

| UČNI NAČRT PREDMETA / COURSE SYLLABUS | | | | | | | | |
|---|----------------------------------|--|----|--|--|--|---|-------------|
| Ime predmeta: | | Nevrokirurgija | | | | | | |
| Course title: | | Neurosurgery | | | | | | |
| Študijski program in stopnja Study programme and cycle | | Študijska smer Study option | | Letnik Year of study | | Semester Semester | | |
| Biomedicinska tehnologija/3. stopnja | | | | 2 | | 3 ali 4 | | |
| Biomedical Technology/3rd Degree | | | | | | | | |
| Vrsta predmeta (obvezni ali izbirni) / Course type (compulsory or elective) | | | | Izbirni | | | | |
| | | | | Elective | | | | |
| 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 |
| 15 | 20 | 10 | | | | | 135 | 6 |
| | | AV | LV | RV | | | | |
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| Nosilec predmeta / Course coordinator: | | | | Prof. dr. Tadej Strojnik | | | | |
| Jeziki /Languages: | | Predavanja / Lectures: | | Slovenščina/Slovene | | | | |
| | | Vaje / Tutorial: | | Slovenščina/Slovene | | | | |
| Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti: | | | | Prerequisites for enrolling in the course or for performing study obligations: | | | | |
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| Vsebina (kratek pregled učnega načrta): | | | | Content (syllabus outline): | | | | |
| <p>Nevromodulacija je hitro razvijajoča se metoda zdravljenja bolečine, neurodegenerativnih in psihiatričnih bolezni. V zadnjih letih so se tehnike, cilji in indikacije nevromodulatornega zdravljenja precej spremenili, zato želimo podati celovit pregled tega hitro se razvijajočega področja. Razpravljali bomo o osnovnih principih, zgodovinskih mejnikih in različnih tehnikah, kot so globoka možganska stimulacija (DBS), stimulacija vagusnega živca (VNS), stimulacija hrbtenjače (SCS), transkranijska magnetna stimulacija (TMS) in novejših tehnikah, kot so npr. možgansko-računalniški vmesniki (BCI) in zaprte zanke (Closed Loop sistemi). Predstavili bomo tudi najpogostejše indikacije in kirurške tarče za zdravljenje neurodegenerativnih obolenj, nove metode stimulacije in glavne sisteme, ki so trenutno v</p> | | | | <p>Neuromodulation is a rapidly developing method for the treatment of pain, neurodegenerative and psychiatric disorders. In recent years, the techniques, goals, and indications of neuromodulatory treatment have changed significantly, so we will provide a comprehensive overview of this rapidly evolving field. We will discuss the basic principles, historical milestones, and various techniques such as deep brain stimulation (DBS), vagus nerve stimulation (VNS), spinal cord stimulation (SCS), transcranial magnetic stimulation (TMS) and newer techniques such as brain-computer interfaces (BCI) and closed-loop systems. We will also introduce the most common indications and surgical targets for the treatment of neurodegenerative diseases, new stimulation methods and the main systems currently</p> | | | | |

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| klinični uporabi. Predstavili in obravnavali bodo tudi osnove stereotaksije in radiokirurgije. | in clinical use. We will also present and discuss the basics of stereotaxy and radiosurgery. |
| Temeljna literatura in viri / Reading materials: | |
| <p>Burchiel, Kim J (Author), Raslan Ahmed M (Author). Functional Neurosurgery and Neuromodulation. Elsevier, 1 st edition 2018</p> <p>AZIZ, Tipu (Editor), GREEN, Alex (Editor). Neuromodulation for Intractable Pain. Mdpi AG, 2020</p> <p>KNOTKOVA, Helena (Editor), RASCHE, Dirk(Editor). Textbook of Neuromodulation: Principles, Methods and Clinical Applications. Springer, 2014</p> <p>STROJNIK, Tadej (glavni urednik). Izbrana poglavja iz nevrokirurgije. 1. izd. Maribor: Medicinska fakulteta, 2010. 340 str., ilustr. ISBN 978-961-6739-15-3. [COBISS.SI-ID 65527553]</p> | |
| Cilji in kompetence: | Objectives and competences: |
| <p>V okviru tega predmeta bodo študenti podrobno spoznali osnovna načela nevromodulacije. Na izbranih primerih bodo identificirali primerne kandidate za zdravljenje ter predstavili načrt zagotavljanja celostne oskrbe pred, med in po terapiji. Študenti se bodo prav tako podučili o pomenu in osnovah programiranja naprav, ki se uporabljajo v nevromodulaciji. Spoznali bodo nove tehnologije in smeri v nevromodulaciji, vključno z naprednimi tehnikami, kot so sistemi zaprte zanke, možgansko-računalniški vmesniki in integracija z umetno inteligenco, kar bo poudarilo razvojno dinamiko področja. Študenti bodo pri oskrbi pacientov demonstrirali interdisciplinarno in timsko usmerjeno sodelovanje z drugimi deležniki, pri tem pa bodo tudi kritično ovrednotili aktualne raziskave in strokovno literaturo. Študenti bodo razumeli trenutno stanje in prihodnje izzive nevromodulacije in bodo tako usposobljeni za klinično prakso, raziskovalno delo in inovacije na tem področju.</p> | <p>In this course, students will develop a comprehensive understanding of the basic principles of neuromodulation. Using specific examples, they will be able to identify appropriate candidates for treatment and develop a plan for complete patient care before, during, and after therapy. Students will also learn the basics and importance of programming devices used in neuromodulation. They will become familiar with the latest technologies and advances in neuromodulation, including sophisticated techniques such as closed-loop systems, brain-computer interfaces, and the integration of artificial intelligence, illustrating the evolving dynamics of the field. In caring for patients, students will demonstrate interdisciplinary and team-based collaboration with other participants and critically evaluate current research and literature. Students will gain an understanding of the current state and future challenges of neuromodulation that will equip them for clinical practice, research, and innovation in the field.</p> |
| Predvideni študijski rezultati: | Intended learning outcomes: |
| Znanje in razumevanje: Študent opiše in razloži osnovna načela, klinične indikacije in tehnologije, povezane z nevromodulacijo. Študent interpretira najnovejše raziskave, vključno z razvojem sistemov zaprte zanke in uporabo umetne inteligence na tem področju. Na izbranem primeru študent analizira in kritično oceneni terapevtska možnosti | Knowledge and understanding: Students will learn the basic principles, clinical applications and technologies associated with neuromodulation. They will also interpret the latest research, including the use of artificial intelligence and closed-loop systems in this field. In addition, they will analyse and critically evaluate the therapeutic options of neuromodulation using a chosen example. Students will also assess the ethical, legal and social |

