UNIVERSITI TEKNOLOGI MARA

CMT651: QUALITY CONTROL AND ASSURANCE

Course Name (English)	QUALITY CONTROL AND ASSURANCE APPROVED
Course Code	CMT651

MQF Credit	3

Course Description	The overall goal s to provide basic definitions of quality and quality improvements, a brief overview of the tools and methods and discuss in detail the management systems for quality improvement. It provides the students with the necessary initial knowledge and framework for implementing quality improvement.

Transferable Skills	none

Teaching Methodologies	Lectures, Discussion, Small Group Sessions

CLO		
	CLO1	Integrate and appraise various quality control approaches in process design, development and improvement
	CLO2	Apply basic statistical quality control knowledge to perform process capability analysis
	CLO3	Utilise information and creativity in the critical thinking process of planning, design development and improvement of quality
	CLO4	Demonstrate leadership qualities within a team to complete multiple tasks within a specified time.
	CLO5	Use verbal and written skills to discuss, justify and communicate conclusions

Pre-Requisite Courses	No course recommendations

Topics
1. Quality management and Improvement - Overview
1.1) 1.1 Overview and learning objectives
1.2) 1.1.1 The meaning of quality and quality improvement
1.3) 1.2.2 Dimensions of quality and engineering terminology
1.4) 1.2 Evolution of quality control and improvement
1.5) 1.3 Statistical methods for quality control and improvement
1.6) 1.4 Management of quality improvement
1.7) 1.4.1 Philosophy and management strategies
1.8) 1.4.2 Quality and productivity
1.9) 1.4.3 Quality costs
1.10) 1.4.4 Legal and statutory requirements
1.11) 1.4.5 Implementing quality improvement
2. DMAIC Problem solving process - Overview
2.1) 2.1 Overview of DMAIC
2.2) 2.2 The Define step
2.3) 2.3 The Measure step
2.4) 2.4 The Analysis step
2.5) 2.5 The Improve step
2.6) 2.6 The Control step
2.7) 2.7 Examples of DMAIC
2.8) 2.7.1 Improvement of time delivery
2.9) 2.7.2 Imroving service quality in a bank

3. TQM tools and techniques - overview
3.1) 3.1. SPC (Statistical Process Control)
3.2) 3.2. Acceptance Sampling
3.3) 3.3. Reliability
3.4) 3.4. Design of Experiments
3.5) 3.5. Taguch's Quality Engineering
3.6) 3.6. ISO 9000
3.7) 3.7. ISO 14000
3.8) 3.8. Benchmarking
3.9) 3.9. Total Productive Maintenance
3.10) 3.10. Quality by design

4. Quality control and Improvement
4.1) 4.1. Describing variation
4.2) 4.1.1. Stem and leaf plot
4.3) 4.1.2. Histogram
4.4) 4.1.3. Numerical summary of data
4.5) 4.1.4. Box Plot
4.6) 4.1.5. Probability distributions
4.7) 4.2. Discrete distribution
4.8) 4.2.1. Hyper geometric
4.9) 4.2.2. Binomial
4.10) 4.2.3. Poisson
4.11) 4.3. Continuous distribution
4.12) 4.3.1. Normal distribution
4.13) 4.4. Probability plot
4.14) 4.4.1. Normal probability plot
4.15) 4.5. Useful Approximation
4.16) 4.6. Binomial approximation to the hyper geometric
4.17) 4.7. Poisson approximation to Binomial
4.18) 4.8. Normal approximation to binomial
4.19) 4.9. Comments on approximation

5. Statistical Inference in Quality control and Improvement
5.1) 5.1. Statistics and Sampling Distribution
5.2) 5.2. Point estimation of process parameters
5.3) 5.3. Statistical inference for a single sample
5.4) 5.4. Statistical inference for two samples
5.5) 5.5. ANOVA (more than two samples)
5.6) 5.6. Linear Regression Models

6. Statistical Process Control
6.1) 6.1. Cause of Quality Variations
6.2) 6.2. Statistical Basis of Control Chart
6.3) 6.3. The Seven Basic Quality tools
6.4) 6.4. Implementing SPC
6.5) 6.5. An Application of SPC

7. Variables Control Charts
7.1) 7.1. Control Charts for ? and R
7.2) 7.2. Control Charts for ? and s
7.3) 7.3. The Shewhart Control Chart for Individual Measurements
7.4) 7.4. Summary and Applications of Variable Control Charts

8. Attributes Control Charts
8.1) 8.1. Control Charts for Fraction
8.2) 8.2. Control Charts for Nonconformities (defects)
8.3) 8.3. Choice between Attributes and Variables Control Charts
8.4) 8.4. Guidelines for Implementing Control Charts

9. Process and measurement systems capabilities
9.1) 9.1. Process Capability Analysis using Histogram or Probability Plot
9.2) 9.2. Process Capability Ratios
9.3) 9.3. Process Capability Analysis Using Control Charts

10. Acceptance sampling procedure
10.1) 10.1. Acceptance Sampling Problem
10.2) 10.1.1. Types of Sampling Plan
10.3) 10.1.2. Lot Size
10.4) 10.1.3. Random Sampling
10.5) 10.1.4. Guidelines for Using Acceptance Sampling
10.6) 10.2. Single Sampling Plan for Attributes
10.7) 10.2.1. OC curve
10.8) 10.2.2. Designing a Single Sampling Plan with a Specified OC Curve
10.9) 10.2.3. Rectifying Inspection
10.10) 10.3. Double, Multiple and Sequential Sampling
10.11) 10.4. Military Standard 105E(ANSI/ASQC Z1, 4, ISO 28590
10.12) 10.4.1. Description and Procedure

10.13) 10.4.2. Discussion
10.14) 10.5. Dodge-Romig Sampling Plans
10.15) 10.5.1. AOQL Plan
10.16) 10.5.2. LTPD Plans
10.17) 10.5.3. Estimation of Process Average

11. Quality cost
11.1) 11.1. Understand the link between quality and productivity and between quality and cost

Assessment Breakdown	%
Continuous Assessment	100.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Assignment 1 - use of DMAIC	10%	CLO1
	Assignment	Assignment 2 - SPC tools & control chart	10%	CLO4
	Assignment	Assignment 3 - OC curve	10%	CLO3
	Quiz	Quiz 1	5%	CLO5
	Quiz	Quiz 2	5%	CLO2
	Test	Cummulative of tests	60%	CLO5

Reading List	Recommended Text	• Montgomery, D.C. 2013, *A modern Introduction to Statistical Quality Control*, 7 Ed., John Wiley & Sons, Inc. New Jersey [ISBN: 978-047023397]
	Reference Book Resources	• Evans, J.R. and Lindsay, W.M. 2008, *The Management and Control of Quality*, 7 Ed., Ohio: South-Western Cengage Centre
		• Besterfield, D.H. 2004, *Quality Control*, 7 Ed., Pearson Prentice Hall New Jersey
		• Juran, J.M. 1988, *Quality Control Handbook*, 4 Ed., McGraw Hill Book Company New York
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	