

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Verjetnost in statistika
Course title:	Probability and Statistics

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Doktorski program ekonomskih in poslovnih ved, tretjestopenjski program	Usmeritev Ekonomija in usmeritev Poslovne vede	1.	1.
Doctoral Program in Economics and Business	Economics and Business track	1.	1.

Vrsta predmeta / Course type	Metodološke osnove / Methodological foundations
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Univerzitetna koda predmeta / University course code:	
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Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje Laboratory work	Druge oblike dela Other work	Samost. delo Individ. work	ECTS
25				35	60	4

Nosilec predmeta / Lecturer:	prof. dr. Mihael Perman
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Jeziki / Languages:	Predavanja / Lectures:	Angleški/English; Slovenski/Slovenian
	Vaje / Tutorial:	Angleški/English; Slovenski/Slovenian

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

- Opravljene obveznosti pri predmetih skupnega metodološkega jedra.
- Poznavanje osnov statistične analize, vzorčenja, verjetnostnih porazdelitev, statističnega sklepanja, linearne regresijske analize, multivariatne analize (na ravni npr. Keller: Statistics for Business and Economics).

Prerequisites:

The course builds on the methodological core courses common to PhD students of business and economics.

Required background knowledge includes basic statistics, sampling and statistical inference, data collection, linear regression analysis, (e.g. as introduced in Keller: Statistics for Business and Economics).

Vsebina:

- Slučajne spremenljivke in njihove porazdelitve.
- Transformacije slučajnih spremenljivk.
- Pričakovana vrednost in pogojna pričakovana vrednost.
- Konvergenca slučajnih spremenljivk, centralni limitni izrek.
- Porazdelitve izvedene iz normalne porazdelitve.
- Vzorčenje.
- Ocenjevanje parametrov, lastnosti cenilk,

Content (Syllabus outline):

- Random variables and their distributions.
- Transformations of random variables.
- Expectation and conditional expectation.
- Convergence of random variables, central limit theorem.
- Distributions derived from the normal distribution.
- Survey sampling.
- Estimation of parameters, properties of estimators, asymptotic properties of estimators.

asimptotske lastnosti cenilk.

- Preizkušanje domnev, Wilksov izrek.
- Zadostnost, izrek o faktorizaciji, teorija optimalnosti za ocenjevanje parametrov in preizkušanje domnev.
- Linearni modeli, izrak Gauss-Markova. Splošna linearna domneva, posplošitve, napovedovanje, diagnostične metode.

- Hypothesis testing, Wilk's theorem.
- Sufficiency, factorization theorem, optimal theory of estimation and hypothesis testing.
- Linear models, Gauss-Markov theorem, general linear hypothesis, generalizations, prediction, diagnostics.

Temeljni literatura in viri / Readings:

J. Rice, *Mathematical Statistics & Data Analysis*, Thomson Brooks/Cole, Third Edition, International student edition, 2006.

G. G. Roussas, *A Course in Mathematical Statistics*, Academic Press, 1997.

William H. Greene, *Econometric Analysis*, Third edition, Prentice Hall, 1997.

S. Weisberg, *Applied Linear Regression*, John Wiley & Sons, 1985.

Cilji in kompetence:

Temeljni izobraževalni cilj tega predmeta je študenta usposobiti za izvajanje metodološko primernih in praktično relevantnih raziskovalnih projektov kvalitativne in kvantitativne narave.

Objectives and competences:

This course aims to develop students' abilities to design and carry out methodologically sound and practically relevant empirical research of qualitative nature.

Predvideni študijski rezultati:

Znanje in razumevanje:

Predvideni študijski rezultati:

- Sposobnost praktične uporabe relevantnih pristopov k zbiranju in analizi kvalitativnih in kvantitativnih podatkov na ravni doktorskega študija.
- Sposobnost uporabe izbranih analitičnih programskih orodij za reševanje praktičnih poslovnih problemov.

Intended learning outcomes:

Knowledge and understanding:

Learning outcomes:

- Ability to apply relevant techniques of qualitative and quantitative data collection and analysis.
- Enhanced software skills to solve practical business problems.

Metode poučevanja in učenja:

Learning and teaching methods:

Predavanja, vaje in seminarji. Vse oblike dela vključujejo diskusije izbranih člankov in študij primerov ter krajše študentske predstavitve individualnih in skupinskih domačih nalog.

Lectures, in-class and computer lab exercises, seminars. All methods include student presentations and discussions based on student individual and group assignments.

Delež (v %) /

Weight (in %)

Assessment:

Načini ocenjevanja:

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Način (pisan izpit, ustno izpraševanje, naloge, projekt)	60%	Type (examination, oral, coursework, project):
Prispevek k diskusijam, individualne in skupinske domače naloge, projekt kvalitativnega raziskovanja, projekt kvantitativnega raziskovanja.	40%	Formal evaluation is based on class participation, individual and group assignments, a project of qualitative and a project of quantitative nature.

Reference nosilca / Lecturer's references:

1. PERMAN, Mihael, WELLNER, Jon A. An excursion approach to maxima of the Brownian bridge. *Stochastic Processes and their Applications*, ISSN 0304-4149. [Print ed.], 2014, vol. 124, iss. 9, str. 3106-3120. <http://dx.doi.org/10.1016/j.spa.2014.04.008>. [COBISS.SI-ID 17154393]
2. AHČAN, Aleš, MASTEN, Igor, POLANEC, Sašo, PERMAN, Mihael. Quantile approximations in autoregressive portfolio models. *Journal of Computational and Applied Mathematics*, ISSN 0377-0427. [Print ed.], Feb 2011, vol. 235, iss. 8, str. 1976-1983, doi: 10.1016/j.cam.2010.09.023. [COBISS.SI-ID 19878630]
3. KOMELJ, Janez, PERMAN, Mihael. Joint characteristic functions construction via copulas. *Insurance. Mathematics & economics*, ISSN 0167-6687, 2010, vol. 47, iss. 2, str. 137-143. <http://dx.doi.org/10.1016/j.insmatheco.2010.06.003>. [COBISS.SI-ID 16242777]
4. M. Perman, An excursion approach to Ray-Knight theorems for perturbed Brownian motion. *Stochastic Processes and their Applications*, 1993, vol. 46, no. 2, str. 267-281.
5. M. Perman, J. A. Wellner, On the distribution of Brownian areas. *Annals of applied probability*, 1996, let. 6, no. 4, str. 1091-1111.
6. M. Perman, J. A. Wellner, An excursion approach to maxima of the Brownian bridge. *Stochastic Processes and their Applications*, , 2014, vol. 124, iss. 9, str. 3106-3120.