Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

| UČNI NAČRT PREDMETA / COURSE SYLLABUS | |
|---|---|
| **Predmet:** | **Pregled tehnologij** |
| **Course title:** | **Technologies overview** |

| Študijski program in stopnja<br>Study programme and level | Študijska smer<br>Study field | Letnik<br>Academic year | Semester<br>Semester |
|---|---|---|---|
| **Enovit magistrski študijski program druge stopnje Predmetni učitelj** | **/** | **4** | **Zimski**<br>**Autumn** |
| **Five-year master's degree program Subject Teacher** | **/** | | |

| | |
|---|---|
| **Vrsta predmeta / Course type** | Obvezni / Obligatory |
| **Univerzitetna koda predmeta / University course code:** | |

| Predavanja<br>Lectures | Seminar<br>Seminar | Vaje<br>Tutorial | Lab. vaje<br>Laboratory work | Terenske vaje<br>Field work | Samost. delo<br>Individ. work | ECTS |
|---|---|---|---|---|---|---|
| **60** | | | **15** | | **105** | **6** |

| | |
|---|---|
| **Nosilec predmeta / Lecturer:** | Maja Leitgeb |

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|---|---|---|
| **Jeziki / Languages:** | **Predavanja / Lectures:** | slovenski / slovene |
| | **Vaje / Tutorial:** | slovenski / slovene |

| Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti: | Prerequisits: |
|---|---|
| Znanje iz osnov kemijske tehnike. | Basic knowledge of chemical engineering. |

**Vsebina:**

- Voda kot surovina v kemijski industriji, njene lastnosti in zaščita okolja.
- Energija in goriva (fosilna ter alternativna).
- Proizvodnja biodizla in bioetanola.
- Keramična industrija.
- Druge anorganske tehnologije (proizvodnja žveplove kisline)
- Jedrska industrija.
- Eksplozivi.
- Prehrambena industrija (pridobivanje olja in maščob, sladkorja).
- Organske tehnologije (agrokemična industrija, mila in detergenti).
- Fermentacijska industrija.
- Farmacevtska industrija.
- Pregled novejših tehnologij.
- Laboratorijske vaje v povezavi s proizvodnjo nekaterih produktov.

**Content (Syllabus outline):**

- Water as raw material in chemical industry, its properties and environmental protection.
- Energy and fuels (fossil and alternative fuels).
- Production of biodiesel and bioethanol.
- Ceramic industries.
- Other inorganic technologies (production of sulfuric acid).
- Nuclear industries.
- Explosives.
- Food industries (manufacture of ois and fats, sugar).
- Organic technologies (agrichemical industries, soap and detegents).
- Fermentation industries.
- Pharmaceutical industries.
- Overview of novel technologies.
- Laboratory exercises in the connection with the production of some products.

**Temeljni literatura in viri / Readings:**


- Shreves Chemical Process Industries, Mcgraw Hill Book Company, New York, 1984.
- Wiley-VCH (ed.), Ullmann's Biotechnology and Biochemical Engineering, 2 Volume Set, Wiley-VCH, Weinheim (Germany), 1st.edition, 2007.
- Gad, Shayne Cox (ed.), Handbook of Pharmaceutical Biotechnology and Pharmaceutical Development, Wiley-VCH, Weinheim (Germany), 1st.edition, 2007.
- P.G. Jessop, W. Leitner, Chemical Synthesis Using Supercritical Fluids, Wiley-VCH, Weinheim, 1999.


**Cilji in kompetence:**

- Program obsega spoznavanje posameznih vrst tehnologij v kemijski industriji,
- študenti spoznajo poleg »klasičnih« tehnologij tudi novejše tehnologije,
- študenti se soočijo s pomenom biotehnologije.

**Objectives and competences:**

- The program comprehends some basic technologies in chemical industries,
- students comprehense among classical technologies, novel technologies, as well,
- students confront with the importance of biotechnology.

