



Univerza v Mariboru

Medicinska fakulteta

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Ime predmeta:	Farmaceutvska biotehnologija							
Course title:	Pharmaceutical Biotechnology							
Študijski program in stopnja Study programme and cycle	Študijska smer Study option			Letnik Year of study	Semester Semester			
Biomedicinska tehnologija/3. stopnja				1	1 ali 2			
Biomedical Technology/3rd Degree								
Vrsta predmeta (obvezni ali izbirni) / Course type (compulsory or elective)				Temeljni Basic				
Univerzitetna koda predmeta / University course code:								
Predavanja Lectures	Seminar Seminar	Vaje Tutorial			Klinične vaje Clinical training	Druge oblike študija Other forms of study	Samost. delo Individual work	ECTS
20	40	15					195	9
		AV	LV	RV				
Nosilec predmeta / Course coordinator:				Izr. prof. dr. Uroš Maver Prof. dr. Uroš Potočnik				
Jeziki /Languages:		Predavanja / Lectures:		Slovenski /Slovene				
		Vaje / Tutorial:		Slovenski /Slovene				
Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:				Prerequisites for enrolling in the course or for performing study obligations:				
Vsebina (kratek pregled učnega načrta):				Content (syllabus outline):				
LADME sistem (predklinična obravnava zdravilnih učinkovin) Biomedicinsko inženirstvo Osnove biomedicinske analitike In vitro testiranje varnosti in učinkovitosti zdravilnih učinkovin in medicinskih pripomočkov Tehnologija rekombinantne DNA Najpomembnejši rekombinantni biofarmaceutiki Priprava in uporaba monoklonskih protiteles Gensko zdravljenje rakavih in ostalih obolenj Sistemi vnosa genov v organizem				LADME system (preclinical drug evaluation) Biomedical Engineering Basic biomedical analytics In vitro testing of the safety and efficacy of drugs and medical devices Recombinant DNA technology The most important recombinant biopharmaceuticals Preparation and use of monoclonal antibodies Gene therapy of cancer and other diseases Introduction to gene delivery into the body				
Temeljni literatura in viri / Reading materials:								
– Sandy B. Primrose, By (author) Richard Twyman : Principles of Gene Manipulation and Genomics; 8th Revised edition; Wiley-Blackwell (an imprint of John Wiley & Sons Ltd), 2016 – Crommelin J.A., Sindelar R.D.: Pharmaceutical Biotechnology, Third edition. CRC Press, New York, 2007 – Hunt S.P., Livesey, F.J. : Functional Genomics. A practical approach, Oxford University Press, 2000.								

- Licinio J, Wong MA-Li: Pharmacogenomics. Wiley-VCH, Germany, 2002.
- Goodman L.S., Gilman A.G., The pharmacological basis of therapeutics, 12th edition, McGraw-Hill, New York, 2011.
- Alberts B., Johnson A., Lewis J., Raff M., Roberts K., Walter P., Molecular Biology of the Cell, 5th edition, Garland Science, 2007.
- Periodične publikacije: Advanced Healthcare Materials, Tissue Engineering - Part B: Reviews

Dopolnilna literatura:

- VIHAR, Boštjan, MILOJEVIĆ, Marko, BANOVIĆ, Luka, MAVER, Uroš. Advanced methods for design of scaffolds for 3D cell culturing. V: MOHAN, Tamilselvan (ur.), STANA-KLEINSCHKEK, Karin (ur.). Functional biomaterials : design and development for biotechnology, pharmacology, and biomedicine. Weinheim: Wiley-VCH, cop. 2023. Str. 305-334, ilustr. ISBN 978-3-527-82764-0, ISBN 978-3-527-35157-2, ISBN 978-3-527-82766-4, ISBN 978-3-527-82765-7.
- ZIDARIČ, Tanja, MAVER, Uroš. Biopolymer thin films as “Smart” materials in biomedical applications. V: MOHAN, Tamilselvan (ur.), STANA-KLEINSCHKEK, Karin (ur.). Functional biomaterials : design and development for biotechnology, pharmacology, and biomedicine. Weinheim: Wiley-VCH, cop. 2023. Str. 239-268, ilustr. ISBN 978-3-527-82764-0, ISBN 978-3-527-35157-2, ISBN 978-3-527-82766-4, ISBN 978-3-527-82765-7.
- MILOJEVIĆ, Marko, MAVER, Uroš, VIHAR, Boštjan. Recent advances in 3D printing in the design and application of biopolymer-based scaffolds. V: MOHAN, Tamilselvan (ur.), STANA-KLEINSCHKEK, Karin (ur.). Functional biomaterials : design and development for biotechnology, pharmacology, and biomedicine. Weinheim: Wiley-VCH, cop. 2023. Str. 489-559, ilustr. ISBN 978-3-527-82764-0, ISBN 978-3-527-35157-2, ISBN 978-3-527-82766-4, ISBN 978-3-527-82765-7.
- MAVER, Tina, KUREČIČ, Manja, SMRKE, Dragica, STANA-KLEINSCHKEK, Karin, MAVER, Uroš. Plant-derived medicines with potential use in wound treatment. V: BUILDERS, Philip (ur.). Herbal medicine. London: IntechOpen, cop. 2019. Str. [121]-150, ilustr. ISBN 978-1-78984-783-3, ISBN 978-1-78984-782-6.

