

## Program Outline



### Black Belt

Run Time (h:mm:ss)

#### Global Concepts

32:07:40

##### Training Orientation

1:29:43

Excel Orientation	Explore the Excel software package	0:29:01
Minitab Orientation	Explore the Minitab software package	0:31:42
Simulator Orientation	Explore the Process Simulator	0:29:00

##### Breakthrough Vision

8:34:32

Content Overview	Understand the nature, purpose, and drivers of Six Sigma	2:09:06
Driving Need	Identify the needs that underlie a Six Sigma initiative	1:20:46
Customer Focus	Explain why focusing on the customer is essential to business success	0:34:34
Core Beliefs	Contrast the core beliefs of Six Sigma to conventional practices	1:24:39
Deterministic Reasoning	Describe a basic cause-and-effect relationship in terms of $Y=f(X)$	0:52:57
Leverage Principle	Relate the principle of leverage to an improvement project	0:38:29
Tool Selection	Identify the primary family of analytical tools used in Six Sigma work	0:24:15
Performance Breakthrough	Explain how a benchmarking chart can be used to assess quality performance	1:09:46

##### Business Principles

5:17:31

Quality Definition	Articulate the idea of quality in terms of value entitlement	0:17:05
Value Proposition	Define the primary components of value and their key elements	0:20:13
Metrics Reporting	Recognize the need for installing and reporting performance metrics	1:07:59
BOPI Goals	Recognize the need for cascading performance metrics	0:12:00
Underpinning Economics	Describe the relationship between quality and cost	0:35:12
Third Generation	Differentiate between the first, second and third generations of Six Sigma	0:51:39
Success Factors	Identify the primary success factors related to a Six Sigma deployment	1:53:23

##### Process Management

9:36:08

Performance Yield	Explain why final yield is often higher than first-time yield	1:14:06
Hidden Processes	Describe the non-value added component of a process	0:40:57
Measurement Power	Describe the role of measurement in an improvement initiative	0:33:38
Establishing Baselines	Explain why performance baselines are essential to realizing improvement	0:45:52
Performance Benchmarks	Explain how a benchmarking chart can be used to assess quality performance	1:00:58
Defect Opportunity	Understand the nature of a defect opportunity and its role in metrics reporting	1:01:18
Process Models	Define the key features of a Six Sigma performance model	1:11:11
Process Capability	Identify the primary indices of process capability	1:21:53
Design Complexity	Describe the impact of complexity on product and service quality	1:17:32
Product Reliability	Explain how process capability can impact product reliability	0:28:43

## Installation Guidelines

<b>Installation Guidelines</b>		<b>3:45:54</b>
Deployment Planning	<i>Understand the elements of Deployment Planning</i>	0:44:14
Deployment Timeline	<i>Understand the elements of Deployment Planning</i>	0:23:24
CXO Role	<i>Receive insight on how key decisions are addressed</i>	0:02:30
Champion Role	<i>Define the operational role of a Six Sigma Champion and highlight key attributes</i>	0:09:50
Black Belt Role	<i>Define the operational role of a Six Sigma Black Belt and highlight key attributes</i>	0:53:38
Green Belt Role	<i>Define the operational role of a Six Sigma Green Belt and highlight key attributes</i>	0:19:35
White Belt Role	<i>Define the operational role of a Six Sigma White Belt and highlight key attributes</i>	0:28:23
Application Projects	<i>Describe the purpose of Six Sigma Application Projects and how such projects are executed</i>	0:08:34
DFSS Principles	<i>See how product design can affect yield and performance</i>	0:18:13
PFSS Principles	<i>Have an understanding of the Process For Six Sigma Criteria</i>	0:14:39
MFSS Principles	<i>Understand how Managing For Six Sigma works</i>	0:02:54

## Application Projects

<b>Application Projects</b>		<b>3:23:52</b>
Project Description	<i>Understand how to fully define a Six Sigma application project</i>	0:22:13
Project Overview	<i>Provide an overview of the key elements that characterizes an application project</i>	0:17:48
Project Guidelines	<i>Explain how to establish project selection guidelines</i>	0:12:54
Project Scope	<i>Explain how to properly scope an application project</i>	0:08:42
Project Leadership	<i>Recognize the actions that must occur to ensure successful project leadership</i>	0:51:44
Project Teams	<i>Form a project team that is capable of supporting Six Sigma applications</i>	0:16:25
Project Financials	<i>Understand the role of project financials in supporting deployment success</i>	0:04:31
Project Management	<i>Explain how application projects are best managed to achieve maximum results</i>	0:04:32
Project Payback	<i>Understand the driving need for establishing project paybacks</i>	0:13:43
Project Milestones	<i>Identify the primary milestones associated with a successful Six Sigma deployment</i>	0:31:17
Project Charters	<i>Understand the role of project charters and how they are used to guide implementation</i>	0:20:03

