

SARDAR PATEL UNIVERSITY
Programme & Subject: M.Sc (Statistics)
Semester: IV
Syllabus with Effect from: June-2013

Paper Code: PS04CSTA02	Total Credit: 4
Title Of Paper: Statistical Quality Control Techniques	

Unit	Description in Detail	Weightage (%)
I	Basic Concepts of quality control. Process control and process capability. Relation between theory of testing hypotheses and charts. choice of control limits, rational subgroup principle, allocating sampling effort, average run length. Purpose of capability Indices. Determining the process capability using, $\bar{X} - R$, $\bar{X} - S$ charts. The role of normality in determining defective parts per million. One sided specification, non-normal distributions.	25%
II	Process capability analysis: potential capability, actual capability, definitive analysis. Testing of potential capability, confidence interval of potential capability and actual capability. Gage and measurement system capability study. Setting specification limits on discret components (linear and non linear combination). Estimation of natural tolerance limit of a process.	25%
III	CUSUM charts, EWMA chart –Use of these charts for prediction. CUSUM, EWMA for controlling process variability. Comparison of these charts with Shewart charts. Acceptance control charts Acceptance sampling plan, chain sampling, continuous sampling plans, Skip –lot sampling plans. Fundamental of experimental design, one factor, two factor, blocking. Concept of interaction.	25%
IV	Process Design and Improvement with designed experiments. Use of Design of 2k- factorial design with $k \geq 1$. 2k-p fractional factorial design in SPC. Taguchi's contribution to Quality Engineering. Elements and principle of quality engineering. Steps in robust design; signal to noise ratio.	25%

Basic Text & Reference Books:-

- Montgomery, D. C. (1985) Introduction to Statistical Quality Control.(Wiley).
- Montgomery, D.C. (1985) Design and Analysis of Experiments; Wiley.
- Rayon,T.P(1989) Statistical Methods for quality improvement.John Wiley and sons.
- Ott, E.R. (1975) Process Quality Control; McGraw Hill.
- Wetherill, G.B. (1977) Sampling Inspection and Quality Control; Halsted Press.
- Wetherill, G.B. and Brown, D.W. (1991) Statistical Process Control, Theory and Practice;Chapman and Hall.
- Phadke, M.S. (1989) Quality Engineering through Robust Design; Prentice Hall.

