SPARC
ENGINEERS

Lean Six Sigma Green Belt – Body of Knowledge

1. Introduction to Lean Six Sigma

- History and purpose of Lean Six Sigma
- Difference between Lean and Six Sigma
- Benefits of combining Lean and Six Sigma
- Introduction to the Theory of Constraints
- Roles and responsibilities:
    - Yellow Belt
    - Green Belt
    - Black Belt
    - Master Black Belt
    - Project Champion

2. Lean Fundamentals

- Waste reduction versus variation reduction
- Lean as a waste-reduction system
- Six Sigma as a variation-reduction system
- Value-added versus non-value-added work
- The 8 wastes, or TIMWOODS
- Standard work
- Visual management
- 5S principles
- Push versus pull systems
- PDCA cycle
- Kaizen and continuous improvement

3. DMAIC Framework Overview

- Define
- Measure
- Analyze
- Improve
- Control
- DMAIC as the core Green Belt project structure
- Continuous improvement cycle

4. Define Phase

- Voice of the Customer, or VOC
- SIPOC diagram
- Problem statement
- Project charter

- Stakeholder analysis
- Stakeholder matrix
- Critical to Quality characteristics, or CTQs
- Translating customer needs into measurable requirements

5. Measure Phase

- Process mapping
- Data collection planning
- Types of data:
    - Quantitative data
    - Qualitative data
    - Continuous data
    - Discrete data
    - Nominal data
    - Ordinal data
- Basic process metrics:
    - Cycle time
    - Takt time
- Measurement System Analysis, or MSA
- Gage R&R
- Relationship between MSA, SPC, and process capability

6. Analyze Phase

- Root cause analysis
- 5 Whys
- Fishbone, or Ishikawa, diagrams
- Pareto charts
- Prioritization matrix
- Hypothesis testing
- Correlation and regression
- Failure Modes and Effects Analysis, or FMEA

7. Improve Phase

- Brainstorming solutions
- Prioritizing improvement ideas
- Impact-effort matrix
- Weighted criteria matrix
- Kaizen events
- Design of Experiments, or DOE
- One-factor-at-a-time testing versus DOE
- Pilot testing
- Validating improvements before full rollout

- Poka-yoke, or mistake proofing

8. FMEA and Risk Reduction

- Introduction to FMEA
- Failure modes, effects, and causes
- Severity, occurrence, and detection
- Risk Priority Number, or RPN
- Process FMEA versus Design FMEA
- Using FMEA to prevent defects, downtime, and customer issues

9. Control Phase

- Control plans
- Process documentation
- Standard operating procedures
- Work instructions
- Forms and documentation control
- Introduction to control charts
- Common cause versus special cause variation
- Western Electric rules
- Control charts versus capability charts
- Sustaining improvement