## General Practices

**38:58:03**

### Value Focus

<b>Value Focus</b>		<b>1:44:01</b>
Value Creation	<i>Define the idea of value and explain how it can be created</i>	0:49:39
Recognize Needs	<i>Recognize the power of need fulfillment and how it links to value creation</i>	0:05:21
Define Opportunities	<i>Understand how to define opportunities that lead to the creation of value</i>	0:04:01
Measure Conditions	<i>Identify and evaluate the conditions that underlies improvement opportunity</i>	0:05:55
Analyze Forces	<i>Explain how the underlying forces are identified and leveraged to create beneficial change</i>	0:06:19
Improve Settings	<i>Establish optimal settings for each of the key forces that underpins beneficial change</i>	0:05:14
Control Variations	<i>Discuss how unwanted variations can mask the pathway to breakthrough</i>	0:06:24
Standardize Factors	<i>Understand the role and importance of standardized success factors</i>	0:06:19
Integrate Lessons	<i>Explain how key lessons learned can be merged into a set of best practices</i>	0:04:25
Application Example	<i>Understand how the breakthrough process can be applied to everyday life</i>	0:10:24

### Lean Practices

**1:41:11**

<b>Lean Practices</b>		<b>1:41:11</b>
Lean Thinking	<i>Comprehend the underlying logic of lean thinking</i>	0:17:07
Constraint Theory	<i>Explain how constraint theory is related to value creation</i>	0:17:11
Continuous Flow	<i>Describe the operational ideas that underpins continuous flow</i>	0:03:25
Pull Systems	<i>Contrast the operation of a push system to that of a pull system</i>	0:03:36
Visual Factory	<i>Explain the role of a visual factory during improvement efforts</i>	0:11:59
Kanban System	<i>Describe how a Kanban system can improve process cycle-time</i>	0:07:29
PokaYoke System	<i>Understand how PokaYoke systems can lead to quality improvement</i>	0:11:17
6S System	<i>Explain how the 6S system can contribute to process efficiency</i>	0:08:27
SMED System	<i>Define the basic elements of an SMED system</i>	0:05:47

7W Approach	<i>Describe how the 7W approach can be used to solve problems</i>	0:07:23
6M Approach	<i>Explain how the 6M approach is used to identify sources of causation</i>	0:07:30

## Quality Tools

**13:13:18**

Variable Classifications	<i>Define the various types of variables commonly encountered during quality improvement</i>	0:08:32
Measurement Scales	<i>Describe each of the four primary scales of measure and their relative power</i>	0:50:01
Problem Definition	<i>Characterize the nature of a sound problem statement</i>	0:35:25
Focused Brainstorming	<i>Explain how focused brainstorming is used to facilitate improvement efforts</i>	0:11:57
Process Mapping	<i>Understand how to define the flow of a process and map its operations</i>	0:24:20
SIPOC Diagram	<i>Describe the nature and purpose of an SIPOC diagram</i>	0:08:26
Force-Field Analysis	<i>Utilize force field analysis to solve problems</i>	0:14:49
Matrix Analysis	<i>Understand how matrices are created and used to facilitate problem solving</i>	0:16:56
C&E Analysis	<i>Explain how C&amp;E matrices can be used to solve quality problems</i>	0:06:02
Failure Mode Analysis	<i>Understand how FMEA is used to realize process and design improvements</i>	0:11:18
Performance Sampling	<i>Explain how to design and implement a sampling plan</i>	0:20:17
Check Sheets	<i>Understand how check sheets can be used for purposes of data collection</i>	0:12:59
Analytical Charts	<i>Identify the general range of analytical charts that can be used to assess performance</i>	0:20:02
Pareto Charts	<i>Explain how Pareto charts can be used to isolate improvement leverage</i>	0:24:25
Run Charts	<i>Utilize run charts to assess and characterize time-based process data</i>	0:10:59
Multi-Vari Charts	<i>Define the major families of variation and how they can be graphed</i>	0:49:29
Correlation Charts	<i>Utilize a correlation chart to illustrate the association between two variables</i>	1:01:24
Frequency Tables	<i>Explain how to construct and interpret a frequency table</i>	0:14:42
Performance Histograms	<i>Construct and interpret a histogram and describe several purposes</i>	1:14:40
Basic Probability	<i>Understand basic probability theory and how it relates to process improvement</i>	0:29:16
Pre-Control Charts	<i>Describe the fundamental rules that guide the operation of a standard pre-control plan</i>	0:41:25
Control Charts	<i>Explain the purpose of statistical process control charts and the logic of their operation</i>	1:41:11
Score Cards	<i>Understand the purpose of Six Sigma score cards and how they are deployed</i>	0:31:24
Search Patterns	<i>Explain how the use of designed experiments can facilitate problem solving</i>	0:32:13
Concept Integration	<i>Understand how to sequence a given selection of quality tools to better solve problems</i>	1:02:54
Quality Simulation	<i>Employ the related quality tools to analyze data generated by the process simulator</i>	0:18:12

