Tamkang University Academic Year 106, 1st Semester Course Syllabus

Course Title	DATA MINING	Instructor	CHUN-HAO CHEN
Course Class	TEIBM1A MASTER'S PROGRAM, DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION ENGINEERING (ENGLISH-TAUGHT PROGRAM), 1A	Details	◆ Selective ◆ One Semester ◆ 3 Credits

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.

Departmental core competences

A. Independent problem solving ability.

B. Independent innovative thinking ability.

C. Research paper writing and presentation ability.

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

E. Project execution and control ability.

F. Lifelong self-directed learning ability.

Course Introduction	This course will introduce related techniques and applications of data mining, and the goal is to provide various approaches for students to solve different data analysis tasks. The contexts include association rule, clustering, classification, genetic algorithms and introducing to their applications. Finally, how to implement related techniques by Python are stated to enhance students' developing experiences.

The Relevance among Teaching Objectives, Objective Levels and Departmental core competences

I.Objective Levels (select applicable ones) :
 (i) Cognitive Domain   : C1-Remembering,   C2-Understanding,   C3-Applying,
                           C4-Analyzing,   C5-Evaluating,   C6-Creating
 (ii) Psychomotor Domain : P1-Imitation,   P2-Mechanism,   P3-Independent Operation,
                           P4-Linked Operation, P5-Automation,   P6-Origination
 (iii) Affective Domain : A1-Receiving,   A2-Responding,   A3-Valuing,
                           A4-Organizing,   A5-Charaterizing,   A6-Implementing

II.The Relevance among Teaching Objectives, Objective Levels and Departmental core competences :
 (i) Determine the objective level(s) in any one of the three learning domains (cognitive,
     psychomotor, and affective) corresponding to the teaching objective. Each objective should
     correspond to the objective level(s) of ONLY ONE of the three domains.
 (ii) If more than one objective levels are applicable for each learning domain, select the
     highest one only. (For example, if the objective levels for Cognitive Domain include
     C3,C5,and C6, select C6 only and fill it in the boxes below. The same rule applies to
     Psychomotor Domain and Affective Domain.)
 (iii) Determine the Departmental core competences that correspond to each teaching objective.
     Each objective may correspond to one or more Departmental core competences at a time.
     (For example, if one objective corresponds to three Departmental core competences: A,AD,
     and BEF, list all of the three in the box.)

No.	Teaching Objectives	Relevance	
		Objective Levels	Departmental core competences
1	Evolutionary Computation Techniques	C2	ABCDEF
2	Data Mining Techniques	C2	ABCDEF
3	Paper Study	C6	ABCDEF
4	The Future of Data Mining	C6	ABCDEF

Teaching Objectives, Teaching Methods and Assessment

No.	Teaching Objectives	Teaching Methods	Assessment
1	Evolutionary Computation Techniques	Lecture, Discussion, Simulation	Practicum, Report, Participation
2	Data Mining Techniques	Lecture, Discussion, Simulation	Practicum, Report, Participation
3	Paper Study	Discussion, Appreciation	Practicum, Report
4	The Future of Data Mining	Lecture, Discussion	Practicum, Report

This course has been designed to cultivate the following essential qualities in TKU students	
Essential Qualities of TKU Students	Description
◇ A global perspective	Helping students develop a broader perspective from which to understand international affairs and global development.
◆ Information literacy	Becoming adept at using information technology and learning the proper way to process information.
◇ A vision for the future	Understanding self-growth, social change, and technological development so as to gain the skills necessary to bring about one's future vision.
◇ Moral integrity	Learning how to interact with others, practicing empathy and caring for others, and constructing moral principles with which to solve ethical problems.
◆ Independent thinking	Encouraging students to keenly observe and seek out the source of their problems, and to think logically and critically.
◇ A cheerful attitude and healthy lifestyle	Raising an awareness of the fine balance between one's body and soul and the environment; helping students live a meaningful life.
◆ A spirit of teamwork and dedication	Improving one's ability to communicate and cooperate so as to integrate resources, collaborate with others, and solve problems.
◇ A sense of aesthetic appreciation	Equipping students with the ability to sense and appreciate aesthetic beauty, to express themselves clearly, and to enjoy the creative process.

Course Schedule

Week	Date	Subject/Topics	Note
1	106/09/18 ~ 106/09/24	Data Mining Overview	
2	106/09/25 ~ 106/10/01	Data Mining - Binary Association Rule Mining Techniques	
3	106/10/02 ~ 106/10/08	Data Mining - Fuzzy Association Rule Mining Techniques	
4	106/10/09 ~ 106/10/15	Data Mining - Hard Clustering	
5	106/10/16 ~ 106/10/22	Data Mining - Soft Clustering	
6	106/10/23 ~ 106/10/29	Data Mining - Regression Models	
7	106/10/30 ~ 106/11/05	Data Mining - Introduction of Classification	
8	106/11/06 ~ 106/11/12	Data Mining - Other Classification Models (SVM, ANN, etc.)	
9	106/11/13 ~ 106/11/19	Data Mining - Genetic Algorithms	
10	106/11/20 ~ 106/11/26	Midterm Examination	
11	106/11/27 ~ 106/12/03	Data Mining - Multi-Objective Genetic Algorithms	

12	106/12/04 ~ 106/12/10	Association Rule - Case study and implementation using Python	
13	106/12/11 ~ 106/12/17	Clustering - Case study and implementation using Python	
14	106/12/18 ~ 106/12/24	Classification - Case study and implementation using Python	
15	106/12/25 ~ 106/12/31	Paper Presentation	
16	107/01/01 ~ 107/01/07	Paper Presentation (Cont.)	
17	107/01/08 ~ 107/01/14	Paper Presentation (Cont.)	
18	107/01/15 ~ 107/01/21	Future of Data Mining	

Requirement	
Teaching Facility	Computer, Projector
Textbook(s)	Data Mining: Concepts and Techniques, Third Edition (The Morgan Kaufmann Series in Data Management Systems)
Reference(s)	
Number of Assignment(s)	2 (Filled in by assignment instructor only)
Grading Policy	◆ Attendance： 20.0 % ◆ Mark of Usual：20.0 % ◆ Midterm Exam： % ◆ Final Exam： % ◆ Other〈Paper Study & HW〉：60.0 %
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.**