City University of Hong Kong
Course Syllabus

offered by College/School/Department of Management Sciences
with effect from Semester B 2017 / 2018

Part I   Course Overview

Course Title: Statistical Inference

Course Code: MS2602

Course Duration: One semester

Credit Units: 3

Level: B2

Proposed Area:
(for GE courses only)
☐ Arts and Humanities
☐ Study of Societies, Social and Business Organisations
☐ Science and Technology

**Medium of
Instruction:**   English

**Medium of
Assessment:**   English

Prerequisites:
(Course Code and Title)   MA2506 Probability and Statistics

Precursors:
(Course Code and Title)   Nil

Equivalent Courses:
(Course Code and Title)   Nil

Exclusive Courses:
(Course Code and Title)   Nil

Part II   Course Details

1.   Abstract

Statistical methods have proven enormously valuable in helping scientists interpret the results of their experiments. This is a course about how statisticians draw conclusions from experimental data. Its primary goal is to introduce the student to an important type of reasoning that statisticians call 'inference'. Rather than provide a superficial introduction to a wide variety of inferential methods, we will concentrate on fundamental concepts and study a few of them in depth. Statistical inference rests on the mathematical foundation of probability. Students having taken an introductory course in probability will benefit most from this course. Many statistical procedures rely on softwares for their implementation. This is done through the elegant MATLAB, a software favoured by engineers, mathematicians as well as scientists.

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.	understand the theory of estimation and hypothesis testing and be able to apply them to real world data	80%	x	x	x
2.	be able to use MATLAB to implement and execute techniques learnt	20%		x	x
3.					
…					

* If weighting is assigned to CILOs, they should add up to 100%. 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			
Lecture		x	x					2
In-class exercises	In-class problem solving allows instant feedback from students	x						1
Hand-in assignments	Strengthens the understanding of topics covered in lectures	x	x					Not applicable

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						
Continuous Assessment: 40%								
Hand-in assignments	x	x					10	
Test(s)	x	x					30	
Examination: 60% (duration: 2 hours)								

* The weightings should add up to 100%.

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. Hand-in assignments	1. The ability to solve mathematical problems involving estimation and hypothesis testing. 2. The ability to write MATLAB codes and interpret MATLAB printouts.	Strong evidence of the capacity to analyse and synthesize; superior grasp of subject matter.	Evidence of grasp of subject ; reasonable understanding of issues.	Student who has some understanding of the subject; ability to develop solutions to simple problems in the material.	Sufficient familiarity with the subject matter to enable the student to progress.	Little evidence of familiarity with the subject matter; weakness in critical and analytic skills.
2. Test(s)	As above	Strong evidence of the capacity to analyse and synthesize; superior grasp of subject matter.	Evidence of grasp of subject ; reasonable understanding of issues.	Student who has some understanding of the subject; ability to develop solutions to simple problems in the material.	Sufficient familiarity with the subject matter.	Little evidence of familiarity with the subject matter; weakness in critical and analytic skills.
3. Examination	As above	Strong evidence of the capacity to analyse and synthesize; superior grasp of subject matter.	Evidence of grasp of subject ; reasonable understanding of issues.	Student who has some understanding of the subject; ability to develop solutions to simple problems in the material.	Sufficient familiarity with the subject matter to enable the student to progress without repeating the course.	Little evidence of familiarity with the subject matter; weakness in critical and analytic skills.
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Part III   Other Information (more details can be provided separately in the teaching plan)

1.   Keyword Syllabus

Theory of point estimation : methods of moments, maximum likelihood and least squares.   Confidence interval estimation. Theory of hypothesis testing, tests concerning the mean(s), variance(s) and proportion(s) (parametric and nonparametric), ANOVA.

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.)

1.	Probability & Statistical Inference – Hogg, Tanis & Zimmerman (9/e, Pearson, 2015)
2.	Statistics Toolbox for Use with MATLAB http://www.mathworks.com/help/stats/index.html
3.	
…	

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

1.	Introduction to Mathematical Statistics – Hogg, McKean & Craig (7/e, Pearson, 2012)
2.	
3.	
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