UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2016/17)

Predmet:	Statistika 1
Course title:	Statistics 1

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Univerzitetni študijski program Finančna matematika	ni smeri	3	prvi in drugi
First cycle academic study programme Financial Mathematics	none	3	first and second

Vrsta predmeta / Course type	obvezni / compulsory

Univerzitetna koda predmeta / University course code:	M0319

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
60		60			180	10

Nosilec predmeta / Lecturer:	prof. dr. Matjaž Omladič, prof. dr. Mihael Perman, prof. dr. Jaka Smrekar, doc. dr. Dejan Velušček

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

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Vpis v letnik študija. Opravljen predmet Verjetnostni račun 1.	Enrolment in the programme. Completed course Probability theory 1.

Vsebina:	Content (Syllabus outline):

Opisna statistika: zbiranje podatkov, njihova klasifikacija in predstavljanje, številske karakteristike.	Descriptive statistics: data collection, classification and presentation, numerical characteristics.
Zveza s teorijo verjetnosti: Populacija in vzorec, vzorčna porazdelitev.	Relation to probability theory: population and sample, sampling distribution.
Točkasto ocenjevanje parametrov: Statistika, cenilka. Nepristranskost in učinkovitost, metode za pridobivanje cenilk (maksimalno verjetje, Bayesov pristop).	Point parameter estimation: Statistics, estimator. Unbiasedness and efficiency, methods of obtaining estimators (maximum-likelihood, Bayesian approach).
Preizkušanje domnev: Neyman-Pearsonov okvir, moč preizkusa, preizkušanje domnev o parametrih normalne porazdelitve, preizkusi s kvocientom verjetij.	Hypothesis testing: Neyman-Pearson lemma, the power of the test, testing hypotheses about parameters of normal distribution, likelihood quotient test.
Območja zaupanja in tolerance s poudarkom na intervalih zaupanja.	Confidence and tolerance distribution with emphasis on confidence intervals.
Neparametrične metode: Ocenjevanje splošne porazdelitvene funkcije (gostote verjenosti), vrstilne karakteristike, preizkušanje z rangi in z znaki.	Nonparametric methods: Estimating the general distribution function (probability density), order characteristics, rank and sign tests

Temeljni literatura in viri / Readings:

R. Lupton: Statistics in Theory and Practice, Princeton University Press, 1993.

J. Rice: Mathematical Statistics and Data Analysis, 3rd Edition, Duxbury Press, 2006.

S. Weisberg: Applied Linear Regression, 3rd Editions, John Wiley &, Sons, 2005.

G. Roussas: A course in mathematical statistics, 2nd edition, Academic Press, 1997.

J. Woolridge: Introductory Econometrics: A modern Approach, 2nd Edition, South-Western College Pub, 2002.

Cilji in kompetence: Objectives and competences:

Pri predmetu bi postavili teoretične osnove statističnega modeliranja in obdelali osnovne sklope statističnega razmišljanja. Statistika je neobhodno potrebno orodje v zavarovalnem in finančnem sektorju, saj omogoča kalibriranje modelov, ki so izhodišče za vrednotenje in preverjanje v zavarovalnem in finančnem sektorju.

To set the theoretical basis of statistical modeling and process basic parts of statistical thinking. Statistics is an indispensable tool in the insurance and financial sectors, as it enables calibration of models, which are the starting point for the evaluation and verification in the insurance and financial sector.

Predvideni študijski rezultati:

Intended learning outcomes:

Znanje in razumevanje: Razumevanje pojma statističnega modela in matematičnega ozadja modeliranja, ocenjevanja in testiranja statističnih modelov.

Uporaba: Statistika je eno najbolj uporabih področij matematike. Študent bo na podlagi samostojnih projektov usposobljen za uporabo statistike na vseh področjih.

Refleksija: Medigra med uporabo, statističnim modeliranjem, povratno informacijo iz drugih ved in spodbude iz uporabe za matematično razmišljanje.

Prenosljive spretnosti – niso vezane le na en predmet: Spretnosti so prenosljive na druga področja matematičnega modeliranja, še najbolj pa je predmet pomemben zaradi svoje neposredne uporabnosti.

Knowledge and understanding: Understanding of the statistical model and mathematical background of modeling, estimating and testing of statistical models.

Application: Statistics is one of the most applied parts of mathematics. The student will be, based on independent projects, qualified to use statistics in all areas.

Reflection: The interplay between the application, statistical modeling, feedback from other disciplines and stimulus from the use of mathematical thinking.

