Lean Six Sigma Black Belt Course Content and Outline

Introduction:

- What is Six Sigma? Input/Output (X and Y) Relationship
- Six Sigma and Lean Enterprise
- Defects Per Million Opportunities Metric (DPMO)
- Success Stories
- Six Sigma History
- D-M-A-I-C Process
- Thought Process Mapping
- Six Sigma Organizational Structure
- Role of the Black Belt
- Exercises and Quiz

Define I - Prioritize:

- Process Thinking
- Process Mapping
- Flow Charts, Value-Added Flow Charts, Deployment Flow Charts
- Spaghetti Diagrams
- Value Stream Mapping (Takt Time, Line Balancing)
- Balanced Scorecard
- Pareto Chart
- Project Selection
- Project Charter
- Project Tracking - Gantt Chart
- Stakeholder Analysis
- Exercises and Quiz

Define II - Voice of the Customer:

- Customer Satisfaction & Kano Model
- Sample Surveys
- Survey Construction
- Margin of Error
- Affinity Diagrams
- CTQC Tree Diagrams, Critical to Quality Characteristics (CTQC's)
- Setting Specifications
- Quality Function Deployment
- Operational Definition
- Exercises and Quiz

Measure I: Measurement and Basic Statistics

- Variable and Attribute Data
- Role of Statistics in Solving Business Problems
- Statistical Terms
- Variable and Attribute Data
- Types of Measurements
- Graphical Analysis
- Histograms
- Measuring Central Tendency
- Measuring Process Variability
- Normal Probability Distribution, Z-Scores
- Exercises and Quiz

Measure II: Measurement System Analysis

- Cause and Effect Matrix
- Measurement System Analysis
- Variable Data Gage R&R
- Attribute Agreement Analysis (Attribute Gage R&R)
- Sampling Plan
- Data Collection - Check Sheet
- Baseline DPMO & Sigma Conversion
- Rolled Throughput Yield
- Exercises and Quiz

Measure III: Charting Process Behavior

- Trend Chart
- Statistical Process Control
- Rational Subgrouping
- X and Moving Range Control Charts
- Attribute Control Charts
- X-bar and R Control Charts
- Process Capability
- Exercises and Quiz

Analyze I - Potential Root Cause

- Cause and Effect Diagrams (Fishbone Charts)
- Five-Why, One-How

- FMEA
- Scatter Plots
- Regression and Correlation Analysis
- Multiple Regression
- Logistic Regression
- Exercises and Quiz

Analyze II - Hypothesis Testing

- Introduction to Hypothesis Testing
- Confidence Intervals and Hypothesis Testing
- Comparison of Two Treatments: Z-test, F-Test, t-test
- Comparison of Multiple Treatments - ANOVA, Chi-Square for Multiple Proportions
- Comparison of Variances - Chi-Square Test
- Non-parametric Testing
- Hy-Court TV TM Learning Lab
- Exercises and Quiz

Analyze III - Design of Experiments

- Introduction to Design of Experiments
- Single Factor Experiments
- Full Factorial Experiments
- Fractional Factorial Experiments
- General Factorial Experiments
- Experiment Simulations
- Advanced Topics
- Exercises and Quiz

Improve

- Design for Manufacturability/Serviceability/Repairability (DFSS)
- Brainstorming
- Continuous Flow (Little's Law)
- Quick Changeovers
- Implementing Work Cells
- Theory of Constraints
- Pull Scheduling
- Narrowing the List of Ideas
- FMEA
- Error-proofing
- Corrective Action Matrix
- Piloting a Solution
- System Dynamics

- Exercises and Quiz

Control:

- Control Plan
- SPC Revisited
- FMEA Revisited
- Visual Control - 5-S
- CHECK Process
- Total Productive Maintenance
- Best Practices - Integrating Success
- Exercises and Quiz

Tools for Success

- Leadership
- Team Development
- Leading Teams
- Leading Change
- Exercises and Quiz