

Tamkang University Academic Year 107, 1st Semester Course Syllabus

Course Title	BIG DATA MINING	Instructor	DAY, MIN-YUH
Course Class	TLVXM1A MASTER'S PROGRAM IN DIGITAL BUSINESS AND ECONOMICS, 1A	Details	<ul style="list-style-type: none"> ◆ Required ◆ One Semester ◆ 3 Credits
D e p a r t m e n t a l A i m o f E d u c a t i o n			
<p>Our goal is to train students not only to acquire knowledge from economics, finance, and industrial developments but also to apply information technology and analytical and quantitative skills to various situations. By doing so, students can enhance their competitiveness in facing rapid changes in world economy.</p>			
D e p a r t m e n t a l c o r e c o m p e t e n c e s			
<ul style="list-style-type: none"> A. Cultivating students the ability of computer programming. B. Training students the ability of website design for starting up a business. C. Training students the ability of analyzing various situations in the financial market. D. Helping students to acquire the knowledge of financial technology. 			
Course Introduction	<p>This course introduces the fundamental concepts and research issues of Big Data Mining. Topics include ABC: AI, Big Data, Cloud Computing, Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, Fundamental Big Data: MapReduce Paradigm, Hadoop and Spark Ecosystem, Foundations of Big Data Mining in Python, Supervised Learning: Classification and Prediction, Unsupervised Learning: Cluster Analysis, Unsupervised Learning: Association Analysis, Machine Learning with Scikit-Learn in Python, Deep Learning for Finance Big Data with TensorFlow, CNN, RNN, RL, SNA.</p>		

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	Understand and apply the fundamental concepts and research issues of big data mining.	P6	ABCD
2	Conduct information systems research in the context of big data mining.	P6	ABCD

Teaching Objectives, Teaching Methods and Assessment

No.	Teaching Objectives	Teaching Methods	Assessment
1	Understand and apply the fundamental concepts and research issues of big data mining.	Lecture, Discussion, Appreciation, Practicum, Problem solving	Practicum, Report, Participation
2	Conduct information systems research in the context of big data mining.	Lecture, Discussion, Appreciation, Simulation, Practicum, Problem solving	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	107/09/10~ 107/09/16	Course Orientation for Big Data Mining	
2	107/09/17~ 107/09/23	ABC: AI, Big Data, Cloud Computing	
3	107/09/24~ 107/09/30	Mid-Autumn Festival (Day off)	
4	107/10/01~ 107/10/07	Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data	
5	107/10/08~ 107/10/14	Fundamental Big Data: MapReduce Paradigm, Hadoop and Spark Ecosystem	
6	107/10/15~ 107/10/21	Foundations of Big Data Mining in Python	
7	107/10/22~ 107/10/28	Supervised Learning: Classification and Prediction	
8	107/10/29~ 107/11/04	Unsupervised Learning: Cluster Analysis	
9	107/11/05~ 107/11/11	Unsupervised Learning: Association Analysis	
10	107/11/12~ 107/11/18	Midterm Project Report	
11	107/11/19~ 107/11/25	Machine Learning with Scikit-Learn in Python	
12	107/11/26~ 107/12/02	Deep Learning for Finance Big Data with TensorFlow	

13	107/12/03 ~ 107/12/09	Convolutional Neural Networks	
14	107/12/10 ~ 107/12/16	Recurrent Neural Networks	
15	107/12/17 ~ 107/12/23	Reinforcement Learning	
16	107/12/24 ~ 107/12/30	Social Network Analysis	
17	107/12/31 ~ 108/01/06	Bridge Holiday (Extra Day Off)	
18	108/01/07 ~ 108/01/13	Final Project Presentation	
Requirement	Big Data Mining (MBA, DBETKU) (Fall 2018) (2018.09-2019.01) (MBA, DBETKU) (3 Credits, Required) (M2244) (8619) [Full English Course] (1071) (Master's Program in Digital Business and Economics) (Monday, 9, 10, 11, 16:10-19:00) (B206)		
Teaching Facility	Computer, Projector		
Textbook(s)	Slides		
Reference(s)	<p>Learning Data Mining with Python - Second Edition, Robert Layton, Packt Publishing, 2017.</p> <p>Hands-On Data Science and Python Machine Learning: Perform data mining and machine learning efficiently using Python and Spark, Frank Kane, Packt Publishing, 2017.</p> <p>Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems, Aurélien Géron, O'Reilly Media, 2017</p> <p>Practical Machine Learning with Python: A Problem-Solver's Guide to Building Real-World Intelligent Systems, Dipanjan Sarkar, Raghav Bali, Tushar Sharma, Apress, 2017.</p> <p>Python Machine Learning: Machine Learning and Deep Learning with Python, scikit-learn, and TensorFlow, 2nd Edition, Sebastian Raschka and Vahid Mirjalili, Packt Publishing, 2017.</p> <p>Deep Learning with Python, Francois Chollet, Manning Publications, 2017.</p> <p>Big Data, Data Mining, and Machine Learning: Value Creation for Business Leaders and Practitioners, Jared Dean, Wiley, 2014.</p> <p>Data Mining: Concepts and Techniques, Third Edition, Jiawei Han, Micheline Kamber and Jian Pei, Morgan Kaufmann, 2011.</p>		
Number of Assignment(s)	3 (Filled in by assignment instructor only)		
Grading Policy	<p>◆ Attendance : % ◆ Mark of Usual : 40.0 % ◆ Midterm Exam : %</p> <p>◆ Final Exam : %</p> <p>◆ Other (Project Report) : 60.0 %</p>		
Note	<p>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.</p> <p>※ Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.</p>		