja ter v uporabi različnih laboratorijskih tehnik.

Intended Learning Outcomes:

Knowledge and Comprehension

Students gain the knowledge of transformations of basic functional groups for obtaining selected classes of organic compounds. Additionally, they deepen knowledge of safety experimental work.

Application

Students learn to select the optimal reaction sequence towards target molecule by applying appropriate reagents and reaction conditions. They also learn a rational use of some novel laboratory techniques.

Analysis

To be aware that thorough study of organic transformations and selection of appropriate reaction conditions represents the basis of synthetic organic chemistry.

Skill-transference Ability

By solving different problems, students will be trained to apply the knowledge of organic reactions and analytical thinking as well as to use different laboratory techniques.

Metode poučevanja in učenja:

Predavanja, seminarji in vaje.

Learning and Teaching Methods:

Lectures, seminars and laboratory work
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Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

Pisni izpit.		Written exam. Successfully finished
Opravljene vaje so pogoj za pristop k izpitu.		laboratory training for admission to exam.

Reference nosilca / Lecturer's references:

- ŠTEFANE, Bogdan, POŽGAN, Franc. Reactivity of terminal phenylpentenes in a ruthenium-catalyzed cross-metathesis reaction : construction of linear bifunctional C-8 alkenes. *Monatshefte für Chemie*, ISSN 0026-9247, 2013, vol. 144, no. 5, str. 633-640, ilustr. http://download.springer.com/static/pdf/324/art%253A10.1007%252Fs00706-012-0905-3.pdf?auth66=1394015235_1293d9b626d48e1067808ff126455dfc&ext=.pdf, doi: [10.1007/s00706-012-0905-3](https://doi.org/10.1007/s00706-012-0905-3). [COBISS.SI-ID [36523525](https://www.cobiss.si/id/36523525)]
- ŠTEFANE, Bogdan, POŽGAN, Franc, SOSIČ, Izidor, GOBEC, Stanislav. A microwave-assisted nucleophilic substitution reaction on a quinoline system: the synthesis of amino analogues of nitroxoline : Bogdan Štefane ... [et al.]. *Tetrahedron letters*, ISSN 0040-4039. [Print ed.], 2012, vol. 53, no. 15, str. 1964-1967. <http://www.sciencedirect.com/science/article/pii/S0040403912002274?v=s5>, doi: [10.1016/j.tetlet.2012.02.017](https://doi.org/10.1016/j.tetlet.2012.02.017). [COBISS.SI-ID [3200625](https://www.cobiss.si/id/3200625)]
- ŠTEFANE, Bogdan, FABRIS, Jan, POŽGAN, Franc. C-H bond functionalization of arylpyrimidines catalyzed by an in situ generated ruthenium(II) carboxylate system and the construction of tris(heteroaryl)-substituted benzenes. *European journal of organic chemistry*, ISSN 1434-193X, 2011, no. 19, str. 3474-3481, doi: [10.1002/ejoc.201100238](https://doi.org/10.1002/ejoc.201100238). [COBISS.SI-ID [35023109](https://www.cobiss.si/id/35023109)]