COURSE AGENDA

Day One

- Introductions and Course Administration
- Chapter I – Foundations
- Statistics Review
- Types of Variables
  - Random Samples, Means, Variance, Standard Deviation
  - Seatwork Problems on Statistics
  - Random Sample, Population
  - Sample Statistics, Population Statistics
  - Population Distributions
  - Central Limit Theorem
  - Distribution of the Mean
  - Variance as the Primary Criminal
- Relationship of Quality Programs
  - Statistical Process Control (SPC)
  - Comparison of SPC to DOE
  - DOE Origins
  - SPC Discussion
  - Statapult Introduction
  - SPC Rapid Fire Class Project – Break up into teams of about 5 or 6
- Relationship of Quality Programs, Continued
  - Discussion SPC Rapid Fire Class Project Results
  - Six Sigma
  - Lean
  - Lean Six Sigma
  - Quality Improvement Example
  - DOE Examples
  - DOE Class Project (Two Variable, Two Settings) – Same Teams
- Relationship of Quality Programs, Continued
  - Discussion of DOE Class Project (Two Variable, Two Settings) Results
  - Load course software into your computer
  - Analysis of Results
  - Discussion and Comparison of Results
- Chapter I Homework: Please Read/Skim Chapter One (Foundations) and Chapter Two (Conducting Experimental Designs and Analysis) in Course Text

Day Two

- Chapter II – Simple DOE Examples and Projects
  - Review of Chapter I
  - Why Use DOE?
    - Reduction in Variation
    - General DOE Outcomes
    - Advantages of DOE
  - Set the Conditions for Successful DOE
    - Input-Process-Output (IPO) Diagram
    - Process Flow Diagram
    - Fishbone / Ishikawa / Cause and Effect (CE) Diagram
  - Team Seatwork: Diagram the Statapult Using IPO and CE
- Chapter II – Simple DOE Examples and Projects, Continued
  - Coding and Uncoding Data
  - Example DOE Calculations By Hand
  - Example DOE Calculation By Computer
  - Using Output Equations to Determine Input Settings
  - Confirmation Runs
  - Hypothesis Testing
  - Setting Acceptable Risk Value
  - Confirmation Run Statistical Tests
  - P-Value
- Chapter II – Simple DOE Examples and Projects, Continued
  - 3-Variable, 2-Level Example
  - Comparison with Tabular Presentation, Regression, Balanced Design
  - KISS Guideline
  - Class Projects – Same Teams
    - Class Project One: Two Variables, Two Levels (Use Computer)
    - Class Project Two: Three Variables, Two Levels (Use Computer)
    - Discussion, Presentation, and Comparison of Results
- Chapter II Homework: Please Read/Skim Chapter 3 (Design Types) and Chapter 5 (Analysis of Experimental Data) in Course Text
- Chapter III – Fractional Factorial and Screening Designs
  - Review of Chapter II
  - Example of Fractional Factorial DOE
    - Half-Fractional Factorial Design and Aliasing
    - Class Project One: 4 Runs, 3 Variable, Two Levels (Same Teams)
    - Discussion and Comparison

Day Three

- Chapter III – Fractional Factorial and Screening Designs
  - Seatwork: Full Factorial, 2-Factor, 2-Level and More Complex Designs
  - Discussion of “Defining Word” and “Defining Relation”
  - Resolution
  - Foldover Designs and Blocking Variables
  - Screening Design Example
  - Class Project Two: Screening Design (Sam Teams)
  - Suggested Reading for Chapter III: Chapter 3 (Design Types) in Course Text
- Chapter IV – Finding Interactions
  - Review if Chapter III
  - Robust Designs
  - Screening Designs
    - Types of Designs
    - Examples: Interactions/No Interactions
    - Graphical Analysis Techniques (Two and Three Dimensions)
    - Class Project One (Same Teams)
- Chapter V – Finding Quadratic Effects
  - Review of Chapter IV
  - Experiments to Locate Quadratic Effects
  - Three-Level Designs
  - Full Factorial Designs to Locate Quadratics
  - D-Optimal Designs
  - Fractional and Latin Square Designs
  - Box-Behnken Designs
  - Box-Wilson/Central Composite Design
- Final and Conclusion
  - Review of Topics Covered and Objectives
  - Reminder of Course Feedback Form
  - Restate Contact Info for Instructor
  - Final Class Project / Challenge (Same Teams)
    - Complete 3-Factor, 2-Level, 4 Replication Design
    - Challenge: Hit the Target/Quarter/Cup on 4 Out of 5 Attempts