

STAT-807 Statistical Process Control (3 Credit Hours)

1. Objectives

This course aims to introduce students to the univariate, multivariate, Bayesian, parametric and nonparametric control charts and procedures.

2. Course Contents

Introduction to statistical process control and its tools, Multivariate process monitoring through Hotelling T² charts. Chi-square chart, generalized variance chart. Multivariate EWMA and CUSUM charts. Robustness and nonparametric approaches for process monitoring, Some Bayesian structures for quality control, Covariates and process improvement, Process capability study, Introduction of six sigma, Designed experiment and process monitoring, Acceptance sampling and acceptance sampling plans. Advancements in techniques for quality improvement and quality assurance, Taghuchi's methods for quality control, Evolutionary operation and process improvement, Introduction to statistical software for SPC. Related applications/computations with R.

3. Recommended Books

- i. Oakland, J.S. Statistical Process Control, 6th Edition. Butterworth-Heinemann, Elsevier Science Publisher (2007).
- ii. Montgomery, D.C., Introduction to Statistical Quality Control, 5th Edition. John Wiley & Sons (2004).
- iii. Alwan, L.C., Statistical Process Analysis, McGraw-Hill (2000)
- iv. Farnum, N.R., Statistical Quality Control and Improvement, Duxbury (1994).
- v. Wheeler, D. J. Advanced Topics in Statistical Process Control- the Power of Shewhart's Charts, SPC Press, Knoxville (1995).

4. Outcomes

On successful completion of this course, students will be able to monitor the univariate and multivariate process based on variables and /or attributes. Moreover, students will be able to conduct the acceptance sampling and modern process/quality design procedures.