

**City University of Hong Kong
Course Syllabus**

**offered by Department of Management Sciences
with effect from Semester A 2017 /18**

Part I Course Overview

Course Title:	Data Mining
Course Code:	MS6711
Course Duration:	One Semester
Credit Units:	3
Level:	P6
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: <i>(Course Code and Title)</i>	Nil
Precursors: <i>(Course Code and Title)</i>	MS5212 Statistical Methods I or equivalent
Equivalent Courses: <i>(Course Code and Title)</i>	Nil
Exclusive Courses: <i>(Course Code and Title)</i>	FB6711 Data Mining

Part II Course Details

1. Abstract

The course aims to provide an introduction to discover hidden information from business data using data mining techniques with the aid of SAS Enterprise Miner software.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Demonstrate knowledge of data mining concepts and algorithms.	30%	✓	✓	✓
2.	Define and formulate real-world data mining problems.	10%	✓	✓	✓
3.	Explore and prepare the data for data mining projects.	10%	✓	✓	✓
4.	Evaluate critically the appropriateness of the extracted information.	10%	✓	✓	✓
5.	Extract and analyze information from data with the use of SAS Enterprise Miner software.	40%	✓	✓	✓
...					
		100%			

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.					Hours/week (if applicable)
		1	2	3	4	5	
Lectures	Lecturer explains and discusses the concepts, algorithms, of data mining and how to evaluate the quality of the extracted information.	✓	✓	✓	✓		
In-class activities	Lecturer will demonstrate the use of SAS Enterprise Miner software in class on selected topics. Students are required to work individually or as a group on simulated or small real data using the software. Through these in-class exercises, the lecturer can identify the common problems that students have and give more elaboration as needed. Students can also identify the kinds of mistakes that they have made and learn how to correct them.	✓		✓	✓	✓	
Out-of-Class assignments	Running the data mining algorithms on large data set is a very time consuming process. It is not possible to do it regularly in class. Students tackle focused problems based on large business data as out-of-class assignments. Students may work in small groups for these assignments so that they can discuss the problems and come up a solution together.	✓		✓	✓	✓	

Project	<p>The ultimate aim of the course is to provide students with the specialist knowledge and training to run a business data mining task. Students are given a large data set with described business problem. They are asked to extract useful information related to the set of identified data mining goals for the problem. This is likely to be a semester-long activity.</p> <p>Students need to make use of everything they have learned in this course in order to achieve the goals. They are encouraged to form small groups for the project so that they can analyze the data and run the software together. They can always seek help and advice from the lecturer during the semester.</p>	✓	✓	✓	✓	✓		
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4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.						Weighting	Remarks
	1	2	3	4	5			
Continuous Assessment: <u>60</u> %								
Assignments	✓	✓	✓	✓	✓		10%	
Project	✓	✓	✓	✓	✓		50%	
Examination: <u>40</u> % (duration: 3 Hours , if applicable)								
Examination	✓	✓	✓	✓	✓		60%	
							100%	

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
Assignments, Project, Examination	Scores shall be awarded for each assignment, project and examination.	Excellent achievement in all aspects of CILOs, including good knowledge in data mining concepts, knowing how to prepare, utilising SAS Enterprise Miner software, selecting appropriate data mining tools, judging the quality of the results, and presenting the results effectively.	Good achievement in most aspects of CILOs, including good knowledge in data mining concepts, knowing how to prepare, utilising SAS Enterprise Miner software, selecting appropriate data mining tools, judging the quality of the results, and presenting the results effectively.	Satisfactory achievement in most aspects of CILOs, including good knowledge in data mining concepts, knowing how to prepare, utilising SAS Enterprise Miner software, selecting appropriate data mining tools, judging the quality of the results, and presenting the results effectively.	Satisfactory achievement in some aspects of CILOs, but have serious weakness in one or more aspects of the CILOs.	Failed to achieve most of the CILOs.

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

(An indication of the key topics of the course.)

Introduction to data mining

What is data mining? Why use data mining? How do you mine data? Data mining terminology.

Data Mining Process

Defining a study; Data preparation; Data cleansing; Building a model.

Data Mining Tools and Technologies

Decision trees; Neural network; Clustering analysis; Association rules; Logistic Regression models.

Case Studies

Applications in banking and finance, retail, telecommunications, and financial market.

Data Mining Software

SAS Enterprise Miner Software.

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

Nil

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

1.	Getting Started with SAS Enterprise Miner 14.2, SAS Pub, 2016.
2.	DATA MINING techniques with SAS ENTERPRISE MINER. Sampling, Exploratory Analysis and Association Rules, Scientific Books, CreateSpace Independent Publishing Platform 2015.
3.	Data Mining Techniques Predictive Models with SAS Enterprise Miner, Scientific Books,
4.	CreateSpace Independent Publishing Platform 2015.
5.	Regression Models and Decision Trees with SAS ENTERPRISE MINER, Scientific Books, CreateSpace Independent Publishing Platform 2015.
6.	Data Mining Techniques, Segmentation with SAS Enterprise Miner, Scientific Books, CreateSpace Independent Publishing Platform 2015.

7.	Predictive modeling with SAS Enterprise Miner: Practical Solution for Business Applications, second edition, Kattamuri S. Sarma, SAS Institute, 2013.
8.	Data mining techniques: For marketing, sales, and customer support, Michael Berry & Linoff, 3 rd Edition, John Wiley & Sons, 2011. (Small quantity of copies is available at the campus bookshop.).
9.	Data Mining and Analysis, Mohammed J. Zaki , Wagner Meira Jr. Cambridge University Press, 2014
10.	Principles of Data Mining, Max Bramer, 2 nd Edition, Springer, 2013. (Small quantity of copies is available at the campus bookshop.)
11.	Data Mining for Business Analytics: Concepts, Techniques, and Applications in Microsoft Excel with XLMiner, 3 rd Edition, Galit Shmueli, Nitin Patel, Peter Bruce, Wiley, 2016.
12.	Introduction to Data Mining with Case Studies, 2 nd Edition, G K Gupta, Prentice-Hall of India Pvt. Ltd, 2011.
13.	Handbook of Statistical Analysis and Data Mining Applications, Robert Nisbet, John Elder, Gary Miner, Academic Press, 2009.
14.	Practical Applications of Data Mining, 1 st edition, Sang C. Suh, Jones & Bartlett Learning, 2012.
15.	Data Mining and Statistics for Decision Making, Stéphane Tufféry, Wiley, 2011.
16.	Data mining: Concepts and techniques, Jiawei Han, Micheline Kamber, & Jian Pei, 3 rd Edition, Morgan Kaufmann Pub, 2011.
17.	A Practical Guide to Data Mining for Business and Industry: Case Studies and Methodology, Andrea Ahlemeyer-Stubbe, Shirley Coleman, Wiley, 2014.
18.	Discovering Knowledge in Data: An Introduction to Data Mining, Daniel T. Larose, Chantal D. Larose, 2 nd edition, Wiley, 2014.
19.	Data Mining: Concepts, Models, Methods, and Algorithms, Mehmed Kantardzic, 2 nd edition, Wiley, 2011.