2023/2024

Univerza v Mariboru
Medicinska fakulteta

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Ime predmeta:	Farmakologija s toksikologijo
Course title:	Pharmacology with toxicology

Študijski program in stopnja Study programme and cycle	Študijska smer Study option	Letnik Year of study	Semester Semester
Splošna medicina, enovit magistrski študijski program		**Drugi**	**4.**
General medicine, Uniform master's degree study program		**Second**	**4th**

Vrsta predmeta (obvezni ali izbirni) / Course type (compulsory or elective)	obvezni compulsory
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
		AV	**LV**	**RV**				
57	53		10				180	10

Nosilec predmeta / Course coordinator:	**prof. dr. Sebastjan Bevc**

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:**
Ni posebnih pogojev za vključitev.	There are no special conditions for inclusion.

Vsebina (kratek pregled učnega načrta):

Osnove splošne farmakologije in toksikologije

- farmakodinamika/toksikodinamika
- farmakokinetika/toksikoknetika
- področja farmakologije in toksikologije

Kemijski mediatorji

Zdravila z učinki na organske sisteme

- srce in žilje
- ledvice
- kri in krvotvorni organi
- prebavila
- dihala
- periferni živčni sistem
- osrednji živčni sistem
- zdravila, ki uravnavajo nivo glukoze v krvi

Content (syllabus outline):

Principles in general pharmacology and toxicology

- pharmacodynamics/toxicodynamics
- pharmacokinetics/toxicokinetics
- areas in pharmacology and toxicology

Chemical mediators

Special pharmacology of:

- cardiovascular system
- kidneys
- blood and haematopoiesis
- gastrointestinal system
- respiratory system
- peripheral nervous system
- central nervous system
- drugs influencing blood glucose levels

- zdravila z vplivom na hemostazo in trombozo
- zdravila z vplivom na nivo lipidov v krvi
- farmakološko zdravljenje debelosti, farmakologija hipofize, nadledvičnice, ščitnice, reproduktivnega sistema, kosti, endokrinopatij
- protivnetne učinkovine in imunomodulatorji
- nizkomolekularna in biološka zdravila
- osnovni principi kemoterapije, zdravila v terapiji rakavih obolenj
- protimikrobno zdravljenje: protibakterijska zdravila, protivirusna zdravila, antimikotiki, antiprotozoiki, antihelmintiki
- antiseptiki, dezinficiensi, insekticidi
- zlorabe zdravil, odvisnost od zdravil
- prehranska dopolnila
- razvoj novega zdravila

- drugs affecting haemostasis and thrombosis
- drugs affecting blood lipid levels
- pharmacological treatment of obesity, pharmacology of pituitary, adrenal glands, thyroid, reproductive system, bones, endocrinopathies
- antiinflammatory drugs and immunomodulators
- small-molecular and biological drugs
- basic principles of chemotherapy, anticancer drugs
- antimicrobial agents: antibacterial, antiviral, antifungal, antiprotozoal and antihelminthic drugs
- antiseptic, dezinfective and insecticide agents
- drug abuse, drug dependence
- food supplements
- development of new drugs

Temeljni literatura in viri / Reading materials:

Temeljna literatura:

- Rang HP, Dale M, Ritter JM, Flower RJ, Henderson G. Pharmacology. 7th ed. Churchill Livingstone; 2012. (or the latest edition)
- Katzung BG, Masters SB, Trevor AJ. Basic and clinical pharmacology. 11th ed. New York: McGraw-Hill; 2009. (or the latest edition)
- Izbrana poglavja iz eksperimentalne toksikologije (e-gradivo)

Dodatna literatura:

