

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet: Baze podatkov in modeliranje podatkov
Course title: Databases and data modelling

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Informatika v sodobni družbi, visokošolski strokovni študijski program prve stopnje	-	Prvi	Drugi
Informatics in Contemporary Society, first cycle Professional Study Programme	-	First	Second

Vrsta predmeta / Course type

Obvezni / Obligatory

Univerzitetna koda predmeta / University course code:

1-ISD-VS-BPMP-2025-12-04

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30	-	45	-	-	105	6

Nosilec predmeta / Lecturer: izr. prof. dr. Blaž Rodič

Jeziki / Languages:

Predavanja / Lectures: Slovenski / Slovenian, Angleški / English

Vaje / Tutorial: Slovenski / Slovenian, Angleški / English

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

Študent/študentka mora pred pristopom k izpitu opraviti morebitne obveznosti iz vaj.

Prerequisites:

The student is obliged to complete potential lab work assignments before the admission to the exam.

Vsebina:

- Uvod v predmet.
- Namen študija predmeta, povezanost predmeta z drugimi predmeti, vsebina študija predmeta, študijska literatura.
- Podatki in podatkovni viri v organizaciji. Strukturirani in nestrukturirani podatkovni viri. Upravljanje podatkovnih virov. Pridobivanje in specifikacija informacijskih zahtev uporabnikov.
- Sistemi za upravljanje z bazami podatkov in njihove značilnosti.

Content (Syllabus outline):

- Introduction.
Aims of the course, relations with other courses, short overview of topics, recommended literature.
- Data and data sources in organizations. Structured and non-structured data sources. Management of data sources. Acquisition and specification of user requirements.
- Database management systems and their characteristics:
Definition, database management technologies.

- Opredelitev. Tehnologija sistemov za upravljanje baz podatkov.
- Trendi upravljanja podatkov, Big Data
- Modeli podatkov: Relacijski, mrežni, hierarhični, objektno orientirani podatkovni model.
- Nivoji modeliranja podatkov.
- Konceptualni, logični in fizični nivo modeliranja podatkov.
- Konceptualni model podatkov.
- Opredelitev. Model Entiteta-Razmerje. Poslovna pravila in podatki. Konceptualno načrtovanje podatkovne baze.
- Logični model podatkov.
- Relacijski podatkovni model. Preoblikovanje konceptualnega modela v logični model podatkov. Normalizacija.
- Fizični model podatkov.
- Preoblikovanje logičnega modela v relacijsko bazo podatkov. Denormalizacija. Kreiranje baze podatkov in manipulacija s podatki z jezikom SQL. Zagotavljanje varnosti podatkov. Uvajanje baze podatkov in njen življenjski cikel.
- Podatkovna skladišča. Podatkovna baza in podatkovno skladišče, Evolucija podatkovnih skladišč, Poslovna analitika (OLAP - On line analytical processing), Arhitektura podatkovnih skladišč.

- Data management trends, Big Data
- Data models: Relational, network, hierarchical, and object-oriented data model.
- Data modelling levels. Conceptual, logical and physical data modelling level.
- Conceptual model: Definition, entity-relationship model, business rules and data. Conceptual database design.
- Logical model: Relational data model. Transforming conceptual model into logical (conceptual). Normalization.
- Physical model: Transforming logical model into relational database. Denormalization. Database creation and manipulation with SQL. Database security and integrity. Database deployment and its lifecycle.
- Data warehouses. Data warehouses and databases, Evolution of data warehouses, Business analytics (OLAP - On line analytical processing), Data warehouse architecture.

Temeljni literatura in viri / Readings:

- Sumathi, S. & Esakkirajan, S. (2007). *Fundamentals of Relational Database Management Systems*. Springer.
- Wilton, P. & Colby, J. W. (2005). *Beginning SQL*. Wrox.
- Benyon, D. (1997). *Information and Data Modelling*. McGraw-Hill Publishing Co. Inc.
- Coronel, C. & Morrison, S. (2014). *Database Systems: Design, Implementation, & Management* (11th Ed.). Cengage Learning.

