

**City University of Hong Kong  
Course Syllabus**

**offered by Department of Management Sciences  
with effect from Semester A 2019 /20**

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**Part I Course Overview**

<b>Course Title:</b>	Regression Analysis
<b>Course Code:</b>	MS3252
<b>Course Duration:</b>	One Semester
<b>Credit Units:</b>	3
<b>Level:</b>	B3
<b>Proposed Area:</b> <i>(for GE courses only)</i>	<input type="checkbox"/> Arts and Humanities <input type="checkbox"/> Study of Societies, Social and Business Organisations <input type="checkbox"/> Science and Technology
<b>Medium of Instruction:</b>	English
<b>Medium of Assessment:</b>	English
<b>Prerequisites:</b> <i>(Course Code and Title)</i>	Nil
<b>Precursors:</b> <i>(Course Code and Title)</i>	CB2200 Business Statistics or equivalent
<b>Equivalent Courses:</b> <i>(Course Code and Title)</i>	Nil
<b>Exclusive Courses:</b> <i>(Course Code and Title)</i>	MS3102 Statistics for Management Decisions MS3311 Statistics for Service Operations Management MS3402 Statistics for Business Management

## Part II Course Details

### 1. Abstract

(A 150-word description about the course)

This course aims to:

- Introduce regression and analysis of variance techniques and models commonly used in solving business problems.
- Provide an opportunity for students to practice quantitative research skills with real business cases related to management decision making.

Build students' competence in using contemporary computer software such as SAS, IBM's SPSS, R, Python to analyze business data.

### 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 <sup>#</sup>	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Explain concepts in regression analysis and analysis of variance.	30%		✓	
2.	Evaluate statistical theory and its relevance to different real-world business problems.	30%		✓	
3.	Evaluate critically the appropriateness, accuracy and limitations of various statistical methods.	20%		✓	
4.	Apply contemporary computer software such as SAS, IBM's SPSS, R, Python to analyze data arising from real-life business problems, interpret the results and give recommendations.	20%		✓	
		100%			

\* If weighting is assigned to CILOs, they should add up to 100%.

# Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

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	Statistical techniques and models, relevant knowledge and concepts are explained.	✓	✓	✓	✓			

Exercises	Students discuss their responses to take-home exercises that are designed to enhance their analytical skills in statistical modelling within a business context. They are required to interpret the model results and give recommendations. Students are given the opportunity in class to feed back on each others' work.	✓	✓	✓	✓			
Computer Laboratory Activities	The instructor demonstrates the use of contemporary computer software such as SAS, IBM's SPSS, R, Python to solve real-world business problems. Students are asked to carry out similar analyses after the demonstration.				✓			

#### 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				
Continuous Assessment: <u>30</u> %								
<u>Mid-Term Test</u> Aims at testing the student's ability in choosing a suitable statistical technique to analyse a data set collected by a certain method and executing the technique to get the correct answer.	✓	✓	✓	✓			20%	
<u>Exercises</u> Exercises are designed to reinforce their skills in statistical modelling. Statistical softwares may be involved.		✓	✓	✓			10%	
Examination: <u>70</u> % (duration: 2 hours, if applicable)								
<u>Examination</u> Aims at testing the student's ability in choosing a suitable statistical technique to analyse a data set collected by a certain method and executing the technique to get the correct answer	✓	✓	✓	✓			70%	
							100%	

\* The weightings should add up to 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. Mid-Term Test	The test is designed to assess students' professional knowledge of <b>SELECTING</b> and <b>APPLYING</b> different statistical models to solve business problems.	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Exercises	Students are required to work on these exercises individually to <b>PRACTISE</b> their <b>ANALYTICAL SKILLS</b> in statistical modelling within a business context.	High	Significant	Moderate	Basic	Not even reaching marginal level
3. Written Examination	The exam is designed to assess students' professional knowledge of <b>SELECTING</b> and <b>APPLYING</b> different statistical models to solve business problems. Computer output may be given for students' interpretation and suggestions.	High	Significant	Moderate	Basic	Not even reaching marginal level

**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.)*

**1. Multiple Regression**

Review of simple linear regression. Overview of the concept of linear models. Formulation and assumptions of multiple regression models. Inferences about regression parameters. Diagnostics of residuals. Comparing two regression models. Partial F-tests. Model building and variables selection strategies: all possible, forward, backward and stepwise regression. Multicollinearity. Using dummy variables and interacting terms. Transformations in regression analysis. Regression on dummy dependent variables.

**2. Logistic Regression**

Binary logit models. Maximum likelihood estimation. Odds ratio. Goodness of fit tests.

**3. Analysis of Variance**

One-way analysis of variance. Partition of the total sum of squares: ANOVA table. Multiple comparisons and simultaneous confidence intervals using methods of Tukey.

**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.)*

Mendenhall, W. and Sincich T. A Second Course in Statistics: Regression Analysis. Prentice Hall.

**2.2 Additional Readings**

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

Books	
1.	Dielman, T.E. Applied Regression Analysis: A Second Course in Business and Economic Statistics, 4/e, Duxbury, 2005.
2.	Kutner, M.H., Nachtsheim, C.J. and Neter J. Applied Linear Regression Models, 5/e, McGraw Hill, 2011.
3.	Levine, D.M., Szabat K A, Stephan D F, Business Statistics: A First Course, 7/e, Prentice Hall, 2015.
4.	Fox J, Weisberg S, An R Companion to Applied Regression. Sage Publication, 2011.
5.	Ciaburro G, Regression Analysis with R, Packt Publishing, 2018.
6.	Massaron L, Boschetti A, Regression Analysis with Python, Packt Publishing, 2016.
Online Resources	
5.	SAS Online Documents <a href="http://v8.doc.sas.com/sashtml/">http://v8.doc.sas.com/sashtml/</a>
6.	Statistics Glossary <a href="http://www.stats.gla.ac.uk/steps/glossary/index.html">http://www.stats.gla.ac.uk/steps/glossary/index.html</a>
7.	Multiple Regression with Ren & Stimpy <a href="http://www.-psych.nmsu.edu/regression/home.html">http://www.-psych.nmsu.edu/regression/home.html</a>