



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Artificial Neural Networks							
Course Code		MTK580		Course Level		Second Cycle (Master's Degree)			
ECTS Credit	7	Workload	175 (<i>Hours</i>)	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		Nowadays, the methods of artificial intelligence are widely used in computer science. Artificial neural networks (ANN) are very advantageous in most systems, especially in the systems which have very complex mathematical structures. In this course, the aim is to teach the fundamental ANN subjects and to develop some ANN applications.							
Course Content		Introduction to Artificial Intelligence and Machine Learning. Introduction to Artificial Neural Networks (ANNs). The basic structures of ANNs. Elementary Artificial Neural Networks. Supervised learning. Multilayer Perceptron. Reinforcement learning. Learning Vector Quantization (LVQ). Unsupervised learning. Adaptive Resonance Theory (ART). Recurrent Neural Networks and other networks. Hybrid ANN Models. Neural Network Hardware. Applications of ANN.							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Discussion, Individual Study					
Name of Lecturer(s)		Lec. Rifat ASLIYAN							

Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	30
Final Examination	1	50
Assignment	1	20

Recommended or Required Reading

1	Prof. Dr. Ercan Öztemel, Yapay Sinir Ağları (Artificial Neural Networks), Papatya Yayıncılık, 2003.
2	T. Khana, Foundations of Neural Networks, Addison-Wesley Publishing Comp., 1990.
3	L. H. Tsoukalas, R. E. Uhrig, Fuzzy and Neural Approaches in Engineering, John Wiley & Sons, Inc. , 1997.

Week	Weekly Detailed Course Contents	
1	Theoretical	Introduction to Artificial Intelligence and Machine Learning
	Preparation Work	Read the pages 13-28 from the Course Book 1.
2	Theoretical	Introduction to Artificial Neural Networks (ANNs)
	Preparation Work	Read the pages 29-42 from the Course Book 1.
3	Theoretical	The basic structures of ANNs
	Preparation Work	Read the pages 45-57 from the Course Book 1.
4	Theoretical	Elementary Artificial Neural Networks
	Preparation Work	Read the pages 59-74 from the Course Book 1.
5	Theoretical	Supervised learning. Multilayer Perceptron
	Preparation Work	Read the pages 75-113 from the Course Book 1.
6	Theoretical	Reinforcement learning. Learning Vector Quantization (LVQ)
	Preparation Work	Read the pages 115-135 from the Course Book 1.
7	Theoretical	Unsupervised learning. Adaptive Resonance Theory (ART)
	Preparation Work	Read the pages 137-162 from the Course Book 1.
8	Theoretical	Recurrent Neural Networks and other networks
	Preparation Work	Read the pages 165-176 from the Course Book 1.
9	Preparation Work	Read all subjects again.
	Intermediate Exam	MIDTERM EXAM
10	Theoretical	Recurrent Neural Networks and other networks
	Preparation Work	Read the pages 176-185 from the Course Book 1.
11	Theoretical	Hybrid ANN Models
	Preparation Work	Read the pages 188-195 from the Course Book 1.
12	Theoretical	Neural Network Hardware



12	Preparation Work	Read the pages 198-201 from the Course Book 1.
13	Theoretical	Applications of ANN
	Preparation Work	Read the pages 203-206 from the Course Book 1.
14	Theoretical	Applications of ANN
	Preparation Work	Read the pages 206-210 from the Course Book 1.
15	Theoretical	Applications of ANN
16	Preparation Work	Read all subjects again.
	Final Exam	FINAL EXAM

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	3	3	84
Assignment	1	10	2	12
Midterm Examination	1	32	2	34
Final Examination	1	43	2	45
Total Workload (Hours)				175
[Total Workload (Hours) / 25*] = ECTS				7

*25 hour workload is accepted as 1 ECTS

Learning Outcomes

1	To be able to recognize the artificial neural network (ANN) concepts.
2	To be able to design ANN with supervised, unsupervised and reinforcement learning.
3	To be able to design multilayer perceptron, Learning Vector Quantization (LVQ), Adaptive Resonance Theory (ART), Recurrent Neural Networks and other networks.
4	To be able to develop some applications with ANN.
5	To be able to gain the skill of interpreting some interrelations among these concepts

Programme Outcomes (Mathematics Master)

1	To be able to have an adequate theoretical and practical domain knowledge.
2	To be able to comprehend the interdisciplinary interaction associated with Mathematics.
3	To be able to use theoretical and practical domain knowledge gained in the field of Mathematics.
4	To be able to interpret knowledge from different disciplines integrating knowledge in the field of mathematics and produce new information.
5	To be able to define, analyse, model and to solve the problems by scientific methods in Mathematics.
6	To be able to conduct a math related specialistic study independently.
7	To be able to develop new strategic approaches to solve problems occurred in unforeseen and complex math-related applications by taking responsibility.
8	To be able to lead in situations that require solving problems related to the mathematics.
9	To be able to criticize his/her knowledge and skills acquired in the field mathematics.
10	To be able to transfer his/her ideas and suggestions for solutions to problems by supporting quantitative or qualitative data verbally and in writing.
11	To be able to communicate both orally and written in a foreign language.
12	To be able to use computer hardware and information technologies with software required by Mathematics.
13	To be able to contribute to the solution of the social, scientific, cultural and ethical problems related to the Mathematics, and being able to support the development of social, scientific, cultural and ethical values.
14	To be able to develop mathematics-related strategies, policies and operational plans, and to evaluate the results obtained within the framework of quality processes.
15	To be able to use his/her knowledge in the field of mathematics and practical problem-solving skills in interdisciplinary studies.

Contribution of Learning Outcomes to Programme Outcomes 1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High

	L1	L2	L3	L4	L5
P1	4	5	5	5	5
P2	3	4	4	4	4
P3	2	3	4	4	4
P7	3	4	4	4	4
P12	3	3	4	4	4



P15	2	3	3	3	3
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