RTU Course "Databases"

12307 Sistēmu teorijas un projektēšanas katedra

General data

Code	DSP730
Course title	Databases
Course status in the programme	Courses of Free Choice
Course level	Undergraduate Studies
Course type	Academic
Field of study	Computer Science
Responsible instructor	Eiduks Jānis
Academic staff	Lavendelis Egons Andersone Ilze
Volume of the course: parts and credits points	1 part, 2.0 Credit Points, 3.0 ECTS credits
Language of instruction	LV, EN
Possibility of distance learning	Not planned
Maximum auditorium capacity	36
Maximum number of students per semester	36
Abstract	Data storage and processing issues have been and still are in the centre of attention of computer science professionals and database users. Technologies (memory volumes, processor frequencies) have evolved rapidly. At the same time demands have raised even more rapidly. One of the main data processing technologies is using database. Initially it was created as an attempt to eliminate the main drawbacks of file management systems. Different logical models of databases are used: hierarchical (tree), network, relational and object data models. The most common models are relational and object-relational data models. Relational and object algebras are the basis of these models. Database server programming languages are used widely during the last years. These languages facilitate processing of large and complicated data volumes. Flexibility of the database is facilitated by the server programming languages, too, because it simplifies implementation of necessary changes.
Goals and objectives of the course in terms of competences and skills	The aim of the course is to introduce students into database technologies and universal database systems, as well as to give narrowed contents of the courses “Basics of database technologies” and “Large databases”.
Structure and tasks of independent studies	During the course students have to carry out independent assignments about the following topics: relational databases, data definition and manipulation non-procedural language SQL as well as object-relational database storage structures and data querying possibilities.
Recommended literature	1. C. J. Date. An Introduction to Database systems. 8th edition. Addison-Wesley, 2003, 1024 pp. (Ir arī tulkojums krievu valodā.) 2. Joe Celko. SQL for smarties: advanced SQL programming Third Edition. 2005, Morgan Kaufmann Publishers, pp. 840. (Ir arī tulkojums krievu valodā.) 3. Paul Litwin, Ken Getz, Mike Gunderloy. Access 2002. Desktop developer`s handbook. 2002, SYBEX, pp. 992. (Ir arī tulkojums krievu valodā.) 4. Sanjay Mishra, Alan Beaulien. Mastering Oracle SQL, 2nd Edition. 2004, O’Reilly, 496 pp. 5. Steven Feurstein, Bill Prybil. Oracle PL/SQL Programming: Covers Versions Through Oracle Database 11g Release 2 (Animal Guide), 2009, 1232 pp. 6. Benjamin Rosenzweig, Elena Silvestrova. Oracle PL/SQL by Example (4th Edition). Prentice Hall, 2008, 768 pp. 7. Thomas Kyte. Expert Oracle Database Architecture: Oracle Database Programming 9i, 10g, and 11g Techniques and Solutions, Second Edition, Apress, 2010, 832 pp.
Course prerequisites	1. Mathematics 1.1. Relational algebra and relational calculus 1.2. Theory of concurrency (queues, blocking, synchronisation) 1.3. Theory of coding 2. Data structures 2.1. operative structures 2.2. Organisations of folders and files 2.3. Sequential access methods 2.4. random access method, hash functions, hash tables, data indexing, banal search, tries, B* and B+ trees, TRIE structures 2.5. Sort and search methods.
Courses acquired before	

Course outline

Theme	Hours
Information systems and databases	4
Relational database systems	4
Database management systems	4
Data definition and manipulation non-procedural language SQL	8
Data storage structures and querying possibilities in objec-relational databases	8
Database server programming languages	4

Learning outcomes and assessment

Learning outcomes	Assessment methods
Student knows basic database concepts.	Corresponding test questions.
Student understands data storage structures used in relational databases.	Laboratory work and corresponding test questions.
Student understands and can use relational database definition and data manipulation language SQL.	Laboratory work and corresponding test questions.
Student understands data storage structures used in object-relational databases.	Laboratory work and corresponding test questions.
Student can use object-relational database definition and data manipulation language SQL.	Laboratory work and corresponding test questions.
Student understands basic principles of server programming languages.	Corresponding test questions.

Study subject structure

Part	Semester			CP	Hours per Week			Tests			Tests (free choice)		
	Autumn	Spring	Summer		Lectures	Practical	Lab.	Test	Exam	Work	Test	Exam	Work
1.	*	*	*	2.0	1.5	0.0	0.5	*					