Transferable skills: Skills are transferable to other areas of mathematical modeling, the new kniowledge is important due to its direct applicability.

Metode poučevanja in učenja:

Learning and teaching methods:

predavanja in vaje, 2 samostojna projekta

Lectures and exercises, 2 individual projects

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Način (pisni izpit, ustno izpraševanje, naloge, projekt): 2 kolokvija namesto izpita iz vaj, izpit iz vaj, izpit iz teoretičnih osnov (ustni ali pisni) ocene: 1-5 (negativno), 6-10 (pozitivno) (po Statutu UL)	50% 50%	Type (examination, oral, coursework, project): 2 midterm exams instead of written exam, written exam Exam on theory (oral or written) grading: 1-5 (fail), 6-10 (pass) (according to the Statute of UL)

Reference nosilca / Lecturer's references:

Matjaž Omladič:

OMLADIČ, Matjaž, OMLADIČ, Vesna. More on restricted canonical correlations. Linear Algebra and its Applications, ISSN 0024-3795. [Print ed.], 2000, vol. 1/3, no. 321, str. 285-293. [COBISS.SI-ID 17112925]

OMLADIČ, Matjaž. On 2-groups with submultiplicative spectrum. Journal of Pure and Applied Algebra, ISSN 0022-4049. [Print ed.], 2002, vol. 167, iss. 2-3, str. 315-328. [COBISS.SI-ID 11365977]

OMLADIČ, Matjaž. A variety of commuting triples. Linear Algebra and its Applications, ISSN 0024-3795. [Print ed.], 2004, vol. 383, str. 233-245. [COBISS.SI-ID 13037401]

Mihael Perman:

KOMELJ, Janez, PERMAN, Mihael. Joint characteristic functions construction via copulas. Insurance. Mathematics & economics, ISSN 0167-6687, 2010, vol. 47, iss. 2, str. 137-143. [COBISS.SI-ID 16242777]

PERMAN, Mihael, WERNER, Wendelin. Perturbed Brownian motions. Probability theory and related fields, ISSN 0178-8051, 1997, let. 108, št. 3, str. 357-383. [COBISS.SI-ID 7848537]

HUZAK, Miljenko, PERMAN, Mihael, ŠIKIĆ, Hrvoje, VONDRAČEK, Zoran. Ruin probabilities and decompositions for general perturbed risk processes. Annals of applied probability, ISSN 1050-5164, 2004, vol. 14, no. 3, str. 1378-1397. [COBISS.SI-ID 13168985]

HUZAK, Miljenko, PERMAN, Mihael, ŠIKIĆ, Hrvoje, VONDRAČEK, Zoran. Ruin probabilities for competing claim processes. Journal of Applied Probability, ISSN 0021-9002, 2004, vol. 41, no. 3, str. 679-690. [COBISS.SI-ID 13207641]

Jaka Smrekar:

SMREKAR, Jaka, YAMASHITA, Atsushi. Function spaces of CW homotopy type are Hilbert manifolds. Proceedings of the American Mathematical Society, ISSN 0002-9939, 2009, vol. 137, no. 2, str. 751-759. [COBISS.SI-ID 14965849]

SMREKAR, Jaka. Periodic homotopy and conjugacy idempotents. Proceedings of the American Mathematical Society, ISSN 0002-9939, 2007, vol. 135, no. 12, str. 4045-4055. [COBISS.SI-ID 14382681]

CENCELJ, Matija, DYDAK, Jerzy, SMREKAR, Jaka, VAVPETIČ, Aleš, VIRK, Žiga. Algebraic properties of quasi-finite complexes. Fundamenta mathematicae, ISSN 0016-2736, 2007, vol. 197, str. 67-80. [COBISS.SI-ID 14502233]

Dejan Velušček:

OSHIMA, Kojiro, TEICHMANN, Josef, VELUŠČEK, Dejan. A new extrapolation method for weak approximation schemes with applications. Annals of applied probability, ISSN 1050-5164, 2012, vol. 22, no. 3, str. 1008-1045. [COBISS.SI-ID 16384857]

VELUŠČEK, Dejan. A short note on the higher level version of the Krull--Baer theorem. Canadian mathematical bulletin, ISSN 0008-4395, 2011, vol. 54, no. 2, str. 381-384. [COBISS.SI-ID 15907161]

VELUŠČEK, Dejan. Higher product Pythagoras numbers of skew fields. Asian-European journal of mathematics, 2010, vol. 3, no. 1, str. 193-207. [COBISS.SI-ID 15542105]