

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
Računalništvo in spletne tehnologije, visokošolski strokovni študijski program	-	Prvi	Drugi
Computer Science and Web Technologies, first cycle professional study programme	-	First	Second

Vrsta predmeta / Course type

Obvezni / Obligatory

Univerzitetna koda predmeta / University course code:

2-RST-VS-BPMP-2026-09-29

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 obveznosti iz vaj.

Prerequisites:

The student is obliged to complete 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.
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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 <i>in predmetno-specifičnih kompetenc:</i> • 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 <i>and subject-specific competences:</i> • familiarity with the basics of relational databases and SQL language, as well as their use in web applications • familiarity with data modelling methodology
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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 modelling 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):		Type (examination, oral, coursework, project):
• pisni izpit • naloge v okviru vaj	50	• written exam • tutorial coursework
	50	

Reference nosilca / Lecturer's references:

- BARBO, Matej, RODIČ, Blaž. Modeling the influence of safety aid market penetration on traffic safety : case of collision warning system for powered two-wheelers. Accident analysis and prevention. [Print ed.]. 2023, vol. 192 (107240), str. 1-11, ilustr. ISSN 0001-4575. DOI: 10.1016/j.aap.2023.107240.
- RODIČ, Blaž, BARBO, Matej. Decision support for traffic safety : case of rear-end collision modelling. *Journal of decision systems*. [in press] 2024, str. 1-12. ISSN 1246-0125. DOI: [10.1080/12460125.2024.2372481](https://doi.org/10.1080/12460125.2024.2372481).
- 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.
- BARTOL, Tomaž, DOLNIČAR, Danica, BOH PODGORNİK, Bojana, RODIČ, Blaž, ZORANOVIĆ, Tihomir. A comparative study of information literacy skill performance of students in agricultural sciences. *Journal of academic librarianship*. [Print ed.]. 2018, iss. 3, vol. 44, str. 374-382. ISSN 0099-1333. DOI: [10.1016/j.acalib.2018.03.004](https://doi.org/10.1016/j.acalib.2018.03.004).
- ŠAVRIČ, Jerneja, RODIČ, Blaž. Role of information system support in project management : case of companies competing at publicly funded calls for projects. V: PANKOWSKA, Malgorzata (ur.). *Digital transformation, perspective development, and value creation : research case studies*. New York; Abingdon: Routledge, 2024. Str. [103]-117. Routledge advances in management and business studies. ISBN 978-1-032-45340-8, ISBN 978-1-032-45356-9.