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| nevromodulacije. Ovrednoti tudi etične, pravne in socialne vidike zdravljenja z nevromodulacijo. | | implications of neuromodulation treatment. This comprehensive approach prepares students for a career in clinical practise, research or further academic work in the field of neuromodulation and ultimately contributes to improving the treatment of neurological and psychiatric disorders. | |
| Prenosljive/ključne spretnosti in drugi atributi: Po zaključku predmeta nevromodulacije se od študentov pričakuje, da bodo dosegli temeljito razumevanje njenih načel, tehnik in klinično uporabnost, ter razvili sposobnost kritične ocene raziskav in razvili sposobnost in spoznali pomen interdisciplinarnega sodelovanja. | | Transferable/key competences and other abilities: After completing the neuromodulation course, students are expected to gain a solid understanding of its principles, techniques, and clinical applications, along with the ability to critically evaluate research and engage in interdisciplinary collaboration. | |
| Metode poučevanja in učenja: | | Learning and teaching methods: | |
| Predavanja Seminar Vaje (seminarske vaje) Samostojno delo | | Lectures Seminars (case reports) Tutorial Individual work | |
| Načini ocenjevanja: | | Delež (v %) / Share (in %) | Assessment methods: |
| Način (pisni izpit, ustno izpraševanje, naloge, projekt) | | | Method (written or oral exam, coursework, project): |
| Pisni izpit | | 100 % | Written exam |
| Reference nosilca / Course coordinator's references: | | | |
| "STROJNIK, Tadej, BUJAS, Tatjana, VELNAR, Tomaž. Invasive myxopapillary ependymoma of the lumbar spine : a case report. World journal of clinical cases, ISSN 2307-8960. [Online ed.], May 2019, vol. 7, iss. 10, str. 1142-1148, ilustr. https://www.wjgnet.com/2307-8960/abstract/v7/i10/1142.htm , doi: 10.12998/wjcc.v7.i10.1142. [COBISS.SI-ID 6697279], [JCR, WoS do 8. 6. 2019: št. citatov (TC): 0, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0, Scopus do 13. 6. 2019: št. citatov (TC): 0, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0] kategorija: 1A3 (Z); uvrstitev: SCI, Scopus, MBP; tip dela je verificiral OSICM točke: 22.85, št. avtorjev: 3" | | | |
| "ŠMIGOC, Tomaž, RAVNIK, Janez, VORŠIČ, Matjaž, STROJNIK, Tadej, BUNC, Gorazd. Dekompresijska kraniektomija pri malignih ishemičnih infarktih v velikih in malih možganih : lastne izkušnje in pregled literature = The role of decompressive craniectomy in malignant cerebral and cerebellar ischemic stroke : case series and literature review. V: RAKUŠA, Martin (ur.), MENIH, Marija (ur.), MAGDIČ, Jožef (ur.). Sodobni pogledi na možgansko kap. Maribor: Univerzitetni klinični center, Oddelek za nevrološke bolezni; Ljubljana: Združenje nevrologov Slovenije - SZD. 2016, str. 146-157. [COBISS.SI-ID 5635391] kategorija: 3C (Z); tip dela je verificiral OSICM točke: 4, št. avtorjev: 5" | | | |
| "STROJNIK, Tadej, DUH, Darja, LAH TURNŠEK, Tamara. Prevalence of neurotropic viruses in malignant glioma and their onco-modulatory potential. In Vivo, ISSN 1791-7549, Mar.-Apr. 2017, vol. 31, no. 2, str. 221-229, ilustr. http://iv.iiarjournals.org/content/31/2/221.full , doi: 10.21873/invivo.11049. [COBISS.SI-ID 5953599], [JCR, SNIP, WoS do 12. 5. 2019: št. citatov (TC): 4, čistih citatov (CI): 4, čistih citatov na avtorja (CIAu): 1.33, Scopus do 29. 9. 2019: št. citatov (TC): 5, čistih citatov (CI): 5, čistih citatov na avtorja (CIAu): 1.67] kategorija: 1A4 (Z); uvrstitev: SCI, Scopus, MBP; tip dela je verificiral OSICM točke: 17.85, št. avtorjev: 3" | | | |

