

## UČNI NAČRT PREDMETA / COURSE SYLLABUS

<b>Predmet:</b>	OSNOVE INDUSTRIJSKE KEMIJE
<b>Course Title:</b>	FUNDAMENTALS OF INDUSTRIAL CHEMISTRY

Študijski program in stopnja Study Programme and Level	Študijska smer Study Field	Letnik Academic Year	Semester Semester
VSŠP Kemijska tehnologija, 1. stopnja	/	1.	1.
PSP Chemical Technology, 1 <sup>st</sup> Cycle	/	1 <sup>st</sup>	1 <sup>st</sup>

**Vrsta predmeta / Course Type:** obvezni / Mandatory

**Univerzitetna koda predmeta / University Course Code:** KT104

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje Work	Druge oblike študija	Samost. delo Individual Work	ECTS
45	30	/	/	/	75	5

**Nosilec predmeta / Lecturer:** izr. prof. dr. Boštjan Genorio / dr. Boštjan Genorio, Associate Professor

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

**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:**  
 Osnove industrijske kemije:  
 Kemija in industrijska kemija, razdelitev in organiziranost kemijske industrije, slovenska kemijska industrija,  
 Malotonažna in malolitražna industrijska proizvodnja, velikotonažna idnustrijska proizvodnja, predelovalna industrija, visokotehnološka proizvodnja  
 Surovinska osnova procesov, primarne, sekundarne surovine, racionalna uporaba surovinskih virov, reprovegerige, predpriprava surovin pred predelavo, bogatenje surovin  
 Energija v kemijski industriji, smotrna uporaba različnih surovinskih virov in odpadne toplote  
 Kemijski tehnološki procesi, tehnološki režim,

**Content (Syllabus outline):**  
 Fundamentals of Industrial Chemistry:  
 Chemistry and industrial chemistry, distribution and structure of the chemical industry, Slovenian chemical industry,  
 Small scale industrial production, large scale industrial production, high-tech manufacturing.  
 The raw material base processes, primary, secondary raw materials, rational use of raw materials resources, reproductions chains, pretreatment of raw materials before processing, beneficiation of raw materials  
 Energy in the chemical industry, rational use of different sources of raw materials and waste heat  
 Chemical technological processes, technological

tehnološke sheme, šaržni in kontinuirni procesi  
Infrastrukturni pogoji industrijske proizvodnje, oprema, proces  
Tehnološki procesi, masne bilance procesov, karakteristike in kvaliteta produktov, izkoristek procesov.

regime, technological schemes, batch and continuous processes  
Infrastructure conditions in industrial production, equipment, process  
Technological processes, mass balance processes, characteristics and quality of products, efficiency of processes.

### Temeljna literatura in viri / Readings:

- Ignatowitz, Eckhard, Kemijska tehnika, Jutro, 1996, ISBN 961-6006-30-4 (60%)
- Heaton, C.A., Introduction to Industrial Chemistry, Springer 1996, ISBN 978-0-7514-0272-8 (10 %);
- Brockel, U.; Meier, W.; Wagner, G., Product Design and Engineering, Vol 1 & Vol 2, Wiley-vch Verlag GmbH & Co. KgaA 2007, ISBN 978-3-527-31529-1 (30%)

### Cilji in kompetence:

Slušatelji se v okviru predavanj in seminarja seznanijo z različnimi nivoji in osnovnimi značilnostmi kemijske industrijske proizvodnje, z osnovami kemijskih industrijskih procesov ter njihovimi infrastrukturnimi pogoji, možnostmi za uspešno in varno vodenje procesov.

### Objectives and Competences:

Students in the context of lectures and seminars familiar with the different levels and the basic characteristics of industrial chemical production, with the fundamentals of chemical industrial processes and their infrastructure requirements, the possibilities for successful and safe management processes.

### Predvideni študijski rezultati:

#### Znanje in razumevanje

Študent se nauči razlikovati med pogoji in zahtevami laboratorijskega dela in industrijskim nivojem. Spozna osnovne značilnosti, robne pogoje in zahteve za uspešno in sodobno industrijsko proizvodnjo.

### Intended Learning Outcomes:

#### Knowledge and Comprehension

Students learn how to distinguish between the terms and conditions of the laboratory work and industrial level. Learn about the basic features, boundary conditions and requirements for a successful and modern industrial production.

#### Uporaba

Analizira probleme, ki se pojavijo pri prenosu v večje merilo pri prenosu procesov v industrijsko prakso.

#### Application

The student analyzes the problems that occur in the transmission of higher criterion in the transfer processes in industrial practice.

#### Refleksija

Analiza racionalne izvedbe industrijskih kemijskih reakcijskih sistemov in procesov omogoča študentu boljši vpogled in razumevanje osnovnih konceptov kemije in industrijske kemije.

#### Analysis

Analysis of the rational performance of industrial chemical reaction systems and processes allows students a better understanding of the basic concepts of chemistry and industrial chemistry.

#### Prenosljive spretnosti

Teoretične principe dodatno spoznava pri njihovi implementaciji v industrijsko merilo in prakso ter kritično vrednoti skladnost med teoretičnimi načeli in možnostjo za njihovo praktičnim uveljavljanje.

#### Skill-transference Ability

A student gets additionally acquainted with theoretical principles at implementation into industrial scale and practice and to critically evaluate the consistency between theoretical

principles and practical option for their enforcement.

**Metode poučevanja in učenja:**

Predavanja in seminar.

**Learning and Teaching Methods:**

Lectures and seminars.

**Načini ocenjevanja:**

Delež (v %) /

Weight (in %) **Assessment:**

- dva neobvezna kolokvija  
- Pisni izpit (lahko ga nadomestita dva pozitivno ocenjena kolokvija) in  
Ustni izpit (pogoj za pristop k ustnem izpitu je pozitivno opravljen Pisni izpit)

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

- Genorio B, Strmcnik D, Subbaraman R, Tripkovic D, Karapetrov G, Stamenkovic V R, Pejovnik S and Marković N M 2010 Selective catalysts for the hydrogen oxidation and oxygen reduction reactions by patterning of platinum with calix [4] arene molecules Nat. Mater. 9 998–1003
- Genorio B, Lu W, Dimiev A M, Zhu Y, Raji A-R O, Novosel B, Alemany L B and Tour J M 2012 In Situ Intercalation Replacement and Selective Functionalization of Graphene Nanoribbon Stacks ACS Nano 6 4231–40
- Xiang C, Behabtu N, Liu Y, Chae H G, Young C C, Genorio B, Tsentelovich D E, Zhang C, Kosynkin D V, Lomeda J R, Hwang C-C, Kumar S, Pasquali M and Tour J M 2013 Graphene Nanoribbons as an Advanced Precursor for Making Carbon Fiber ACS Nano 7 1628–37
- Xiang C, Cox P J, Kukovecz A, Genorio B, Hashim D P, Yan Z, Peng Z, Hwang C-C, Ruan G, Samuel E L G, Sudeep P M, Konya Z, Vajtai R, Ajayan P M and Tour J M 2013 Functionalized Low Defect Graphene Nanoribbons and Polyurethane Composite Film for Improved Gas Barrier and Mechanical Performances. ACS Nano 7 10380–6
- Raji A-R O, Varadhachary T, Nan K, Wang T, Lin J, Ji Y, Genorio B, Zhu Y, Kittrell C and Tour J M 2016 Composites of Graphene Nanoribbon Stacks and Epoxy for Joule Heating and Deicing of Surfaces ACS Appl. Mater. Interfaces 8 3551–6