



Techno India NJR Institute of Technology

Academic Administration of Techno NJR Institute

Syllabus Deployment

Name of Faculty	: Mrs Abhishek Sharma	Subject Code: 7ME4-23
Subject	: Quality Control Lab	
Department	: Mechanical Engineering	Sem: VII
Total No. of Lectures Planned: 16		Max. Marks: 50(IA: 30, ETE: 20)

COURSE OUTCOMES:

At the end of this course students will be able to:

- CO1: Understand the role of statistical tools in quality improvement.
- CO2: Understand the different types of variability, rational subgroups, and how a control chart is used to detect assignable causes.
- CO3: Construct and interpret control charts for variables such as \bar{x} , r , s , and individuals charts.
- CO4: Conduct the experiments related to probability distribution.
- CO5: Solve the SQC problems using MINITAB software.

Lecture No.	Exp. No.	Topic
1	1	CASE STUDY ON X BAR CHART AND R CHART of an industrial process output and process capability analysis of the process. The charts are to be drawn and calculations of process capability analysis to be reported. Introduction to X bar and R chart, Development and use of X bar and R chart, Estimating process capability.
2	1	To perform a case study on X bar and R chart, and to construct the charts. To interpret result and concluding the case study.
3	2(a)	TO VERIFY THE BINOMIAL DISTRIBUTION of the number of defective balls by treating the balls with a red colour to be defective. Introduction to Binomial distribution.
4	2 (a)	Conducting experiment and calculating the probabilities.
5	2(b)	TO PLOT A P -CHART by taking a sample of $n=20$ and establish

		control limits. Introduction to P chart, Development and use of P chart.
6	2(b)	To plot a P chart and interpret result
7	3	CASE STUDY ON C-CHART of a product and establish control limits. Introduction to C chart, Development and use of C chart.
8	3	To plot a C chart and interpret result
9	4(a)	TO PLOT THE OPERATING CHARACTERISTICS CURVE FOR SINGLE SAMPLING ATTRIBUTE PLAN for $n = 20$; $c = 1, 2, 3$. Designate the red ball as defective. Introduction to OC curve and Single sampling plan To plot OC curve and interpret result
10	4(b)	TO COMPARE THE ACTUAL O.C. CURVE WITH THEORETICAL O.C. CURVE using approximation for the nature of distribution
11	5(a)	TO VERIFY NORMAL DISTRIBUTION using the experimental setup.
12	5(b)	TO FIND THE DISTRIBUTION of numbered cardboard chips by random drawing one at a time with replacement. Make 25 subgroups in size 5 and 10 find the type of distribution of sample average in each case. Comment on your observations
13	6	TO CARRY OUT VERIFICATION OF POISSON DISTRIBUTION using experimental set up.
14	7(a)	TO SHOW THAT A SAMPLE MEANS FOR A NORMAL UNIVERSE FOLLOW A NORMAL DISTRIBUTION
15	7(b)	TO SHOW THAT THE SAMPLE MEANS FOR A NON-NORMAL UNIVERSE ALSO FOLLOW A NORMAL DISTRIBUTION.
16	8	SOLVE QUALITY CONTROL PROBLEMS using SPC software MINITAB.

Additional activities: As it is specified in RTU to solve quality problems using SPC Software Minitab. So, the above experiments are solved theoretically using formulae and the same are solved in MINITAB software, this helps in comparing and concluding the findings in a more better manner.

The additional lectures are planned for the same to learn and perform the experiments on MINITAB. Below are some of the specific topics planned to discuss.

Sr.no.	Topic
1.	<u><i>To plot Control charts for X bar and R , P chart, np chart , C chart and U chart</i></u>
	All the options related to control chart are used to interpret result and considering special requirements. Options used are Scale, Labels, Multiple graphs, Data options and chart specific options.
2.	<u><i>To check for Probability distribution</i></u>
	Options in Minitab like Probability distribution plots and calc/Probability distribution are used to solve the questions for Normal, Binomial, Poisson and Hyper geometric distributions.
3.	<u><i>Magnificent seven using MINITAB using case study.</i></u>
4.	<u><i>To create a sampling plan and compare sampling plan (OC curve)</i></u>

TEXT/REFERENCE BOOKS

1. STATISTICAL QUALITY CONTROL BY DOUGLAS C. MONTGOMERY
2. STATISTICAL QUALITY CONTROL BY M. MAHAJAN , DHANPAT RAI & CO.