Tamkang University Academic Year 114, 1st Semester Course Syllabus

Course Title	MACHINE LEARNING SPECIALIZATION	Instructor	HO THI TRANG
Course Class	TEIBM1A MASTER'S PROGRAM, DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION ENGINEERING (ENGLISH-TAUGHT PROGRAM), 1A	Details	◆ General Course ◆ Selective ◆ One Semester ◆ 3 Credits
Relevance to SDGs	SDG9 Industry, Innovation, and Infrastructure SDG11 Sustainable cities and communities		

Departmental Aim of Education

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

Ⅱ. Strengthen creativity and research capacity.

Ⅲ. Build profound professional knowledge in computer science and information engineering.

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 information engineering.(ratio:20.00)

E. Project execution and control ability.(ratio:10.00)

F. Lifelong self-directed learning ability.(ratio:10.00)

Subject Schoolwide essential virtues

1. A global perspective. (ratio:10.00)

2. Information literacy. (ratio:20.00)

3. A vision for the future. (ratio:20.00)

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:10.00)

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

Course Introduction	This course will teach you the fundamentals of machine learning and how to use these techniques to build real-world AI applications. It provides a broad introduction to modern machine learning, including supervised learning, unsupervised learning. This course does not require any prior Machine Learning experience. However, some knowledge of the Python programming language and high school math is necessary.

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	Build machine learning models in Python using popular machine learning libraries NumPy and scikit-learn.	Cognitive
2	Build and train supervised machine learning models for prediction and binary classification tasks, including linear regression and logistic regression.	Cognitive
3	Build and train a neural network with TensorFlow to perform multi-class classification.	Cognitive

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

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	ABD	278	Lecture, Discussion, Practicum	Study Assignments, Discussion(including classroom and online)
2	ACDEF	12357	Lecture, Discussion, Practicum	Study Assignments, Discussion(including classroom and online), Practicum
3	ABCE	46	Lecture, Discussion, Practicum	Study Assignments, Discussion(including classroom and online), Practicum

Course Schedule			
Week	Date	Course Contents	Note
1	114/09/15 ~ 114/09/21	Course introduction, introduction to machine learning	
2	114/09/22 ~ 114/09/28	Supervised learning, unsupervised learning, jupyter notebooks	In-class assignment
3	114/09/29 ~ 114/10/05	Linear regression with one variable	
4	114/10/06 ~ 114/10/12	Linear algebra review	In-class assignment
5	114/10/13 ~ 114/10/19	Linear regression with multiple variables	
6	114/10/20 ~ 114/10/26	Classification: logistic regression	
7	114/10/27 ~ 114/11/02	Classification: regularization	
8	114/11/03 ~ 114/11/09	Advanced learning algorithms: neural network	
9	114/11/10 ~ 114/11/16	Midterm Exam Week	Final project proposal
10	114/11/17 ~ 114/11/23	Advanced learning algorithms: neural network training	
11	114/11/24 ~ 114/11/30	Advice for applying machine learning(1)	In-class assignment
12	114/12/01 ~ 114/12/07	Advice for applying machine learning (2)	
13	114/12/08 ~ 114/12/14	Decision trees	
14	114/12/15 ~ 114/12/21	Clustering, dimensionality reduction	
15	114/12/22 ~ 114/12/28	Case study	
16	114/12/29 ~ 115/01/04	Final project presentation	
17	115/01/05 ~ 115/01/11	Final project presentation	
18	115/01/12 ~ 115/01/18	Flexible Teaching Week for Teachers	
Key capabilities			
Interdisciplinary			

Distinctive teaching	
Course Content	Computer programming or Computer language (students have hands-on experience in related projects) AI application
Requirement	
Textbooks and Teaching Materials	Using teaching materials from other writers:Textbooks Name of teaching materials: We will mainly use online resources as the teaching materials.
References	
Grading Policy	◆ Attendance： 10.0 % ◆ Mark of Usual： % ◆ Midterm Exam： 30.0 % ◆ Final Exam： 45.0 % ◆ Other〈Assignment〉：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.