

**City University of Hong Kong  
Course Syllabus**

**offered by Department of Management Sciences  
with effect from Semester A 2020/21**

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**Part I Course Overview**

<b>Course Title:</b>	Predictive Modeling and Forecasting for Business
<b>Course Code:</b>	MS6219
<b>Course Duration:</b>	One semester
<b>Credit Units:</b>	3
<b>Level:</b>	P6
<b>Medium of Instruction:</b>	English
<b>Medium of Assessment:</b>	English
<b>Prerequisites:</b> (Course Code and Title)	MS5218 Applied Linear Statistical Models
<b>Precursors:</b> (Course Code and Title)	Nil
<b>Equivalent Courses:</b> (Course Code and Title)	MS6215 Forecasting Methods for Business
<b>Exclusive Courses:</b> (Course Code and Title)	Nil

## Part II Course Details

### 1. Abstract

This course aims to

- introduce students to a range of forecasting techniques used in business and economics;
- develop a solid conceptual understanding of these techniques;
- enable students to appreciate the practical relevance of the techniques through case studies;
- acquaint students with the necessary computing knowledge to execute an analysis.

### 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.	Apply different forecasting techniques to solve problems in a business context	40%	✓	✓	✓
2.	Select the most appropriate forecasting method for a given business problem	15%		✓	✓
3.	Evaluate the validity of the statistical results and the limitations of the forecasting techniques	15%	✓		✓
4.	Implement the techniques using the relevant computer software	20%		✓	
5.	Communicate and explain the analysis and findings to non-specialists	10%		✓	✓
		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	
Lectures	The concepts and statistical properties of the forecasting techniques and their relevance to business and economics are explained. The strengths and weaknesses of the techniques, and how they can be used to tackle different business problems are discussed in details. Case studies and examples are used to illustrate the forecasting techniques in practice. There will also be opportunities for peer interactions in the lectures through group discussions.	✓	✓	✓		
Computer-based laboratories	Hands-on experience with the forecasting techniques and problem solving activities based on real world business data using the SAS software. During the laboratory sessions, the instructor can identify problems encountered by students and provide assistance. The laboratory sessions consolidate and supplement what the students learn in lectures. There will be opportunities for students to work together and help each other.	✓	✓	✓	✓	
Project	Students work in groups and each group of students is presented with a different forecasting problem, for which they have to come up with the most suitable method among those covered in the course. The project is the ultimate showdown of the students' intellectual ability and technical skills – they first have to understand the nature of the problem and the characteristics of the data, then select the most appropriate forecasting technique to use, test the validity of the results, and finally present the results to the instructor and fellow students.	✓	✓	✓	✓	✓

### 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>35</u> %							
Test	✓	✓	✓			20%	
Project	✓	✓	✓	✓	✓	15%	
Examination: <u>65</u> % (duration: 3 hours, if applicable)							
Examination	✓	✓	✓			65%	
						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)
1. Test	Knowledge in the technical aspects of the subjects and their relevance to business applications	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Project	Ability to conduct analysis using appropriate techniques and explain results to business practitioners	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Examination	Knowledge in the technical aspects of the subjects and their relevance to business applications	High	Significant	Moderate	Basic	Not even reaching marginal levels

## Part III Other Information

### 1. Keyword Syllabus

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

1. Forecasting Goal; Data Characterization; Evaluating Predictive Accuracy
2. Smoothing-Based Forecasting Methods  
Moving Average; Detrending and Seasonal Adjustment; Exponential Smoothing (Simple, Double and Seasonal).
3. Fourier Series Forecasting Models  
Cyclical Movement; Spectral Density Function; Periodogram.
4. Regression-Based Forecasting Methods  
Capturing Trend and Seasonality with Linear Regression; Forecasting with Autocorrelation; Seemingly Unrelated Regression Equations.
5. Box-Jenkins (ARIMA) Models  
Autoregressive (AR), Moving Average (MA), ARMA and ARIMA processes; Stationarity and Invertibility, Random Walk; Autocorrelation and Partial Autocorrelation Functions, Identification of Models, Estimation of Parameters, Diagnostic Checking and Model Selection.
6. Predictive Analytics in Practice  
Communicating Predictive Analytics to stakeholders; Forecasting Implementation Issues; Subjective and Naive Forecasts.

### 2. Reading List

#### 2.1 Compulsory Readings

Nil

#### 2.2 Additional Readings

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

1.	Abelson P and Joyeux R, Economic Forecasting, Allen and Unwin, 2000
2.	Bowerman, B L, O'Connell, R and Koehler A, Forecasting, Time Series and Regression, 4/e, South-Western College Publishing, 2004
3.	Hanke J E and Wichern D, Business Forecasting, 9/e, Prentice Hall, 2008
4.	Kuhn M and Johnson K, Applied Predictive Modeling, Springer, 2013