Course Title	ADVANCED MACHINE LEARNING ALGORITHMS	Instructor	CHEN, SHIH-HSIN
Course Class	TEIBM1A MASTER'S PROGRAM, DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION ENGINEERING (ENGLISH-TAUGHT PROGRAM),	Details	◆ General Course ◆ Selective ◆ One Semester

Relevance to SDGs	1A
	  SDG8 Decent work and economic growth
	  SDG9 Industry, Innovation, and Infrastructure		

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:10.00)

D. Research & development (R&D) ability in information engineering.(ratio:20.00)

E. Project execution and control ability.(ratio:20.00)

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: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 the research of the CSIE taught in this course, it may be necessary to solve the problems of image classification, object detection, image segmentation, prediction, classification, and optimization. Therefore, relevant research methods will be taught, and the required environment and implementation will be taught.

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	Image recognition, optimization problem, classification, prediction, deep learning, CPLEX, genetic algorithm	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)

Course Schedule

Week	Date	Course Contents	Note
1	111/02/21 ~ 111/02/25	Introduction	
2	111/02/28 ~ 111/03/04	Machine learning foundations	
3	111/03/07 ~ 111/03/11	Tutorial of deep learning	
4	111/03/14 ~ 111/03/18	Image Classification: the evolution of AlexNet to ResNet	

5	111/03/21~ 111/03/25	Object Detection Algorithms: YOLOv3 and YOLOv4	
6	111/03/28~ 111/04/01	Report: Literature review of image classification and object detection	
7	111/04/04~ 111/04/08	Spring festival	
8	111/04/11~ 111/04/15	Train object detection models and Orchid classification dataset	
9	111/04/18~ 111/04/22	Preparation of the image research and algorithm evaluations	
10	111/04/25~ 111/04/29	Midterm report	
11	111/05/02~ 111/05/06	Kneron edge computing	
12	111/05/09~ 111/05/13	Forecasting: LSTM	
13	111/05/16~ 111/05/20	Classification: XGBoost and decision tree	
14	111/05/23~ 111/05/27	Literature review of the forecasting and classification	
15	111/05/30~ 111/06/03	Optimization : Genetic Algorithm	
16	111/06/06~ 111/06/10	Preparation of the final report	
17	111/06/13~ 111/06/17	Final report	
18	111/06/20~ 111/06/24	Statistics: ANOVA	

Requirement	
Teaching Facility	Computer, Projector
Textbooks and Teaching Materials	Teaching material is designed by the lecturer
References	
Number of Assignment(s)	**5** (Filled in by assignment instructor only)
Grading Policy	◆ Attendance： 10.0 % ◆ Mark of Usual：20.0 % ◆ Midterm Exam： 35.0 % ◆ Final Exam： 35.0 % ◆ Other 〈 〉： %

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 .
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