

Course Data Storage and Management Systems

Basic Information

This is a course, which contributes to MSc award in Mathematics

Duration	72 hours (2 ECTS)
Starting date	September 1st
Study credits	2 ECTS credits
Language of instruction	English level B1(European Framework of Reference of Communicative Skills)
Academic requirements	<ul style="list-style-type: none">– BSc degree in Mathematics, Physics, Computer Science, Engineering or equivalent (a copy of your diplomas from previous university studies and transcripts of completed courses and grades)– Skype interview

Course Description

“Data Storage and Management Systems” is the first course on data analysis, which enables students to master the fundamentals of data storage technologies, the modern data storage and management systems and data design services.

The most important part of this course is reviewed, and development of warehouse approach. The course material involves the study of data storage systems, which will be very relevant for the future data analysts, in particular, this course provides firstly the data storage technics apply as a preapproach of the algorithms and mathematical methods of data analysis.

Special Features of the Course

The course focuses on theoretical and practical material of the data design and the basis of modern OLAP technology, which is part of the broader category of business intelligence, also encompasses relational databases, report writing, and data mining. Those instruments allow students to develop the depth of knowledge necessary for the data scientists.

Students will be able to apply the architecture of data warehouses, in particular, virtual storage, DataMart model, corporate data warehouse model. Students will also learn the types of databases that will be apply to the application, researches or information systems development. The content of the course includes relational, network, and hierarchical databases.

Course Aim

To introduce the basic types of storage systems.

- To develop skills of warehousing design, DataMart and virtual storage.
- To provide students with knowledge of technical implementations of data processing technology.

Course Objectives

- To give students a notion of detailed knowledge about the types of data storage models, data warehouses, data marts and data lakes.
- To ensure students are familiar with the theoretical foundation of data processing technologies, in particular, online analytical processing.
- To equip the student with abilities about the organization of data storage, in particular, the choice of data storage model for the original problem.
- To develop practical skills in data storage and management systems.

Learning Outcomes of the Course

By the end of the course, students will be able to:

- manage the project during at all the stages of its life cycle;
- manage the stages of the life cycle of the methodological and technological infrastructure of data analysis in the organization;
- manage the development of products, services, and applications based on data analysis;
- build data storage structure;
- apply the data management systems in the data analysis;

Course (module) Structure

Learning Activities	Hours
Practice sessions	18
Self-study Assignments	54
Total study hours	72

Course Outline

Week	Practice session / Assignments	Hours ¹
1-2	<ul style="list-style-type: none">- Data and information, informational processes- Data classification and data types, information systems- Home assignment № 1	6
3-4	<ul style="list-style-type: none">- Basics of Data Storage Technologies- Database Development Process- Principles of Database Management- Home assignment № 2	6
5-6	<ul style="list-style-type: none">- Database management systems, database design, relational databases- Database Normal Forms- Home assignment № 3	8
7-8	<ul style="list-style-type: none">- Data warehouse architecture, data warehouse model- Data Mart- Data Lake	10

¹ Hours designed for Classroom sessions, Web-sessions, Home Assignments etc.

	- Home assignment № 4	
9-10	- OLTP and OLAP approaches - OLAP Classification - OLAP Cubes - Data Warehouse and Business Intelligence: Systems Architecture and OLTP vs. OLAP - Home assignment № 5	10
11-12	- Metadata and Common data warehouse meta-model - Classification scheme - Entity Relationship Diagram - Home assignment № 6	10
13-14	- Cloud computing, Service models (SaaS, PaaS, IaaS) - Grid computing - Home assignment № 7	10
15-16	- Data protection principles - Home assignment № 8	8
17-18	- Modern data storage and management systems	4

Assessment

Grade policy for both practical home assignments and the final exam is:

- Pass/Fail exam

The exam is taken orally. Each exam ticket consists of 2 theoretical questions from the list of exam questions.

The final grade includes grade for homework and exam in a ratio of 60:40.

Attendance Policy

Students are expected to attend classes regularly. However, occasional skipping classes is permissible if a student does all necessary in-class work at home.

Lecturer(s) and Tutors, Contact Information

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Core Reading

Book is available on-line in Elsevier at SFU library.

James O'Reilly, Network Storage, 1st Edition, Tools and Technologies for Storing Your Company's Data, Paperback ISBN: 9780128038635, eBook ISBN: 9780128038659, Imprint: Morgan Kaufmann, Published Date: 13th October 2016, Page Count: 280