Univerza v Mariboru

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Ultrazvok v urgentni medicini**
Course title:	**Ultrasound in emergency medicine**

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
BIOMEDICINSKA TEHNOLOGIJA BIOMEDICAL TECHNOLOGY		2.	3 ali 4

Vrsta predmeta / Course type	
Univerzitetna koda predmeta / University course code:	

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
15	15		15		105	5

Nosilec predmeta / Lecturer:	**Doc. dr. Matej Strnad, dr. med., spec.**

Jeziki / Languages:	**Predavanja / Lectures:**	**Slovenščina / Slovene; Angleščina / English**
	Vaje / Tutorial:	**Slovenščina / Slovene; Angleščina / English**

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Kandidat mora doseči 300 ECTS na predhodnem študiju.	Graduate degree 300 ECTS

Vsebina:	**Content (Syllabus outline):**
Vsebina študijskega predmeta »Ultrazvok v urgentni medicini« zajema predvsem proučevanje znanj in novih metodologij obposteljnega (»point-of-care«) ultrazvoka za diagnostiko in spremljanje zdravljenja (»monitoring«) izbranih bolezenskih entitet s področja urgentne medicine. V okviru predmeta bodo slušatelji, poleg preučevanja tehnik, indikacij in omejitve ter interpretacij dobljenih rezultatov, preučevali tudi umeščenost obposteljne ultrazvočne diagnostike v proces obravnave kritično obolelega pacienta (princip »z obposteljnim ultrazvokom« podprtega diagnostično-terapevtskega odločanja) zlasti na naslednjih področjih: 1. motnje zavesti in poškodbe glave (transkranialni ultrazvok, ultrazvočno določanje intrakranialnega tlaka, ocena zeničnih reakcij), 2. oskrba dihalne poti (ultrazvok dihalnih poti in podpora endotrahealni intubaciji), 3. dispnoični bolnik in bolnik s prsno bolečino (ultrazvok stene prsnega koša, ultrazvok pljuč, usmerjena ehokardiografija, ultrazvok globokega venskega sistema), 4. bolnik z bolečino v trebuhu (usmerjeni ultrazvok žolčnika, ledvic, črevesnih vijug in slepiča, prisotnost proste tekočine),	The contents of the study programme »Ultrasound in emergency medicine« comprise above all the studying of new methodologies of bedside (“point-of-care”) ultrasound for diagnosis and monitoring of treatment of specific disease entities from the field of emergency medicine. The students will study various ultrasound technics, indications and limitations of point-of-care ultrasound, interpret point-of-care ultrasound findings as well as research the importance of point-of-care ultrasound in management of critically ill patients (principle of point-of-care ultrasound enhanced diagnostic processes and therapeutic decision-making) in the following fields of emergency medicine: 1. altered mental status and head trauma (transcranial ultrasound, evaluation of intracranial pressure with ultrasound, evaluation of pupil reactions), 2. airway management (airway ultrasound and its support by endotracheal intubation), 3. patient with acute dyspnoea and chest pain (ultrasound of thoracic wall, lung ultrasound, focused echocardiography, deep venous ultrasound),

5. nediferencirani šokirani bolnik (ultrazvočni protokol RUSH) 6. kritično prizadeti poškodovanec (ultrazvočni protokoli FAST, E-FAST in FAST-ER), 7. ultrazvočna diagnostika mehkotkivnih lezij (vnetja, okužbe, poškodbe) Za slušatelje je priporočeno osnovno poznavanje (tehnike, indikacije, omejitve, interpretacija rezultatov) obposteljnih ultrazvočnih preiskav.	4. patient with acute abdominal pain (focused ultrasound of gallbladder, kidneys, intestine and appendix, free fluid in abdomen), 5. undifferentiated patient in shock (RUSH protocol) 6. patient with life threatening injuries (FAST, E-FAST, FAST-ER protocols) 7. ultrasound of soft tissues (inflammations, infections, trauma) Students should have basic knowledge of point-of-care ultrasound diagnostics (basic technics, knobology, indications, limitations, interpretation of findings).

Temeljni literatura in viri / Readings:

1. Noble VE, Nelson B. Manual of emergency and critical care ultrasound. 2nd ed. Cambridge: Cambridge University Press 2011.
2. Ma JO, Mateer JR, Reardon RF, Joing SA. Ma and Mateer's Emergency Ultrasound. 3th ed. McGraw Hill 2014.
3. De Backer D, Cholley BP, Slama M, Vieillard Baron A, Vignon P. Hemodynamic monitoring using echocardiography in the critically ill. Springer Verlag 2011.
4. Lichtenstein DA. General ultrasound in the critically ill. Springer Verlag 2007.

