



### UČNI NAČRT PREDMETA / COURSE SYLLABUS

Ime predmeta:	Osnove medicinske tehnologije
Course title:	Fundamentals of medical technology

Študijski program in stopnja Study programme and cycle	Študijska smer Study option	Letnik Year of study	Semester Semester
Splošna medicina, enovit magistrski študijski program		Prvi, drugi	1., 4.
General medicine, Uniform master's degree study program		First, second	1st, 4th

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
5	40	AV	LV	RV			45	3

Nosilec predmeta / Course coordinator:

Jeziki /Languages: Predavanja / Lectures:   
Vaje / Tutorial:

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):
<p><b>Osnove medicinske tehnologije:</b></p> <ul style="list-style-type: none"> <li>• medicinska oprema za dostop do obtočil (IV kanile, katetri z več svetlinami, Gauge merski sistem, brizgalke, Luer-lock spojke, oprema za infuzijo, gravitacijski infuzijski sistemi – mikro in makro infuzijski sistemi),</li> <li>• medicinski pripomočki za aplikacijo kisika (navadne obrazne maske in maske z zbiralniki kisika, Venturi maske, merilniki pretoka, končne spojke medicinskih plinov, posode medicinskih plinov pod tlakom),</li> </ul>	<p><b>Fundamentals of medical technology:</b></p> <ul style="list-style-type: none"> <li>• medical equipment for vascular access (IV cannulas, multi-lumen catheters, Gauge catheter sizing, syringes, Luer-lock connectors, infusion equipment, gravity infusion systems – micro and macro drip),</li> <li>• medical equipment for oxygen therapy (simple oxygen mask and mask with reservoir, Venturi mask, flowmeters, terminal outlets of medical gases, medical gas cylinders),</li> </ul>

<ul style="list-style-type: none"> <li>• osnovna oprema za oživljanje (defibrilator, laringoskop in dihalna cevka),</li> <li>• basic equipment for mechanical ventilation (ročni dihalni balon - AMBU, maske za ventilacijo anestezijski krožni dihalni sistem, prenosni ventilator, dihalni filtri),</li> <li>• osnove sistemov kliničnega monitoringa (pulzna oksimetrija, EKG odvodi, sistemi merjenja krvnega tlaka, kapnografija).</li> </ul>	<ul style="list-style-type: none"> <li>• basic resuscitation equipment (defibrillator, laryngoscope and tracheal tube),</li> <li>• basic equipment for mechanical ventilation (manual resuscitator – AMBU, face masks, anesthesia circle system, portable emergency ventilator, breathing filters),</li> <li>• basic principles of clinical monitoring systems (pulse oximetry monitoring, ECG leads, blood pressure monitoring systems, capnography).</li> </ul>
--	---

### Temeljni literatura in viri / Reading materials:

1. Temeljne fizikalne osnove v anesteziologiji, anestezijski aparat, anestezijski dihalni sistemi in anestezijski ventilator. Učbenik za fakultetni študij anesteziologije. Manohin, Aleksander, Križmarić Miljenko. 2006
2. Aston, D. Rivers A, Dharmadasa A. (2014). Equipment in Anaesthesia and Critical Care: A complete guide for the FRCA. Scion Publishing Limited.
3. Davey, A. J., & Diba, A. (2012). Ward's anaesthetic equipment. Elsevier Health Sciences

### Dodatna literatura in viri / Additional literature and sources

1. Pisano A. (2017). Physics for Anesthesiologists, From Daily Life to the Operating Room. Springer International Publishing.
2. Kramme R, Hoffman KP, Pozoz R. (2011). Springer Handbook of Medical Technology. Springer Heidelberg Dordrecht London New York.
3. Reich DL. (2011). Monitoring in Anesthesia and Perioperative Care. Cambridge University Press.
4. Sandberg WS, Urman RD, Ehrenfeld JM. (2011). The MGH Textbook of Anesthetic Equipment. Saunders Elsevier.

### Cilji in kompetence:

Študenti se seznanijo z osnovnimi tehničnimi načeli medicinske tehnologije pri diagnostiki in zdravljenju.  
Razumejo različne principe delovanja medicinskih tehnologij in simulatorjev.  
Seznanjeni bodo z osnovnim konceptom medicinske tehnologije.

### Objectives and competences:

Students are introduced to the technical principles of the biomedical technologies in diagnostic and treatment.  
They understand different working principles of biomedical technologies and simulators.  
They are introduced with the basic concept of biomedical technology.

