FIRST SEMESTER 2016-2017
Course Handout – II

Date:02/08/2016

In addition to part I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. : **ME F443/MF F443**
Course Title : **Quality Control, Assurance and Reliability**
Instructor-in-charge : **B K ROUT**

1. Course Description

Basic concepts of probability and probability distribution, Standard probability distribution, Sampling and Sampling Distributions, Confidence intervals, Testing significance, Statistical tolerance, Various types of control charts, Statistical process control techniques, Defect diagnosis and prevention, Basic concepts of reliability, Reliability design evaluation and control, Method of applying total quality management into production process.

2. Scope and Objective of the Course

This course presents an exposition to the modern thoughts on quality and related practices. The principles and techniques for quality control, based on statistical methods and the procedures for quality assurance are covered. Tools for quality engineering and quality management are dealt in detail. Concepts of reliability and methods to improve product and systems reliability are also covered. The course is tailored to enable students to become successful managers in a sustained manner, thereby provide support to the business houses in their never ending quest for quality.

3. Text Book

T1 Mitra A., Fundamentals of Quality Control and Improvement, Pearson Education, 2nd Edition, 2001.

Reference Books

R1 Gryna, F. M., Chua, R. C. H. and Defeo, J. A., Juran's Quality Planning and Analysis for Enterprise Quality, Tata McGraw Hill, 5th Edition, 2007.

R2 Montgomery, D. C., Introduction to Statistical Quality Control, John Wiley & Sons, 4th Edition, 2003.

R3 Kapur, K. and Lamberson, L., Introduction to Reliability Engineering, John Wiley & Sons, 2nd Edition, 1989.

R4 Montgomery, D.C., Design and Analysis of Experiments, John Wiley & Sons, 3rd Edition, 2000.

R5 Mathews, P., Design of Experiments with Minitab, Pearson Education, 1st Edition, 2005.

Course Plan

Lecture No.	Learning Objectives	Topics to be covered	Refer to Text Book [T1]
1-2	Introduction to Quality Control and Total Quality System, Quality control in service sector	Evolution of quality control, Quality, Quality assurance, Responsibility for quality, Total quality systems, Quality cost, Quality and productivity, Service industries and characteristics, Model for service quality	Ch-1, Ch-13
3	Some philosophies and their impact on Quality	Deming's philosophy, Crosby's philosophy, Juran's philosophy	Ch-2
4	Quality Management practices, tools and standards	Management commitment, QFD, Innovative adoption and performance evaluation, Tools for continuous improvement, International standards.	Ch-3
5-10	Fundamental of statistical concepts and techniques in quality control and improvement	Descriptive statistics, Probability distributions, Inferential statistics, Concepts in sampling.	Ch-4
11-12	Graphical methods of Data presentation and quality improvement	Frequency distributions and Histograms, Run charts, Stem-and-leaf plots, Pareto diagram, Cause-and-effect diagram, Normal probability plot, Scatter diagrams, Multivariable charts.	Ch-5
19-21	Statistical process control using control charts	Causes of variation, Statistical basis for control charts, Selection of rational samples, Analysis of patterns.	Ch-6
21-25	Control chart for variables	Selection of characteristics for investigation, Control chart for mean and range, Control chart for mean and standard deviation, Other control charts	Ch-7
25-27	Control chart for attributes	Charts for proportion nonconforming, Charts for number of nonconformities, Chart for number of nonconformities per unit, Chart for demerits per unit.	Ch-8
27-31	Process capability analysis	Process capability analysis, Process capability indices, procedures for setting tolerances on assemblies and components.	Ch-9

Lecture No.	Learning Objectives	Topics to be covered	Refer to Text Book [T1]
32-35	Acceptance sampling plans for attributes and variables	Types of sampling plan, OC curve, Evaluating sampling plans, Lot by Lot attribute sampling plan, other attribute sampling plans.	Ch-10
35- 37	Reliability	Introduction to reliability, System reliability, Reliability and life testing plans	Ch-11
37-43	Design of experiment and Taguchi method	Experimental design fundamentals, Factorial experiments, Taguchi method.	Ch-12

4. Evaluation Scheme**

EC No.	Evaluation Component	Duration	Weightage	Date & Time	Nature of the Component
1	MIDSEMESTER	1.5 hrs	30%	**8/10 2:00 - 3:30 PM**	Closed Book
4	Quiz/Assignment/ Seminar/Report/Presentation (OTHERS)		30%	Will be announced in the class	TAKE HOME or CLASS ASSIGNMENT
3	COMPREHENSIVE Exam.	3 Hrs	40%	**14/12 FN**	Partially Open and Closed Book

** This course is compulsory for higher degree students (ME (Mech) and ME (MSE)). Therefore 30% mark is kept for Others.

5. Chamber Consultation hours: To be announced in the class.

6. Notices: All notices will be displayed on the Notice Board of **Mechanical Engg Dept.**

7. **Makeup policy:** Make-up will be granted only for genuine cases.

Instructor In-charge
ME F443/MF F443