Six Sigma Black Belt

I. Organization wide Planning and Deployment

A. Organization wide Considerations

1. Fundamentals of Six Sigma and lean methodologies
2. Six Sigma, lean, and continuous improvement methodologies
3. Relationships among business systems and processes
4. Strategic planning and deployment for initiatives

B. Leadership

1. Roles and responsibilities
2. Organizational roadblocks and change management

II. Organizational Process Management and Measures

A. Impact on Stakeholders

B. Benchmarking

C. Business Measures

1. Performance measures
2. Financial measures

III. Team Management

A. Team Formation

1. Team types and constraints
2. Team roles and responsibilities
3. Team member selection criteria
4. Team success factors

B. Team Facilitation

1. Motivational techniques
2. Team stages of development
3. Team communication
4. Team leadership models

C. Team Dynamics

1. Group behaviors
2. Meeting management
3. Team decision-making methods

D. Team Training

1. Needs assessment
2. Delivery
3. Evaluation

IV. Define

A. Voice of the Customer

1. Customer Identification
2. Customer data collection
3. Customer requirements

B. Business Case and Project Charter

1. Business case
2. Problem statement
3. Project scope
4. Goals and objectives
5. Project performance measurements
6. Project charter review

C. Project Management (PM) Tools

1. Gantt charts
2. Toll-gate reviews
3. Work breakdown structure (WBS)
4. RACI model (responsible, accountable, consulted, and informed)

D. Analytical Tools

1. Affinity diagrams
2. Tree diagrams
3. Matrix diagrams
4. Prioritization matrices
5. Activity network diagrams

V. Measure

A. Process Characteristics

1. Process flow metrics
2. Process analysis tools

B. Data Collection

1. Types of data
2. Measurement scales
3. Sampling
4. Data collection plans and methods

C. Measurement Systems

1. Measurement system analysis (MSA)
2. Measurement systems across the organization
3. Metrology

D. Basic Statistics

1. Basic statistical terms
2. Central limit theorem
3. Descriptive statistics
4. Graphical methods
5. Valid statistical conclusions

E. Probability

1. Basic concepts
2. Distributions

F. Process Capability

1. Process capability indices
2. Process performance indices
3. General process capability studies
4. Process capability for attributes data
5. Process capability for non-normal data
6. Process performance vs. specification
7. Short-term and long-term capability

VI. Analyze

A. Measuring and Modeling Relationships between Variables

1. Correlation coefficient
2. Linear regression
3. Multivariate tools

B. Hypothesis Testing

1. Terminology
2. Statistical vs. practical significance
3. Sample size
4. Point and interval estimates
5. Tests for means, variances, and proportions
6. Analysis of variance (ANOVA)
7. Goodness-of-fit (chi square) tests
8. Contingency tables
9. Non-parametric tests

C. Failure Mode and Effects Analysis (FMEA)

D. Additional Analysis Methods

1. Gap analysis
2. Root cause analysis
3. Waste analysis

VII. Improve

A. Design of Experiments (DOE)

1. Terminology
2. Design principles
3. Planning experiments
4. One-factor experiments
5. Two-level fractional factorial experiments
6. Full factorial experiments

B. Lean Methods

1. Waste elimination
2. Cycle-time reduction
3. Kaizen
4. Other improvement tools and techniques

C. Implementation

VIII. Control

A. Statistical Process Control (SPC)

1. Objectives
2. Selection of variables
3. Rational subgrouping
4. Control chart selection
5. Control chart analysis

B. Other Controls

1. Total productive maintenance (TPM)
2. Visual controls

C. Maintain Controls

1. Measurement system reanalysis
2. Control plan

D. Sustain Improvements

1. Lessons learned
2. Documentation
3. Training for process owners and staff
4. Ongoing evaluation

IX. Design for Six Sigma (DFSS) Framework and Methodologies

A. Common DFSS Methodologies

B. Design for X (DFX)

C. Robust Designs