Tamkang University Academic Year 114, 1st Semester Course Syllabus

Course Title	NEURAL NETWORK		Instructor	YING-NONG CHEN
Course Class	TEIEM1A MASTER'S PROGRAM IN INTELLIGENT COMPUTING AND APPLICATION, DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION		Details	◆ General Course ◆ Selective ◆ One Semester ◆ 3 Credits
Relevance to SDGs	ENGINEERING, 1A SDG9 Industry, Innovation, and Infrastructure			

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Ⅰ. Cultivate the ability to conduct independent research and problem solving.

Ⅱ. Strengthen creativity and research capacity.

Ⅲ. Build profound professional knowledge in networking and communication.

Ⅳ. Engage in self-directed lifelong learning.

Subject Departmental core competences

A. Independent problem solving ability.(ratio:20.00)

B. Independent innovative thinking ability.(ratio:20.00)

C. Research paper writing and presentation ability.(ratio:20.00)

D. Research &development (R&D) ability in networking and communication.(ratio:15.00)

E. Project execution and control ability.(ratio:5.00)

F. Lifelong self-directed learning ability.(ratio:20.00)

Subject Schoolwide essential virtues

1. A global perspective. (ratio:10.00)

2. Information literacy. (ratio:20.00)

3. A vision for the future. (ratio:10.00)

4. Moral integrity. (ratio:10.00)

5. Independent thinking. (ratio:10.00)

6. A cheerful attitude and healthy lifestyle. (ratio:10.00)

7. A spirit of teamwork and dedication. (ratio:20.00)

8. A sense of aesthetic appreciation. (ratio:10.00)

	Course Introduction	In this course, some feature extraction methods will be introduced, such as Principle Component Analysis, Linear Discriminant Analysis. Then, the detailed principles about the back propagation neural networks will be introduced. And,please notice that we have to implement many algorithms mentioned above by Matlab. Therefore, students without any programming background and skills, do not take this course.

The correspondences between the course's instructional objectives and the cognitive, affective, and psychomotor objectives.

Differentiate the various objective methods among the cognitive, affective and psychomotor domains of the course's instructional objectives.

I. Cognitive : Emphasis upon the study of various kinds of knowledge in the cognition of the course's veracity, conception, procedures, outcomes, etc.
II.Affective : Emphasis upon the study of various kinds of knowledge in the course's appeal, morals, attitude, conviction, values, etc.
III.Psychomotor: Emphasis upon the study of the course's physical activity and technical manipulation.

No.	Teaching Objectives	objective methods
1	Knowing the idea and algorithm of back propagation	Cognitive
2	Knowing the fundamental idea of back propagation neural networks	Cognitive
3	Knowing the fundamental idea of back propagation neural networks	Cognitive
4	Know the fundamental idea of backpropagation neural networks	Cognitive

The correspondences of teaching objectives : core competences, essential virtues, teaching methods, and assessment

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	AB	15	Lecture, Practicum	Discussion(including classroom and online), Practicum, Activity Participation
2	A	5	Lecture	Discussion(including classroom and online), Practicum
3	ABC	235	Lecture	Discussion(including classroom and online), Practicum
4	ABCDEF	12345678	Lecture	Discussion(including classroom and online), Practicum, Activity Participation

Course Schedule			
Week	Date	Course Contents	Note
1	114/09/15～114/09/21	Perceptron	
2	114/09/22～114/09/28	Perceptron	
3	114/09/29～114/10/05	Perceptron	
4	114/10/06～114/10/12	Optimization	
5	114/10/13～114/10/19	Optimization	
6	114/10/20～114/10/26	Optimization	
7	114/10/27～114/11/02	Back Propagation Neural Networks	
8	114/11/03～114/11/09	Hands on Practice	
9	114/11/10～114/11/16	Back Propagation Neural Networks	
10	114/11/17～114/11/23	Information Theory - Entropy	
11	114/11/24～114/11/30	Information Theory - Entropy	
12	114/12/01～114/12/07	Information Theory - Entropy	
13	114/12/08～114/12/14	Entropy Based Back Propagation Neural Networks	
14	114/12/15～114/12/21	Principle Component Analysis	
15	114/12/22～114/12/28	Linear Discriminant Analysis	
16	114/12/29～115/01/04	Hands on Practice	
17	115/01/05～115/01/11	Hands on Practice	
18	115/01/12～115/01/18	Hands on Practice	
Key capabilities	self-directed learning Problem solving		
Interdisciplinary	STEAM course (S:Science, T:Technology, E:Engineering, M:Math, A field:Integration of Art and Humanist)		

Distinctive teaching	Project implementation course
Course Content	Computer programming or Computer language (students have hands-on experience in related projects) AI application
Requirement	
Textbooks and Teaching Materials	Self-made teaching materials:Textbooks Name of teaching materials: "Neural Network Design (2nd Edition) (Hagan, Demuth, Beale, De Jesus) ISBN：9780971732117 " Using teaching materials from other writers:Presentations
References	
Grading Policy	◆ Attendance： 15.0 % ◆ Mark of Usual： % ◆ Midterm Exam：30.0 % ◆ Final Exam： 40.0 % ◆ Other〈Additional Project〉：15.0 %
Note	This syllabus may be uploaded at the website of Course Syllabus Management System at https://web2.ais.tku.edu.tw/csp or through the link of Course Syllabus Upload posted on the home page of TKU Office of Academic Affairs at http://www.acad.tku.edu.tw/CS/main.php. ※"Adhere to the concept of intellectual property rights" and "Do not illegally photocopy, download, or distribute." Using original textbooks is advised. It is a crime to improperly photocopy others' publications.