

## UČNI NAČRT PREDMETA / COURSE SYLLABUS

<b>Predmet:</b>	Podatkovna skladišča in podatkovna analitika
<b>Course title:</b>	Data warehouses and data analytics

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Poslovna Informatika, magistrski študijski program druge stopnje	-	Drugi	Tretji
Business Informatics, second cycle Masters Study Programme	-	Second	Third

**Vrsta predmeta / Course type**

Obvezni / Obligatory

**Univerzitetna koda predmeta / University course code:**

4-PI-MAG-PSPA-2022-05-27

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30	-	30	-	-	90	5

**Nosilec predmeta / Lecturer:**

izr. prof. dr. Blaž Rodič

**Jeziki /  
Languages:**

**Predavanja /  
Lectures:**

slovenski, angleški / Slovene, English

**Vaje / Tutorial:**

slovenski, angleški / Slovene, English

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

Študent/študentka mora pred pristopom k izpitu imeti pozitivno ocenjene vaje in seminarsko nalogo.

Predmet zahteva znanja o pridobljena v okviru predmeta Sistemi za podporo odločanju

**Prerequisites:**

Positively evaluated exercises and seminar paper are a prerequisites for exam.

Course requires knowledge obtained within the course Decision Support Systems.

**Vsebina:**

- Uvod v predmet.  
Namen študija predmeta, povezanost predmeta z drugimi predmeti, vsebina študija predmeta, študijska literatura.
- Poslovni pomen baz podatkov kot ključnega vira znanja za potrebe poslovanja, modeliranje podatkov na različnih ravneh, lastnosti baz podatkov in podatkovnih skladišč.

**Content (Syllabus outline):**

- Introduction.  
Aims of the course, relations with other courses, short overview of topics, recommended literature.
- Business importance of databases as key sources of knowledge for business purposes, data modelling at various levels, qualities of databases and data warehouses.

- Pregled metod, tehnik in orodij analize podatkov: enostavne rešitve, poslovna analitika, podatkovno rudarjenje, nove tehnologije.
- Arhitektura in načrtovanje podatkovnih skladišč: namen in načrtovanje podatkovnih skladišč, zagotavljanje kvalitete shranjenih podatkov, pristopi k analizi shranjenih podatkov.
- Priprava, migracija, in posredovanje podatkov, ETL tehnologija, vizualizacija podatkov, kakovost in oplemenitenje podatkov.
- Poslovna analitika: OLAP – sprotno analitično procesiranje, odkrivanje, analiza in definiranje poslovnih problemov, kvalitativno in kvantitativno modeliranje, ovrednotenje in prenos rezultatov v poslovno prakso, pregled tipičnih poslovnih problemov in pristopi reševanja.
- Veliki podatki (Big Data), Porazdeljene podatkovne tehnologije, sistem Hadoop

- Methods, techniques and tools of data analysis: simple solutions, business analytics, data mining, new technologies.
- Data warehouse architecture and warehouse design: design methodologies, data quality assurance, data analysis.
- Data preparation, migration and transfer, ETL technology, data visualization, data quality and enhancement.
- Business analytics: OLAP - On line analytical processing, business problem detection, analysis, and definition, descriptive and predictive modelling, modelling result evaluation and business adoption, overview of various industry examples with solution approaches
- Big Data, Distributed data technologies, Hadoop system.

### Temeljni literatura in viri / Readings:

- Kimball, R., Ross, M. (2013) The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling, 3rd Ed., John Wiley & Sons.
  - Kimball, R., Ross, M., Thornthwaite, W., Mundy, J., Becker, B. (2016) The Kimball Group Reader: Relentlessly Practical Tools for Data Warehousing and Business Intelligence Remastered Collection, John Wiley & Sons.
  - Ballard, C., Farrell, D.M., Gupta, A., Mazuela, C., Vohnik, S. (2012) Dimensional Modeling: In a Business Intelligence Environment, IBM Redbooks.
  - Sherman R. (2014), Business Intelligence Guidebook: From Data Integration to Analytics, Morgan Kaufmann.
- Izbrana poglavja iz:
- Jaklič, J. (2002): Upravljanje in uporaba podatkov, Ekonomska fakulteta, Ljubljana
  - Rob, P. and Coronel, C. (2002): Database Systems: Design, Implementation, and Management, 5th edn, Course Technology, Cambridge MA
  - Giordano, A.D. (2010), Data Integration Blueprint and Modeling: Techniques for a Scalable and Sustainable Architecture, IBM Press

### Cilji in kompetence:

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

*Splošne kompetence:*

- Sposobnost fleksibilne uporabe znanja v praksi.

### Objectives and competences:

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

*General competences:*

- The ability of flexible usage of knowledge in practice.

- Uporaba uveljavljenih metodoloških pristopov za upravljanje sodobnih poslovnih sistemov.
- Poglobljeno razumevanje delovanja organizacijskih sistemov.

*Predmetno-specifične kompetence:*

- Razumevanje arhitekture podatkovnih skladišč.
- Sposobnost dokumentiranja in analize uporabniških zahtev za razvoj podatkovnih skladišč.
- Sposobnost modeliranja podatkovnih skladišč.
- Uporaba metod integracije podatkov v podatkovnih skladiščih (filtriranje, čiščenje, poenotenje, meta podatki, ETL).
- Uporaba orodij za podatkovno analitiko in poslovno inteligenco.
- Sposobnost interpretacije zahtev gradnje distribuiranih baz podatkov.

- Usage of established methodological approaches for managing modern business systems.
- In-depth understanding of the functioning of organizational systems.

