Tamkang University Academic Year 113, 1st Semester Course Syllabus

Course Title	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	Instructor	CHUAN LI
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 SDG8 Decent work and economic growth		

Departmental Aim of Education

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.

Subject Departmental core competences

A. AI Technology Application and Innovation Capabilities.(ratio:40.00)

B. Intelligent Machinery and Manufacturing R&D Capabilities.(ratio:20.00)

C. Independent Research and Problem-Solving Skills.(ratio:20.00)

D. Sustainable Development Goals Implementation Skills.(ratio:5.00)

E. International Communication and Cooperation Skills.(ratio:10.00)

F. Proactive Lifelong Learning Skills.(ratio:5.00)

Subject Schoolwide essential virtues

1. A global perspective. (ratio:10.00)

2. Information literacy. (ratio:30.00)

3. A vision for the future. (ratio:5.00)

4. Moral integrity. (ratio:10.00)

5. Independent thinking. (ratio:30.00)

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

7. A spirit of teamwork and dedication. (ratio:5.00)

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

Course Introduction	Machine learning (ML) is a branch of artificial intelligence and computer science that focuses on using data and algorithms to enable AI to imitate the way that humans learn, progressively improving its accuracy via continuous implementation and data curation.

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	This course presents various topics based upon application-focused and hands-on approaches for students to learn basic ideas. Using numerous study cases, we aim to deliver students different topics with clear definitions, theorems, and methods.	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, Practicum	Testing, Study Assignments, Discussion(including classroom and online), Practicum, Report(including oral and written), Activity Participation

Course Schedule

Week	Date	Course Contents	Note

1	113/09/09 ~ 113/09/15	Introduction to machine learning;	
2	113/09/16 ~ 113/09/22	Data preparation;	
3	113/09/23 ~ 113/09/29	Modeling and evaluation;	
4	113/09/30 ~ 113/10/06	Basics of engineering data feature;	
5	113/10/07 ~ 113/10/13	A brief overview of probability;	
6	113/10/14 ~ 113/10/20	Bayesian concept of learning;	
7	113/10/21 ~ 113/10/27	Bayesian concept of learning;	
8	113/10/28 ~ 113/11/03	Supervised learning: classification;	
9	113/11/04 ~ 113/11/10	Supervised learning: classification;	
10	113/11/11 ~ 113/11/17	Supervised learning: regression;	
11	113/11/18 ~ 113/11/24	Supervised learning: regression;	
12	113/11/25 ~ 113/12/01	Unsupervised learning;	
13	113/12/02 ~ 113/12/08	Basics of neural networks;	
14	113/12/09 ~ 113/12/15	Basics of neural networks;	
15	113/12/16 ~ 113/12/22	Basics of deep learning;	
16	113/12/23 ~ 113/12/29	Basics of deep learning;	
17	113/12/30 ~ 114/01/05	Other types of learning; (Optional)	
18	114/01/06 ~ 114/01/12	Final	

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	USR curriculum

Course Content	Computer programming or Computer language (students have hands-on experience in related projects) AI application
Requirement	linear algebra and vector calculus
Textbooks and Teaching Materials	Self-made teaching materials:Textbooks, Presentations, Handouts Using teaching materials from other writers:Textbooks, Presentations, Handouts
References	
Grading Policy	◆ Attendance： 5.0 % ◆ Mark of Usual：25.0 % ◆ Midterm Exam： 20.0 % ◆ Final Exam： 25.0 % ◆ Other〈Mini Project〉：25.0 %
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.**