COMP 421 (01) INTRODUCTION TO MACHINE LEARNING

Fall 2018

1. Course Information

Instructor:	Mehmet Gönen, mehmetgonen@ku.edu.tr
KU Credits:	3.00
ECTS Credits:	6.00
Prerequisite(s):	Prerequisite: MATH 107 and 203 and ENGR 200 AND COMP 110 or 120 or 130
Class Location & Meeting Times:	ENG Z50 - Monday, Wednesday 10:00-11:15
PS (Yes/No):	Yes
DS (Yes/No):	No
Lab (Yes/No):	No
Language of Instruction:	English
Office Hours:	ENG 118 - Monday, Wednesday 13:00-14:15

Teaching Assisstant(s):

	E-Mail	Phone	Office - Office Hours
•Cigdem Ak	CAK14@KU.EDU.TR		
•Veli Oğuzalp Bakir	VBAKIR@KU.EDU.TR		
•Angi Ghanem	AGHANEM15@KU.EDU.TR		
•Arezou Rahimi	ARAHIMI14@KU.EDU.TR		
•Jan Fehmi Sayilgan	JSAYILGAN14@KU.EDU.TR		

2. Course Description

A broad introduction to machine learning covering regression, classification, clustering, and dimensionality reduction methods; supervised and unsupervised models; linear and nonlinear models; parametric and nonparametric models; combinations of multiple models; comparisons of multiple models and model selection.

3. Course Overview

Machine learning uses interdisciplinary techniques such as statistics, linear algebra, optimization, and computer science to create automated systems that can process large volumes of data to make predictions or decisions without explicit human intervention. This course (a) introduces students to a broad range of machine learning algorithms to prepare them for research/industry applications, (b) shows them how to combine multiple algorithms to obtain better results, and (c) shows them how to assess the performance of the algorithms.

4. Course Learning Outcomes (CLOs):

CLO #   **Upon sucessful completion of this course, students will be able to**…

CLO #	Upon sucessful completion of this course, students will be able to…
1	comprehend the core differences in analyses enabled by regression, classification, clustering, and dimensionality reduction algorithms.
2	select the appropriate machine learning algorithms for real-life applications.

3   assess the model quality in terms of relevant performance/error metrics for each application.
4   apply machine learning algorithms to real-life problems and optimize the models learned.

5. Assessment Methods

Method	Description	Weight %
Homework	Homeworks	40.00
Midterm Exam	Midterm Exam	20.00
Final Exam	Final Exam	40.00
	Total:	100.00

6. Instructional Material and Learning Resources

- Introduction to Machine Learning, Edition: 3rd (ISBN: 978-0-262-028189)
  - **Author:**   Ethem Alpaydın
  - **Publisher:**   The MIT Press (Year: 2014)
  - **Material Type:**   Textbook
  - **Material Status:**   Required

- Active Use of Course Page on Blackboard: https://ku.blackboard.com/

- KOLT Tutoring: No Service Available

7. Course Schedule

Meeting Times	Subject
SEP 17	Introduction (Chapter 1)
SEP 19	Supervised Learning (Chapter 2)
SEP 24	Parametric Methods (Chapter 4)
SEP 26	Parametric Methods (Chapter 4)
OCT 1	Multivariate Methods (Chapter 5)
OCT 3	Linear Discrimination (Chapter 10)
OCT 8	Linear Discrimination (Chapter 10)
OCT 10	Multilayer Perceptrons (Chapter 11)
OCT 15	Multilayer Perceptrons (Chapter 11)
OCT 17	Multilayer Perceptrons (Chapter 11)
OCT 22	Multilayer Perceptrons (Chapter 11)
OCT 24	Nonparametric Methods (Chapter 8)
OCT 29	NO LECTURE
OCT 31	Nonparametric Methods (Chapter 8)
NOV 5	Decision Trees (Chapter 9)
NOV 7	Decision Trees (Chapter 9)

NOV 12	Kernel Machines (Chapter 13)
NOV 14	NO LECTURE
NOV 19	Kernel Machines (Chapter 13)
NOV 21	Kernel Machines (Chapter 13)
NOV 26	Dimensionality Reduction (Chapter 6)
NOV 28	Dimensionality Reduction (Chapter 6)
DEC 3	Clustering (Chapter 7)
DEC 5	Clustering (Chapter 7)
DEC 10	Combining Multiple Learners (Chapter 17)
DEC 12	Combining Multiple Learners (Chapter 17)
DEC 17	Design and Analysis of Machine Learning Experiments (Chapter 19)
DEC 19	Design and Analysis of Machine Learning Experiments (Chapter 19)

8. **Student Code of Conduct and Academic Grievance Procedure**

Student Code of Conduct

Statement on Academic Honesty with Emphasis on Plagiarism

Academic Grievance Procedure

9. **Course Policies**

10. **Other**