

**City University of Hong Kong**  
**Course Syllabus**

**offered by Department of Systems Engineering**  
**with effect from Semester A 2024 / 25**

**Part I Course Overview**

<b>Course Title:</b>	<u>Advanced Design of Experiments and Taguchi Method</u>
<b>Course Code:</b>	<u>SYE8103</u>
<b>Course Duration:</b>	<u>One semester</u>
<b>Credit Units:</b>	<u>3</u>
<b>Level:</b>	<u>R8</u>
<b>Medium of Instruction:</b>	<u>English</u>
<b>Medium of Assessment:</b>	<u>English</u>
<b>Prerequisites:</b> <i>(Course Code and Title)</i>	<u>Nil</u>
<b>Precursors:</b> <i>(Course Code and Title)</i>	<u>Basic Probability and Statistics</u> <u>SEEM8103 Advanced Design of Experiments and Taguchi Method</u> <u>(offered until 2021/22)</u> <u>ADSE8103 Advanced Design of Experiments and Taguchi Method</u> <u>(offered until 2023/24)</u>
<b>Equivalent Courses:</b> <i>(Course Code and Title)</i>	<u>(offered until 2023/24)</u>
<b>Exclusive Courses:</b> <i>(Course Code and Title)</i>	<u>Nil</u>

## Part II Course Details

### 1. Abstract

This course aims to further develop students' understanding and application of the theories and methods of statistical modelling of observational data and design of experiment. Contents covered include 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		
			A1	A2	A3
1.	Understand the statistical hypothesis testing	10%	✓		
2.	Explain the needs for design of experiments in manufacturing and other applications	15%	✓	✓	
3.	Apply design and analysis of experiments methods to characterize and improve systems and processes	25%		✓	
4.	Explain robust design, Taguchi method etc	25%		✓	
5.	Apply DOE and Taguchi Method to real life problems	25%		✓	
		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. Learning and Teaching Activities (LTAs)

LTA	Brief Description	CILO No.					Hours/week (if applicable)
		1	2	3	4	5	
Lecture & Tutorial	- large class activity - questions and discussion	✓	✓	✓	✓	✓	39 hours/sem (in-class) 66 hours/sem (ex-class)

### 4. Assessment Tasks/Activities (ATs)

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

## 5. Assessment Rubrics

Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter

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

Applicable to students admitted from Semester A 2022/23 to Summer Term 2024

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

**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.)*

- Data collection, data analysis, and model prediction
- Design and analysis of Experiments
- Analysis of Variance modelling
- Full factorial and fractional factorial designs
- Process characterization and improvement
- Robust design and parameter design
- Taguchi Method

**2. Reading List**

**2.1 Compulsory Readings**

1.	<i>Applied Linear Statistical Models</i> by Kutner, Nachtsheim, Neter, and Li, 5th edition, McGraw Hill, 2005.
2.	Lecture notes

**2.2 Additional Readings**

*NIL*