Course Name	Course Code	semester	T + P	Credit	ECTS
Machine Learning			3+0	3	6

Prerequisite Courses	None

Language of Course	Turkish
Course class	Technical Elective
Coordinator of Course	Yrd.Doç.Dr. İbrahim Berkan AYDİLEK
Instructor	Yrd.Doç.Dr. İbrahim Berkan AYDİLEK
Course Assistant	
Objective of Course	This course will introduce some encryption (crypto) systems. The primary objective of this course is to provide cryptology to students who are interested in cryptography.
Course Learning Output	Students who have successfully completed this course: • Can list and describe short history submissions. • Describe and list the connections and practices of machine learning with other areas. • Learn basic algorithms and theory that constitute the structure of computational intelligence and machine learning. • Describe and apply appropriate machine learning techniques for classification, clustering, decision problems. • They can govern the principles, advantages, limitations and possible applications of machine learning.
Course Contents	Instance-Based Learning; Counseling and counseling without learning; Decision Trees; Bayesian Learning; Artificial Neural Networks: forward-feed learning and error correction; Supportive Learning; Simple Optimization; Evaluation of Learning Algorithms-Comparison-Use Together; Attribute Extraction-Selection and Dimension Reduction.

Weeks	Topics
1	Introduction to Machine Learning, Basic Terms, Counseling - Non-counseling Learning, Data Preparation, Cross Validity, Extreme Education
2	Distance based grouping, Similarity & Distance, Distance Measures, K-means clustering, K-NN classifier
3	Entropy, Decision Trees (ID3 and C4.5 algorithms), Classification and Regression Trees
4	Probability and Conditional Probability, Bayes Theorem, Naive Bayes Classifier, Categorical and Numerical Data
5	Linear Regression, Multiple Linear Regression, Least Squares Method, Thresholding and Competitive Classification
6	Introduction to Artificial Neural Networks, Single Layer YSAs, Sensor, Adaline, Smallest Mean Squares
7	Back-Propagation Algorithm, Multilayer Sensor, Stop Training Criteria
8	MIDTERM

9	Re-learning, Q-Learning, TD-Learning, Learning Vector Shredding (LVQ) Networks, LVQ2, LVQ-X
10	Mapping, Diametral Based Functions (RBF), RBF Networks
11	Lagrange Method, Lagrange Coefficient Optimization, Support Vector Machines (SVM), Quadratic Programming
12	Feature Extraction and Selection, Dimension Reduction,
13	Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA)
14	Curve fitting and MATLAB application.
15	FINAL EXAM

General Sufficiency
The ability of students to design algorithms by machine learning is important in evaluating software with this in-language programming language.
References
• T. Mitchell, "Machine Learning", McGraw-Hill, 1997. • C. M. Bishop, "Pattern Recognition and Machine Learning", Springer, 2007. • S. Haykin, "Neural Networks and Learning Machines", Prentice Hall, 2008. • R. O. Duda, Pattern Classification, Wiley-Interscience, 2000. • E. Öztemel, "Yapay Sinir Ağları", Papatya Yayıncılık, 2003. • Y. Özkan, "Veri Madenciliği Yöntemleri", Papatya Yayıncılık, 2008.
Assessment
Midterm exam: 40%, Final exam: 60%; Project or homework evaluations may be made at the beginning of the semester.