### Predvideni študijski rezultati:

#### Znanje in razumevanje:

Po zaključku tega predmeta bo študent sposoben:

- sprejemati znanje o osnovnih tehničnih principih sistemov medicinske tehnologije,
- razvrstiti in definirati osnovne medicinske pripomočke,
- povezovati in integrirati znanje za razumevanje osnovnih konceptov

### Intended learning outcomes:

#### Knowledge and understanding:

On completion of this course the student will:

- acquire knowledge regarding the fundamental technical principles of medical technology,
- classified and defined basical medical devices,

<p>medicinske tehnologije v diagnostiki in terapiji,</p> <ul style="list-style-type: none"> <li>primerjati in razpravljati o različnih tipih medicinskih pripomočkov.</li> </ul> <p><b><u>Prenosljive/ključne spretnosti in drugi atributi:</u></b></p> <p>Po zaključku tega predmeta bo študent sposoben izvesti sledeče prenosljive in ključne spretnosti:</p> <ul style="list-style-type: none"> <li>uporaba osnovne moderne tehnologije za merjenje in aplikativno uporabo,</li> <li>sposobnost uporabe medicinskih pripomočkov v širokem področju medicine,</li> <li>sposobnost kritične analize, sinteze in evaluacije ključnih tehničnih lastnosti umetnih dihalnih poti in monitoringa fizioloških sistemov,</li> <li>evaluacija ključnih spremenljivk v različnih sistemih kliničnega monitoringa,</li> <li>sposobnost sinteze in predvidevanja osnovnih rešitev in posledic delovanja različne medicinske tehnologije</li> </ul>	<ul style="list-style-type: none"> <li>summarize and integrate knowledge to understand fundamental concepts of medical technology in the diagnostic and therapy,</li> <li>compare and discuss different types of medical devices.</li> </ul> <p><b><u>Transferable/key competences and other abilities:</u></b></p> <p>On completion of this course the student will have the following transferable and key skills:</p> <ul style="list-style-type: none"> <li>use modern medical technology to perform measurement and application,</li> <li>capability to use medical devices in a broad range in medicine.</li> <li>capability to critically analyze, synthesize and evaluate technical key topics of artificial airways and physiological monitoring systems,</li> <li>evaluate key variables in different monitoring of human body systems.</li> <li>ability to synthesize and anticipate basic solutions and consequences in operation of different medical technology.</li> </ul>
--	---

**Metode poučevanja in učenja:**

Učenje s simulatorji. Uporaba realne klinične opreme.
--

**Learning and teaching methods:**

Learning with simulation systems. Use of real medical equipment and medical devices.
---

**Načini ocenjevanja:**

Seminarska naloga	Delež (v %) / Share (in %)
	100 %

**Assessment methods:**

<b>Seminar work</b>
---------------------

**Reference nosilca / Course coordinator's references:**

<p>1. MLINARIČ, Marko, MLINARIČ, Maša, KRIŽMARIČ, Miljenko, TAKAČ, Iztok, REPŠE-FOKTER, Alenka. Effectiveness of artificial intelligence algorithms in identification of patients with high-grade histopathology after conisation. European journal of gynaecological oncology. [Online ed.]. June 2023, vol. 44, iss. 3, str. 1-10. ISSN 2709-0086. <a href="https://www.ejgo.net/articles/10.22514/ejgo.2023.050">https://www.ejgo.net/articles/10.22514/ejgo.2023.050</a>, DOI: 10.22514/ejgo.2023.050. [COBISS.SI-ID 159720963]</p> <p>2. MLINARIČ, Marko, KRIŽMARIČ, Miljenko, TAKAČ, Iztok, REPŠE-FOKTER, Alenka. Identification of women with high grade histopathology results after conisation by artificial neural networks. Radiology and oncology. [Print ed.]. 2022, vol. 56, iss. 3, str. 355-364, ilustr. ISSN 1318-2099.</p>
--

<https://sciendo.com/article/10.2478/raon-2022-0023>, DOI: 10.2478/raon-2022-0023. [COBISS.SI-ID 115112451]

3. KRIŽMARIĆ, Miljenko, MAVER, Uroš, ZDRAVKOVIĆ, Marko, MEKIŠ, Dušan. Effects of the reservoir bag disconnection on inspired gases during general anesthesia : a simulator-based study. BMC anesthesiology. 2021, vol. 21, str. 1-9, ilustr. ISSN 1471-2253.

<https://bmcanesthesiol.biomedcentral.com/track/pdf/10.1186/s12871-021-01256-2.pdf>, DOI: 10.1186/s12871-021-01256-2. [COBISS.SI-ID 50343171]

4. FRANIĆ, Damir, FISTONIĆ, Ivan, FRANIC IVANISEVIC, Maja, PERDIJA, Željko, KRIŽMARIĆ, Miljenko. Pixel CO2 laser for the treatment of stress urinary incontinence : a prospective observational multicenter study. Lasers in surgery and medicine. 2021, vol. 53, issue 4, str. 514-520. ISSN 1096-9101.

<https://onlinelibrary.wiley.com/doi/10.1002/lsm.23319>, DOI: 10.1002/lsm.23319. [COBISS.SI-ID 28354307]