Universidad Carlos III de Madrid

COURSE: Artificial Neural Networks								
DEGREE: Computer Science and Engineering						YEAR: 4	TERM: 1	
WEEKLY PROGRAMMING								
WEEK	SESSION	DESCRIPTION	GROUPS		SPECIAL ROOM FOR SESSION (Computer class room, audio-visual class room)	Inidicate YES/NO If the session needs 2 teachers: Maximum 4 sessions	WEEKLY PROGRAMMING FOR STUDENT		
			LECTURE	SEMINAR			DESCRIPTION	CLASS HOURS	HOMEWORK HOURS Maximum 7 H
1	1	Introduction to the course	X		On-line	NO	Reading the recommended literature	1,66	2
1	2	Unit 1: Introduction to Artificial Neural Networks Biological Foundations Computation Model Learning and Generalization History of Neural Networks		X	On-line	NO	Reading the recommended literature	1,66	
2	3	Unit 2. Early computation models (1) Simple Perceptron. Linear Classification Exercises	X		On-line	NO	Study the contents explained in the theoretical session Reading the recommended literature	1,66	4
2	4	Data Processing Presentation of Practice I		X	In-class	NO	Reading document about "Data Processing" Practice I	1,66	
3	5	Unit 2. Early computation models (2) Adaline. Linear Regression Exercises	X		On-line	NO	Study the contents explained in the theoretical session Reading the recommended literature Solve the proposed exercises	1,66	5
3	6			X				1,66	

		Guided work Practice I			On-line	NO	Practice I		
4	7	Unit 3. Multilayer Perceptron (1) Introduction Architecture Learning algorithm (I)	X		On-line		Study the contents explained in the theoretical session Reading the recommended literature Solve the proposed exercises	1,66	5
4	8	Guided work Practice I		X	On-line	YES	Practice I	1,66	
5	9	Unit 3. Multilayer Perceptron (2) Learning algorithm (II) Learning Process Learning characteristics	X		On-line	NO	Study the contents explained in the theoretical session Reading the recommended literature Solve the proposed exercises	1,66	5
5	10	Guided work Practice I Guide lines for the Practice report		X	In-class	NO	Practice I Report for Practice I	1,66	
6	11	Unit 3. Multilayer Perceptron (3) Non Linear Classification and Regression Exercises	X		On-line	NO	Study the contents explained in the theoretical session Reading the recommended literature Solve the proposed exercises	1,66	5
6	12	Guided work Practice I		X	On-line	NO	Practice I Report for Practice I	1,66	
7	13	Unit 4: Unsupervised learning (1) Basic characteristics Kohonen self-organizing maps	X		On-line	NO	Study the contents explained in the theoretical session Reading the recommended literature Solve the proposed exercises	1,66	6
7	14	Finnish Practice I		X	On-line	YES	Finnish Practice I and the report. Deliver of Practice I	1,66	
8	15	Unit 4: Unsupervised learning (2) Other clustering algorithms Exercises	X		On-line	NO	Study the contents explained in the theoretical session Reading the recommended literature Solve the proposed exercises	1,66	5
8	16	Presentation of Practice II		X	In-class	NO	Practice II	1,66	
9	17	Unit 6. Introduction to Deep Learning (1)	X		On-line	NO		1,66	5

Week	Session	Content			Mode	Eval	Student work	Hours	Credits
		Vanishing Gradient Problem. Some solutions					Study the contents explained in the theoretical session Reading the recommended literature		
9	18	Guided work Practice II		X	On-line	NO	Practice II	1,66	
10	19	Partial Test Preparation	X		On-line	NO	Study for Partial Test	1,66	6
10	20	Partial Test		X	In-class	NO	Practice II	1,66	
11	21	Unit 6. Introduction to Deep Learning (2) Convolutional Neural Networks (CNN) Hyper-parameters of CNNs Examples of application of the CNN	X		On-line	NO	Study the contents explained in the theoretical session Reading the recommended literature Solve the proposed exercises	1,66	5
11	22	Guided work Practice II		X	On-line	YES	Practice II	1,66	
12	23	Unit 5. Radial Basis Neural Networks (1) Introduction Architecture Learning method (1)	X		On-line	NO	Study the contents explained in the theoretical session Reading the recommended literature	1,66	5
12	24	Guided work Practice II Guide lines for the Practice report		X	In-class	NO	Practice II Report for Practice II	1,66	
13	25	Unit 5. Radial Basis Neural Networks (2) Learning method (2) Radial basis networks versus multi-layer perceptron Exercises	X		On-line	NO	Study the contents explained in the theoretical session Reading the recommended literature Solve the proposed exercises	1,66	5
13	26	Guided work Practice II		X	On-line	NO	Practice II Report for Practice II	1,66	
14	27	Unit 7. Introduction to Recurrent Neural Networks 7.1 Basic Concepts 7.2 Some recurrent neural network architectures 7.3 Time Series Prediction	X		On-line	NO	Study the contents explained in the theoretical session Reading the recommended literature	1,66	6

14	28	Finnish Practice II	X		On-line	YES	Finnish Practice II and the report. Deliver of Practice II	1,66	
SUBTOTAL								**48,14 + 69 = 117,14**	
15		Tutorials						3	
16-18		Assessment						**3**	26
								6	26
TOTAL								**149,14**	