

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet: Vizualizacija podatkov
Course title: Data visualization

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Podatkovne znanosti, magistrski študijski program druge stopnje	-	Prvi	Prvi
The second cycle masters study programme Data Sciences	-	First	First

Vrsta predmeta / Course type

Obvezni / Obligatory

Univerzitetna koda predmeta / University course code:

2-PZ-MAG-VP-2026-09-29

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
10	-	35	-	-	105	5

Nosilec predmeta / Lecturer: izr. prof. dr. Nuša Erman

**Jeziki /
Languages:**

**Predavanja /
Lectures:** Slovenski, angleški / Slovene, English
Vaje / Tutorial: Slovenski, angleški / Slovene, English

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

Ni posebnih pogojev za vključitev v delo.

Pogoj za pristop k pisnemu izpitu je pravočasna oddaja in pozitivno ocenjena projektna naloga z zagovorom.

Prerequisites:

There are no special prerequisites for inclusion in the work.
A prerequisite for taking the written exam is the timely submission and successful completion of the project assignment, including its presentation.

Vsebina:

- Uvod v uporabo programskega okolja R: vrste podatkov v R, vektor, faktor, seznam, matrika, podatkovni okvir.
- Proučitev podatkov pred njihovo vizualizacijo.
- Načrtovanje vizualizacije: izbira ustreznega grafičnega prikaza.
- Vizualizacija z uporabo osnovnih R ukazov.

Content (Syllabus outline):

- Introduction to R software environment: data types in R, vector, factor, list, matrix, data frame.
- Exploring the data before visualizing them.
- Planning for visualization: selecting the appropriate graphic display.
- Visualization using R Base commands.

- Vizualizacija z uporabo izbranih R paketov (lattice, ggplot2).
- Dinamični in interaktivni prikazi s pomočjo R Shiny.

- Visualization using selected R packages (lattice, ggplot2).
- Dynamic and interactive displays using R Shiny.

Temeljni literatura in viri / Readings:

- Wilke, C.O. (2019): *Fundamentals of Data Visualization: A Primer on Making Informative and Compelling Figures*. California: O'Reilly Media.
Dostopno prek: <https://clauswilke.com/dataviz/>
- Chang, W. (2018): *R Graphics Cookbook: Practical Recipes for Visualizing Data. 2nd edition*. California: O'Reilly Media.
Dostopno prek: <https://r-graphics.org/>
- Wickham, H. (2016): *ggplot2: Elegant Graphics for Data Analysis*, 2nd ed. Springer.
- Resnizky, H.G. (2015): *Learning Shiny*. Packt Publishing.
- Wickham, H. (2020): *Mastering Shiny*. California: O'Reilly Media.
Dostopno prek: <https://mastering-shiny.org/>
- Sievert, C. (2019). *Interactive web-based data visualization with R, plotly, and shiny*. Chapman and Hall/CRC. Dostopno prek: <https://plotly-r.com/>

Cilji in kompetence:

Učna enota prispeva k razvoju naslednjih splošnih in predmetno specifičnih kompetenc:

Splošne kompetence:

- Sposobnost skrbeti za kakovost strokovnega dela skozi avtonomnost, samoiniciativnost, (samo)kritičnost, (samo)refleksivnost in (samo)evalviranje.
- Sposobnost fleksibilne uporabe znanja v praksi.
- Uporaba ustreznih metodoloških pristopov za izvajanje, koordiniranje in organiziranje raziskav.

Predmetno-specifične kompetence:

- obvladanje vizualizacijskih metod, postopkov in procesov
- sposobnost logičnega sklepanja, ocenjevanja velikostnega reda rezultata, natančnosti izražanja, pisanja in razmišljanja
- usposobljenost za uporabo sodobnih vizualizacij podatkov

Objectives and competences:

The instructional unit contributes to the development of the following general and subject-specific competences:

General competences:

- The ability to manage quality of professional work through autonomy, initiative, as well as (self-)criticism, (self-)reflection and (self-)evaluation.
- The ability of flexible usage of knowledge in practice.
- Utilization of adequate methodological approaches to conduct, coordination and organisation of research

Subject-specific competences:

- competence in visualization methods, procedures and processes
- ability to make logical conclusions, to estimate the order of magnitude of the results well as the ability to express oneself, write and think in an accurate manner
- ability to use modern data visualizations

Predvideni študijski rezultati:

Intended learning outcomes:

Znanje in razumevanje: <i>Sposobnost študenta/študentke bo:</i> • poznavanje enega izmed najbolj prilagodljivih orodij za statistično analizo in grafični prikaz podatkov; • sposobnost njegove praktične uporabe; • poznavanje osnovnih in naprednih funkcij in pristopov k vizualizaciji podatkov.	Knowledge and understanding: The ability of the student: • acquaintance with one of the most flexible tools for statistical analysis and graphics of data; • ability to use it in practice; • knowledge of basic and advanced functions and approaches to data visualization.
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Metode poučevanja in učenja: • <i>predavanja</i> z aktivno udeležbo študentov (razlaga, diskusija, vprašanja, primeri, reševanje problemov) • <i>vaje</i>, kjer študentje na enostavnih primerih ponovijo temeljne koncepte in metode, predstavljene na predavanjih • <i>laboratorijske vaje</i>, kjer se študenti seznajajo s programskimi orodji za zbiranje in analiziranje podatkov	Learning and teaching methods: • <i>lectures</i> with active students participation (explanations, discussion, questions, examples, problem solving); • <i>tutorials</i> (students will recall, reinforce, and shed light on the concepts and methods taught on lectures); • <i>lab work</i> (students will learn state of the art software for data collection and analysis).
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Načini ocenjevanja:		Delež (v %) / Weight (in %)	Assessment:
Način:			Type:
• pisni izpit • projektna naloga in njen zagovor	50 % 50 %	• written exam • project work and its presentation	

Reference nosilca / Lecturer's references: • ERMAN, Nuša, ROBIDA, Nika, ROJKO, Katarina. Differences among higher education students from the ICT field : formal education vs. lifelong learning. Journal of infrastructure, policy and development. 2025, vol. 9, iss. 1, [article no.] 10714, str. 1-20. • ROJKO, Katarina, ERMAN, Nuša. The Impact of the Covid-19 Pandemic on Higher Education Students' Perceptions of Educational Applications and Platforms. International Journal of Cognitive Research in Science, Engineering and Education. 2023, vol. 11, no. 2, str. 267-279. • ERMAN, Nuša, ROJKO, Katarina, LESJAK, Dušan. Traditional and new ICT spending and its impact on economy. Journal of computer information systems. 2022, vol. 62, iss. 2, str. 384-396.

- ROJKO, Katarina, LESJAK, Dušan, ERMAN, Nuša. The COVID-19 Pandemic Crisis : impact on ICT spending. Journal of computer information systems. 2022, vol. , iss. , str. 1-16.