Tamkang University Academic Year 107, 2nd Semester Course Syllabus

Course Title	FINANCIAL DATA ANALYTIC TECHNIQUES	Instructor	CHUN-HAO CHEN
Course Class	TEIXM1A MASTER'S PROGRAM, DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION ENGINEERING, 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	In this course, concepts, properties, progresses and advantages of financial data analytic techniques (FDAT) are introduced for providing different ways for students to solve problems. The goals of this course include two parts: (1) the spirit of FDAT; (2) related knowledge of FDAT. The topics include time series analysis, mean-variance model, portfolio optimization and trading strategies will introduce in this course.

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	Financial Data Analytic Techniques: Overview	C2	A
2	Financial Data Analytic Techniques: Basic Knowledge Review	C2	A
3	Financial Data Analytic Techniques: Techniques And Models	C2	A
4	Financial Data Analytic Techniques: Researches	C6	A
5	Paper Study	C6	A

Teaching Objectives, Teaching Methods and Assessment

No.	Teaching Objectives	Teaching Methods	Assessment
1	Financial Data Analytic Techniques: Overview	Lecture, Discussion	Practicum, Report, Participation
2	Financial Data Analytic Techniques: Basic Knowledge Review	Lecture, Discussion	Practicum, Report, Participation
3	Financial Data Analytic Techniques: Techniques And Models	Lecture, Discussion	Practicum, Report, Participation
4	Financial Data Analytic Techniques: Researches	Lecture, Discussion	Practicum, Report, Participation
5	Paper Study	Lecture, Discussion	Practicum, Report, Participation

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	108/02/18～108/02/24	Financial Data Mining Overview	
2	108/02/25～108/03/03	Time Series Data Analysis - I (Dimension Reduction)	
3	108/03/04～108/03/10	Time Series Data Analysis - II (Association Analysis)	
4	108/03/11～108/03/17	Time Series Data Analysis - III (Pattern Mining)	
5	108/03/18～108/03/24	Time Series Data Analysis - IV (Pattern Optimization)	
6	108/03/25～108/03/31	Mean-Variance Model - I (Introduction)	
7	108/04/01～108/04/07	Mean-Variance Model - II (Optimization Techniques)	
8	108/04/08～108/04/14	Portfolio Optimization - I (Stock Portfolio)	
9	108/04/15～108/04/21	Portfolio Optimization - II (Group Stock Portfolio)	
10	108/04/22～108/04/28	Midterm Examination	
11	108/04/29～108/05/05	Portfolio Optimization - III (Advanced Topics of Group Stock Portfolio)	
12	108/05/06～108/05/12	Trading Strategy - I (Introduction to Technical Index Analysis)	

13	108/05/13 ~ 108/05/19	Trading Strategy - II (Trading Strategy Optimization)	
14	108/05/20 ~ 108/05/26	Case Discussion & Paper Study	
15	108/05/27 ~ 108/06/02	Case Discussion & Paper Study	
16	108/06/03 ~ 108/06/09	Case Discussion & Paper Study	
17	108/06/10 ~ 108/06/16	Case Discussion & Paper Study	
18	108/06/17 ~ 108/06/23	Final Examination	

Requirement	Basic knowledge of data mining approaches
Teaching Facility	Computer, Projector
Textbook(s)	Python for Finance (Analyze Big Financial Data, Yves Hilpisch, O'Reilly Media, 2014. Data Mining : Concepts and Techniques, 3/e (Hardcover), Jiawei Han, Micheline Kamber, Jian Pei, 2011.
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〈HW and Paper Study〉：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.**