Cilji in kompetence:	**Objectives and competences:**
Cilji študija »Ultrazvok v urgentni medicini« so: • razumevanje in kritično vrednotenje obposteljne ultrazvočne diagnostike v procesu obravnave kritično obolelega; • kritično vrednotenje ter možnost prenosa v klinično prakso novih obposteljnih ultrazvočnih aplikacij (transkranialni ultrazvok, ultrazvočno merjenje IKT, okularni ultrazvok, ultrazvok dihalnih poti, ultrazvočni protokoli za obravnavo nediferenciranih bolnikov); • razumevanje tehnik, indikacij, omejitev in interpretacij dobljenih rezultatov obposteljne ultrazvočne preiskave.	The objectives of the study »Ultrasound in emergency medicine« are: • comprehension and evaluation of point-of-care ultrasound diagnostics in management of critically ill patients; • applicability evaluation and transfer of new point-of-care ultrasound applications into clinical praxis (transcranial ultrasound, evaluation of intracranial pressure with ultrasound, ocular ultrasound, airway ultrasound, ultrasound protocols for undifferentiated patients); • comprehension of technics, indications, limitations and interpretations of point-of-care ultrasound findings.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Znanje in razumevanje: • Osvojitev novih znanj s področja ultrazvoka v urgentni medicini ter njihovo razumevaje, ki jih bo mogoče neposredno koristiti v procesu zdravljenja in spremljanja kritično obolelih. • Ključne veščine ultrazvoka v urgentni medicini. Prenesljive/ključne spretnosti in drugi atributi: Odvisno od raziskovalnega področja in samega raziskovalnega projekta.	**Knowledge and understanding:** Knowledge and understanding: • Acquired new knowledge in the field of ultrasound in emergency medicine, which can be applied directly in the processes of treatment and following of critically ill patients. • Key skills in emergency medicine ultrasound. Transferable/Key Skills and other attributes: Depends on the research field and on the research project.

Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja, seminarji, seminarske vaje, samostojno raziskovalno delo.	Lectures, seminars, tutorials, independent research work.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
• Ustno izpraševanje • Seminarska naloga • Praktični izpit	25 % 25 % 50 %	• Oral examination • Coursework • Practical examination

Reference nosilca / Lecturer's references:

1. PELCL, Tine, BOROVNIK LESJAK, Vesna, VUJANOVIĆ, Vitka, STRNAD, Matej. Impact of prehospital rapid sequence intubation and mechanical ventilation on prehospital vital signs and outcome in trauma patients. *Signa vitae*, ISSN 1845-206X, 2017, vol. 13, no. 1, str. 51-55. http://www.signavitae.com/wp-content/uploads/2017/04/sv13-n1-51-55.pdf, doi: 10.22514/SV131.042017.23 /. [COBISS.SI-ID 512719928], [JCR, SNIP, Scopus do 11. 7. 2017: št. citatov (TC): 0, čistih citatov (CI): 0]

2. STRNAD, Matej, BOROVNIK LESJAK, Vesna, VUJANOVIĆ, Vitka, KRIŽMARIĆ, Miljenko. Predictors of mortality in patients with isolated severe traumatic brain injury. *Wiener klinische Wochenschrift*, ISSN 1613-7671, 2017, vol. 129, iss. 3, str. 110-114. https://link.springer.com/article/10.1007%2Fs00508-016-0974-0, doi: 10.1007/s00508-016-0974-0. [COBISS.SI-ID 512595256], [JCR, SNIP, WoS do 7. 4. 2017: št. citatov (TC): 1, čistih citatov (CI): 1, Scopus do 29. 1. 2017: št. citatov (TC): 2, čistih citatov (CI): 2]

3. STRNAD, Matej, PROSEN, Gregor, BOROVNIK LESJAK, Vesna. Bedside lung ultrasound for monitoring the effectiveness of prehospital treatment with continuous positive airway pressure in acute decompensated heart failure. *European journal of emergency medicine*, ISSN 1473-5695, 2016, vol. 23, iss. 1, str. 50-55. http://journals.lww.com/euro-emergencymed/Abstract/2016/02000/Bedside_lung_ultrasound_for_monitoring_the.11.aspx, doi: 10.1097/MEJ.0000000000000205. [COBISS.SI-ID 512583224], [JCR, SNIP, WoS do 26. 3. 2017: št. citatov (TC): 4, čistih citatov (CI): 4, Scopus do 1. 3. 2017: št. citatov (TC): 4, čistih citatov (CI): 4]

4. STRNAD, Matej, BOROVNIK LESJAK, Vesna, VUJANOVIĆ, Vitka, PELCL, Tine, KRIŽMARIĆ, Miljenko. Predictors of mortality and prehospital monitoring limitations in blunt trauma patients. *BioMed research international*, ISSN 2314-6141, 2015, vol. 2015. http://www.hindawi.com/journals/bmri/2015/983409/. [COBISS.SI-ID 512471608], [JCR, SNIP, WoS do 21. 3. 2015: št. citatov (TC): 0, čistih citatov (CI): 0, Scopus do 2. 12. 2015: št. citatov (TC): 1, čistih citatov (CI): 1]