- Goodman LS, Gilman AG, Limbird LE, Hardman JG, Goodman Gilman A. The pharmacological basis of therapeutics. 10th ed. New York: McGraw-Hill; 2001. (or the latest edition)
- Klaassen CD. Casarett & Doull's toxycology: The basic science of poisons. 7th ed. New York: McGraw-Hill; 2008. (or the latest edition)
- Centralna baza zdravil: http://www.cbz.si
- Javna agencija RS za zdravila in medicinske pripomočke: http://www.jazmp.si/
- Evropska agencija za zdravila (EMA): http://www.ema.europa.eu/ema/
- Ferk P, Lipnik-Štangelj M. Navodila za vaje iz farmakologije in toksikologije. Spremenjena in dopolnjena izd. Maribor: Medicinska fakulteta; 2010. (ali kasnejša izdaja)
- Maver T, Žunič M, Bevc S in Maver U. Izbrana poglavja iz splošne farmakologije in toksikologije – Navodila za vaje študijskega programa Splošna medicina (e-gradivo), VAJA 2: Farmakokinetika; 2023 (ali kasnejša izdaja)

Cilji in kompetence:

- spoznati osnovne mehanizme delovanja zdravil, vpliv zdravil na organizem in vpliv organizma na zdravila
- pridobiti pregledno znanje o zdravilih po osnovnih farmakodinamičnih skupinah
- pridobivanje sposobnosti za povezovanje pričakovanih učinkov, koristnih in škodljivih
- spoznati osnove toksikologije, pridobiti pregledno znanje o prepoznavanju in ukrepanju pri zastrupitvah z zdravili

Objectives and competences:

- to acquire knowledge on basic mechanisms of drug actions and the fate of drugs in the human body
- to get an overview of the most important pharmacodynamic groups of drugs
- to gain the ability for linking the expected effects, useful and harmful
- to acquire knowledge on general principles in toxicology as well as on recognizing and acting in drug poisoning

Predvideni študijski rezultati:

Intended learning outcomes:

Znanje in razumevanje:	Knowledge and understanding:
• razumeti osnovne mehanizme delovanja zdravil, vpliv zdravil na organizem in vpliv organizma na zdravila • poznavanje zdravil po osnovnih farmakodinamičnih skupinah • sposobnost za povezovanje pričakovanih učinkov, koristnih in škodljivih • razumevanje interakcij med zdravili in zdravil s hrano • poznavanje osnov toksikologije, primerno znanje o prepoznavanju in ukrepanju pri zastrupitvah z zdravil • sposobnost kritično uporabljati relevantne literaturne vire na področju farmakologije in toksikologije Prenesljive/ključne spretnosti in drugi atributi: -	• understanding basic mechanisms of drug actions and the fate of drugs in the human body • knowledge on major pharmacodynamic groups of drugs • the ability for linking the expected effects, useful and harmful • understanding drug-drug and drug-food interactions • understanding general principles in toxicology, appropriate knowledge on recognizing and acting in drug poisoning • the ability of critical usage of relevant literature sources in the field of pharmacology and toxicology Transferable/Key Skills and other attributes: -

Metode poučevanja in učenja:	**Learning and teaching methods:**
• predavanja • seminarji • vaje • samostojno delo	• lectures • seminars • practical work • individual work

Načini ocenjevanja:	Delež (v %) / Share (in %)	**Assessment methods:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt) Pogoj za pristop k izpitu so uspešno opravljene vaje in seminarji ter pridobljena pozitivna ocena iz seminarjev. • kolokvij iz vaj • seminar • seminarski kolokvij (trije delni ali en zaključni) • izpit pisni • izpit ustni ŠTUDIJSKE OBVEZNOSTI ŠTUDENTOV • obvezna prisotnost na vajah in seminarjih • opravljene vaje in seminarji • kolokvij iz vaj (izstopni iz vsake vaje in zaključni po zaključku vaj) • kolokviji iz seminarjev (trije delni ali en zaključni) • izpit pisni • izpit ustni • samostojno delo POGOJI ZA PRISTOP K POSAMEZNEMU PREVERJANJU ZNANJA	**10%** **10%** **20%** **30%** **30%**	Method (written or oral exam, coursework, project): Successfully completed practical work and seminars including positive assessment of the final seminar test are necessary to approach the exam. • Colloquium based on tutorials • seminar • seminar colloquium (three partial or one joint final) • written examination; • oral examination. ACADEMIC OBLIGATIONS OF STUDENTS: obligatory attendance at laboratory work and seminars completed laboratory work and seminars colloquium based on laboratory work (exit colloquiums from respective tutorials and final colloquium after all finished tutorials) colloquium based on seminar (three partial or one final colloquium) written exam oral exam independent work

