

Discipline Specific Elective (DSE) Course: 3e Statistical Quality Management

Structure 1: PG Curricular Structure with only Course Work

Structure 2: PG Curricular Structure with Course Work + Research

Structure 3: PG Curricular Structure with Research only

Course Title & Code	Credits	Credit Distribution of the Course			Eligibility Criteria	Prerequisite of the course (if any)
		Lecture (45 Hours)	Tutorial (00 Hours)	Practical (30 Hours)		
DSE 3e: Statistical Quality Management	4	3	0	1	NIL	Basic knowledge of statistical quality control

Course Objectives:

- To understand the procedure which seeks to enhance theoretical and practical aspects of industrial management.
- To improve the quality of the output of a particular industrial process.

Course Learning Outcomes: After the completion of paper student will be able to:

- Identify and remove the cause of defects through different statistical quality management techniques.
- Practice how to minimize the variability in manufacturing and business process.
- Practice the different sampling plan for real life problem.

Unit I: (10 Hours)

Fundamentals of statistical concepts and techniques in quality control and improvement, Acceptance Control Chart, Multivariate Control Chart and Generalized Variance Chart.

Unit II: (12 Hours)

Acceptance sampling plans for inspection by variables for two sided specifications. Continuous Sampling plans. Bayesian sampling plans, designing a variable sampling plan with a specified OC curve, other variables sampling procedures, Sequential sampling plan.

Unit III: (12 Hours)

Process capability analysis and parametric estimation, confidence interval, and test of hypothesis for normally distributed characteristics. Process capability analysis for non-normal distributions, Process capability analysis using non-parametric approach.

Unit IV: (11 Hours)

Product and process design, fundamentals of experimental design, Taguchi method, loss functions, signal-to-noise ratio and performance measures, process modelling through regression analysis, Process capability analysis for auto-correlated process.

Essential Readings:

1. Grant, E.L. and Leavenworth, R.S. (2017). *Statistical Quality Control*, McGraw Hill.
2. Levinson, W.A. (2010). *Statistical Process Control for Real-World Applications*, CRC Press.
3. Montgomery, D.C. (2019). *Introduction to Statistical Quality Control*, Wiley.
4. Wetherill, G.B. (1977). *Sampling Inspection and Quality Control*, Halsted Press.

Suggested Readings:

1. Biswas, S. (1996). *Statistics of Quality Control, Sampling Inspection and Reliability*, New Age International Publishers.
2. Burr, I. W. (2020). *Statistical Quality Control Methods: 16 (Statistics: A Series of Textbooks and Monographs)*, CRC Press.
3. Dale, B. H., Carol, B., Glen, B. H., Hemant, B.U. (2018). *Total Quality Management*, Pearson.
4. Duncan A.J. (1974). *Quality Control and Industrial Statistics*, Taraporewala & Sons.
5. Knoth S. and Schmid W. (2021). *Frontiers in Statistical Quality Control*, Springer.
6. Mittag, H. J. and Rinne, H. (1993). *Statistical Methods of Quality Assurance*, Chapman & Hall.
7. Montgomery, D.C. (2010). *Statistical Quality Control: A Modern Introduction*, John Wiley & Sons.
8. Ott, E.R. (2005). *Process Quality Control: Troubleshooting And Interpretation of Data Standards media*.
9. Wetherill, G.B. Brown, D.W. (1991). *Statistical Process Control Theory and Practice*, Chapman & Hall.

List of Practicals:

1. Acceptance Control chart.
2. Multivariate Control chart.
3. Continuous sampling plan
4. Bayesian sampling plan
5. Sequential sampling plan
6. Process capability analysis