AGU Graduate School of Engineering and Science …………………………………………… Program

COURSE RECORD

Code	**BENG622**
Name	**Machine Learning**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate
Semester	Fall/Spring
Type	Elective
Location	
Prerequisites	
Special Conditions	
Coordinator(s)	Assist. Prof. Dr. Müşerref Duygu Saçar Demirci
Webpage	
Content	The course presents an introduction to popular machine learning approaches. The key processes in machine learning will be covered: common classification methods like SVM and Decision Tree and approaches like hierarchical clustering will be analyzed in detail. Through a course project, the students will apply a few machine learning software on a real problem.
Objectives	- Explaining the basic concepts of Machine Learning. - Using machine learning approaches accurately. - To gain experience of analyzing real biological data. - Improving skills in independent study and research.
Learning Outcomes	Students will be, LO1 Able to describe machine-learning concepts. LO2 Able to describe classification and clustering methods. LO3 Able to describe performance evaluation. LO4 Able to design processes on big data sets. LO5 Able to design a machine learning workflow to solve a real problem.
Requirements	
Reading List	
Ethical Rules and Course Policy	

LEARNING ACTIVITIES

Activities	Number	Weight (%)
Lecture	12	40%
Group Works	2	30%
Presentations	2	25%
Site Visits	1	5%
	Total	100

ASSESSMENT

Evaluation Criteria	Weight (%)
Group Project Assignments & Presentations	90%
Attendance/Participation	10%
Total	100%

For a detailed description of grading policy and scale, please refer to the website https://goo.gl/HbPM2y section 28.

COURSE LOAD

Activity	Duration (hour)	Quantity	Work Load (hour)
In class activities	3	14	42
Group work	8	14	112
Research (web, library)	3	14	42
Required Readings	4	14	56
Pre-work for Presentation	25	2	50
		General Sum	**302**

ECTS: 7,5 (Work Load/25-30)

CONTRIBUTION TO PROGRAMME OUTCOMES*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
LO1	5	5	5	5	4	4	3	3						
LO2	5	5	5	5	4	4	3	3						
LO3	5	5	5	5	4	4	3	3						
LO4	5	5	5	5	4	4	3	3						
LO5	5	5	5	5	5	5	3	3						

* Contribution Level: 0: None, 1: Very Low, 2: Low, 3: Medium, 4: High, 5: Very High

WEEKLY SCHEDULE

W	Topic	Outcomes
1	Introduction to Machine Learning Lab/Activity: machine learning definition, goals, concepts	LO1
2	Regression I Lab/Activity: linear regression with one variable	LO2
3	Regression II Activity: linear regression with multiple variables	LO2
4	Regression III Activity: Logistic regression	LO2
5	Supervised Learning Activity: basic classification concepts	LO2
6	Classification I Activity: Decision Tree	LO2
7	Classification II Activity: SVM	LO2
8	Clustering I Activity: basic issues in clustering, partitioning methods: k-means, expectation maximization (EM)	LO2
9	Student Presentations Activity: students will present a research article	LO5
10	Clustering II Activity: hierarchical methods	LO2
11	Performance Evaluation Activity: training, testing, performance evaluation, cross-validation	LO3
12	Dimensionality Reduction Activity: PCA, SVD	LO4
13	Mining Real Data Activity: obtaining real data and demonstration of analysis using a software	LO5
14	Project Presentations Activity: students will present their term projects	LO5

Prepared by Müşerref duygu SAÇAR DEMİRCİ
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