Tamkang University Academic Year 113, 2nd Semester Course Syllabus

Course Title	MACHINE LEARNING(II)		Instructor	ZHU, ZHENG-AN
Course Class	TKFXB2A DEPARTMENT OF ARTIFICIAL INTELLIGENCE, 2A		Details	◆ General Course ◆ Required ◆ One Semester ◆ 2 Credits
Relevance to SDGs	SDG4 Quality education			

Departmental Aim of Education

Ⅰ. Students may analyze problems in applied science based on the fundamental knowledge of programming, mathematics, and artificial intelligence.

Ⅱ. Students may plan and implement an AI system following the procedures of problem analysis, experiment testing, data visualizing, derivation and deduction.

Ⅲ. Educate the students to be AI engineers who may accomplish their missions indepedently and may collaborate with their colleagues in the workplace.

Ⅳ. Students may have basic skills and global competence for career diversification, and may keep lifelong learning.

Subject Departmental core competences

A. Professional analysis.(ratio:30.00)

B. Practical application.(ratio:30.00)

C. Professional attitude.(ratio:30.00)

D. Global Mobility.(ratio:10.00)

Subject Schoolwide essential virtues

1. A global perspective. (ratio:5.00)

2. Information literacy. (ratio:30.00)

3. A vision for the future. (ratio:15.00)

4. Moral integrity. (ratio:5.00)

5. Independent thinking. (ratio:25.00)

6. A cheerful attitude and healthy lifestyle. (ratio:5.00)

7. A spirit of teamwork and dedication. (ratio:10.00)

8. A sense of aesthetic appreciation. (ratio:5.00)

	This course introduces the fundamental concepts and core techniques of machine learning, covering major areas such as supervised learning, unsupervised learning, and reinforcement learning. Key topics include classification, regression, dimensionality reduction, clustering, and ensemble learning, along with an introduction to neural networks, convolutional neural networks, and the basic principles of reinforcement learning.
Course Introduction	

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	Students will be able to understand the fundamental concepts of machine learning, build machine learning models, and apply machine learning techniques to solve real-world problems.	Cognitive

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

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	ABCD	12345678	Lecture, Discussion, Publication	Testing, Discussion(including classroom and online), Report(including oral and written)

Course Schedule			
Week	Date	Course Contents	Note
1	114/02/17 ~ 114/02/23	Ensemble Learning	
2	114/02/24 ~ 114/03/02	Ensemble Learning	
3	114/03/03 ~ 114/03/09	Machine Learning for Sentiment Analysis	
4	114/03/10 ~ 114/03/16	Regression Analysis	

5	114/03/17~114/03/23	Regression Analysis	
6	114/03/24~114/03/30	Clustering Analysis	
7	114/03/31~114/04/06	Clustering Analysis	
8	114/04/07~114/04/13	Multilayer Artificial Neural Network	
9	114/04/14~114/04/20	Midterm Exam/Midterm Assessment Week (teachers can adjust the week as needed)	
10	114/04/21~114/04/27	The Mechanics of PyTorch	
11	114/04/28~114/05/04	Convolutional Neural Networks	
12	114/05/05~114/05/11	Recurrent Neural Networks	
13	114/05/12~114/05/18	Transformers	
14	114/05/19~114/05/25	Reinforcement Learning	
15	114/05/26~114/06/01	Generative Adversarial Networks	
16	114/06/02~114/06/08	Final Project Presentation	
17	114/06/09~114/06/15	Final Exam/Final Assessment Week (teachers can adjust the week as needed)	
18	114/06/16~114/06/22	Flexible Teaching Week: Generally, no in-person classes; teachers may arrange teaching activities or final assessments, among other options.	

Key capabilities	self-directed learning Information Technology 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) Logical Thinking AI application

Requirement	100 minutes of this course are designated for instruction, while the professor will use the extra time flexibly depending on the situation.
Textbooks and Teaching Materials	Self-made teaching materials:Presentations Using teaching materials from other writers:Textbooks Name of teaching materials: Machine Learning with PyTorch and Scikit-Learn: Develop machine learning and deep learning models with Python
References	
Grading Policy	◆ Attendance： % ◆ Mark of Usual：10.0 % ◆ Midterm Exam： 20.0 % ◆ Final Exam： 50.0 % ◆ Other〈LAB CLASS〉：20.0 %
Note	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 . ※ **Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.**