Cilji in kompetence:

- Učna enota prispeva k razvoju naslednjih splošnih kompetenc:
- poznavanje pomena kakovosti in prizadevanje za kakovost strokovnega dela skozi avtonomnost, samoiniciativnost, (samo)kritičnost, (samo)refleksivnost in (samo)evalviranje v strokovnem delu

Objectives and competences:

- Teaching unit contributes to the development of the following general competences:
- familiarity with the importance of quality, striving to maintain the quality of professional work through practicing autonomous behaviour, showing initiative, as well as through

- prepoznavanje in ocenitev aktualnih in nastajajočih tehnologij ter ocenitev njihove uporabnosti za reševanje potreb uporabnikov
- usposobljenost za samoučenje s ciljem obvladovanja najnovejših relevantnih spletnih in mobilnih tehnologij
- sposobnost varnega in namenskega koriščenja najzahtevnejših spletnih storitev
- zmožnost za prepoznavanje in izkoriščanje priložnosti, ki jih ponuja spletna tehnologija

in predmetno-specifičnih kompetenc:

- poznavanje osnov relacijskih podatkovnih baz in jezika SQL ter njihova uporaba v spletnih aplikacijah
- poznavanje metodologij modeliranja podatkov

(self-) criticism, (self-)reflection and (self-)evaluation

- identification and evaluation of current and emerging technologies, and assessment of their usability in terms of fulfilling user requirements
- ability to self-educate with the aim to master relevant state-of-the-art web and mobile technologies
- ability to safely and purposefully use the most complex web services
- ability to recognize and seize opportunities offered by the web technology

and subject-specific competences:

- familiarity with the basics of relational databases and SQL language, as well as their use in web applications
- familiarity with data modelling methodology

Predvideni študijski rezultati:

Znanje in razumevanje:

Študent/študentka:

- pozna in razume pomen podatkov in podatkovnih virov
- pozna in razume podatkovne modele
- je zmožen modelirati podatke na konceptualnem, logičnem in fizičnem nivoju
- pozna in razume teoretične osnove sistemov za upravljanje baze podatkov
- pozna in razume tehnološke in arhitekturne zahteve sistemov za upravljanje baze podatkov
- zna kreirati podatkovno bazo in izvajati manipulacije nad podatki
- pridobljeno znanje uporablja za razvoj, vzdrževanje in ustrezno rabo osebne baze podatkov
- je zmožen sodelovati pri razvoju baze podatkov transakcijskega informacijskega sistema
- pozna in je zmožen uporabljati neproceduralne jezike za delo z bazo podatkov

Intended learning outcomes:

Knowledge and understanding:

The student:

- knows and understands the meaning of data and data sources
- knows and understands data models
- can perform data modeling on conceptual, logical and physical level
- knows and understands the theory behind database management systems
- knows and understands technological and architectural database management systems requirements
- can create a database and manipulate stored data
- can apply acquired knowledge for personal database design, management and its proper daily use
- can collaborate in database development for transactional information system
- knows and uses non-procedural database languages for database operation

Metode poučevanja in učenja:

- predavanja z aktivno udeležbo študentov (razlaga, diskusija, vprašanja, primeri, reševanje problemov)
- laboratorijske vaje (spoznavanje s programskim jezikom SQL in delo z njim, priprava poizvedb)

Learning and teaching methods:

- lectures with active students' involvement (explanation, discussion, questions, examples, problem solving)
- laboratory work (learning the SQL language, generating queries)

Načini ocenjevanja:Delež (v %) / **Assessment:**
Weight (in %)

Način (pisni izpit, ustno izpraševanje, naloge, projekt):	Delež (v %) / Weight (in %)	Type (examination, oral, coursework, project):
<ul style="list-style-type: none"> • pisni izpit (sestavljen iz dveh delov, teoretičnih vprašanj in praktičnih nalog) 	100	<ul style="list-style-type: none"> • written examination (consisting of two parts: theoretical questions and practical exercises)

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, 2018, 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.
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