Statistical Quality Control/ Process Control

This course covers the use of statistics and problem solving methods to improve the quality of products. The term statistical quality control is often used to cover all uses of statistical techniques for the control of product quality. This course will focus on how quality improvement methods can be applied to several areas of a company including manufacturing, process development, engineering design, and production design. The technical tools needed to achieve quality improvement in different areas of a company will be examined. One of the important concepts of quality control and improvement is the understanding of variability. The companies find it difficult to provide the customer with products that have flawless quality characteristics.

The reason for this is variability. No two products are identical, and there is always a certain amount of variability in every product. If this variation is large, the product becomes unacceptable. It is important to understand the variability and also the sources of variability so that it can be reduced or eliminated if possible. Quality improvement includes the reduction of variability in products and processes. This variation can only be described in statistical terms. In this course we will learn the sources of variability and also, how to control them using quality control methods.

The course will be focused on the following topics: an overview of statistical techniques including the descriptive and inferential statistics, review of probability and probability distributions useful in quality control, concepts of sampling and sampling distributions and inference procedure including estimation and hypothesis testing, control charts for measurable quality characteristics including the charts for variables, or charts for x-bar and R (average and range), and s (charts for average and0charts for x-bar standard deviation), charts for fraction rejected or the p-chart , the c-chart and the u-chart , the portion of sampling theory which deals with the quality protection given by any specified sampling acceptance procedure, and design and analysis of various control charts using the computer(MINITAB).

Upon completion of this course, you should be able to:

- understand the use and importance of Quality as a field
- understand the statistical techniques useful in quality control/process control
- understand the methods and philosophy of control charts and why control charts work

- set up and use x-bar and s charts, individual, x-bar and R chart, other charts for variables (moving range charts, etc.)
- understand the concepts of process capability analysis and techniques of process capability
- set up and use control charts for attributes (p-chart, np-chart, c-chart, u-chart)
- understand the concepts and uses of sampling plans
- use of computer to solve quality related problems, and
- understand the control tools in Six Sigma.