Jimma University
College of Natural Science
Department of Statistics

Course title :   Statistical Quality Control (Stat*3142*)
Course code: *Stat 3142*
Credit hours: *3*
Contact hours: 3hrs (3 lecture hrs+1hr tutorial+1hr lab)
Instructor's Name: Mr. Reta H.
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Course description
Introduction; Basic methods of statistical process control; Other statistical process-monitoring and control techniques; Acceptance sampling; Reliability and Life testing; Ethiopian experience in Statistical quality control, field trip and reporting.
Objective
   ❖ To introduce the most common statistical methods for statistical quality control (SQC).
Learning outcomes
Upon the completion of the course students are expected to:
   ❖ Identify application of various Statistical quality tools,
   ❖ Specify the parameters and information needed to make SQC records useful for trouble-shooting and problem-solving,
   ❖ Use control chart techniques for quality improvement,
   ❖ Identify the regulatory and accreditation requirements for SQC for tests of interest,
   ❖ Perform a critical review of laboratory practices for planning, establishing, and operating a SQC procedure,
   ❖ Select control materials that are appropriate for tests of interest.
   ❖ Calculate SQC statistics,
   ❖ Carry out reliability tests,
   ❖ Evaluate the status of Ethiopian experience in statistical quality control.

Course outline:
1. **Introduction (6 lecture hours)**
    1.1. Quality Improvement in the Modern Business Environment.
    1.2. Modeling Process Quality.
2. **Methods of Statistical Process Control and Capability Analysis (21 lecture hours)**
    2.1. Methods and Philosophy of Statistical Process Control..
    2.2. Control Charts for Variables.
    2.3. Control Charts for Attributes.
    2.4. Process and Measurement System Capability Analysis.
3. **Other Statistical Process-monitoring and Control Techniques (10 lecture hours)**
    3.1. Cumulative Sum and Exponentially Weighted Moving Average Control Charts.
    3.2. Other Univariate Statistical Process Monitoring and Control Techniques.
    3.3. Multivariate Process Monitoring and Control.

4. **Acceptance Sampling (6 lecture hours)**
    4.1.Concepts of acceptance sampling
    4.2.Lot-by-lot acceptance sampling for attributes.
    4.3.Other acceptance sampling techniques
5. **Reliability and Life Testing (5 lecture hours)**
    5.1.Introduction
    5.2.Common models and distributions
    5.3.Estimation of mean life with complete samples
    5.4.Reliability Estimation
    5.5.Types of reliability tests

Textbook
Montogomery D. C. (2005) Introduction to Statistical Quality Control (5th Edition) Arizona State University.

References
1) Chang D. and Macmillan S. (1992). Statistical Quality Design and Control. Contemporary Concepts and Methods..
2) Donald J. (1992). Statistical Process Control (2nd edition). SPS Press.
3) Lenz, H.-J. and Wilrich, P.-TH (2004). Frontiers in Statistical Quality Control. Wiley, New York..
4) Thomas P. R. (2000). Statistical Methods for Quality Improvement,(2nd edition). Wiley, New York. 5. Vardeman, S.B. (1994). Statistics for engineering problem solving. Boston: PWS.
5) Vardeman, S.B., & Jobe, J.M. (1999). Statistical quality assurance methods for engineers.
6) Vardeman, S.B., & Jobe, J.M. (2001). Basic engineering data collection and analysis. Pacific Grove, CA: Duxbury.
7) Westgard J. O. (2002). Basic QC Practices (2nd edition)

Teaching methods
Lecture, reading assignment, exercises and tutorial.

Mode of Assessment

Tests and/or assignments:	30%
Field trip and report:	20%
Final Exam:	50%
Total :	100%