

Tamkang University Academic Year 113, 2nd Semester Course Syllabus

Course Title	AI DEEP NEURAL NETWORK APPLICATIONS AND IMPLEMENTATIONS	Instructor	ISAAC YIHJIA TSAI
Course Class	TEXBM1A INTERNATIONAL INTENSE MASTER'S PROGRAM IN AI INTELLIGENT MACHINERY AND SUSTAINABLE MANUFACTURING, COLLEGE OF ENGINEERING (ENGLISH-TAUGHT PRO, 1A	Details	◆ General Course ◆ Selective ◆ One Semester ◆ 3 Credits
Relevance to SDGs	SDG4 Quality education		
D e p a r t m e n t a l A i m o f E d u c a t i o n			
I . Educating students to possess the ability to apply AI in the field of intelligent machinery and manufacturing, while also fostering the capability to implement sustainable development goals. II. Training students to possess independent research and problem-solving skills, and to adhere to engineering ethics as professional engineers. III. Cultivating students' ability to discern international technology trends and engage in global communication and cooperation. IV. Developing students' abilities for lifelong learning and staying current with the times.			
S u b j e c t D e p a r t m e n t a l c o r e c o m p e t e n c e s			
A. AI Technology Application and Innovation Capabilities.(ratio:30.00) B. Intelligent Machinery and Manufacturing R&D Capabilities.(ratio:10.00) C. Independent Research and Problem-Solving Skills.(ratio:20.00) D. Sustainable Development Goals Implementation Skills.(ratio:10.00) E. International Communication and Cooperation Skills.(ratio:15.00) F. Proactive Lifelong Learning Skills.(ratio:15.00)			
S u b j e c t S c h o o l w i d e e s s e n t i a l v i r t u e s			
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

This course mainly discusses the implementation and application of deep learning networks.

The course start with the convolutional network for image classification and image processing.

After addressing image processing and recognition, we will explain how to transfer graphic styles and run examples of object detection network.

Then, the course will cover the generated adversarial network which is used to generate fictitious image contents.

Finally, the transformer architecture is introduced.

It is used to deal with sequence text or time series data.

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	Conforming the professional features of the departments	Cognitive

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

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	ABCDEF	12345678	Lecture	Discussion(including classroom and online)

Course Schedule

Week	Date	Course Contents	Note
1	114/02/17 ~ 114/02/23	An Introduction to Neural Networks	
2	114/02/24 ~ 114/03/02	Supervised learning	
3	114/03/03 ~ 114/03/09	Machine Learning with Shallow Neural Networks	
4	114/03/10 ~ 114/03/16	Deep neural network	

5	114/03/17 ~ 114/03/23	Loss function	
6	114/03/24 ~ 114/03/30	Training model	
7	114/03/31 ~ 114/04/06	Gradients and Initializatoin	
8	114/04/07 ~ 114/04/13	Measuring performance	
9	114/04/14 ~ 114/04/20	Regularization	
10	114/04/21 ~ 114/04/27	Midterm Exam Week	
11	114/04/28 ~ 114/05/04	Convolutional networks	
12	114/05/05 ~ 114/05/11	Residual networks	
13	114/05/12 ~ 114/05/18	Transformers	
14	114/05/19 ~ 114/05/25	Graph neural network	
15	114/05/26 ~ 114/06/01	Unsupervised Learning	
16	114/06/02 ~ 114/06/08	GANs	
17	114/06/09 ~ 114/06/15	Final Exam Week	
18	114/06/16 ~ 114/06/22	Review (iclass)	
Key capabilities		self-directed learning	
Interdisciplinary			
Distinctive teaching			
Course Content		Computer programming or Computer language (students have hands-on experience in related projects)	
Requirement			

Textbooks and Teaching Materials	Self-made teaching materials:Presentations Using teaching materials from other writers:Textbooks
References	
Grading Policy	<p>◆ Attendance : 20.0 % ◆ Mark of Usual : % ◆ Midterm Exam : 40.0 %</p> <p>◆ Final Exam : %</p> <p>◆ Other 〈Final report〉 : 40.0 %</p>
Note	<p>This syllabus may be uploaded at the website of Course Syllabus Management System at http://info.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.</p> <p>※ Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.</p>