MA851 Statistical Quality Control and Reliability 4-0-0-4

Basic concepts in Quality Engineering: definitions, Statistical Process Control: Process evaluation and control by control charts: x-bar and R-bar charts, Moving Average and Moving Range Charts, Charts for Individuals, Median and Range Charts. Control Charts for Attributes - Non-conforming, Non-conformities (defects).Group control chart for multiple stream processes,Formation of multivariate control charts .

Monitoring techniques in control charts. OC and ARL curves of control charts, moving average control charts, EWMA charts, CUSUM charts, – two sided and one sided procedures – V – mask technique, process capability analysis, process capability indices – C_p and $C_{pk,}$capabilities of Process.Process and measurement system capability analysis - Area properties of Normal distribution,

Product quality control: Acceptance sampling methods- single, multiple and sequential sampling plans; Recent developments in inspection methods.

Concept and Definition of reliability (reliability mathematics)-Failure distributions, hazard models – exponential, Rayleigh, Weibull, Normal and Lognormal distributions - MTTF, MTBF. Reliability of systems – series and parallel configurations - Reliability improvement, redundancy, k-out-of-n system -Reliability of complex configurations,Reliability of three-state devices and Markov analysis.

Textbooks/References:

1. Douglas C. Montgomery, “Design and Analysis of Experiments”, Seventh Edition, Wiley, 2010
2.Juran J.M., “Quality Control by Design”, The Free Press, 1992
3.CharlesEbeling, “An introduction to Reliability and Maintainability Engineering”, Tata McGraw Hill, 2000.
4.HamdyA.Taha(1987):OperationsResearch– An Introduction, 4/e, Prentice Hall of India ,Private Ltd, NewDelhi.