



Univerza v Mariboru

Medicinska fakulteta

**UČNI NAČRT PREDMETA / COURSE SYLLABUS**

|                      |                                           |
|----------------------|-------------------------------------------|
| <b>Ime predmeta:</b> | Uvod v raziskovalno delo in telemedicino  |
| <b>Course title:</b> | Introduction to Research and Telemedicine |

| <b>Študijski program in stopnja</b><br>Study programme and cycle | <b>Študijska smer</b><br>Study option | <b>Letnik</b><br>Year of study | <b>Semester</b><br>Semester |
|------------------------------------------------------------------|---------------------------------------|--------------------------------|-----------------------------|
| Splošna medicina, enovit magistrski študijski program            |                                       | Šesti                          | 11.                         |
| General medicine, Uniform master's degree study program          |                                       | Sixth                          | 11th                        |

**Vrsta predmeta (obvezni ali izbirni) /**  
**Course type (compulsory or elective)**

obvezni

compulsory

**Univerzitetna koda predmeta / University course code:**

| Predavanja<br>Lectures | Seminar<br>Seminar | Vaje<br>Tutorial |    |    | Klinične vaje<br>Clinical<br>training | Druge oblike<br>študija<br>Other forms<br>of study | Samost. delo<br>Individual<br>work | ECTS |
|------------------------|--------------------|------------------|----|----|---------------------------------------|----------------------------------------------------|------------------------------------|------|
| 15                     | 45                 |                  |    |    |                                       |                                                    | 45                                 | 4    |
|                        |                    | AV               | LV | RV |                                       |                                                    |                                    |      |
|                        |                    |                  | 15 |    |                                       |                                                    |                                    |      |

**Nosilec predmeta / Course coordinator:**

prof. dr. Pavel Skok

prof. dr. Dejan Dinevski

**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:**

**Vsebina (kratek pregled učnega načrta):**

Definiranje pojma znanosti, povezanost s filozofijo in etiko. Razmejitev med strokovnim in raziskovalnim delom kot virom novega znanja. Spoznati splošne metode znanstveno raziskovalnega dela, pomen

**Content (syllabus outline):**

Definition of the term science, relationship with philosophy and ethics. Boundaries between scientific and research work as sources of new knowledge. Common methods of scientific research, meaning of liaison of

povezanosti teoretičnih znanj in uporabe v klinični medicini, algoritmi odločanja. Raziskovalno delo kot metoda

preverjanja kliničnih odločitev in odgovornega sledenja posledic. Etnična in pravna vprašanja pri raziskovanju v biomedicini, odnos med zdravnikom, farmacevtsko industrijo in bolnikom, njegova obveščenost in soodločanje. Definiranje odnosov vzrok – posledica v biomedicini in vloga presejalnih testov.

Razumevanje osnovnih statističnih pojmov v biomedicini (incidenca, prevalenca, pozitivna in negativna napovedna vrednost, občutljivost in specifičnost testov, lažno pozitivnih in negativnih rezultatov), pomena relativnega tveganja in razmerja oboj. Razlikovanje prospektivnih, retrospektivnih, epidemioloških, kontroliranih, randomiziranih, kohortnih, primer – kontrola in dvojno slepih vrst raziskav. Pomen računalniške tehnologije in statističnih orodij pri znanstveno raziskovalnem delu.

#### **Telemedicina**

- Osnove in principi telemedicine
- Zgodovina telemedicine ter njene prednosti
- Tehnološki temelji telemedicine in standardi za prenos medicinskih podatkov
- Medicinski senzorji za prenos informacij o stanju pacienta
- Praktične aplikacije telemedicine v zdravstvenem sistemu:
  1. telezdravstvo,
  2. nega bolnika na daljavo,
  3. nadzor bolnika na daljavo,
  4. telekonzultacije
- Videokonferenca v telemedicini –drugega mnenje na daljavo
- Praktični primeri na posameznih medicinskih področjih: teledermatologija, telekirurgija, telepatologija, telekardiologija...
- Informacijski sistemi v medicini,
- Uporaba slik in v medicini (DICOM),
- Odločitveni sistemi v medicini,
- Inteligentni sistemi v medicini,
- Moderna telemedicinska praksa v svetu in v Sloveniji

theoretical knowledge and its application in clinical medicine, algorithms of decision making. Research work as method of clinical decisions and responsible consequences following-up testing. Ethical and legislative questions in biomedicine research, relationship between physician, pharmaceutical industry and patient's acknowledgment and decision-making. Definition of relationship cause –consequence in biomedicine and role of screening tests.

