



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			

Vrsta predmeta / Course type

izbirni

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 /

Languages:

Predavanja / Lectures:

Vaje / Tutorial:

Slovenski/slovene

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

Delež (v %) / Weight (in %)		Assessment:
Načini ocenjevanja:		
Način (pisni izpit, ustno izpraševanje, naloge, projekt) Domače naloge 10% Seminarska naloga 40% Pisni izpit 50% ŠTUDIJSKE OBVEZNOSTI ŠTUDENTOV Glede na sklep Senata z dne 13. 6. 2011 je za študente obvezna 50 % udeležba na predavanjih. POGOJI ZA PRISTOP K POSAMEZNEMU PREVERJANJU ZNANJA Opravljen seminar in vaje.		Type (examination, oral, coursework, project): Homework 10% Seminar work 40% Written exam 50% ACADEMIC OBLIGATIONS OF STUDENTS According to the decision of the Senate on June 13, 2011, 50% attendance at lectures is obligatory for students. 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]