

City University of Hong Kong
Course Syllabus

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

Part I Course Overview

Course Title:	<u>Quality and Reliability Engineering</u>
Course Code:	<u>SYE6043</u>
Course Duration:	<u>One Semester</u>
Credit Units:	<u>3</u>
Level:	<u>P6</u>
Medium of Instruction:	<u>English</u>
Medium of Assessment:	<u>English</u>
Prerequisites: <i>(Course Code and Title)</i>	<u>Nil</u>
Precursors: <i>(Course Code and Title)</i>	<u>Nil</u>
Equivalent Courses: <i>(Course Code and Title)</i>	<u>SEEM6043 Quality and Reliability Engineering (offered until 2021/22)/</u> <u>ADSE6043 Quality and Reliability Engineering (offered until 2023/24)</u>
Exclusive Courses: <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.	Beware of some basic techniques for quality improvement, and fundamental knowledge of statistics and probability.	10%	✓	✓	
2.	Apply control charts to analyze and improve the process quality.	30%	✓	✓	✓
3.	Design a simple sampling plan and its OC curve for effectiveness analysis.	20%	✓	✓	
4.	Acquire basic knowledge of reliability for the system reliability calculation and the model calculation.	20%	✓	✓	
5.	Acquire 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 real-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)

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

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

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: <u>50</u> %							
Course work	✓	✓	✓	✓	✓	50%	
Examination: <u>50</u> % (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 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. 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.

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. 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