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
Matematika, 3. stopnja		1. ali 2.	1. ali 2. ali 4.
Mathematics, 3rd Degree		1st or 2nd	1st or 2nd or 4th

Vrsta predmeta / Course type | obvezni ali izbirni/obligatory or elective

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
60					240	10

Nosilec predmeta / Lecturer: | Dominik Benkovič

Jeziki / Languages:	Predavanja/Lectures:	Slovenski in angleški jezik; Slovene and English
	Vaje / Tutorial:	Slovenski in angleški jezik; Slovene and English

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

Prerequisits:

Poznanje osnovnih pojmov iz verjetnostnega računa in poznavanje osnov matematične statistike.	Knowledge of basic concepts from probability theory and knowledge of basic concepts of statistics.

Vsebina:

Content (Syllabus outline):

Osnovni pojmi teorije verjetnosti (naključne spremenljivke, naključni vektorji, številske karakteristike, limitni izreki teorije verjetnosti). Pogojne porazdelitve, regresija, martingali. Uvod v teorijo stohastičnih procesov, markovske verige.	Basic concepts of probability theory (random variables, random vectors, numerical characteristics, limit theorems of probability theory). Conditional distributions, regression, martingales. Introduction to the theory of stochastic

Univariatne statistične metode (ocenjevanje parametrov, preizkušanje statističnih hipotez).

Osnove pojmi multivariatnih statističnih metod (analiza variance, analiza kovariance, regresijska analiza, faktorska analiza).

Nekatere izmed teh tem so obdelane podrobneje, druge pa le na osnovni ravni. Pri izboru se upoštevajo interesi in raziskovalne usmeritve študentov.

processes, Markov chains.

Univariate methods in statistics (estimation of parameters, testing statistical hypothesis).

Basic concepts of multivariate statistics methods (analysis of variance, analysis of covariance, regression analysis, factor analysis).

Some of these topics are treated in greater detail, and some of them only at a basic level. The selection depends on students' interests and their research orientation.

Temeljni literatura in viri / Readings:

- M. Bilodeau, D. Brenner, *Theory of Multivariate Statistics*, Springer Verlag, 1999.
- P. Bremaud, *Markov Chains: Gibbs fields, Monte Carlo simulations and queues*, 2nd edition, Springer Verlag, 1999.
- R.Christensen, *Advanced Linear Modeling*, 2nd edition, Springer Verlag, 2001.
- G. R. Grimmett, D. R. Stirzaker: *Probability and random processes*, Oxford University Press, 1992.
- R. Jamnik: *Matematična statistika*, DZS, 1980.
- G. McPearson, *Applying and Interpreting Statistics*, Springer Verlag, 2001.
- H. T. Nguyen, G. S. Rogers, *Fundamentals of Mathematical Statistics*, Springer Verlag, 1989.
- J. R. Norris, *Markov Chains*, Cambridge University Press, 1997.
- S. I. Resnick, *Adventures in Stochastic Processes*, Birkhäuser, Boston, 1992.
- N. Sarapa: *Teorija vjerojatnosti*, Školska knjiga, 2002.
- A. Sen, M. Srivastava, *Regression analysis: Theory, Methods, and Applications*, Springer Verlag, 1990.

Cilji in kompetence:

- Doseči poglobljeno razumevanje teoretskih in metodoloških konceptov s področja verjetnosti in statistike
- Razviti sposobnost samostojnega razvijanja novega znanja s področja verjetnosti in statistike
- Razviti sposobnost za samostojno reševanje najzahtevnejših problemov iz verjetnosti in statistike
- Razviti sposobnost izboljševanja znanih in odkrivanja novih rezultatov s področja verjetnosti in statistike
- Zmožnost razvijanja kritične refleksije na področju verjetnosti in statistike
- Razviti zmožnost vodenja najzahtevnejših znanstvenoraziskovalnih projektov s širšega področja verjetnosti in statistike.

Objectives and competences:

- To achieve a deeper understanding of theoretical and methodological concepts of probability and statistics
- To develop the ability to independently develop new knowledge in the field of probability and statistics
- To develop the ability for solving the most challenging problems in probability and statistics
- To develop the ability of improving known results as well as obtaining new results in probability and statistics
- Ability to develop critical reflection in probability and statistics
- To develop the ability to lead the most challenging scientific research projects in the wider field of probability and statistics

Predvideni študijski rezultati:

Intended learning outcomes:

Znanje in razumevanje:	Knowledge and understanding:
• poznavanje in razumevanje osnovnih rezultatov teorije verjetnosti; • poznavanje in razumevanje osnovnih rezultatov in metod statistike. Prenesljive/ključne spretnosti in drugi atributi: • podlaga za raziskovalno delo na področju verjetnosti in statistike; • prenos znanja iz statistike na različna strokovna in znanstvena področja, kjer se uporabljajo statistične analize podatkov. • uporaba znanja iz teorije verjetnosti pri statistiki in na drugih področjih uporabne matematike.	• knowledge and understanding of basic results of probability theory; • knowledge and understanding of basic results and methods of statistics. Transferable/Key Skills and other attributes: • a basis for research in area of probability and statistics; • knowledge transfer of statistical methods into different areas dealing with data analysis • knowledge transfer of methods of probability theory into statistics and to other fields of applied mathematics.

Metode poučevanja in učenja:	**Learning and teaching methods:**
• predavanja; • priprava seminarja; • konzultacije; • samostojni študij.	• lectures; • seminar work; • consultations; • self-study.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Type (examination, oral, coursework, project):
• seminar;	**20 %**	• seminar;
• domače naloge;	**30 %**	• homework;
• ustni izpit.	**50 %**	• oral examination.

Reference nosilca / Lecturer's references:

1. BENKOVIČ, Dominik, GRAŠIČ, Mateja. Generalized derivations on unital algebras determined by action on zero products. *Linear Algebra and its Applications*, ISSN 0024-3795. [Print ed.], 2014, vol. 445, str. 347-368.
2. BENKOVIČ, Dominik, EREMITA, Daniel. Multiplicative Lie n-derivations of triangular rings. *Linear Algebra and its Applications*, ISSN 0024-3795. [Print ed.], 2012, vol. 436, iss 11, str. 4223-4240
3. BENKOVIČ, Dominik, ŠIROVNIK, Nejc. Jordan derivations of unital algebras with idempotents. *Linear Algebra and its Applications*, ISSN 0024-3795. [Print ed.], 2012, vol. 437, iss. 9, str. 2271-2284
4. BENKOVIČ, Dominik. Lie triple derivations on triangular matrices. *Algebra colloquium*, ISSN 1005-3867, 2011, vol. 18, spec. iss. 1, str. 819-826.
5. BENKOVIČ, Dominik. Generalized Lie derivations on triangular algebras. *Linear Algebra and its Applications*, ISSN 0024-3795. [Print ed.], 2011, vol. 434, iss 6, str. 1532-1544.