Comprehension of basic statistic terms in biomedicine (incidence, prevalence, positive and negative prognostic values, sensitivity and specificity of tests, false positive and negative results), meaning of relative risk and expectation ratio. Distinguishes between prospective, retrospective, epidemiologic, followed-up, randomised, cohort, case – control, and double blind researches. Importance of computer technology and statistic software in scientific research work.

#### **Telemedicine**

- telemedicine basics and principles,
- history of telemedicine and its advantages,
- technological basis of telemedicine and the standards for medical data transfer,
- medical sensors for data transfer about the state of a patient,
- practical application of telemedicine in the health system:
  1. telehealth service,
  2. remote patient care,
  3. remote patient control,
  4. teleconsultations,
- videoconferencing in telemedicine – remote second opinion,
- practical cases in individual medical areas: teledermatology, telesurgery, telepathology, telecardiology ...,
- information system in medicine,
- use of pictures and graphics in medicine (DICOM),
- determination systems in medicine,
- intelligent systems in medicine,
- modern telemedical practice in the world and in Slovenia.

### **Temeljni literatura in viri / Reading materials:**

1. Temeljna:
2. Norman K. Denzin (Editor), Yvonna S. Lincoln (Editor) Handbook of Qualitative Research, 2nd ed. Sage publications, London 2000.
3. Georgi Graschew and Stefan Rakowsky, Telemedicine Techniques and Applications, InTech Open Publishing 2011; chapter: Dejan Dinevski et al., Clinical Decision Support Systems

Dodatna:

4. Altman DC. Practical statistics for medical research. Chapman&Hall. London 1996.
5. Georgi Grasczew and Theo A. Roelofs, Advances in Telemedicine: Technologies, Enabling Factors and Scenarios, InTech Open Publishing 2011; chapter: Dejan Dinevski et al., Video Communication in Telemedicine
6. R.L. Bashur, G.W. Shannon, History of Telemedicine, Mary Ann Liebert, 2009
7. Beauchamp TL, Childress JE. Principles of biomedical ethics, 5th ed. Oxford University Press, Oxford 2001.
8. Matthews DE, Farewell VT. Using and understanding statistics. Karger, Basel, 1996.
9. Adamič Š. Temelji biostatistike, Medicinska fakulteta Ljubljana, 1989.

**Cilji in kompetence:**

Razumeti pomen znanosti in pogojev za raziskovalno delo ter ustvarjanje novega znanja. Ustvariti razmišljanje o odnosu do raziskav v biomedicini, molekularni biologiji in genski tehnologiji. Spoznati osnove raziskovalnega dela v biomedicini in bioznanostih, povezavo in pomen epidemiologije, biostatistike in njenih orodij (statističnih testov, vrednotenja), vloga izsledkov za javno zdravje.

Študent se bo na podlagi osnovnih znanj poglobil v nekatera od naštetih poglavij telemedicine in medicinske informatike z namenom globljega razumevanja in obvladovanja le-teh.

**Objectives and competences:**

Understanding the meaning of science and research work conditions and new knowledge acquiring. Establishment of contemplative approach to researches in biomedicine, molecular biology and genetic technology. Acquiring of basic knowledge about researching in biomedicine and biosciences, relationship and importance of epidemiology, biostatistics and their tools (statistic tests, evaluation) importance of findings to public health.

On the basis of their knowledge, students will deepen it in some of the listed telemedicine and medical informatics chapters in order to better understand and utilize acquired knowledge.

**Predvideni študijski rezultati:**

**Znanje in razumevanje** pomena znanosti, kritičnega vrednotenja izsledkov raziskav v biomedicini in preverjanje domnev. Zavedanje možnih napak pri analizah, sklepanju in prikazovanju rezultatov. Sposobnost analize znanstveno raziskovalnih prispevkov, vsebinska in kvalitativna. Prenosljive/ključne spretnosti in drugi atributi: Nacrtovanje raziskave, pomen natančnosti in točnosti pri zbiranju podatkov in izvajanju raziskave, obdelava in kvantitativna/kvalitativna interpretacija pridobljenih rezultatov v skladu z znanimi dejstvi in pridobljenimi novimi spoznanji.

Po zaključku tega predmeta bo študent razumel in poznal področja telemedicine in medicinske informatike, znal uporabljati določene aplikacije iz naštetih področij.

