

Obuda University John von Neumann Faculty of Informatics		Institute of Biomatics		
Name and code: <i>Database- and Big Data technologies (NIXABIEMNE)</i> Credits: 4				
<i>Computer Engineering MSc (English language) 2022/23 year 2. semester</i>				
Subject lecturer: Erick Alexander Noboa Castro				
Prerequisites (with code):				
Weekly hours:	Lecture: 2	Seminar.: 0	Lab. hours: 2	Consultation: 0
Way of assessment:	Homeworks & tests			
Course description:				
<i>Goal:</i> The aim of the lesson is to familiarize students with advanced database management concepts and procedure.				
<i>Course description:</i> Relational data models, relational algebra, SQL deep dive. Logical and physical data model, relations. RDBMS design, dependencies, constraints, normal forms, normalization. Triggers and constrains in SQL. Database fundamentals, instance definition, memory structures in db. Transactions. Index types, hashes. SQL tuning. NoSQL databases: types, concepts, architecture, queries. MongoDB and Cassandra. Introduction to Big data, Hadoop framework, Apache Spark. Streaming and batch processing in Spark.				

Schedule	
<i>Education week</i>	<i>Topic</i>
1.	Introduction. Knowledge assessment. Relational database systems. Advanced SQL exercises.
2.	Database architecture, Database instance. Advanced SQL exercises.
3.	Holiday (March 13 th)
4.	From SQL basics to advanced SQL. Execution plan, database tuning, access paths, indexes, join types, CBO statistics, selectivity, costs, materialization, pipelining. Execution plan analysis.
5.	From SQL basics to advanced SQL. Execution plan, database tuning, access paths, indexes, join types, CBO statistics, selectivity, costs, materialization, pipelining. Execution plan analysis.
6.	NoSQL databases. Cassandra: concepts, architecture, queries
7.	Holiday (April 10 th)
8.	NoSQL databases. MongoDB: concepts, architecture, queries
9.	NoSQL databases <i>practice</i> (Mongo DB, Casandra)
10.	Holiday (May 1st)
11.	Basics of Big data. Apache Spark. Spark in practice.
12.	Big Data: Stream processing + Cloud Technologies.
13.	NoSQL databases: concepts, types. Key-value stores. Redis: concepts, architecture, queries.
14.	Holiday (retake test) (May 29 th)

Midterm requirements

There will be two tests during the course:

1. test is on the 5th week. Topic: Relational databases, tuning. Theory and practise (40 points)
2. test is on the 13th week. Topic: Big data and Spark (10 points)

Prerequisite for obtaining a mid-year grade: students must pass both tests and all homework with at least 51% each.

Weekly summary of each lecture (20 points)*

Student has to solve a homework project in the topics of Cassandra, MongoDB and Spark (30 points)

A student who has missed more than 30% of the classes will not receive a mid-year grade.

(Student's participation during lectures is considered as part of the Homework.*

Final grade calculation methods

The final grade is formed from the project points and the tests points.

Achieved result	Grade
85%-100%	excellent (5)
74%-84<%	good (4)
63%-73<%	average (3)
51%-62<%	satisfactory (2)
0%-50%	failed (1)

Type of requirement

Homework project and tests

Type of replacement

In the 14th week for all of the tests.

References

Obligatory: Lecture notes (download form <https://elearning.uni-obuda.hu/>)

Recommended:

Elmasri, Navathe: Fundamentals of Database Systems

Other materials: -