STATISTICAL QUALITY CONTROL & RELIABILITY ENGINEERING

Course Code	17MEE657	**Credits**	4
Hours/Week (L-T-P)	4-0-0	**CIE Marks**	50
Total Hrs	52	**SEE Marks**	50
Exam Hrs	03	**Course Type**	Open Elective
Stream	Management		

COURSE LEARNING OUTCOMES

Students will be able to

6. Interpret the quality improvement and control techniques.
7. Formulate and analyze problems on quality control techniques and reliability.
8. Analyze problems related to quality by the help of controls chart.
9. Analyze quality related problems using controls chart for conformities and nonconformities.
10. Demonstrate the life testing reliability by specific models and reliability tests.

COURSE CONTENTS

UNIT -1- (11 Hrs)

INTRODUCTION:

The Meaning of Quality and Quality Improvement; Brief History of Quality Methodology; Statistical Methods for Quality Control and Improvement; Total Quality Management (quality philosophy, links between quality and productivity, quality costs legal aspects of quality implementing quality improvement).

UNIT -2- (11 Hrs)

MODELLING PROCESS QUALITY:

Mean, Median, Mode, Standard deviation, Calculating area, The Deming funnel experiment, Normal distribution tables, finding the Z score, Central limit theorem. Chance and assignable causes, Statistical Basis of the Control Charts

CONTROL CHARTS FOR VARIABLES:

Control Charts for X-Bar and R charts, Type I and Type II errors.

UNIT -3- (11Hrs)

CONTROL CHARTS FOR ATTRIBUTES:

Binomial distribution, Poisson distribution (from the point of view of Quality control) Control Chart for Fraction Nonconforming, Control Chart for number Nonconforming, Control Charts for Nonconformities or Defects, Control Chart for Number of non-conformities per unit

PROCESS CAPABILITY:

The foundation of process capability, Natural Tolerance limits, CP – process capability index, CPK, PP – Process performance index, summary of process measures

UNIT -4- (11 Hrs)

LOT-BY-LOT ACCEPTANCE SAMPLING FOR ATTRIBUTES:

The accepting sampling problem, single sampling plan for attributes, Double, Multiple, and sequential sampling, AOQL, LTPD, OC curves

RELIABILITY :

Introduction, Quality control and Reliability, Basic elements of reliability, Achievements of reliability, Failure mode , Effect and criticality analysis(FMECA), Total Productive Maintenance(TPM), Quality and reliability, Availability of single repairable system using Markov model

UNIT -5- (9Hrs)

LIFE TESTING – RELIABILITY

Life testing – Objective – failure data analysis, Mean failure rate, mean time to failure, mean time between failure, hazard rate – Weibull model, system reliability, series, parallel and mixed configuration – simple problems. Maintainability and availability – simple problems. Acceptance sampling based on reliability test.

TEXT BOOKS

SINO	Unit	Text Book Title	Author(s)	Publisher(s)	Edition/Year of Publication
1.	All	Statistical Quality Control	M.Mahajan	Dhanpat Rai &Co	6th Edition/ 2015
2.	All	Inspection Quality Control and Reliability	Sharma S.C.	Khanna Publishers	10th Edition /2016