**Prenosljive/ključne spretnosti in drugi atributi:**

- Samostojno delo z računalnikom
- Uporaba računalniških programov in informacijske tehnologije
- Sposobnost iskanja podatkov

**Intended learning outcomes:**

**Knowledge and Understanding** of the meaning of science, critical assessment of the research results in biomedicine and hypothesis testing. Awareness of possibility of false analyse results, conclusions and result presentation. Ability of scientific research contributions, content and quality analyse.

**Transferable/Key Skills and other attributes:** Research planning, meaning of precision and accuracy in data collection, carrying out of the research, data processing, quantitative and qualitative interpretation of results according to known facts and new findings.

On the completion of this course students will: understand and be acquainted with the basics of telemedicine and medical informatics, and be able to use the applications from the listed chapters.

**Transferable/Key skills and other attributes:**

- Autonomous work with a computer
- Use of computer applications and information technology
- Ability of searching for information

**Metode poučevanja in učenja:****Learning and teaching methods:**

|                                                                                                                    |                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Predavanja</li> <li>• Seminar</li> <li>• Vaje, e-izobraževanje</li> </ul> | <ul style="list-style-type: none"> <li>• Lectures,</li> <li>• Seminar</li> <li>• Exercises, e-learning</li> </ul> |
|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|

Delež (v %) /

**Načini ocenjevanja:**

Share (in %)

**Assessment methods:**

|                                                                                                                                |                        |                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Način (pisni izpit, ustno izpraševanje, naloge, projekt)<br>seminarska naloga<br>pisni izpit - test ob uporabi računalnika     | <b>34</b><br><b>66</b> | Type (examination, oral, coursework, project):<br><br>Seminar work<br>Written exam                                                                   |
| ŠTUDIJSKE OBVEZNOSTI ŠTUDENTOV<br>Glede na sklep Senata z dne 13. 6. 2011 je za študente obvezna 50 % udeležba na predavanjih. |                        | ACADEMIC OBLIGATIONS OF STUDENTS<br>According to the decision of the Senate on June 13, 2011, 50% attendance at lectures is obligatory for students. |
| POGOJI ZA PRISTOP K POSAMEZNEMU PREVERJANJU ZNANJA<br>Opravljen seminar in vaje.                                               |                        | REQUIREMENTS FOR ACCESS TO INDIVIDUAL KNOWLEDGE CHECKING                                                                                             |

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

POPOVIĆ, Peter, ZORE, Andrej, ŠURLAN POPOVIĆ, Katarina, GARBAJS, Manca, SKOK, Pavel. Hepatic encephalopathy after transjugular intrahepatic portosystemic shunt in patients with recurrent variceal hemorrhage. Gastroenterology Research and Practice, ISSN 1687-630X. [Online ed.], 2013. <http://www.hindawi.com/journals/grp/2013/398172/cta/>, doi: 10.1155/2013/398172. [COBISS.SI-ID 4614463], [JCR, SNIP, WoS do 13. 5. 2013: št. citatov (TC): 0, čistih citatov (CI): 0, normirano št. čistih citatov (NC): 0, Scopus do 15. 1. 2014: št. citatov (TC): 1, čistih citatov (CI): 1, normirano št. čistih citatov (NC): 0]

GORENJAK, Mario, TRAPEČAR, Martin, GRADIŠNIK, Lidija, SKOK, Pavel, CENCIČ, Avrelija. A Novel polymerase chain reaction (PCR) based assay for authentication of cell lines or tissues from human, pig and chicken origin. Journal of bioscience and biotechnology. Print ed., 2012, letn. 1, št. 1, str. 1-7. [COBISS.SI-ID 3338284]

SKOK, Pavel, SINKOVIČ, Andreja. Upper gastrointestinal haemorrhage: predictive factors of in-hospital mortality in patients treated in the medical intensive care unit. Journal of international medical research, ISSN 0300-0605, 2011, vol. 39, no. 3, str. 1016-1027. <http://www.jimronline.net/content/full/2011/103/1668.pdf>. [COBISS.SI-ID 3995967], [JCR, SNIP, WoS do 5. 11. 2013: št. citatov (TC): 1, čistih citatov (CI): 1, normirano št. čistih citatov (NC): 0, Scopus do 25. 9. 2013: št. citatov (TC): 1, čistih citatov (CI): 1, normirano št. čistih citatov (NC): 0]

