



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	BIOSTATISTIKA
Course title:	BIostatistics

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Ekologija z naravovarstvom, 1. stopnja		2. ali 3.	zimski ali poletni
Ecology with Nature Conservation, 1 st cycle		2 nd or 3 rd	Winter or Summer

Vrsta predmeta / Course type

Izbirni / Elective

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30	15				135	6

Nosilec predmeta / Lecturer:

Franč JANŽEKOVIČ

Jeziki /

Languages:

Predavanja /

Lectures:

Vaje / Tutorial:

slovenščina / Slovene

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

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Prerequisites:

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Vsebina:

Content (Syllabus outline):

• Načrtovanje zbiranja podatkov in njihove organizacije v tabele in relacijske tabele. • Opisna statistika, mere srednje vrednosti, mere razpršenosti, grafični prikazi. • Postavljanje statističnih hipotez, ničelna hipoteza in stopnja tveganja, napaka prve in druge vrste, velikost učinka. • Parametrični testi za preverjanje razlik med vzorci, t test, F test. • Povezanost med spremenljivkami, korelacija in linearna regresija, nelinearna regresija. • Neparametrični testi za preverjanje razlik med vzorci, Hi-kvadrat test, Mann-Whitney test, Kruskal-Wallis test. • Multivariatni pristop, analiza glavnih komponent, diskriminantna analiza, klasična analiza. • Osnove modeliranja.	• Planning the collection and organization of data in tables and relational tables. • Descriptive statistics, measures of mean, measures of dispersion or scattering, graphic representations. • Setting of statistical hypotheses, Null hypothesis and probability, type I and type II error, effect size. • Parametric tests for the differences between samples, t test, F test. • Linkage between variables, correlation and linear regression, nonlinear regression. • Non-parametric tests for differences between samples, Hi-square test, Mann-Whitney test, Kruskal-Wallis test. • Multivariate approach, Principal Component Analysis, Discriminant analysis, Cluster analysis. • Basics modelling.
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Temeljni literatura in viri / Readings:

Osnovna literature:

Sokal, R.R., Rohlf, F.J. (2012). Biometry: the principles and practice of statistics in biological research. W.H. Freeman and Co.

Dodatna literature:

Košmelj, K. (2007). Uporabna statistika. Biotehniška fakulteta UL.

Cilji in kompetence:

Študent pridobi kompetence:

- za razumevanje in uporabo osnovnih statističnih metod na področju biologije, biomedicine in ekologije;
- za prikaz množičnih podatkov in rezultatov statističnih analiz;
- za interpretacijo rezultatov statističnih analiz;
- za izbor ustreznih statističnih analiz.

Objectives and competences:

Student acquires competences:

- to understand and use basic statistical methods in the field of biology, biomedicine and ecology;
- to display mass data and results of statistical analysis;
- to interpret the results of statistical analysis;
- to select relevant statistical analyses.

Predvideni študijski rezultati:

Znanje in razumevanje:

- načrtovanja eksperimenta z namenom zbiranja podatkov in njihove organizacije v tabele in relacijske tabele;

Intended learning outcomes:

Knowledge and understanding:

- designing an experiment in order to collect and organize data in tables and relational tables;

• zna uporabiti mere srednjih vrednosti, mere razpršenosti in jih grafično prikazi; • zna oblikovati ničelno in alternativno statistično hipotezo in razume stopnjo tveganja, se zaveda napake prve in druge vrste in zna oceniti velikost učinka; • zna uporabiti univariatna testa za preverjanje razlik med vzorci, t test in F test; • razume pomen povezanosti med spremenljivkami, zna izračunati korelacijo in linearna regresijo in preveriti pogoje zanjo, zna načrtovati prikaz nelinearnega odnosa med spremenljivkama; • zna uporabiti neparametrične teste za preverjanje razlik med vzorci, Hi-kvadrat test, Mann-Whitney test, Kruskal-Wallis test; • razume pomen in zna uporabiti multivariatne metode: analiza glavnih komponent, diskriminantna analiza in klastrska analiza; • zna načrtovati in izračunati osnovne statistične modele.	• can use different kind of the mean values, measures of dispersions and graphically represent them; • can formulate a null and alternative statistical hypothesis and understands the degree of probability, is aware of type I and type II error and can evaluate the effect size; • can use univariate tests to analyze the differences between samples, t test and F test; • understands relationships between variables, can calculate correlation and linear regression, and knows how to check the conditions for it, can plan a presentation of a nonlinear relationship between variables; • can use non-parametric tests to analyze the differences between samples, Hi-square test, Mann-Whitney test, Kruskal-Wallis test; • understands the meaning and can use multivariate methods: Principal component Analysis, Discriminant analysis and Cluster analysis; • can design and calculate basic statistical models.
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Metode poučevanja in učenja:

• Predavanja • Študije primerov s področja biologije, biomedicine in ekologije

Learning and teaching methods:

• Lectures • Case studies from biology, biomedicine and ecology
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Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

Način:		Type:
Pisni izpit	60	Written exam
Sprotne naloge	40	Coursework

Reference nosilca / Lecturer's references:

BIBI, Shahnaz, NADEEM, Muhammad Sajid, MUSHTAQ, Muhammad, KAYANI, Amjad Rashid, MAHMOOD, Tariq, JANŽEKOVIC, Franc. Morphological, cranial and coat colour variations in *Mus musculus castaneus* populations of Pothwar, Pakistan. *Pure and applied biology*. 2022, vol. 11, no. 1, str. 271-283. ISSN 2304-2478. DOI: [10.19045/bspab.2022.110029](https://doi.org/10.19045/bspab.2022.110029). [COBISS.SI-ID [134649859](https://www.cobiss.si/id/134649859)]
 KLENOVŠEK, Tina, JAKŠIĆ, Predrag, JANŽEKOVIC, Franc. Size and shape variability of the wing in burnet moth, *Zygaena ephialtes* (L., 1767) (Lepidoptera: Zygaenidae) = Burnet güvesi, *Zygaena ephialtes* (L., 1767)

(Lepidoptera: Zygaenidae)'nde kanadın boy ve şekil değişkenliği. *Turkish journal of entomology*. 2022, vol. 46, iss. 2, str. 239-247. ISSN 2536-491X. [Digitalna knjižnica Univerze v Mariboru – DKUM](#), DOI: [10.16970/entoted.1096288](#), DOI: [20.500.12556/DKUM-88799](#). [COBISS.SI-ID [118037251](#)]
JANŽEKOVIČ, Franc, KLENOVŠEK, Tina. The biogeography of diet diversity of barn owls on Mediterranean islands. *Journal of biogeography*. 2020, vol. 47, iss. 11, str. 2353-2361, ilustr. ISSN 0305-0270. [COBISS.SI-ID [35935747](#)]