

Course number and name	END 317 / Database Management and Big Data
Credits, contact hours, categorization of credits	3 credits / 42 hours / Engineering topic
Instructor or course coordinator	Başar ÖZTAYŞI
Text book and other supplemental materials	<ul style="list-style-type: none"> • <i>Fundamentals of Database Systems</i>, 2016, Ramez Elmasri, Shamkant B. Navathe, Pearson • <i>Getting Started with NoSQL</i>, 2013, Gaurav Vaish • <i>Database Demystified</i>, 2010, McGrawHill • <i>NoSQL for Dummies</i>, 2015, Adam Fowler

Course information	
Content	Main concepts of relational databases and architecture, relational data model, data modelling, SQL (structured Query Language), data warehouse, ETL (extract, transform, load) tools, NoSQL databases, positioning NoSQL databases in organization, use cases, reports and visualization
Prerequisites	BIL100/BIL102/BIL104/BIL 105/BIL106/BIL110 Introduction to Scientific and Engineering Computing or MAT 115 Introduction to Programming Language
Type	Selected elective

Course learning outcomes
<p>Students who pass the course will:</p> <ol style="list-style-type: none"> I. Ability to read and design Entity Relationship Diagram II. Ability to understand, write and execute basic SQL commands III. Ability to design and use data warehouses V. Basic reporting skills V. Ability to evaluate the suitability of NoSQL databases that can be used in enterprises.

Student outcomes	Level of contribution
SO1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	Partial
SO2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	Partial
SO3. An ability to communicate effectively with a range of audiences.	Not applicable
SO4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	Not applicable
SO5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	Little
SO6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	Partial
SO7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	Not applicable

Week	Topics	Learning outcome(s)
1	Introduction to data, data base and other basic concepts	I
2	History of database systems and introduction to relational databases	I
3	Relational data models and data modelling	I, II
4	Basic SQL (Structured Query Language)	II
5	Advanced SQL: view, trigger, stored procedure	III
6	Introduction to data warehouse and ETL (Extract, Transform, Load)	III
7	Introduction to NoSQL and positioning NoSQL databases in organization	III, V
8	Key-Value NoSQL databases	V
9	Wide Column NoSQL databases	IV, V
10	Document based NoSQL databases	IV, V
11	Graph NoSQL databases	IV, V
12	Introduction to distributed data processing	IV, V
13	Applications of big data analytics	IV, V
14	Analysis of real-world applications	IV, V