Opravljene vaje in seminarji ter opravljeni kolokviji iz vaj in seminarjev so pogoj za pristop k pisnemu izpitu. Pozitivno opravljen pisni izpit je pogoj za pristop k ustnemu izpitu.		REQUIREMENTS FOR ACCESS TO INDIVIDUAL KNOWLEDGE CHECKING: Completed laboratory work, coursework and partial exams in laboratory work and coursework are required for access to the written exam. Positively marked written exam is a requirement for access to the oral exam.

Reference nosilca / Course coordinator's references:

BEVC, Sebastjan, VODOŠEK HOJS, Nina, KNEHTL, Maša, EKART, Robert, HOJS, Radovan. Cystatin C as a predictor of mortality in elderly patients with chronic kidney disease. *The aging male*. 2019, vol. 22, no. 1, str. 62-67. ISSN 1473-0790. https://www.tandfonline.com/doi/abs/10.1080/13685538.2018.1479386?journalCode=itam20, https://doi.org/10.1080/13685538.2018.1479386, DOI: 10.1080/13685538.2018.1479386. [COBISS.SI-ID 6434879]

PETRESKI, Tadej, EKART, Robert, HOJS, Radovan, BEVC, Sebastjan. Hyperuricemia, the heart, and the kidneys : to treat or not to treat?. *Renal failure*. 2020, vol. 42, issue 1, str. 978-986. ISSN 1525-6049. https://www.tandfonline.com/doi/full/10.1080/0886022X.2020.1822185, https://doi.org/10.1080/0886022X.2020.1822185, DOI: 10.1080/0886022X.2020.1822185. [COBISS.SI-ID 30199299]

MIHEVC, Matic, PETRESKI, Tadej, MAVER, Uroš, BEVC, Sebastjan. Renal proximal tubular epithelial cells : review of isolation, characterization, and culturing techniques. *Molecular biology reports*. Dec. 2020, vol. 47, issue 12, str. 9865-9882, ilustr. ISSN 1573-4978. https://link.springer.com/article/10.1007/s11033-020-05977-4, https://doi.org/10.1007/s11033-020-05977-4, DOI: 10.1007/s11033-020-05977-4. [COBISS.SI-ID 37514499

PETRESKI, Tadej, PIKO, Nejc, EKART, Robert, HOJS, Radovan, BEVC, Sebastjan. Review on inflammation markers in chronic kidney disease. *Biomedicines*. [Online ed.]. 2021, vol. 9, str. [1]-16, ilustr. ISSN 2227-9059. https://www.mdpi.com/2227-9059/9/2/182, https://doi.org/10.3390/biomedicines9020182, DOI: 10.3390/biomedicines9020182. [COBISS.SI-ID 51369219]

BAKKUM, Michiel J., RICHIR, Milan C., PAPAIOANNIDOU, Paraskevi, LIKIC, Robert, et al., BEVC, Sebastjan (927), KRŽAN, Mojca (927), et al. EurOP [sup]2 E - the European Open Platform for Prescribing Education, a consensus study among clinical pharmacology and therapeutics teachers. *European Journal of Clinical Pharmacology*. 2021, vol. 77, iss. 8, str. 1209-1218, ilustr. ISSN 0031-6970. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8275529/, DOI: 10.1007/s00228-021-03101-4. [COBISS.SI-ID 106371587

KNEHTL, Maša, PETRESKI, Tadej, PIKO, Nejc, EKART, Robert, BEVC, Sebastjan. Polypharmacy and mental health issues in the senior hemodialysis patient. *Frontiers in psychiatry*. 12 May 2022, str. 1-12, ilustr. ISSN 1664-0640. https://www.frontiersin.org/articles/10.3389/fpsyt.2022.882860/full#ack1, https://doi.org/10.3389/fpsyt.2022.882860, DOI: 10.3389/fpsyt.2022.882860. [COBISS.SI-ID 107792643]