

Semester	FOUR
Paper Number	HSTCR4102T
Paper Title	Statistical Quality Control
No. of Credits	6
Theory/Composite	Composite
No. of periods assigned	Th: 4 Pr: 3
Module	single
Course description/objective	<p><i>At the end of the course, a student is expected to</i></p> <ul style="list-style-type: none"> ○ Have an exposure to the application of statistical theory in the industry. ○ Distinguish the various phases of SQC and capture the variation in quality of the manufactured items. ○ Learn about Statistical Techniques used in various phases, namely Control Charts in Process Control and Sampling Inspection Techniques in Product Control. ○ Learn to measure process capability. ○ Learn about recent developments in SQC – Six Sigma Plans, Total Quality Management, VOC and Critical to Quality Concepts.
Syllabus	<p>UNIT 1: <i>Quality:</i> Definition, dimensions of quality, historical perspective of quality control and improvements starting from World War II, historical perspective of Quality Gurus and Quality Hall of Fame. Quality system and standards: Introduction to ISO quality standards, Quality registration. Statistical Process Control - Seven tools of SPC, chance and assignable Causes of quality variation. Statistical Control Charts- Construction and Statistical basis of $3\text{-}\sigma$ Control charts, Rational Sub-grouping. [12L]</p> <p>UNIT2: <i>Control charts :</i> X-bar & R-chart, X-bar & s-chart. Control charts for attributes: np-chart, p-chart, c-chart and u-chart. Comparison between control charts for variables and control charts for attributes. Analysis of patterns on control chart. Estimation of process capability. [16L]</p> <p>UNIT 3: <i>Acceptance sampling plan for attributes:</i> Principle of acceptance sampling plans. Single and Double sampling plan their OC, AQL, LTPD, AOQ, AOQL, ASN, ATI functions with graphical interpretation, use and interpretation of Dodge and Romig's sampling inspection plan tables. [12L]</p> <p>UNIT 4:</p>

	<p>Introduction to Six-Sigma: Overview of Six Sigma, Lean Manufacturing and Total Quality Management (TQM). Organizational Structure and Six Sigma training plans- Selection Criteria for Six-Sigma roles and training plans. Introduction to DMAIC using one case study: Define Phase, Measure Phase, Analyse Phase, Improve Phase and Control Phase.</p> <p>[12L]</p>	
List of Practical	<ol style="list-style-type: none"> 1. Construction and Interpretation of statistical control charts X-bar & R chart X-bar & s-chart np- chart p-chart c-chart u- chart 2. Single sample inspection plan: Construction and interpretation of OC, AQL, LTPD, ASN, ATI, AOQ, AOQL curves. 3. Calculation of process capability and comparison of 3-sigma control limits with specification limits. 4. Use a case study to apply the concept of six sigma application in DMAIC: practical application. 	
Reading/Reference Lists	<ol style="list-style-type: none"> 1. Montgomery, D.C. (2009): Introduction to Statistical Quality control, 6th edition, Wiley India, Pvt Ltd 2. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol 2, 8th edition, The world Press, Kolkata 3. Mukhopadhyay, P. (2011): Applied Statistics, 2nd edition revised reprint, Books and Allied(P) Ltd. 4. Montgomery, D.C. and Runger, G.C. (2008): Applied Statistics and Probability for Engineers, 3rd edition reprint, Wiley India Pvt Ltd. 5. Ehrlich, B. Harris (2002): Transactional Six sigma and Lean Servicing, 2nd edition, St Lucie Press 6. Hoyle, David (1995): ISO Quality systems Handbook, 2nd edition, Butterworth Heinemann Publication. 	
Evaluation	<p style="text-align: center;">Theory</p> <p>CIA: 10 End-Sem: 50 Total: 60</p>	<p style="text-align: center;">Practical</p> <p>Continuous assessment: 40</p>
Paper Structure for End Sem Theory	Short questions (5 marks each)	Long questions (15 marks each)
	4 out of 6	2 out of 3