Cilji in kompetence:	Objectives and competences:
<p>Pridobiti znanja molekularne biologije, molekularne genetike in predvsem razumevanje novih načinov terapij in tarč, ki izhajajo iz spoznavanja človeškega genoma.</p> <p>Spoznavanje najpomembnejših kompleksnih zdravilnih učinkovin iz področja biofarmacevtikov.</p> <p>Razširiti znanje s področja priprave novih zdravil in medicinskih pripomočkov, vključno s testiranjem njihove varnosti in učinkovitosti.</p>	<p>Acquire knowledge of molecular biology, molecular genetics and understanding of novel approaches to gene therapy derived from human genome sequencing.</p> <p>Getting to know the most important active substances in the field of biopharmaceuticals.</p> <p>Expand knowledge on the preparation of new drugs and medical devices, including testing their safety and efficacy.</p>
Predvideni študijski rezultati:	Intended learning outcomes:
<p>Znanje in razumevanje:</p> <p>Z razumevanjem sestave in delovanja biofarmacevtikov in uporabe genske terapije se poveča praktično znanje o biofarmacevtikih, glavnih terapevtskih učinkih in razumevanje nastajanja neželenih učinkov.</p> <p>S spoznavanjem novih pristopov k razvoju zdravil, medicinskih pripomočkov in njihovega testiranja, se povečajo možnosti za inovativno razmišljanje študentov v smeri razvoj novih terapevtskih pristopov.</p>	<p>Knowledge and understanding:</p> <p>By understanding the composition and functioning of biopharmaceuticals and the use of gene therapy to increase the practical knowledge of biopharmaceuticals main therapeutic effects and understanding the emergence of side effects.</p> <p>By learning new approaches of the development of medicines, medical devices and their testing to increase opportunities for innovative thinking in students towards the development of new therapeutic approaches.</p>

Prenosljive/ključne spretnosti in drugi atributi: Iskanje podatkov po svetovnih bazah podatkov, aplikacija v prakso (iskanje primerov)		Transferable/key competences and other abilities: Knowledge of database searching, application into practical work (case studies)	
Metode poučevanja in učenja:		Learning and teaching methods:	
Predavanja Seminarske naloge Vaje		Lectures Seminars Tutorial	
Načini ocenjevanja:		Delež (v %) / Share (in %)	Assessment methods:
Način (pisni izpit, ustno izpraševanje, naloge, projekt)			Method (written or oral exam, coursework, project):
Pisni izpit		60 %	Written examination
Seminarska naloga (pisna in predstavitev)		40 %	Seminars (written and presented)
Reference nosilca / Course coordinator's references:			
Izr. prof. dr. Uroš MAVER:			
1. ZIDARIČ, Tanja, MAJER, David, MAVER, Tina, FINŠGAR, Matjaž, MAVER, Uroš . The development of an electropolymerized, molecularly imprinted polymer (MIP) sensor for insulin determination using single-drop analysis. <i>Analyst</i> . [Online ed.]. First published 24 Jan 2023, 14 str.			
2. ROŽANC, Jan, FINŠGAR, Matjaž, MAVER, Uroš . Progressive use of multispectral imaging flow cytometry in various research areas. <i>Analyst</i> . [Online ed.]. 2021, vol. 146, str. 4985-5007.			
3. MILOJEVIĆ, Marko, GRADIŠNIK, Lidija, STERGAR, Janja, SKELIN, Maša, STOŽER, Andraž, VESENJAK, Matej, DOBNIK-DUBROVSKI, Polona, MAVER, Tina, MOHAN, Tamilselvan, STANA-KLEINSCHEK, Karin, MAVER, Uroš . Development of multifunctional 3D printed bioscaffolds from polysaccharides and NiCu nanoparticles and their application. <i>Applied Surface Science</i> , ISSN 1873-5584. [Online ed.], 2019, vol. 488, str. 836-852.			
Prof. dr. Uroš POTOČNIK:			
1. JEZERNIK, Gregor, GORENJAK, Mario, POTOČNIK, Uroš . MIF variant rs755622 is associated with severe Crohn's disease and better response to anti-TNF adalimumab therapy. <i>Genes</i> . 2023, vol. 14, issue 2, [article no.] 452, str. [1]-15.			
2. JEZERNIK, Gregor, GORENJAK, Mario, POTOČNIK, Uroš . Gene ontology analysis highlights biological processes influencing non-response to anti-TNF therapy in rheumatoid arthritis. <i>Biomedicines</i> . [Online ed.]. 2022, vol. 10, issue 8, str. [1]-27.			
3. JURGEC, Staša, JEZERNIK, Gregor, GORENJAK, Mario, BÜDEFELD, Tomaž, POTOČNIK, Uroš . Meta-analytic comparison of global RNA transcriptomes of acute and chronic myeloid leukemia cells reveals novel gene candidates governing myeloid malignancies. <i>Cancers</i> . 2022, vol. 14, issue 19, str. [1]-17.			