*Subject-specific competences:*

- Understanding the architecture of data warehouses.
- Ability to document and analyze user requirements for the development of data warehouses.
- Ability to model data warehouse.
- Usage of the methods of integration of data in data warehouses (filtration, cleaning, standardization, metadata, ETL).
- Usage of user tools for data analytics and business intelligence.
- Ability to interpret the demands of construction of distributed databases.

**Predvideni študijski rezultati:**

Študenti bodo zmožni:

- argumentirati pomen podatkov in podatkovnih virov;
- modelirati podatkovna skladišča na konceptualnem, logičnem in fizičnem nivoju;
- analizirati s pomočjo modeliranja podatkov in odkrivati zakonitosti v podatkih;
- ovrednotiti vlogo podatkovnih skladišč kot pomembnega sestavnega dela informacijskih sistemov
- uporabljati tehnike dimenzijskega podatkovnega modeliranja,
- argumentacije kakovosti podatkov za uspešno realizacijo podatkovnih skladišč in pozna metodološki pristop, ki omogoča dvig kakovosti informacij.

**Intended learning outcomes:**

- Students will be able to: argument the meaning of data and data sources;
- model data;
- perform data warehouse modelling on conceptual, logical and physical level;
- model data for the purposes of analysing and discovering rules in data;
- evaluate the role of data warehouses as an integral part of information systems
- use the techniques of dimensional data modelling,
- arguments the importance of data quality for successful implementation of data warehouses, and is familiar with methodological approaches that increase the quality of information.

**Metode poučevanja in učenja:**

- Predavanja z aktivno udeležbo študentov (razlaga, diskusija, vprašanja, primeri, reševanje problemov).

**Learning and teaching methods:**

- Lectures with active students' involvement (explanation, discussion, questions, examples, problem solving).

- Laboratorijske vaje (spoznavanje dela s programskimi orodji).
- Individualne in skupinske konzultacije (diskusija, dodatna razlaga, obravnava specifičnih vprašanj).
- *individualno delo*; študij znanstvene in strokovne literature in priprava empirične seminarske naloge.

- Laboratory work: (using software for data warehouse design and data analytics).
- Individual and group consultations (discussions, supplementary explanations, treatment of specific questions).
- individual work: study of scientific and professional literature and development of empirical seminar work.

<b>Načini ocenjevanja:</b>	Delež (v %) / Weight (in %)	<b>Assessment:</b>
Način (pisni izpit, ustno izpraševanje, naloge, projekt): <ul style="list-style-type: none"> <li>• pisni izpit</li> <li>• empirična seminarska naloga, poročila laboratorijskih vaj</li> </ul>	50 % 50 %	Type (examination, oral, coursework, project): <ul style="list-style-type: none"> <li>• written exam</li> <li>• empirical seminar work, report of laboratory exercises</li> </ul>

**Reference nosilca / Lecturer's references:**

- RODIČ, Blaž. Industry 4.0 and the new simulation modelling paradigm. Organizacija : revija za management, informatiko in kadre, ISSN 1318-5454. [Tiskana izd.], aug. 2017, vol. 50, no. 3, str. 193-207, ilustr., doi: 10.1515/orga-2017-0017
- BRELIH, Marjan, RAJKOVIČ, Uroš, RUŽIČ, Tomaž, RODIČ, Blaž, KOZELJ, Daniel. Modelling decision knowledge for the evaluation of water management investment projects. Central European Journal of Operations Research, ISSN 1435-246X, 2019, vol. , iss. , str. <https://link.springer.com/content/pdf/10.1007%2Fs10100-018-0600-5.pdf>, doi: 10.1007/s10100-018-0600-5.
- KANDUČ, Tadej, RODIČ, Blaž. Optimisation of machine layout using a force generated graph algorithm and simulated annealing. International journal of simulation modelling, ISSN 1726-4529, 2016, vol. 15, no. 2, str. 275-287.
- RODIČ, Blaž, BAGGIA, Alenka. Dynamic airport ground crew scheduling using a heuristic scheduling algorithm. International journal of applied mathematics and informatics, ISSN 2074-1278, 2013, vol. 7, iss. 4, str. 153-163.
- RODIČ, Blaž. Mobile agents for distributed decision support systems. The International Scientific Journal of Management Information Systems, ISSN 1452-774X, 2011, vol. 6, no. 1, str. 20-27.
- RODIČ, Blaž, KLJAJIĆ, Miroljub. Accessing distributed data sources with mobile agents and XML. V: JAŠKOVÁ, Mária (ur.). ECON '05 : [selected research papers], (Research works proceedings, ISSN 0862-7908, Vol. 12, 2005). Ostrava: Technical University of Ostrava, Faculty of Economics. 2005, str. 280-287.
- RODIČ, Blaž, KLJAJIĆ, Miroljub. Integracija simulacijskih orodij v e-poslovni informacijski sistem. V: GRIČAR, Jože (ur.). Izboljšanje konkurenčnosti regije z e-poslovanjem, (Organizacija, ISSN 1318-5454, Letn. 37, 2004, št. 3). Kranj: Moderna organizacija. 2004, str. 162-167.
- ŠKRABA, Andrej, BAGGIA, Alenka, RODIČ, Blaž. Application of a group decision support system in the reform of study programmes. V: DONDON, Philippe (ur.). Recent advances in education and modern educational technologies, (Educational technologies series, 9). [S. l.: s. n.]. 2013, str. 128-134.

- RODIČ, Blaž. Issues of e-collaboration and knowledge management in media industries. V: LUGMAYR, Artur (ur.), et al. Information systems and management in media and entertainment industries, (International series on computer entertainment and media technology (Online), ISSN 2364-9488). Cham: Springer. cop. 2016.