



الجامعة الافتراضية السورية
SYRIAN VIRTUAL UNIVERSITY

Course Definition File

Neural Networks and Fuzzy Logic

Information

Technology

Engineering



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Ministry of Higher Education		وزارة التعليم العالي
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1. Basic Information:

Course Name	Neural Networks and Fuzzy Logic
Course ID	ANN601
No. of Recorded Sessions*	12
No. of Synchronized Sessions*	12
No. of Quizzes (hrs.)	None
Exam (hrs.)	1.5
Registered Sessions Work Load (hrs.)	36
Synchronized Sessions Work Load (hrs.)	48
Credit Hours	6

* The duration of each session 1.5 hr

2. Pre-Requisites:

Course	ID
Artificial Intelligence	BAI501
Artificial Algorithms	BIA601

3. Course Objectives:

This course is an important and necessary complement to the basic courses of Artificial Intelligence. The course introduces the basic concepts in the sciences of neural networks and fuzzy logic. It aims to provide the students with the basic knowledge related to the automated processing of information through the use of fuzzy logic methods and artificial neural networks, and the application of these methods to real data sets for real problems.

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4. Learning Outcomes (LO):

Upon completion of the course, the student must:

- Recognize the methods of processing information using the theory of fuzzy logic.
- Learn about artificial neural network techniques and how to use them to build different models and systems.
- Design a system based on the concept of fuzzy sets, and characterize its input and output,
- The ability to configure data sets to train neural networks and evaluate their performance.

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5. Assessment Results:

Chapter No.	Chapter Title	Intended Objectives	Assessment Type				
			Developed content/ Recorded Sessions	Practical Activities (Synchronized Sessions)	Quizzes and Exams	Presentations And Interviews	Reports
CH1	Introduction to Artificial Neural Networks	Comprehension –Analytical Thinking	X		X		
CH2	Stochastic Gradient Descent (SGD)	Comprehension –Analytical Thinking	X		X		
CH3	Feed Forward and Back Propagation procedures	Comprehension –Analytical Thinking –Tools And Application Hands– On	X	X	X	X	X
CH4	Some Advanced Architectures of Deep	Comprehension –Analytical Thinking –Tools And Application Hands– On	X	X	X	X	X

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Syrian Virtual University		الجامعة الافتراضية السورية

	Neural Networks						
CH5	Introduction to Fuzzy Logic	Comprehension –Analytical Thinking	X		X		
CH6	Fuzzy Sets and Membership Functions	Comprehension –Analytical Thinking	X		X		
CH7	Operations of Fuzzy Sets and Linguistic Variables	Comprehension –Analytical Thinking –Tools And Application Hands– On	X	X	X	X	X
CH8	Fuzzy Rules and De–fuzzification	Comprehension –Analytical Thinking –Tools And Application Hands– On	X	X	X	X	X

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6. Course Syllabus

Chapter No.	Chapter Title	Chapter Content (Syllabus)	No. of Theoretical Learning Units	No. of Practical Learning Units)
CH1	Introduction to Artificial Neural Networks	<ol style="list-style-type: none"> 1. Definition of Artificial Neural Networks 2. Neural Networks and Human Perception 3. History of Artificial Neural Networks 	1	0
CH2	Stochastic Gradient Descent (SGD)	<ol style="list-style-type: none"> 1. Stochastic Gradient Descent (SGD) 2. Applying SGD in Neural Networks 	1	0
CH3	Feed Forward and Back Propagation procedures	<ol style="list-style-type: none"> 1. Feed Forward procedure 2. Back Propagation procedure 3. Code Python of Back Propagation procedure 	1	1
CH4	Some Advanced Architectures of Deep	<ol style="list-style-type: none"> 1. Concepts of Deep Learning 2. Some Advanced Architectures of Deep Learning 3. Some Architectures of Deep Learning 	1	1

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Syrian Virtual University		الجامعة الافتراضية السورية

	Neural Networks			
CH5	Introduction to Fuzzy Logic	<ol style="list-style-type: none"> 1. Introduction to Fuzzy Logic 2. Definition and History of fuzzy logic 	1	0
CH6	Fuzzy Sets and Membership Functions	<ol style="list-style-type: none"> 1. Definition of fuzzy sets 2. Membership functions 	1	0
CH7	Operations of Fuzzy Sets and Linguistic Variables	<ol style="list-style-type: none"> 1. Operations of fuzzy sets 2. Linguistic variables 	1	1
CH8	Fuzzy Rules and De-fuzzification	<ol style="list-style-type: none"> 1. Fuzzy rules (Reasoning) 2. De-fuzzification 	1	1

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7. Practical Activity:

- Tools and Labs:

Tool Name	Description
Matlab	A tool and development environment for engineering and mathematical applications
PyCharm	Integrated development environment in Python

Practical Activities per Chapters:

Chapter	Practical Activity	Remarks
CH1	<ul style="list-style-type: none"> . Exercises • Homework • Webinars • Project • Experiment • Other 	
CH2	<ul style="list-style-type: none"> . Exercises • Homework • Webinars • Project • Experiment • Other 	

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CH3	Exercises Homework . Webinars • Project Experiment • Other	
CH4	Exercises Homework . Webinars • Project Experiment • Other	
CH5	. Exercises • Homework • Webinars • Project • Experiment • Other	
CH6	. Exercises • Homework • Webinars • Project • Experiment • Other	
CH7	Exercises	

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	Homework . Webinars • Project Experiment • Other	
CH8	Exercises Homework . Webinars • Project Experiment • Other	

8. References:

- [1] "Artificial Intelligence: A New Synthesis" N.J. Nilsson, 2001.
- [2] "An Introduction to Fuzzy Logic and Fuzzy Sets", James J. Buckley, Esfandiar Eslami / Springer 2002