Tamkang University Academic Year 109, 1st Semester Course Syllabus

Course Title	ADVANCED PROCESS ANALYSIS AND SIMULATION	Instructor	YANG, YAN-LING
Course Class	TEDXM1A MASTER'S PROGRAM, DEPARTMENT OF CHEMICAL AND MATERIALS ENGINEERING, 1A	Details	◆ Blended Course ◆ Selective ◆ One Semester ◆ 3 Credits

Departmental Aim of Education

Education Objectives: Cultivation of chemical/materials engineering experts with professional knowledge and high research-and-development capability.

Subject Departmental core competences

A. Possess the advanced knowledge of chemical/material engineering and to be able to use it. (ratio:50.00)

B. Capable to plan and execute the chemical/material engineering projects.(ratio:25.00)

D. Capable of creative thinking and solving problem independently.(ratio:25.00)

Subject Schoolwide essential virtues

3. A vision for the future. (ratio:10.00)

5. Independent thinking. (ratio:90.00)

Course Introduction	1. learn Python programming language 2. learn the basic concept of the machine learning 3. students will be an in-depth understanding of the basic concepts of statistical process/quality control. 4. students will understand the principles of multivariate statistical analysis and can apply the methods to practical problems. 5. students will implement industrial cases and data analysis using deep learning.

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	Learn Python programming language, basic machine learning principles, and deep learning network concepts, as well as implement factory case and data analysis.	Cognitive

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

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	ABD	35	Lecture, Discussion	Discussion(including classroom and online), Practicum, Report(including oral and written), 出席率

Course Schedule

Note for Blended Course : When utilizing weekly digital instruction, please fill in "Online Asynchronous Instruction".

Week	Date	Course Contents	Note
1	109/09/14 ~ 109/09/20	Introduction to Python/Keras and Machine Learning	
2	109/09/21 ~ 109/09/27	Python: An Informal Introduction to Python	
3	109/09/28 ~ 109/10/04	Python: More Control Flow Tools (I)	線上非同步教學
4	109/10/05 ~ 109/10/11	Python: More Control Flow Tools (II)	
5	109/10/12 ~ 109/10/18	Supervised Machine Learning	
6	109/10/19 ~ 109/10/25	Forward and Backward Propagation in Neural Networks	
7	109/10/26 ~ 109/11/01	Important considerations	
8	109/11/02 ~ 109/11/08	Convolutional Neural Networks	
9	109/11/09 ~ 109/11/15	Recurrent Neural Networks	
10	109/11/16 ~ 109/11/22	Midterm	

11	109/11/23 ~ 109/11/29	Keras: Dense Neural Network	
12	109/11/30 ~ 109/12/06	Keras: Convolutional Neural Network	
13	109/12/07 ~ 109/12/13	Keras: Recurrent Neural Network	
14	109/12/14 ~ 109/12/20	Unsupervised Machine Learning (I)	
15	109/12/21 ~ 109/12/27	Unsupervised Machine Learning (II)	
16	109/12/28 ~ 110/01/03	Unsupervised Machine Learning (III)	線上非同步教學
17	110/01/04 ~ 110/01/10	Final Report	
18	110/01/11 ~ 110/01/17	Final Report	

Requirement	
Teaching Facility	Computer, Projector
Textbooks and Teaching Materials	There will be no official textbook. Reading material will be provided on occasion and students are encouraged to explore related material.
References	D.M. Himmeblblau and K.B. Bischoff, "Process Analysis and Simulation"
Number of Assignment(s)	(Filled in by assignment instructor only)
Grading Policy	◆ Attendance： % ◆ Mark of Usual：20.0 % ◆ Midterm Exam： 30.0 % ◆ Final Exam： % ◆ Other〈Final Project〉：50.0 %
Note	1. This syllabus may be uploaded at the website of the Course Syllabus Management System at https://info.ais.tku.edu.tw/csp or through the link of the Course Syllabus Upload posted on the home page of the TKU Office of Academic Affairs http://www.acad.tku.edu.tw/CS/main.php 2. According to the Implementation regulations of distance education for junior college and above are prescribed pursuant to Article 2, "The distance learning course referred to in these Measures refers to more than one-half of the teaching hours in each subject." 3. According to the regulations of Tamkang University Enforcement Rules for digital teaching, Paragraph 2 and Article 3, the distance learning course of our school must be "The course of digital teaching with distance learning platform or synchronous video system in our school. Teaching Hours include course lectures, teacher-student interaction discussions, quizzes and other learning activities." 4. If there are any temporary course changes (including time changes and classroom changes of distance learning courses, blended courses), please make out an application according to regulations to the Office of Academic Affairs. **※ Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.**