**Predvideni študijski rezultati:**

**Intended learning outcomes:**

| **Znanje in razumevanje:** | **Knowledge and understanding:** |
|---|---|
| • Razumevanje posameznih tehnologij na osnovi komponent, kot so osnovne mehanske in termične operacije ter reakcijski sistemi. | • Understanding of technologies on the basis of cpompounds, such as unit operations and reaction systems. |
| **Prenesljive/ključne spretnosti in drugi atributi:** | **Transferable/Key Skills and other attributes:** |
| • Vsebina predmetaje osnova za razumevanje vsebine predmeta Strokovni ogledi z varstvom okolja na drugi stopnji. | • The subject is the basis for understanding of the subject Professional excursions with environmental protection. |

| **Metode poučevanja in učenja:** | **Learning and teaching methods:** |
|---|---|
| • Predavanja<br>• Laboratorijske vaje<br>• Individualno delo | • Lectures<br>• Laboratory excersises<br>• Individual work |

| **Načini ocenjevanja:** | Delež (v %) / Weight (in %) | **Assessment:** |
|---|---|---|
| • Laboratorijske vaje<br>• Pisni izpit<br>• Ustno izpraševanje | 20 %<br>40 %<br>40 % | • Laboratory work<br>• Written examination<br>• Oral examination |

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


- HABULIN, Maja, KNEZ, Željko. Optimization of (R,S)-1-phenylethanol kinetic resolution over Candida antarctica lipase B in ionic liquids. *J. mol. catal., B Enzym.*. [Print ed.], June 2009, vol. 58, iss. 1/4, str. 24-28, doi: 10.1016/j.molcatb.2008.10.007. [COBISS.SI-ID 12966422]
- ŠULEK, Franja, KNEZ, Željko, HABULIN, Maja. Immobilization of cholesterol oxidase to finely dispersed silica-coated maghemite nanoparticles based magnetic fluid. *Appl. surf. sci.*. [Print ed.], May 2010, vol. 256, iss. 14, str. 4596-4600. [COBISS.SI-ID 14055446]
- THOREY, Paul, KNEZ, Željko, HABULIN, Maja. Alcohol dehydrogenase in non-aqueous media using high-pressure technologies : reaction set-up and deactivation determination. *J. chem. technol. biotechnol. (1986)*. [Print ed.], 2010, vol. 85, str. 1011-1016. [COBISS.SI-ID 14291222]
- ŠULEK, Franja, DROFENIK, Mihael, HABULIN, Maja, KNEZ, Željko. Surface functionalization of silica-coated magnetic nanoparticles for covalent attachment of cholesterol oxidase. *J. magn. magn. mater.*. [Print ed.], Jan. 2010, vol. 322, iss. 2, str. 179-185, doi: 10.1016/j.jmmm.2009.07.075. [COBISS.SI-ID 13418262]
- PRIMOŽIČ, Mateja, KNEZ, Željko, HABULIN, Maja. Mehanizmi in kinetika encimskih reakcij z dvema substancama. *Kemija v šoli in družbi*, jun. 2010, letn. 22, št. 2, str. 20-25. [COBISS.SI-ID 14251798]
- KAVČIČ, Sabina, KNEZ, Željko, HABULIN, Maja. Aditivi v prehrani. *Kemija v šoli in družbi*, okt. 2010, letn. 22, št. 3, str. 10-13. [COBISS.SI-ID 14704150]

**Nagrade:**

1998 Messer Griesheim Preis (Innovationspreis 1998)

2003 Srebrna plaketa Univerze v Mariboru

**Projekti, v katerih je nosilec sodeloval v zadnjih 3 letih oz. trenutno sodeluje**

Uporabna biokataliza

Magnetni delci kot potencialni nosilci bioaktivnih učinkovin

Bilateralni projekti: SLO-HUN, SLO-HRV, SLO-RO