Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Bio- in farmacevtska tehnika**
Course title:	**Bio and pharmaceutical engineering**

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	/	2.	poletni Spring
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 Laboratory work	Terenske vaje Field work	Samost. delo Individ. work	ECTS
15			15		60	3

Nosilec predmeta / Lecturer:	Maja Leitgeb

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

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Predhodno znanje organske kemije.	Basic knowledge of organic chemistry.

Vsebina:

- Biotehnologija – definicija.
- Pripravljalni procesi v biotehnologiji.
- Osnovna znanja v povezavi z načrtovanjem potencialne farmacevtske učinkovine.
- Bioreaktorji.
- Biotehnološki procesi za proizvodnjo živil in krme.
- Poznavanje zakonskih predpisov in patentiranja.
- Proizvodnja antibiotikov.

Laboratorijsko delo:

Laboratorijske vaje s področja proizvodnje farmacevtskih učinkovin.

Content (Syllabus outline):

- Biotechnology – definition.
- Preparative processes in biotechnology.
- Basic knowledge in connection with designing of potential pharmaceutical active substance.
- Bioreactors.
- Biotechnological processes for food and feed production.
- Law regulations and taking out a patent knowledge.
- Production of antibiotics.

Laboratory work:

Laboratory exercises from the field of potential pharmaceutical active substance production.

Temeljni literatura in viri / Readings:

- Wiley-VCH (ed.), Ullmann's Biotechnology and Biochemical Engineering, 2 Volume Set, Wiley-VCH, Weinheim (Germany), 1st.edition, 2007.
- G. Walsh, Biopharmaceuticals: Biochemistry and Biotechnology, Wiley-VCH, 2. edition, University of Limerick, Ireland, 2003.
- Ho, Rodney J. Y., Gibaldi Milo, Biotechnology and Biopharmaceuticals; Transforming Proteins and Genes into Drugs, Wiley-VCH, Weinheim (Germany), 1st. edition, 2003.
- Gad, Shayne Cox (ed.), Handbook of Pharmaceutical Biotechnology and Pharmaceutical Development, Wiley-VCH, Weinheim (Germany), 1st.edition, 2007.

Cilji in kompetence:

- Študent pridobi osnovna znanja s področja bio in farmacevtske tehnologije.
- Seznanjen bo z uporabno orientiranim znanjem iz mikrobiologije in biokemije, ki je tesno povezano s kemijskim inženirstvom.

Objectives and competences:

- The basic knowledge of bio and pharmaceutical engineering is given to the students.
- They wil learn about application-oriented science of microbiology and biochemistry that is very closely connected with chemical engineering.

Predvideni študijski rezultati:

Intended learning outcomes:

Znanje in razumevanje:	**Knowledge and understanding:**
• Usvojeno bo znanje in razumevanje proizvodnje biomase z organizmi oz. deli organizmov ter znanja, potrebna za načrtovanje potencialne farmacevtske učinkovine **Prenesljive/ključne spretnosti in drugi atributi:** • Predmet se dopolnjuje s predmeti, ki obravnavajo vsebine iz biokemijske tehnike (mikrobiologija, biokemija, biokemijska tehnika – biotehnologija).	• The knowledge and understanding about biomass production from organisms and parts of organisms will be adopted, as well as knowledge, required for design of potential pharmaceutical active substance. **Transferable/Key Skills and other attributes:** • The subject is related to the subjects which dicuss topics in the connection with biochemical engineering (microbiology, biochemistry, biochemical engineering).

Metode poučevanja in učenja:	**Learning and teaching methods:**
• Predavanja v učilnici, ki je opremljena z avdio-vizualnimi pripomočki. • Individualna priprava seminarskih nalog s predstavitvijo in diskusijo. • Laboratorijsko delo na izbranem primeru.	• Lectures in lecture room, equipped with audio-visual equipment • Individual preparation of seminars and their presentation with discussion. • Laboratory work on selected case.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način (seminarska naloga, ustno izpraševanje) - seminarska naloga: - ustni izpit	40 % 60 %	Type (seminary work, oral examination): - seminary work - 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