



RTU Course "Technology of Large Databases"

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General data

Code	DSP303
Course title	Technology of Large Databases
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Undergraduate Studies
Course type	Academic
Field of study	Computer Science
Responsible instructor	Jānis Eiduks
Volume of the course: parts and credits points	1 part, 2.0 Credit Points, 3.0 ECTS credits
Language of instruction	LV, EN
Annotation	The main differences of large databases (LDB) and desk-top databases. Data models of LDB. Architecture of LDB logical and physical data organization. On-line transaction management and On-line Analytical processing database systems. Instance and its structure. Database dictionary and configuration parameters. Optimisation of SQL queries. Tuning and audit. The most popular large database management systems: Oracle, MS SQL Server, DB2, Progress, Postgress. The future trends.
Goals and objectives of the course in terms of competences and skills	Large databases logical and physical structure building knowledge of relational and object-relational databases. Large database management system architecture and functionality understanding. Database management system functioning optimization performance understanding. Client/server database system administration knowledge. Complicated but effective large-scale database building skills. Server programming language framework knowledge and ability to create specialized unversial database system extensions. Query language SQL and object SQL latest features knowledge.
Structure and tasks of independent studies	Students' work in practice in a given course is very important, because a large part of the knowledge they receive with follow-up performing practical tasks. Secondly, each student in the practical work develops his/her own task, where determined requirements are included. Therefore, each student in a practical work, analyzing his own choice of subject environment, invents its features and represents the DB and carries out retrieval queries. Themes of the practical work: 1. Relational database information objects and data retrieval. 2. Relational-object DB information objects and data retrieval. 3. Server programming language PL/SQL use. 4. IDE tools and Java programming languages use in the DB serve
Recommended literature	1. Date C. J. An Introduction to Database systems. 8th edition. Addison-Wesley, 2003, 1024 pp. (Ir arī tulkojums krievu valodā.) 2. Date C.J. Database in depth. Relational theory for practitioners. O'Reilly, 2005, 240 pp. 3. Conolly T., Begg C. Database systems: A practical Approach to Design, Implementation and Management. 4th Edition. Addison Wesley, 2004, 1400 pp. 4. David M. Kroenke. Eight Edition. Databases Processing. Eighth edition. Prentice Hall, 2003, 800 pp. 5. Garcia-Molina H., Ullman J.D., Widom J. Database systems: The Complete Book, 2nd edition. Prentice Hall, 2008, 1248 pp. Relāciju-objektu datu bāzes datu modeļi tiek apskatīti arī lielās datu bāzes tehnoloģijas mācību grāmatās (tādās, kā pirmās piecas), tomēr detalizētāki apraksti ir meklējami grāmatās, kas veltītas konkrētām vadības sistēmām. Līderis šajā jomā ir firmas Oracle datu bāzes vadības sistēma un tai veltītās grāmatas. 6. Stewen Feuerstein, W. B. Pribyl. Oracle PL/SQL Programming. Third Edition. 2002, O'Reilly, 950 pp. 7. Benjamin Rosenzweig, Elena Silvestrova. Oracle PL/SQL by Example (4th Edition). Prentice Hall, 2008, 768 pp. 8. Loney, K. Oracle Database 11: The Complete Reference. McGraw-Hill Osborne Media, 2008, 1368 pp. 9. Greenwald R., Stackowiak R., Stern J. Oracle Essentials: Oracle Database 11g. O'Reilly Media, 4th Edition, 2007, 416 pp. Datū izgūšanas, definēšanas un modificēšanas pamatvaloda datu bāzes sistēmās ir SQL. Šo jautājumu apgūšanai der viena no kompetentākā SQL izmantošanas speciālista Joe Celko's grāmatas un arī grāmatas, kuras veltītas konkrētās datu bāzes vadības sistēma realizētajam SQL. 10. Celko J. SQL for smarties: advanced SQL programming, Third Edition. Morgan Kaufmann Publishers, 2005, 840 pp. Ievērojama speciālista laba mācību grāmata par SQL niansēm. 11. Mishra S., Beaulien A. Mastering Oracle SQL, 2nd Edition. O'Reilly Media, 2004, 496 pp.
Course prerequisites	Course of learning require good English language skills, interest in their speciality, ability to systematize information and make logical conclusions. Also requires following background knowledge: 1. Course of learning database technology basics (Data Base Management Systems - DB1) full acquirement. 2. Application development concept and understanding of key concepts. 3. Computers network basic principles.

Course outline

Theme	Hours
Universal database systems	4
Data storage structures and search possibilities of relational databases	4
Data storage structures and search possibilities of object-relation databases	6
Programming languages of database server and its possibilities	6
Triggers and transaction management	2
Interfaces of applications and database systems	2
Database servers net and replication	2
Database administrator group	2
Database development and administration with integrated development environment	2
Function distribution between database server and application server	2

Learning outcomes and assessment

Learning outcomes	Assessment methods
Competence of large databases architecture	Hands-on practice, test, exam
Large spectra databases data models (relational and relational-object) and its properties knowledge	Hands-on practice, test, exam
Data definition and manipulation languages	Hands-on practice, test, exam
Database server programming languages (SQL procedural extensions and Java)	Hands-on practice, test, exam
Ability to define large database structure and perform initial data loading	Hands-on practice, test, exam
Ability to determine and if needed then correct databases and database management systems parameters	Hands-on practice, test, exam
Ability to perform database audit	Hands-on practice, test, exam

Study subject structure

Part	CP	Hours per Week			Tests		
		Lectures	Practical	Lab.	Test	Exam	Work
1.	2.0	1.5	0.0	0.5		*	