

**City University of Hong Kong  
Course Syllabus**

**offered by Department of Advanced Design and Systems Engineering  
with effect from Semester A 2023 / 24**

**Part I Course Overview**

<b>Course Title:</b>	<u>Quality and Reliability Engineering</u>
<b>Course Code:</b>	<u>ADSE6043</u>
<b>Course Duration:</b>	<u>One Semester</u>
<b>Credit Units:</b>	<u>3</u>
<b>Level:</b>	<u>P6</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>Nil</u>
<b>Equivalent Courses:</b> <i>(Course Code and Title)</i>	<u>SEEM6043 Quality and Reliability Engineering (offered until 2021/22)</u>
<b>Exclusive Courses:</b> <i>(Course Code and Title)</i>	<u>Nil</u>

## Part II Course Details

### 1. Abstract

The aim of this course is to provide students with a basic understanding of the approaches and techniques to assess and improve process and/or product quality and reliability. The objectives are to introduce the principles and techniques of Statistical Quality Control and their practical uses in product and/or process design and monitoring; and the basic concepts and techniques of modern reliability engineering tools.

### 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.	<b>Beware of</b> some basic techniques for quality improvement, and fundamental knowledge of statistics and probability.	10%	✓	✓	
2.	<b>Apply</b> control charts to analyze and improve the process quality.	30%	✓	✓	✓
3.	<b>Design</b> a simple sampling plan and its OC curve for effectiveness analysis.	20%	✓	✓	
4.	<b>Acquire</b> basic knowledge of reliability for the system reliability calculation and the model calculation.	20%	✓	✓	
5.	<b>Acquire</b> basic knowledge of the experimental design with emphasis to factorial design matrix and Taguchi loss function	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)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.					Hours/week (if applicable)
		1	2	3	4	5	
Large Class Activities (Lecture / tutorial) Small Class Activities	To explain fundamentals of the course, and to present basic skill to solve example problems. To demonstrate advance skill for solving problems.	✓	✓	✓	✓	✓	39 hours/ sem

### 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	5		
Continuous Assessment: 50%							
Course work	✓	✓	✓	✓	✓	50%	
Examination: 50% (duration: 2 hours, if applicable)							
						100%	

For a student to pass the course, at least 30% of the maximum mark for the examination should be obtained.

## 5. Assessment Rubrics

*(Grading of student achievements is based on student performance in assessment tasks/activities with the following 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. Examination	≥30%	Excellent	Good	Marginal	Failure
2. Course work	≥30%	Excellent	Good	Marginal	Failure

Examination and course work will be numerically marked and grades awarded accordingly. Overall, the course work weights about 50% and examination weights about 50% of the total mark. The course work includes two assignments.

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. Examination	≥30%	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Course work	≥30%	High	Significant	Moderate	Basic	Not even reaching marginal levels

Examination and course work will be numerically marked and grades awarded accordingly. Overall, the course work weights about 50% and examination weights about 50% of the total mark. The course work includes two assignments.

**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.)*

- Quality concepts and basic techniques for quality improvement;
- Basic statistics and probabilities for quality and reliability;
- Variable control chart;
- Process capability analysis;
- Attribute control chart;
- Acceptance sampling;
- System reliability and reliability model;
- Experimental design and analysis;
- Taguchi loss function and design

**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.)*

*NIL*

**2.2 Additional Readings**

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

1.	Dale H. Besterfield, Quality Control, 8th edition, Prentice Hall, 2009
2.	Lecture notes