

The Hong Kong Polytechnic University

Subject Description Form

Subject Code	LGT5132
Subject Title	Experiments for Business Decision Making
Credit Value	3
Level	5
Normal Duration	1-semester
Pre-requisite/ Co-requisite/ Exclusion	AMA513 Design and Analysis of Experiments
Role and Purposes	<ul style="list-style-type: none">▪ Introduce students to experimental design and analysis as a tool for business decision making.▪ Understand basic concepts, theories and techniques of experimental design and analysis methods▪ Become familiar with the basic usage of computer software for experimental design and analysis▪ Develop ability and confidence in using experimental design and analysis methods for business decision making.
Subject Learning Outcomes	Upon completion of the subject, students will be able to: <ul style="list-style-type: none">a. Understand the concepts, theories and techniques of experimental design and analysis methods with business applicationsb. Apply experimental design and analysis methods to enhance business decision making

<p>Subject Synopsis/ Indicative Syllabus</p>	<p>Basic Statistics for Experimental Design Frequency distribution; mean; confidence intervals; normal distribution. graphical tests.</p> <p>Testing Differences of Means F-tests; source of variations; completely randomized and randomized complete block experiments;</p> <p>Two-Level Factorial Experiments Two-level factorial design and examples; plot and interpret interactions; Analysis of Variance (ANOVA); modeling responses; diagnosing residuals to validate assumptions; Dealing with non-normality;</p> <p>Two-Level Fractional Factorial Designs Fractional factorial design and examples; resolution factorials; Plackett-Burman designs; irregular fractions;</p> <p>Getting the Most from Minimal-Run Designs Minimal-resolution design and examples; complete foldover; single foldover; aliasing problems; analysis of unreplicated general factorials;</p> <p>Experiments with Factors at Three or More Levels General 2-factor factorial design and examples; three level fractional factorial designs and examples;</p> <p>Response Surface Methods for Optimizing Decision Makings Center points; central composite design (CCD); multiple responses</p> <p>Computer Software for Design Construction and Data Anslsysis Minitab and R.</p>
<p>Teaching/Learning Methodology</p>	<p>Concepts, theories, and techniques of experimental design and analysis methods will be introduced through lectures.</p> <p>Case studies on business applications will be discussed through lectures.</p> <p>Students will be guided to practice applications and usages of computer software of experimental design and analysis through tutorials</p>

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)				
			a	b			
	Continuous Assessment	50 %	✓	✓			
	Examination	50 %	✓	✓			
	Total	100 %					
<p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>The coursework includes a series of tutorial exercises of using computer software for experimental design and analysis, assignments, case studies, and/or a group project for real business applications. Mid-term test and/or examination are also required. They are used to assess the intended outcomes a and b.</p> <p><i>To pass this subject, students are required to obtain Grade D or above in BOTH the Continuous Assessment and Exam components.</i></p>							
Student Study Effort Expected	Class contact:						
	▪ Lectures / Tutorials	39 Hrs.					
	Other student study effort:						
	▪ Reading/exercises/group project	81 Hrs.					
	▪	Hrs.					
	Total student study effort		120 Hrs.				

**Reading List and
References**

Textbook

Mark J. Anderson and Patric J. Whitecomb. *DOE Simplified, 2nd Edition*. Productivity Press, New York, 2007.

Johannes Ledolter and Arthur J. Swersey. *Testing 1-2-3: Experimental Design with Applications in Marketing and Service Operations*. Stanford University Press. 2007.

References:

Douglas C. Montgomery. *Design and Analysis of Experiments, 8th Edition*. Wiley, 2012.