5. ZADEL, Sabina, STRNAD, Matej, PROSEN, Gregor, MEKIŠ, Dušan. Point of care ultrasound for orotracheal tube placement assessment in out-of hospital setting. *Resuscitation*, ISSN 1873-1570. [Online ed.], 2015, vol. 87, no. , str. [1-6], ilustr. http://ac.els-cdn.com/S0300957214008156/1-s2.0-S0300957214008156-main. pdf?_tid=59e6f5fc-7ebd-11e4-a1ae-00000aab0f26&acdnat=1418031425_06c848659cf50b5f4f271de62ded28ff, doi: 10.1016/j.resuscitation.2014.11.006. [COBISS.SI-ID 5187903], [JCR, SNIP, WoS do 25. 12. 2016: št. citatov (TC): 8, čistih citatov (CI): 8, Scopus do 2. 6. 2016: št. citatov (TC): 8, čistih citatov (CI): 8]

6. VUJANOVIĆ, Vitka, BOROVNIK LESJAK, Vesna, PELCL, Tine, STRNAD, Matej. Impact of pre-hospital oxygenation and ventilation status on outcome in patients with isolated severe traumatic brain injury. *Signa vitae*, ISSN 1845-206X, 2014, vol. 9, no. 1. http://www.signavitae.com/attachments/07%20STRNAD-VUJANOVIC%20-%20SIGNA%2026.pdf. [COBISS.SI-ID 512404536], [JCR, SNIP, WoS do 24. 8. 2014: št. citatov (TC): 0, čistih citatov (CI): 0, Scopus do 13. 11. 2014: št. citatov (TC): 0, čistih citatov (CI): 0]

7. STRNAD, Matej, ZADEL, Sabina, KLEMENC-KETIŠ, Zalika, PROSEN, Gregor. Identification of lung sliding : a basic ultrasound technique with a steep learning curve. *Signa vitae : specialized medical journal*, ISSN 1334-5605, 2013, vol.

8, no. 1, str. 31-35, ilustr. http://www.signavitae.com/attachments/SIGNA%20VITAE%202013%208%281%29%2031%20-%2035.pdf. [COBISS.SI-ID 30588633], [JCR, SNIP, WoS do 4. 5. 2016: št. citatov (TC): 2, čistih citatov (CI): 0, Scopus do 18. 2. 2016: št. citatov (TC): 2, čistih citatov (CI): 0]

8. PROSEN, Gregor, KLEMEN, Petra, STRNAD, Matej, GRMEC, Štefek. Combination of lung ultrasound (a comet-tail sign) and N-terminal pro-brain natriuretic peptide in differentiating acute heart failure from chronic obstructive pulmonary disease and asthma as cause of acute dyspnea in prehospital emergency setting. *Critical care*, ISSN 1466-609X, 2011, vol. 15, no. 2, str. R114. http://ccforum.com/content/pdf/cc10140.pdf, doi: 10.1186/cc10140. [COBISS.SI-ID 3911231], [JCR, SNIP, WoS do 20. 8. 2017: št. citatov (TC): 47, čistih citatov (CI): 45, Scopus do 24. 6. 2017: št. citatov (TC): 45, čistih citatov (CI): 43]

9. GRMEC, Štefek, STRNAD, Matej, PODGORŠEK, Dejan. Comparison of the characteristics and outcome among patients suffering from out-of-hospital primary cardiac arrest and drowning victims in cardiac arrest. *International journal of emergency medicine*, ISSN 1865-1372, Apr. 2009, vol. 2, no. 1, str. 7-12, tabele. http://link.springer.com/article/10.1007%2Fs12245-009-0084-0, doi: 10.1007/s12245-009-0084-0. [COBISS.SI-ID 3266623], [SNIP, Scopus do 22. 8. 2017: št. citatov (TC): 24, čistih citatov (CI): 23]

10. GRMEC, Štefek, STRNAD, Matej, KUPNIK, Dejan, SINKOVIČ, Andreja, GAZMURI, Raúl J. Erythropoietin facilitates the return of spontaneous circulation and survival in victims of out-of-hospital cardiac arrest. *Resuscitation*, ISSN 0300-9572. [Print ed.], 2009, vol. 80, no. 6, str. 631-637, doi: 10.1016/j.resuscitation.2009.03.010. [COBISS.SI-ID 3285823], [JCR, SNIP, WoS do 21. 5. 2017: št. citatov (TC): 35, čistih citatov (CI): 35, Scopus do 22. 12. 2016: št. citatov (TC): 33, čistih citatov (CI): 33]

11. GRMEC, Štefek, STRNAD, Matej, ČANDER, Darko, MALLY, Štefan. A treatment protocol including vasopressin and hydroxyethyl starch solution is associated with increased rate of return of spontaneous circulation in blunt trauma patients with pulseless electrical activity. *International journal of emergency medicine*, ISSN 1865-1380. Online ed., Dec. 2008, vol. 1, no. 4, str. 311-316, doi: 10.1007/s12245-008-0073-8. [COBISS.SI-ID 3129663], [SNIP]