Annotation

"Database"

RD1. Possession of a conceptual framework in the field of databases, structures of data and database management systems.

RD2. Possession of methods of design of subject domain in the essence communication models and structures of the database in relational DBMS.

RD3. Ability to project infologichesky model of the database and structure of the relational database, to form inquiries in the SQL language to the database.

As a result of studying of discipline the student has to:

Nobility: models of data, principles of creation of a DB, control system of a DB and information storages; life cycle of a DB, the organization of processing of data in a DB, technology of expeditious processing of transaction.

To be able: to model and design structures of data and knowledge; to develop infologichesky and datologichesky schemes of databases; to work with tools of design of databases and knowledge, managements of the projects of IS and information security.

To own: By methods of the description of schemes of databases, by methods of work with tools of design of databases and knowledge, management of the projects of IS and information security.

10. Maintenance of the module (discipline) (list of the main subjects (sections)

Section 1. Basic concepts
1.1. File systems. Scopes of file systems. Shortcomings of file systems of data processing.
1.2. Concept of the databases (D) and control systems of a DB (DBMS). Principles of creation of a DB.
1.3. Classification of DBMS. DB typology.
1.4. The organization of processing of data in a DB.
1.5. The review of the existing DBMS. Documentary DB. Factual DB. Hypertext and multimedia DB. XML servers. Object-oriented DB. The distributed DB. Commercial DB.
1.6. Information units. Introduction to databanks.

Section 2. Relational models.
2.1. Relational structure of data. Type of data, domain, relation, train. The organization of processing of data in a DB.
2.2. Relational database. Her features.
2.3. Manipulation relational data. Data processing operations. Classification of operations over the relations.
2.4. Association of the relations.

2.5. Crossing of the relations.
2.6. Subtraction of the relations.
2.7. Cartesian product of the relations.
2.8. Operation of the choice (restriction) of the relation.
2.9. Operation of a projection over the relation.
2.10. Operation of connection of tables. Natural connection.

Section 3. Conceptual modeling of subject domain
3.1. Concept of model. Types of modeling.
3.2. Infologichesky model of data "Essence communication". Basic concepts. The organization of processing of data in a DB. Integrity restrictions
3.3. The ER elements – models. Essence, attribute, key, communication.
3.4. Systems of designation of ER models. ER charts. Classification of communications.
3.5. Classification of entities.
3.6. Example of creation of infologichesky model. Syntax of the description of design decisions.
3.7. Datalogichesky modeling.
3.8. Management of warehouses of data

Section 4. Integrity of databases
4.1. Reference integrity of data. The strategy of maintenance of reference integrity in modern DBMS.
4.2. Concept of transaction, property of transaction. Realization of transactions in DBMS.
4.3. Concept of restriction of integrity of data generally.
4.4. Classification of restrictions of integrity.
4.5. Realization of restrictions of integrity with means of SQL. The stored procedures and triggers.

Section 5. Tabular languages of inquiries
5.1. Tabular languages of inquiries. Languages of the description and manipulation data of different classes (QBE, SQL, elements 4GL).
5.2. SQL language. Short characteristic of SQL. Types of data of SQL.
5.3. SQL. Offer of SELECT. appointment. Syntax.
5.4. SQL. Selection of data from one table.
5.5. SQL. Aggregation of data.
5.6. SQL. Selection of data from several tables.
5.7. SQL. Offers of modification of data (INSERT, UPDATE, DELETE).
5.8. SQL. Creation and destruction of basic tables.

Section 6. Normalization of the relations
6.1. Purposes of design of relational databases.
6.2. Normalization, functional and multiple-valued dependences.
6.3. Definitions of normal forms.

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