



Univerza v Mariboru

Medicinska fakulteta

## UČNI NAČRT PREDMETA / COURSE SYLLABUS

<b>Ime predmeta:</b>	<b>NMR v biomedicini</b>							
<b>Course title:</b>	<b>NMR in Biomedicine</b>							
<b>Študijski program in stopnja</b> <b>Study programme and cycle</b>	<b>Študijska smer</b> <b>Study option</b>			<b>Letnik</b> <b>Year of study</b>	<b>Semester</b> <b>Semester</b>			
Biomedicinska tehnologija/3. stopnja				2	3 ali 4			
Biomedical Technology/3rd Degree								
<b>Vrsta predmeta (obvezni ali izbirni) /</b> <b>Course type (compulsory or elective)</b>				Izbirni Elective				
<b>Univerzitetna koda predmeta / University course code:</b>								
<b>Predavanja</b> <b>Lectures</b>	<b>Seminar</b> <b>Seminar</b>	<b>Vaje</b> <b>Tutorial</b>			<b>Klinične vaje</b> <b>Clinical training</b>	<b>Druge oblike študija</b> <b>Other forms of study</b>	<b>Samost. delo</b> <b>Individual work</b>	<b>ECTS</b>
15	20	10					135	6
		AV	LV	RV				
<b>Nosilec predmeta / Course coordinator:</b>	Prof. dr. Igor Serša							
<b>Jeziki /Languages:</b>	<b>Predavanja / Lectures:</b>		Slovenščina/Slovene					
	<b>Vaje / Tutorial:</b>		Slovenščina/Slovene					
<b>Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:</b>				<b>Prerequisites for enrolling in the course or for performing study obligations:</b>				
<b>Vsebina (kratek pregled učnega načrta):</b>				<b>Content (syllabus outline):</b>				
Fizikalno ozadje jedrske magnetne resonance in njena uporaba v medicini. Principi delovanja magnetno-rezonančnega tomografa in različne metode slikanja in metode spektroskopije z magnetno resonanco. Poleg fizikalnega ozadja metod bo predstavljena tudi njihova uporabnost v medicinski diagnostiki. Dejavniki, ki vplivajo na kvaliteto slik in nevarnostmi pri delu, praktična znanja pri delu z magnetno-rezonančnim tomografom.				Nuclear magnetic resonance and its applications in medicine. They will learn how a magnetic resonance tomography works and will get to know magnetic resonance imaging and magnetic resonance spectroscopy techniques. In addition to understanding physical background of the methods, the use of the methods for medical diagnostics will be discussed as well. Different factors that influence image quality, safety factors and practical experience.				
<b>Temeljni literatura in viri / Reading materials:</b>								
	– Vladimir Jevtič, Jožef Matela, Miloš Šurlan, Diagnostična in intervencijska radiologija. Splošni del, Maribor : Pivec, 2014, ISBN 978-9616897648							
	– Marinus T. Vlaardingerbroek, Jacques A. Boer, Magneti Resonance Imaging: Theory and Practice, Springer Berlin, Heidelberg, 3rd edition, 2003, ISBN 978-3540436812							

