



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

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| Predmet: | Statistika |
| Course title: | Statistics |

| Študijski program in stopnja Study programme and level | Študijska smer Study field | Letnik Academic year | Semester Semester |
|---|-------------------------------|-------------------------|----------------------|
| Matematika | | 3. | 6. |
| Mathematics | | 3 rd | 6 th |

Vrsta predmeta / Course type

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 |
|------------------------|--------------------|-----------------------|------------------------------|---------------------------|-------------------------------|------|
| 45 | | 15 | 30 | | 90 | 6 |

Nosilec predmeta / Lecturer:

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| Jeziki / Languages: | Predavanja / Lectures: | SLOVENSKO/SLOVENE |
| | Vaje / Tutorial: | SLOVENSKO/SLOVENE |

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

Prerequisites:

Vsebina:

- Osnovni pojmi statistike: Statistična populacija in vzorec. Klasifikacija statističnih spremenljivk. Grafični in tabelni prikazi statističnih podatkov.
- Opisna statistika: Populacijske in vzorčne mere osrednje tendence, vrstilne karakteristike in mere variabilnosti.
- Vzorčne porazdelitve: Osnovni izrek matematične statistike. Porazdelitveni zakoni pomembnih vzorčnih statistik.
- Ocenjevanje parametrov: Točkovne in intervalne ocene. Cenilke in njihove

Content (Syllabus outline):

- Basic concepts of statistics: Statistical population and sample. Classification of statistical variables. Graphical and tabular presentation of statistical data.
- Descriptive statistics: Population and sample measures of central tendency, order statistics and measures of variability.
- Sampling Distributions: The basic theorem of mathematical statistics. Distribution functions of some important sampling statistics.

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| <p>lastnosti. Metoda momentov. Metoda maksimalne zanesljivosti. Interval zaupanja.</p> <ul style="list-style-type: none"> • Preskušanje statističnih hipotez: Ničelna in alternativna hipoteza. Testna statistika in njeno kritično območje. Parametrični preizkusi značilnosti. Neparametrični preizkusi značilnosti. Testiranje neodvisnosti. • Analiza variance: Analiza po enem faktorju. • Neparametrična primerjava treh ali več populacij. • Regresijska analiza: Linearni regresijski model. Metoda najmanjših kvadratov. Testiranje regresijskega modela. | <ul style="list-style-type: none"> • Estimation of parameters: Point estimations and confidence intervals. Estimators and their properties. Moment estimation method. Maximum likelihood method. Confidence interval. • Testing statistical hypothesis: Null hypothesis and alternative hypotheses. Test statistic and its critical region. Parameters hypotheses testing. Nonparameters hypotheses testing. Testing the independence. • Analysis of variance: One-way analysis of variance. • Nonparametric comparison of three or more populations. • Regression analysis: Linear regression model. Method of least squares. Testing linear regression model. |
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Temeljni literatura in viri / Readings:

1. F. Daly, D.J. Hand, C. Jones, D. Lunn, K. McConway: *Elements of statistics*, Addison-Wesley, 1995.
2. M. Hladnik: *Verjetnost in statistika*, Fakulteta za računalništvo in informatiko, 2002.
3. R. Jamnik: *Matematična statistika*, DZS, 1980.
4. R. Jamnik: *Verjetnostni račun in statistika*, DMFA, 1995.
5. G. McPherson: *Applying and interpreting statistics*, Springer, 2nd edition, 2001.
6. J. A. Rice: *Mathematical statistics and data analysis*, Duxbury Press, 1995.

Cilji in kompetence:

Glavni cilj predmeta je proučiti najpomembnejše koncepte, metode in rezultate uporabne statistike.

Objectives and competences:

The main goal of the course is to study the fundamental concepts, methods and results of applied statistics.

Predvideni študijski rezultati:

Znanje in razumevanje:

- Razumevanje in poznavanje osnovnih pojmov in klasičnih metod statistične analize podatkov.
- Razumevanje in pravilna uporaba različnih statističnih testov.
- Obvladanje ustrezne programske opreme za namene statističnega raziskovanja.

Prenosljive/ključne spretnosti in drugi atributi:

Intended learning outcomes:

Knowledge and Understanding:

- Understanding and knowledge of the basic concepts and classical methods of statistical data analysis.
- Understanding and correct application of different statistical tests.
- Knowledge of using an appropriate software for statistical research.

Transferable/Key Skills and other attributes:

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|---|-----------------------------|--|--|
| <ul style="list-style-type: none"> • Prenos znanja iz statistike na različna strokovna in znanstvena področja, kjer se uporabljajo statistične analize podatkov. | | <ul style="list-style-type: none"> • Knowledge transfer of statistical methods into different areas dealing with data analysis. | |
| Metode poučevanja in učenja: | | Learning and teaching methods: | |
| <ul style="list-style-type: none"> • Predavanja • Teoretične vaje • Laboratorijske vaje | | <ul style="list-style-type: none"> • Lectures • Theoretical exercises • Laboratory exercises | |
| Načini ocenjevanja: | | Assessment: | |
| Način (pisni izpit, ustno izpraševanje, naloge) | Delež (v %) / Weight (in %) | Type (examination, oral, coursework): | |
| <u>Izpit:</u> Pisni izpit – problemi Ustni izpit – teorija | 50% 50% | <u>Exams:</u> Written exam – problems Oral exam – theory | |
| Pisni izpit – problemi se lahko nadomesti z dvema testoma (sprotni obveznosti). | | Written exam – problems can be replaced with two mid-term tests. | |
| Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno. | | Each of the mentioned commitments must be assessed with a passing grade. | |
| Opravljen pisni izpit – problemi je pogoj za pristop k ustnemu izpitu – teorija. | | Passing grade of written exam – problems is required to take the oral exam – theory. | |

Reference nosilca / Lecturer's references:

1. BENKOVIČ, Dominik, GRAŠIČ, Mateja. Generalized skew derivations on triangular algebras determined by action on zero products. *Communications in algebra*, ISSN 0092-7872, 2018, vol. 46, iss. 5, str. 1859-1867. <https://doi.org/10.1080/00927872.2017.1360334>.
2. BENKOVIČ, Dominik. Generalized Lie derivations of unital algebras with idempotents. *Operators and matrices*, ISSN 1846-3886, 2018, vol. 12, no. 2, str. 357-367. <https://doi.org/10.7153/oam-2018-12-23>.
3. BENKOVIČ, Dominik. Jordan σ -derivations of triangular algebras. *Linear and Multilinear Algebra*, ISSN 0308-1087, 2016, vol. 64, no. 2, str. 143-155. <http://dx.doi.org/10.1080/03081087.2015.1027646>.
4. BENKOVIČ, Dominik. A note on f -derivations of triangular algebras. *Aequationes mathematicae*, ISSN 0001-9054, 2015, vol. 89, iss. 4, str. 1207-1211. <http://dx.doi.org/10.1007/s00010-014-0298-Y>.

5. BENKOVIČ, Dominik. Lie triple derivations of unital algebras with idempotents. *Linear and Multilinear Algebra*, ISSN 0308-1087, 2015, vol. 63, no. 1, str. 141-165.
<http://dx.doi.org/10.1080/03081087.2013.851200>.