ARTIFICIAL NEURAL NETWORKS

1	Course Title:	ARTIFICIAL NEURAL NETWORKS	
2	Course Code:	EEM4420	
3	Type of Course:	Optional	
4	Level of Course:	First Cycle	
5	Year of Study:	4	
6	Semester:	8	
7	ECTS Credits Allocated:	4.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:	-	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Doç. Dr. NEYİR ÖZCAN SEMERCİ	
15	Course Lecturers:	-	
16	Contact information of the Course Coordinator:	E-posta:neyir@uludag.edu.tr Tel: (224) 294 06 50 Adres: Elektronik Mühendisliği Bölümü 5. Kat, No:540	
17	Website:		
18	Objective of the Course:	The aim of this course is teaching sufficient theorical and practical knowledge about artificial neural networks.	
19	Contribution of the Course to Professional Development:	Gain the sufficient theorical and practical knowledge about artificial neural networks.	
20	Learning Outcomes:		
		1	To be able to model and solve problems with artificial neural networks using toerical and practical knowledge.
		2	Gain the ability to identify, model, and solve complex engineering problems to select and apply appropriate analysis and modelling methods for artificial neural network problems.
		3	Acquiring the ability to design partly or fully with artificial neural networks for a complex system, process meeting specific requirements under realistic constraints and conditions.
		4	To be able to develop, select, and use modern techniques and tools efficiently using information technologies for artificial neural network applications.
		5	Gain the ability to design and conduct complex experiments and to collect, analyze and interpret data for artificial neural network engineering problems.
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21	Course Content:		
	Course Content:		

Week	Theoretical	Practice
1	Artifical Inteligence and Artificial Neural Networks	
2	Realizing Artificial Neural Networks.	
3	Realizing Artificial Neural Networks: McCulloch-Pitts Model,	
4	Activation functions	
5	Models Artificial Neural Networks: Feedforward Neural networks, feedback neural networks	
6	Learning for Artificial Neural Network: Supervised, Unsupervised, Reinforcement Learning	
7	Neural Network Learning Rules: Hebbian Learning Rule, Perceptron Learning Rule, Delta Learning Rule	
8	Neural Network Learning Rules: Widrow-Hoff Learning Rule, Correlation Learning Rule, Winner-Take-All Learning Rule, Outstar Learning Rule	
9	Multilayer Feedforward Networks, XOR problem	
10	Backpropogation Algorithm	
11	Evaluation of network performance in artificial neural networks	
14	CNNs, Kohen-Grossberg, Cognitron networks	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	2.00	28.00
Homeworks	0	0.00	0.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	25.00	25.00
Others	0	0.00	0.00
Final Exams	1	30.00	30.00
Total Work Load			150.00
Total work load/ 30 hr			4.17
ECTS Credit of the Course			4.00

22	Textbooks, References and/or Other Materials:	1. M. Jacek Zurada, , Introduction to Artificial Neural Systems, West Publishing Company, 1992. Foundation (2nd Edition), Prentice-Hall, 1998 3. L.O. Chua, T. Roska, Cellular Neural Networks and Cambridge University Press, 2002. 4. Ç. Elmas, Yapay Sinir Ağları, Seçkin Yayınevi, 2003. Boğaziçi Üniv., 2000. 6. A. Babaev, Bulanık Mantık ve Uygulamaları, Uludağ
23	Assesment	

TERM LEARNING ACTIVITIES	NUMBER	WEIGHT
Midterm Exam	1	40.00
Quiz	0	0.00
Home work-project	0	0.00
Final Exam	1	60.00
Total	2	100.00
Contribution of Term (Year) Learning Activities to Success Grade		40.00
Contribution of Final Exam to Success Grade		60.00
Total		100.00

Measurement and Evaluation Techniques Used in the Course	Measurement and evaluation is carried out according to the priciples of Bursa Uludag University Associate and Undergraduate Education Regulation.

24	**ECTS / WORK LOAD TABLE**

25	**CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS**															
	PQ1	**PQ2**	**PQ3**	**PQ4**	**PQ5**	**PQ6**	**PQ7**	**PQ8**	**PQ9**	**PQ10**	**PQ11**	**PQ12**	**PQ13**	**PQ14**	**PQ15**	**PQ16**
ÖK1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK2	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK3	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK4	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0
ÖK5	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	**1 very low**		**2 low**			**3 Medium**				**4 High**			**5 Very High**			