<ul style="list-style-type: none"> <li>Robert W. Brown, Y.-C. Norman Cheng, E. Mark Haacke, Michael R. Thompson, Ramesh Venkatesan, <i>Magnetic Resonance Imaging: Physical Principles and Sequence Design</i>, Wiley-Blackwell; 2nd edition, 2014, ISBN 978-0471720850</li> <li>Matt A. Bernstein, Kevin F. King, Xiaohong Joe Zhou, <i>Handbook of MRI Pulse Sequences</i>, Academic Press; 1st edition, 2004, ISBN 978-0120928613</li> </ul>		
<b>Cilji in kompetence:</b>		<b>Objectives and competences:</b>
<p>Predmet je podlaga za pridobitev kompetenc s področja diagnostičnega slikanja z magnetno resonanco. Ta vključuje izbor slikovnih metod in njihovih parametrov pri sestavljanju protokolov slikanja, nadzor kvalitete slik in zaznavanja napak, zagotavljanje varnosti pri magnetnoresonančni preiskavi.</p>		<p>The course provides basis for gaining competencies in the field of magnetic resonance imaging. These include the selection of imaging methods and their parameters in the compilation of imaging protocols, quality control of images and error detection, and assurance of safety for examination by magnetic resonance imaging.</p>
<b>Predvideni študijski rezultati:</b>		<b>Intended learning outcomes:</b>
<p><b>Po uspešno opravljenem modulu naj bi bili študenti zmožni:</b>  Pri predmetu NMR v biomedicini študenti pridobijo razumevanje osnov magnetne resonance ter slikanja z magnetno resonanco.  Pridobijo pregled nad različnimi skupinami metod slikanja z magnetno resonanco ter področji njihove uporabe.  Seznanijo se s pomenom različnih parametrov slikanja ter njihovim vplivom na kvaliteto in kontrast slike.  Spoznajo prednosti in slabosti slikanja z magnetno resonanco v primerjavi z ostalimi metodami diagnostičnega slikanja v medicini.</p>		<p><b>After successfully completing the module, students should be able to:</b>  In NMR in Biomedicine, students gain an understanding of the basics of magnetic resonance imaging and magnetic resonance imaging.  They gain an overview of the different groups of magnetic resonance imaging methods and their applications.  They are acquainted with the importance of different imaging parameters and their impact on image quality and contrast.  They learn about the advantages and disadvantages of magnetic resonance imaging compared to other methods of diagnostic imaging in medicine.</p>
<b>Metode poučevanja in učenja:</b>		<b>Learning and teaching methods:</b>
<p>Predavanja  Seminarji  Vaje (praktično delo z MR tomografom)  Samostojno delo</p>		<p>Lectures  Seminars  Tutorial (experimental work on a MR tomograph)  Individual work</p>
<b>Načini ocenjevanja:</b>	<b>Delež (v %) / Share (in %)</b>	<b>Assessment methods:</b>
Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Method (written or oral exam, coursework, project):
Ustni izpit	<b>75 %</b>	Oral exam
Seminarska naloga	<b>25 %</b>	Seminar paper
<b>Reference nosilca / Course coordinator's references:</b>		
<p>AWAIS, Kanza, SNOJ, Žiga, CVETKO, Erika, SERŠA, Igor. Diffusion tensor imaging of a median nerve by magnetic resonance : a pilot study. <i>Life</i>. 2022, vol. 12, iss. 5, str. 748-1-748-13, ilustr. ISSN 2075-1729. <a href="https://www.mdpi.com/2075-1729/12/5/748">https://www.mdpi.com/2075-1729/12/5/748</a>, DOI: 10.3390/life12050748. [COBISS.SI-ID 108348931], [JCR, SNIP, WoS, Scopus] kategorija: 1A2 (Z, A1/2); uvrstitev: SCIE, Scopus, MBP (BIOABS, BIOPREW, FSTA, PUBMED, DOAJ); tip dela je verificiral OSICM</p>		



točke: 21.82, št. avtorjev: 4

VILTUŽNIK, Rebeka, VIDMAR, Jernej, FABJAN, Andrej, JEROMEL, Miran, MILOŠEVIČ, Zoran, KOCIJANČIČ, Igor, SERŠA, Igor. Study of correlations between CT properties of retrieved cerebral thrombi with treatment outcome of stroke patients. *Radiology and oncology*. [Print ed.]. 2021, vol. 55, no. 4, str. 409-417, graf. prikazi, tabeli. ISSN 1318-2099. DOI: 10.2478/raon-2021-0037. [COBISS.SI-ID 79857923], [JCR, SNIP, WoS do 3. 11. 2022: št. citatov (TC): 1, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0,00, Scopus do 1. 11. 2022: št. citatov (TC): 1, čistih citatov na avtorja (CIAu): 0,00] kategorija: 1A2 (Z, A1/2); uvrstitev: SCIE, Scopus, MBP (METADEX, CINAHL, MEDLINE, PUBMED, DOAJ); tip dela je verificiral OSICN točke: 12.87, št. avtorjev: 7

VILTUŽNIK, Rebeka, BAJD, Franci, MILOŠEVIČ, Zoran, KOCIJANČIČ, Igor, JEROMEL, Miran, FABJAN, Andrej, KRALJ, Eduard, VIDMAR, Jernej, SERŠA, Igor. An intermodal correlation study among imaging, histology, procedural and clinical parameters in cerebral thrombi retrieved from anterior circulation ischemic stroke patients. *Journal of clinical medicine*. 2022, vol. 11, no. 19, str. 5976-1- 5976-15. ISSN 2077-0383. DOI: 10.3390/jcm11195976. [COBISS.SI-ID 125257219], [JCR, SNIP, WoS, Scopus] kategorija: 1A2 (Z, A1/2); uvrstitev: SCIE, Scopus, MBP (PUBMED, DOAJ); tip dela je verificiral OSICM točke: 10.58, št. avtorjev: 9