

Certified Quality Engineer Course Syllabus QCTC 1003

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Place: ACC at HBC

Room: TBD

Length of Course: 60 Hours

Course Description:

This course is a refresher study of the Body of Knowledge for the Certified Quality Engineer. Topics include certification overview, quality management, quality systems, auditing, planning and control (project management), sampling plans, measurement systems, reliability & risk management, improvement techniques, quality cost analysis, basic statistics concepts, probability and statistical distributions, statistical applications, inference and hypothesis testing, correlation and regression, analysis of variance, and experimental design. The student will focus on the theory and application of these quality-engineering skills by studying the assigned materials, participating in class discussion, and taking sample exams. These exams contain questions similar to those on the actual CQE exam. These sample exams and their answers will be reviewed in class and for homework to increase the student's ability to understand and correctly answer exam questions.

Course Objective: This course prepares students for the American Society for Quality (ASQ) "Quality Engineer" certification. Passing a separate examination, given twice per year by ASQ, will grant certification. Since the course is intended to be a refresher course, students are expected to have some familiarity with most elements of the body of knowledge through work and/or educational experience.

Rationale:

The CQE refresher course is offered to equip the quality professional to successfully pass the ASQ CQE exam. By obtaining the certification, the quality professional will improve quality in the Austin area.

Evaluation:

The evaluation criteria is passing grade on the CQE exam practice exams.

Texts:

Certified Quality Engineer Primer and Solutions Text
from Quality Council of Indiana (812-533-4215)

Quality Engineering Statistics by Robert A. Dovich (ASQ 800-248-1946), H0679;
List Price: \$27.50, Member Price: \$22.50

Optional: *Lexicon of Quality Terms for CQE, CQT, CMI* by Brenden Duffy (409-722-6241)

CQE Qualifications

Eight years on-the-job experience in one or more of the areas of the CQE Body of Knowledge. A minimum of three years in a decision-making position. "Decision-making" is defined as the authority to define, execute, or control projects/processes and to be responsible for the outcome.

If certified by ASQ as a CQA, CRE, CSQE, or CQM, experience used to qualify for certification in these fields applies to certification as a Quality Engineer.

Part of the 8 year experience requirement will be waived for completed degrees* from college, university, or technical school as follows (only one waiver may be claimed):

Diploma from a technical or trade school—one year will be waived

Associate degree—two years waived

Bachelor's degree—four years waived

Master's or doctorate—five years waived

Course Modules

I. Certification Overview and CQE BOK

II. Management & Leadership

Quality Foundations

Quality Management Systems

Strategic Planning

Stakeholders

Benchmarking

Project Management

Quality Information Systems

ASQ Code of Ethics

Leadership Principles

Facilitation Techniques

Communication Skills

Customer Relations

Supplier Management

Barriers to Quality Improvement

III. Quality Systems

Quality System Elements

Quality System Documentation

Quality Standards & Guidelines

ISO 9001:2000

MBNQA/BNQP

Quality Audits

Audit Types

Audit Components

Cost of Quality

Quality Cost Categories

Quality Cost Bases

Quality Training

Training Needs Assessment

Training Effectiveness

IV. Product & Process Design

Quality Characteristics

Design Review

DFSS

QFD

Robust Design

DFX

Technical Drawings

GD&T Definitions

Design Verification

Reliability and Maintainability

Preventive Maintenance

R&M Indices

Bathtub Curve

Hazard Assessment Tools

V. Product & Process Control

Tools

Control Plans

- Material Control
 - Material Identification
 - Material Segregation
 - Classification of Defects
 - MRB
- Acceptance Sampling
 - Sampling Concepts
 - Sampling Standards
 - Sampling Integrity
- VI. Testing & Measurement
 - Measurement Tools
 - Definitions
 - Destructive Tests
 - Nondestructive Tests
 - Metrology
 - Measurement System Analysis
- VII. Control & Management Tools
 - Quality Control Tools
 - Flow Charts
 - Histograms
 - Pareto Diagrams
 - Management & Planning Tools
 - Affinity Diagrams
 - Matrix Diagrams
 - Prioritization Matrices
 - Activity Network Diagrams
- VIII. Improvement Techniques
 - Improvement Models
 - PDCA
 - Six Sigma
 - Kaizen
 - Lean Techniques
 - TQM
 - Corrective & Preventive Actions
 - Root Cause Analysis
 - Mistake Proofing
- IX. Basic Statistics
 - Collecting Data
 - Types of Data
 - Measurement Scales
 - Data Collection Methods
 - Data Accuracy
 - Descriptive Statistics
 - Graphical Relationships
 - Quantitative Concepts
 - Statistical Conclusions
 - Probability Terms
 - Probability Distributions
 - Continuous Distributions
 - Discrete Distributions
- X. Statistical Applications
 - Statistical Process Control
 - Objectives
 - Common vs. Special Causes
 - Rational Subgrouping
 - Control Charts
 - Control Chart Analysis
 - Pre-control Charts
 - Short-run SPC
 - Capability
 - Capability Studies
 - Performance vs. Specifications
 - Capability Indices
 - Performance Indices
- XI. Advanced Statistics

- Statistical Decision Making
 - Point Estimates
 - Confidence Intervals
 - Hypothesis Testing
 - Paired-comparison Tests
 - Goodness-of-fit Tests
 - Contingency Tables
- Analysis of Variance
- Relationships Between Variables
 - Linear Regression
 - Simple Linear Correlation
 - Time-series Analysis
- Design of Experiments|
 - Terminology
 - Planning Experiments
 - Block Experiments
 - Full-factorial Experiments
 - Fractional Factorials
 - Other Experiments

Class Recommendations

Attend class: Since this is a Continuing Education course, there is a requirement for you to meet the contact hours (60) for the class. Role will be taken at each class and must be submitted to ACC. If you must be absent, please notify the instructor so that you will receive all materials and have all questions answered.

Develop and use good study habits. It is recommended that you spend at least the same amount of time studying and reading outside class as in class.

Take practice exams at home. Go through all questions in the blue pages of the primer and try to select the right answer. It is OK to use the other pages for reference, as in the real exam, but time yourself. You have to answer an average of one question every 1.5 minutes.

Read material before the class in which they are covered. The course schedule shows what parts of the Primer are to be covered in class.

Ask questions. Your instructors welcome questions in class. Save questions you might have during study time, if possible, so that the entire class can learn.

Keep in mind, that some of the questions are phrased in a way that might lead you to a wrong answer, so read the question carefully before answering. We will discuss this further in class.

Recommended optional texts:

Arter, Dennis R., Quality Audits for Improved Performance, 3rd ed., Milwaukee, WI: ASQ Quality Press, 2003. H1180

ASQ Quality Costs Committee, Jack Campanella, 3rd ed., Principles of Quality Costs: Principles, Implementation, and Use, 3rd ed.

Milwaukee, WI: ASQ Quality Press, 1999. H1013

Barrentine, Larry B., Concepts for R&R Studies 2nd ed.

Milwaukee, WI: ASQ Quality Press, 2003. H1149

Brassard, Michael, The Memory Jogger Plus + @, Massachusetts: Goal/QPC, 1989. P448

Dovich, Robert A., Quality Engineering Statistics.

Milwaukee, WI: ASQC Quality Press, 1992. H0679; List Price: \$27.50, Member Price: \$22.50

Gryna, Frank, Quality Planning and Analysis: From Product Development through Use, 4th ed., New York: McGraw-Hill Publishing Co., 2001. P817

Scholtes, Peter R., The Team Handbook, 3rd ed., Oreil Inc., 2003. P1030