POPOVIĆ, Peter, ŠTABUC, Borut, SKOK, Pavel, ŠURLAN, Miloš. Transjugular intrahepatic portosystemic shunt versus endoscopic sclerotherapy in the elective treatment of recurrent variceal bleeding. Journal of international medical research, ISSN 0300-0605, 2010, vol. 38, no. 3, str. 1121-1133. <http://www.jimronline.net/content/full/2010/97/1431.pdf>. [COBISS.SI-ID 3696447], [JCR, SNIP, WoS do 3. 9. 2013: št. citatov (TC): 1, čistih citatov (CI): 1, normirano št. čistih citatov (NC): 0, Scopus do 27. 8. 2013: št. citatov (TC): 2, čistih citatov (CI): 2, normirano št. čistih citatov (NC): 1]

GORENJAK, Mario, SKOK, Pavel, CENCIČ, Avrelija. Novel promising functional cell models to study molecular events in metabolic syndrome. Nutritional therapy & metabolism, ISSN 1828-6232, 2012, letn. 30, št. 1, str. 34-41. [COBISS.SI-ID 3318572], [SNIP, Scopus do 31. 10. 2012: št. citatov (TC): 0, čistih citatov (CI): 0, normirano št. čistih citatov (NC): 0]

**DEJAN DINEVSKI**

VINKO, Matej, BRECELJ, Špela, ERŽEN, Ivan, DINEVSKI, Dejan. Sprejemanje in uporaba informacijskih tehnologij v slovenskem javnem zdravstvu : nacionalna raziskava z uporabo modela UTAUT = Acceptance and use of health information technology in Slovenian public health institutions : a national survey based on UTAUT model. Zdravniški vestnik, ISSN 1318-0347. [Tiskana izd.], apr. 2013, letn. 82, št. 4, str. 234-242. [COBISS.SI-ID 2888677], [JCR]

HUSSEIN, Mohsen, VAN ECK, Carola F., ČRETNIK, Andrej, DINEVSKI, Dejan, FU, Freddie H. Prospective randomized clinical evaluation of conventional single-bundle, anatomic single-bundle, and anatomic double-bundle anterior cruciate ligament reconstruction : 281 cases with 3- to 5-year follow-up. The American journal of sports medicine, ISSN 0363-5465, 2012, vol. 40, no. 3, str. 512-520. <http://ajs.sagepub.com/content/40/3/512.full.pdf+html>, doi: 10.1177/0363546511426416. [COBISS.SI-ID 4192831], [JCR, SNIP, WoS do 11. 12. 2013: št. citatov (TC): 20, čistih citatov (CI): 20, normirano št. čistih citatov (NC): 13, Scopus do 8. 1. 2014: št. citatov (TC): 25, čistih citatov (CI): 25, normirano št. čistih citatov (NC): 16]

HUSSEIN, Mohsen, VAN ECK, Carola F., ČRETNIK, Andrej, DINEVSKI, Dejan, FU, Freddie H. Individualized anterior cruciate ligament surgery : a prospective study comparing anatomic single- and double-bundle reconstruction. The American journal of sports medicine, ISSN 0363-5465, 2012, vol. 40, no. 8, str. 1781-1788. <http://ajs.sagepub.com/content/40/8/1781.full.pdf+html>, doi: 10.1177/0363546512446928. [COBISS.SI-ID 4384063], [JCR, SNIP, WoS do 11. 12. 2013: št. citatov (TC): 7, čistih citatov (CI): 7, normirano št. čistih citatov (NC): 5, Scopus do 8. 1. 2014: št. citatov (TC): 14, čistih citatov (CI): 14, normirano št. čistih citatov (NC): 9]

DINEVSKI, Dejan, POVALEJ, Petra, KRAVOS, Matej. Intelligent data analysis for the diagnosis of alcohol dependence syndrome. Journal of international medical research, ISSN 0300-0605, 2011, vol. 39, no. 3, str. 988-1000. [COBISS.SI-ID 512129848], [JCR, SNIP, WoS do 5. 9. 2011: št. citatov (TC): 0, čistih citatov (CI): 0, normirano št. čistih citatov (NC): 0, Scopus do 28. 9. 2011: št. citatov (TC): 0, čistih citatov (CI): 0, normirano št. čistih citatov (NC): 0]

DINEVSKI, Dejan, MERTIK, Matej, KOKOL, Peter. Diagnosing mitral valve prolapse by improving the predictive power of classifiers. Journal of international medical research, ISSN 0300-0605, 2011, vol. 39, no. 3, str. 1075-1083. [COBISS.SI-ID 512130104], [JCR, SNIP, WoS do 17. 1. 2013: št. citatov (TC): 1, čistih citatov (CI): 1, normirano št. čistih citatov (NC): 0, Scopus do 28. 9. 2011: št. citatov (TC): 0, čistih citatov (CI): 0, normirano št. čistih citatov (NC): 0]