Course number and name	END 305E / Data Analytics for Business
Credits, contact hours, categorization of credits	3 credits / 42 hours / Engineering topic
Instructor or course coordinator	Nizamettin BAYYURT, Mehmet Ali Ergün, Mehmet Yasin ULUKUŞ
Text book and other supplemental materials	• Vercellis, Carlo. *Business intelligence: data mining and optimization for decision making*. John Wiley & Sons, 2011. • Ustundag, A., Cevikcan, E., Beyca, Ö.F. (2022). *Business Analytics for Professionals*, 1st ed. Springer Cham

Course information	
Content	Data Mining Concepts, supervised learning, unsupervised learning, classification, regression, clustering, visualization, preparing a report.
Prerequisites	END 311E Statistics and END 201 Ind. Eng. Appl. In Python
Type	Required

Course learning outcomes

Students who pass the course will:
  I.   Know concept of the data mining.
  II.   Learn to prepare and clean raw data.
 III.   Learn classification, regression and clustering algorithms.
 IV.   Learn visualization methods.

Student outcomes	Level of contribution
SO1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	High
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.	Little
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.	High
SO7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	Partial

Week	Topics	Learning outcome(s)
1	Overview of Machine Learning Techniques	I, IV
2	Simple Linear Regression	I, II, III
3	Multiple Linear Regression	I, II, III
4	Assumptions in Linear Regression	I, II, III
5	Regularized Regression – Ridge and Lasso	I, II, III
6	Intro to Classification with k-Nearest Neighbors Method	I, IV
7	Classification with Naïve Bayes and Logistic Regression	I, II, III
8	Model Validation Techniques	I, II, III
9	Tree-Based Methods	I, II, III
10	Ensemble Learners	I, II, III
11	Intro to Clustering Methods – K-Means	I, IV
12	Hierarchical Clustering	I, II, III
13	Density Based Clustering Methods	I, II, III
14	Feature Transformation with Principal Component Analysis	I, II, III