Master Degree Exam Requirements

Applied Informatics

Technologies of Informatics

2023/2024

1. **Object persistence**
   Essential principles and tools, object-relational mapping, Java Persistence API, common implementation problems
2. **Java EE Web technologies**
   Servlets, Java Server Pages, MVC design pattern on the Web, multi-layered architectures, web frameworks, tools, web container
3. **Languages and formats for the transmission of data**
   XML and its structure, methods describe the structure of the XML, transformations of the XML, software processing (parsers, generators), JSON and its structure, software processing; Another formats (CSV, YAML, ...).
4. **Data Warehousing and OLAP**
   Relational and multidimensional database model, operational database, data warehouse, data mart, building and running of a data warehouse, ETL proces, OLAP tachnics and OLAP operations over a data cube.
5. **Basic features of distributed database systems**
   Advantages, disadvantages, basic functionality. Distributed database design – data fragmentation and allocation. Distribution in commercial systems.
6. **Query optimisation and data replication**
   Distributed query optimisation. Data replication. Applications of the replication.
7. **Data and Information Protection and Security**
   Viruses and other malicious software, basic principles of anti-virus protection. Data protection and recovery in a local PC. Data protection and recovery in a networking environment. Data and information protection in an information system. Legal aspects of data and information protection.
8. **Cryptography – essential approaches and terminology**
   Cryptographic system, key, time and memory efficiency, cryptographic protocol, monoalphabetic and polyalphabetic ciphers, symmetric and asymmetric ciphering, recent ciphering systems - principles, DES, RSA, etc.
9. **Structure and architecture of UNIX / GNU/Linux systems**
   system structure, file system, system process, OS services, shells, instructions of shells, kernel description, kernel data structure, system buffers, I/O subsystem, memory management, real-time operating systems (basic characteristics, the main factors, definition, hard and soft RTOS, RMS, EDF, RTOS examples)
10. **Process control in UNIX (GNU/Linux) system**
    process creation, signals, process termination, invocation by other process, real and efficient UID, process sizing, process management, process scheduling, SysRQ (usage, functions)

11. **Basic UNIX (GNU/Linux) user administration**
    managing files and directories, operations with files and directories, searching file systems, user identity, process identity, identity file and change, access control and access control settings, input/output redirection, command interconnection, user administration, backup, programs for data archiving and data compression, working in command interpreters, SMART technology (meaning, usage, selected values)
12. **Classification of Mobile devices**
    Operating systems, producers, principles of operating, application software, connectivity, specific problems of mobile devices. Mobile clients of information system. Mobile context and sensors, LBS applications.
13. **Application development for mobile platforms**
    Android SDK, Java ME, iOS, Windows Phone - development tools, principles, GUI design, principles of communication.