City University of Hong Kong
Course Syllabus

offered by Department of Systems Engineering and Engineering Management
with effect from Semester A 2017/18

Part I Course Overview

Course Title:	**Quality Engineering**
Course Code:	**SEEM3102**
Course Duration:	**One Semester**
Credit Units:	**3**
Level:	**B3**
Proposed Area: *(for GE courses only)*	☐ Arts and Humanities ☐ Study of Societies, Social and Business Organisations ☐ Science and Technology
Medium of Instruction:	**English**
Medium of Assessment:	**English**
Prerequisites: *(Course Code and Title)*	**Nil**
Precursors: *(Course Code and Title)*	**MA2172 Applied Stats for Science & Engg or MA2177 Engineering Mathematics and Statistics**
Equivalent Courses: *(Course Code and Title)*	**MEEM3042 Reliability and Quality Engineering / MEEM3062 Quality Engineering I / SEEM3062 Quality Engineering I**
Exclusive Courses: *(Course Code and Title)*	**Nil**

Part II Course Details

1. Abstract

(A 150-word description about the course)

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. 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 of experimental design.

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.	**Understand** quality and reliability concept, **beware of** some basic techniques for quality improvement, and **acquire** fundamental knowledge of statistics and probability.	10%	√		
2.	**Apply** the basic and new seven tools for quality problem solving and planning.	10%		√	
3.	**Apply** control charts to analyze and improve the process quality, including ❑ *understand* the relationship between process quality and variations, ❑ *construct* control charts and identify the special causes variations, ❑ *calculate* the non-conformance rate and improve the process quality.	45%		√	
4.	**Design** a simple sampling plan, **construct** its OC curve and **evaluate** its effectiveness for a given process	15%			
5.	**Acquire** some basics of the experimental design and its application, including ❑ *construct* a full and partial 2^k factorial design matrix; ❑ *analyze* the main factor effects and their interactions; ❑ *develop* Taguchi's loss function for a simple design problem;	20%		√	
		100%			

** If weighting is assigned to CILOs, they should add up to 100%.*

[#] Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

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	Take place in classroom setting and consist of lecturing and student activities in between. Students will be grouped in the large classroom to work on mini-tasks.	√	√	√	√	√	3 hours/week
Consultation Hours	Consultation hours will be set aside during the semester to allow student/professor one-on-one consultation.	√	√	√	√	√	1 hour/week

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: 40%							
Course work	√	√	√	√	√	40%	
Examination: 60% (duration: 2 hours)							
**The weightings should add up to 100%.*						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.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Course work	The course work includes two assignments and one test.	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Examination	Closed-book examination.	High	Significant	Moderate	Basic	Not even reaching marginal levels

Examination and course work will be numerically marked and grades awarded accordingly.

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.)

- The Basic and New Seven QC Tools of quality improvement;
- Basic statistics and probabilities for quality and reliability;
- Variable control charts;
- Additional SPC techniques for variables;
- Process capability study and analysis;
- Attribute control charts;
- Acceptance sampling;
- Factorial design, analysis of variance (ANOVA);
- Introduction to Taguchi loss function and design;
- Introduction to reliability engineering concepts

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.)

2.2. Additional Readings

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

1.	Dale H. Besterfield, Quality Control, seventh edition, Prentice Hall, 2004
2.	Douglas C. Montgomery, Introduction to Statistical Quality Control, 3rd edition, John Wiley & Sons, Inc. 1996
3.	Lecture notes