

City University of Hong Kong
Course Syllabus

offered by Department of Advanced Design and Systems Engineering
with effect from Semester A 2022 / 23

Part I Course Overview

Course Title:	<u>Statistical Modeling and Design of Experiments</u>
Course Code:	<u>ADSE8011</u>
Course Duration:	<u>One semester</u>
Credit Units:	<u>3</u>
Level:	<u>R8</u>
Medium of Instruction:	<u>English</u>
Medium of Assessment:	<u>English</u>
Prerequisites:	<u>Nil</u>
Precursors:	<u>Knowledge in Basic Probability and Statistics</u>
Equivalent Courses:	<u>SEEM8011 Statistical Modeling and Design of Experiments (offered until 2021/22)</u>
Exclusive Courses:	<u>Nil</u>

Part II Course Details

1. Abstract

This course aims to develop students' abilities to understand the theory and application methods on statistical modeling of observational data and design of experiment data, including linear models, regression models, and analysis of variance models.

2. Course Intended Learning Outcomes (CILOs)

No.	CILOs	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Develop a familiarity with basic statistical estimation and hypothesis testing ideas and methods	10%	✓	✓	
2.	Understand simple and multiple linear regression models and corresponding inference methods for process characterization and prediction.	30%	✓		
3.	Understand motivations and needs for design of experiments in manufacturing and other applications.	10%	✓		
4.	Understand design and analysis of experiments methods to characterize and improve systems and processes.	30%	✓		
5.	Understand and apply regression methods and design of experiment methods to analyze and solve real life problems and applications.	20%	✓		
		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)

TLA	Brief Description	CILO No.					Hours/week (if applicable)
		1	2	3	4	5	
Lecture	- large class activity - questions and discussion	✓	✓	✓	✓	✓	39 hours/sem

4. Assessment Tasks/Activities (ATs)

Assessment Tasks/Activities	CILO No.					Weighting*	Remarks
	1	2	3	4	5		
Continuous Assessment: <u>100</u> %							
Group Work		✓	✓	✓	✓	40%	
Individual Coursework	✓	✓		✓		25%	
Test		✓	✓	✓		35%	
Examination: 0 % (duration: , if applicable)						100%	

5. Assessment Rubrics

Applicable to students admitted in Semester A 2022/23 and thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Group Work	Application of class materials and teamwork	Excellent	Good	Marginal	Failure
2. Individual Coursework	Application of class materials	Excellent	Good	Marginal	Failure
3. Test	Understanding of class materials	Excellent	Good	Marginal	Failure

Applicable to students admitted before Semester A 2022/23

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Group Work	Application of class materials and teamwork	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Individual Coursework	Application of class materials	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Test	Understanding of class materials	High	Significant	Moderate	Basic	Not even reaching marginal levels

Part III Other Information

1. Keyword Syllabus

- Statistical estimation and hypothesis testing
- Data collection, data analysis, and model prediction
- Regression modeling and analysis
- Design and analysis of Experiments
- Analysis of Variance modeling
- Process estimation and prediction
- Process characterization and improvement
- Robust design and parameter design

2. Reading List

2.1 Compulsory Readings

1.	Applied Linear Statistical Models by Kutner, Nachtsheim, Neter, and Li, 5th edition, McGraw Hill
2.	Lecture notes

2.2 Additional Readings

NIL