



Univerza v Mariboru

Medicinska fakulteta

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Uporabna statistika v medicini
Course title:	Applied statistics in medicine

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Splošna medicina		2	4
General medicine		2	4th

Vrsta predmeta / Course type

Izbirni/elective

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
20	10		30			3

Nosilec predmeta / Lecturer:

doc. dr. Petra Povalej Bržan

Jeziki /

Predavanja / Lectures:

Slovenski/slovene

Languages:

Vaje / Tutorial:

Slovenski/slovene

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Ni posebnih pogojev.

Prerequisites:

There are no special conditions for inclusion.

Vsebina:

Raziskovalni proces

- načrtovanje raziskave
- vzorec in populacija
- vzorčenje
- občutljivi podatki
- manjkajoči podatki
- velikost vzorca
- statistična moč

Osnovni statistični pojmi

- vrste spremenljivk
- verjetnostne porazdelitve

Opisna statistika

- frekvenčna porazdelitev
- rangiranje
- mere centralne tendence
- mere variabilnosti
- kvantili
- predstavitev podatkov (tabelarna, grafična)

Content (Syllabus outline):

Research process:

- research design
- sample and population
- sampling
- sensitive data
- missing data
- sample size
- statistical power

Basic statistical concepts

- types of variables
- probability distributions

Descriptive statistics

- frequency distribution
- ranking
- measures of central tendency
- measures of variability
- quantiles
- presentation of data (tabular, graphic)

Osnove statističnega sklepanja • priprava podatkov • ničelna domneva • napaka prve in druge vrste • standardna napaka • interval zaupanja Univariatna statistična analiza • univariatni statistični testi Bivariatna statistična analiza • Odvisnosti med spremenljivkama • Bivariatni parametrični testi (t-test, korelacija, ANOVA, t- test za odvisne vzorce) • Bivariatni neparametrični statistični testi (Mann-Whitney U test, neparametrična korelacija, hi-kvadrat test, Kruskal-Wallis H test, Median test, neparametrični statistični testi za odvisne vzorce) Masivni podatki v medicini • definicija • elektronski zdravstveni zapisi • dostopnost podatkov • primeri uporabe	Basics of statistical inference • preparing data • null hypothesis • type 1 and 2 statistical error • standard error • confidence interval Univariate statistical analysis • univariate statistical tests Bivariate statistical analysis • dependence between variables • Bivariate parametric tests (t-test, correlation, ANOVA, paired sample t-test) • Bivariate nonparametric tests (Mann-Whitney U test, nonparametric correlation, chi-square test, Kruskal-Wallis H test, Median test, nonparametric test for dependent samples) Big data in medicine • definition • electronic healthcare records (EHR) • availability of data • use-cases
Temeljni literatura in viri / Readings: • Altman DG: Practical Statistics for Medical Research, Chapman and Hall, London, 1991. • Riffenburgh RH: Statistics in Medicine, Elsevier Ltd, Oxford, August 2012. • Field A: An Adventure in Statistics: The Reality Enigma, SAGE Publications Ltd, May 2016.	
Cilji in kompetence: • Poznavanje osnovnih statističnih pojmov • Usposobljenost za ustrezno pripravo podatkov za izvedbo statistične analize • Usposobljenost za uporabo osnovnih statističnih testov • Sposobnost razlage rezultatov uporabljenih statističnih analiz • Sposobnost uporabe pridobljenega znanja v praksi	Objectives and competences: • Understanding of basic statistical concepts • Ability to adequately prepare the data for statistical analysis • Ability to use basic statistical tests • Ability to interpret the results of the statistical analysis • Ability to use the acquired knowledge in practice
Predvideni študijski rezultati: Znanje in razumevanje: • Razumeti osnovne statistične pojme ter uporabo osnovnih statističnih testov. • Razviti sposobnost za uporabo specifičnih statističnih testov in razumeti regresijsko modeliranje. • Razviti sposobnosti, ki omogočajo dosledno razlago raziskovalnih podatkov in zagotavljajo ustrezne informacije o pridobljenih rezultatih. Metode poučevanja in učenja:	Intended learning outcomes: Knowledge and understanding: • Understand basic statistical concepts and the use of basic statistical tests. • Develop strategies to use specific statistical tests and understand basic regression modeling. • Develop strategies that enable consistent interpretation of research data and provide correct information on study results. Learning and teaching methods:

• Predavanja • Seminar • Domače naloge • Vaje	• Lectures • Seminars • Homework • Exercises
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Načini ocenjevanja:		Delež (v %) / Weight (in %)	Assessment:
Način (pisni izpit, ustno izpraševanje, naloge, projekt)			Type (examination, oral, coursework, project):
Domače naloge		10 %	Homework
Seminarska naloga		40 %	Seminar work
Pisni izpit		50 %	Written exam
ŠTUDIJSKE OBVEZNOSTI ŠTUDENTOV Glede na sklep Senata z dne 13. 6. 2011 je za študente obvezna 50 % udeležba na predavanjih.			ACADEMIC OBLIGATIONS OF STUDENTS 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 Opravljen seminar in vaje.			REQUIREMENTS FOR ACCESS TO INDIVIDUAL KNOWLEDGE CHECKING Completed seminar assignment and exercises.

Reference nosilca / Lecturer's references:

POVALEJ, Petra, LENIČ, Mitja, ZORMAN, Milan, KOKOL, Peter, DINEVSKI, Dejan. Accuracy of intelligent medical systems. Computer methods and programs in biomedicine, ISSN 0169-2607. [Print ed.], 2005, vol. 80, suppl. 1, str. S95-S105. [COBISS.SI-ID 10105622]

POVALEJ, Petra, VERLIČ, Mateja, ŠTIGLIC, Gregor. Discovery systems. V: MEYERS, Robert A. (ur.). Encyclopedia of complexity and systems science. New York: Springer, cop. 2009, vol. 2, str. 1982-2002, ilustr. [COBISS.SI-ID 1521572]

ŠTIGLIC, Gregor, POVALEJ, Petra, FIJAČKO, Nino, WANG, Fei, KALOUSIS, Alexandros, DELIBAŠIĆ, Boris, OBRADOVIĆ, Zoran. Comprehensive predictive modeling using regularized logistic regression and comorbidity based features. PLoS one, ISSN 1932-6203, 2015, vol. 10, no. 12, str. 1-6, ilustr.
<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0144439>, doi: 10.1371/journal.pone.0144439. [COBISS.SI-ID 2183076]

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]

POVALEJ, Petra, GALLEGO, J.A., FARINA, Dario, HOLOBAR, Aleš. On repeatability of motor unit characterization in pathological tremor. V: International Conference on Neurorehabilitation, ICNR 2012, Toledo, Spain, November 14-16, 2012. PONS, José L. (ur.), TORRICELLI, Diego (ur.), PAJARO, Marta (ur.). Converging clinical and engineering research on neurorehabilitation, (Biosystems & Biorobotics, ISSN 2195-3562). Heidelberg [etc.]: Springer, cop. 2013, part 1, str. 553-556, ilustr. [COBISS.SI-ID 16456214]

FIJAČKO, Nino, POVALEJ, Petra, ŠTIGLIC, Gregor. Mobile applications for type 2 diabetes risk estimation : a systematic review. Journal of medical systems, ISSN 1573-689X, oct. 2015, vol. 39, iss. 10, 10 str.
<http://link.springer.com/article/10.1007/s10916-015-0319-y/fulltext.html>, doi:10.1007/s10916-015-0319-y. [COBISS.SI-ID 2143908]