Course Syllabus

Code - Course Title	**BVA106 - Database Technologies**
Course Type	II. SEMESTER
Laboratory + Practice	3+1
ECTS	**5.0**
Language of Instruction	Türkçe
Course Type	Required Courses
Course Instructor(s)	DOÇ. DR. ÖZER ÇELİK

Mode of Delivery	Face to face
Prerequisites	Basic Mathematical Knowledge
Courses Recomended	Basic Mathematical Knowledge
Recommended Resources	Faculty Recommendation
Work Placement	N/A

Course Syllabus

Weeks	Learning Outcomes	Topics	Teaching Methods
Week - 1		What is a database? Differences from file systems Database management systems (DBMS) The concepts of data, information, and metadata The role of databases in the context of big data	
Week - 2		Centralized, client–server, distributed databases Cloud-based database architectures OLTP and OLAP systems	
Week - 3		Entity-relationship (ER) diagrams Fundamentals of the relational model (tables, keys, relationships) The concept of normalization	
Week - 4		Introduction to SQL Data Definition Language (DDL) – CREATE, ALTER, DROP Data types and creating tables	
Week - 5		Data Manipulation Language (DML) – INSERT, UPDATE, DELETE Data Query Language (SELECT) WHERE, ORDER BY, GROUP BY, HAVING	
Week - 6		JOIN types (INNER, LEFT, RIGHT, FULL) Subqueries, creating VIEWS INDEX, TRIGGER, STORED PROCEDURE concepts	
Week - 7		Primary key, foreign key, UNIQUE, CHECK constraints Access control, user management SQL Injection and data security measures	
Week - 8		Query optimization Indexing strategies Performance issues in large data sets	
Week - 9		Transaction concept, ACID properties Concurrency control Backup, recovery, replication	
Week - 10		What is NoSQL, and why did it emerge? NoSQL database types: Key-Value, Document, Column, Graph RDBMS vs. NoSQL comparison	
Week - 11		Applications with MongoDB Fast data processing with Redis JSON-based data structures	

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Weeks	Learning Outcomes	Topics	Teaching Methods
Week - 12		Cassandra / HBase fundamentals Graph database applications with Neo4j Social networks, roadmaps, and relational analysis examples	
Week - 13		Data storage on Hadoop and HDFS Using Hive and HBase Data processing with Spark SQL	
Week - 14		Students develop a mini project based on SQL/NoSQL using a data set they select Evaluation from a big data analytics perspective General summary of the course and future technologies	

Learning Outcomes

#	Learning Outcome
1	Explains database structure and fundamental concepts; designs simple databases using the relational model, data modeling, and SQL fundamentals.
2	Performs data insertion, deletion, updating, and querying using SQL queries; performs complex data analysis using advanced SQL techniques.
3	Applies integrity, security, performance, and optimization principles in database management; develops solutions for problems encountered in big data environments.
4	Compares NoSQL database types (Key-Value, Document, Column, Graph); develops applications in systems such as MongoDB, Redis, Cassandra, or Neo4j and establishes integration with the big data ecosystem.

Sustainable Development Goals

No content has been provided.

Course Theme

No content has been provided.

AKTS Workload

Activity	Duration (Hour)	Count	Workload
Teorik Derse Katılım	0	0	0
Sınıf Dışı Çalışma (Ön Hazırlık & Pekiştirme Amaçlı)	0	0	0
Ödevler	0	0	0
Proje - Rapor - Sunum Hazırlama	0	0	0
Ara Sınav Hazırlığı (sınav süresi dahil)	0	0	0
Final Sınavı Hazırlığı (sınav süresi dahil)	0	0	0
Uygulama (Laboratuvar, Müzik/Enstrüman Uygulaması, Atölye/Saha Çalışması vb.)	0	0	0
Staj Uygulaması	0	0	0
		Calculated ECTS	**0**

Assessment Method and Passing Requirements

No content has been provided.