



T.Y.B.Sc. (Mathematics) Semester-VI

Minor Course – VI (Statistics)

COURSE NAME: Statistical Quality Control

COURSE CODE: STMN-S6P6-2CR26 [CREDITS - 02]

Course learning outcome		
At the end of this course, Students will be able to 1. explain the fundamental concepts and objectives of Statistical Quality Control (SQC). 2. differentiate between types of control charts and select appropriate charts for variable and attribute data 3. construct and interpret control charts to monitor and improve quality in manufacturing and service processes. 4. understand and apply the concepts of acceptance sampling, including OC curves, risks, AQL, and LTPD. 5. design and evaluate single and double sampling plans for quality inspection in industrial applications.		
Module 1	Statistical Techniques in quality control	[15L]
Learning Objective 1. Understand the concept, objectives, and importance of Statistical Quality Control (SQC) in quality management. 2. Identify types and causes of variation in processes and learn the fundamentals of control charts. 3. Construct and interpret variable control charts using 3σ limits and apply the theory of runs to detect non-random patterns.		
Learning Outcomes: At the end of this module the learner will be able to 1. define Statistical Quality Control and explain its objectives and significance in quality improvement. 2. identify and differentiate between common and assignable causes of process variation. 3. construct and interpret control charts for variables and attributes using 3σ limits and apply the theory of runs for process analysis.		
1.1	• Introduction of Statistical Quality Control (SQC), Objectives of SQC • Causes of variations • Types of Quality Control charts • Advantages of a control chart	[6L]



	• 3σ limits • Theory of runs	
1.2	• Construction of Control chart for variables: ○ R Chart ○ σ Chart and ○ $\bar{x}$ Chart • Problems of above topics	[4L]
1.3	• Construction of Control chart for attributes: ○ p Chart ○ np Chart and ○ c Chart and its uses • Problems of above topics • Difference between variable charts and attribute charts	[5L]
Module 2	Acceptance sampling plan for attributes	[15L]
Learning Objective 1. Understand the concept and need for acceptance sampling in quality control. 2. Learn the differences between 100% inspection and sample inspection. 3. Understand key terms like Producer's Risk, Consumer's Risk, AQL, LTPD, and OC curves. 4. Understand the procedure for designing and implementing a Single and Double Sampling Plan. 5. Learn the key performance measures: OC curve, ASN, AOQ, AQL, and ATI. 6. Develop problem-solving skills related to single and double sampling plans.		
Learning Outcomes: At the end of this module the learner will be able to 1. understand acceptance sampling plans (Single, Double, and Multiple Sampling). 2. use and analyze OC curve, AOQ curve, ASN curve and ATI curve (Single sampling plan, double sampling plan).		
2.1	• Introduction: ○ Role of Acceptance sampling ○ Explain: 100% inspection and Sample inspection, Producer's risk and Consumer's risk, Good and bad lots, AQL, LTPD ○ OC curve, Ideal OC curve	[3L]
2.2	• Single Sampling Plan: ○ Procedure	[5L]



	○ OC curve, ASN, AOQ and AOQL, ATI ○ Problems of above topics	
2.3	● Double Sampling Plan: ○ Procedure ○ OC curve, ASN, AOQ and AOQL, ATI ○ Problems of above topics	[7L]

References:

1. Mukhopadhyay P.: Applied Statistics, Revised 2/e New Central Book Agency (1999).
2. Gupta SC, Kapoor V.K.: Fundamentals of Applied Statistics, Revised 4/e Sultan Chand & Sons (2007).
3. Montgomery D.C. (2001): Introduction to Statistical Quality Control, 4/e Wiley & Sons.
4. Grant E.L. (2000): Statistical Quality Control, 7/e., Tata Mcgraw Hill
5. Ott E.R. (1975): Process Quality Control, McGraw Hill.
6. Wetherill G.B. (1977): Sampling Inspection and Quality Control, 2/e Halsted Press, USA.
7. Wetherill G.B. and Brown D.W. (1991): Statistical Process Control, Theory and Practice, 3/e Chapman and Hall.

Course Learning Outcomes	Programme Outcomes					
	1	2	3	4	5	6
Explain the fundamental concepts and objectives of Statistical Quality Control (SQC).	X					X
Differentiate between types of control charts and select appropriate charts for variable and attribute data		X			X	
Construct and interpret control charts to monitor and improve quality in manufacturing and service processes.		X	X		X	
Understand and apply the concepts of acceptance sampling, including OC curves, risks, AQL, and LTPD.		X		X		
Design and evaluate single and double sampling plans for quality inspection in industrial applications			X	X	X	



Question Paper Template

Unit	Remembering/ Knowledge (1)	Understanding (2)	Applying (3)	Analysing (4)	Evaluating (5)	Creating (6)	Total marks
I	20%	60%	-	-	20%	-	100%
II	20%	60%	-	-	20%	-	100%



T.Y.B.Sc. (Mathematics) Semester-VI

COURSE NAME: Statistics Minor Lab Course VI

COURSE CODE: STMN-S6PR6-2CRC26 Credit- 02

Course Learning Outcomes		
After the successful completion of the Course, the learner will be able to:		
1. construct and interpret control charts for variables to monitor process stability. 2. construct and interpret control charts for attributes to evaluate product quality. 3. apply statistical methods to develop and evaluate acceptance sampling plans.		
PRACTICAL VI	STMN-S6PR6-2CRC26	[60 Hr]
1 Construction and interpretation of $\bar{x}$ and R chart. 2 Construction and interpretation of Revised $\bar{x}$ and R chart. 3 Construction and interpretation of p chart. 4 Construction and interpretation of Revised p chart. 5 Construction and interpretation of np chart. 6 Construction and interpretation of Revised np chart. 7 Construction and interpretation of c chart. 8 Construction and interpretation of Revised c chart. 9 Examples of Single sampling plan. 10 Examples of Double sampling plan.		
Minimum number of experiments: 8		