## Basic Statistics

**9:05:33**

Performance Variables	<i>Identify and describe the types of variables typically encountered in field work</i>	0:10:26
Statistical Notation	<i>Recognize and interpret the conventional forms of statistical notation</i>	0:44:53
Performance Variation	<i>Explain the basic nature of variation and how it can adversely impact quality</i>	0:22:24
Normal Distribution	<i>Describe the features and properties that are characteristic of a normal distribution</i>	0:49:36
Distribution Analysis	<i>Explain how to test the assumption that a set of data is normally distributed</i>	1:21:06
Location Indices	<i>Identify, compute, and interpret the mean, median, and mode</i>	0:42:05
Dispersion Indices	<i>Identify, compute, and interpret the range, variance, and standard deviation</i>	1:16:37
Quadratic Deviations	<i>Understand the nature of a quadratic deviation and its basic purpose</i>	0:24:47
Variation Coefficient	<i>Compute and interpret the coefficient of variation</i>	0:07:17
Deviation Freedom	<i>Explain the concept of degrees-of-freedom and how it is used in statistical work</i>	0:29:47
Standard Transform	<i>Describe how to transform a set of raw data into standard normal deviates</i>	0:47:51
Standard Z-Probability	<i>Describe how to convert a standard normal deviate into its corresponding probability</i>	0:40:58
Central Limit	<i>Understand that the distribution of sampling averages follows a normal distribution</i>	0:17:29
Standard Error	<i>Recognize that the dispersion of sampling averages is described by the standard error</i>	0:13:32
Student's Distribution	<i>Understand that the T distribution applies when sampling is less than infinite</i>	0:06:07
Standard T-Probability	<i>Describe how to convert a T value into its corresponding probability</i>	0:15:26
Statistics Simulation	<i>Employ basic statistics to analyze data generated by the process simulator</i>	0:15:12

### Continuous Capability

		<b>8:32:11</b>
Performance Specifications	<i>Explain the basic nature and purpose of performance specification limits</i>	0:14:39
Rational Subgrouping	<i>Explain how to form rational subgroups and describe their purpose in Six Sigma work</i>	1:19:00
Capability Study	<i>Understand the concept of process capability and how it applies to products and services</i>	1:32:55
Instantaneous Capability	<i>Understand the concept of instantaneous capability in relation to Six Sigma work</i>	0:47:58
Longitudinal Capability	<i>Understand the concept of longitudinal capability in relation to Six Sigma work</i>	0:47:30
Cp Index	<i>Compute and interpret Cp</i>	0:11:57
Cpk Index	<i>Compute and interpret Cpk</i>	0:19:53
Pp Index	<i>Compute and interpret Pp</i>	0:13:41
Ppk Index	<i>Compute and interpret Ppk</i>	0:24:10
Process Shifting	<i>Understand the impact of process centering error on short-term capability</i>	0:29:10
Process Qualification	<i>Determine the required level of short-term capability necessary to qualify a process</i>	1:39:20
ConcaP Simulation	<i>Apply continuous indices of capability to the process simulator</i>	0:31:58

### Discrete Capability

		<b>4:41:49</b>
Defect Metrics	<i>Identify and describe the defect metrics commonly used in Six Sigma work</i>	0:11:26
Defect Opportunities	<i>Understand the nature and purpose of defect opportunities in terms of quality reporting</i>	0:43:08
Binomial Distribution	<i>Describe the features and properties that are characteristic of a binomial distribution</i>	0:59:19
Poisson Distribution	<i>Describe the features and properties that are characteristic of the Poisson distribution</i>	0:39:31
Throughput Yield	<i>Compute and interpret throughput yield in the context of Six Sigma work</i>	0:08:53
Rolled Yield	<i>Compute and interpret rolled-throughput yield in the context of Six Sigma work</i>	0:20:42
Metrics Conversion	<i>Convert yield and defect metrics to the sigma scale of measure</i>	1:32:19
DiscaP Simulation	<i>Apply discrete indices of capability to the process simulator</i>	0:06:31

### Technical Practices

**48:37:44**

#### Hypothesis Testing

		<b>6:05:49</b>
Statistical Inferences	<i>Explain the concept of a statistical inference and its primary benefits</i>	0:23:00
Statistical Questions	<i>Explain the nature and purpose of a statistical question</i>	0:20:35
Statistical Problems	<i>Understand why practical problems must be translated into statistical problems</i>	0:10:43
Null Hypotheses	<i>Define the nature and role of null hypotheses when making process improvements</i>	0:31:29
Alternate Hypotheses	<i>Define the nature and role of alternate hypotheses when making process improvements</i>	0:18:03
Statistical Significance	<i>Explain the concept of statistical significance versus practical significance</i>	0:56:05
Alpha Risk	<i>Explain the concept of alpha risk in terms of the alternate hypothesis</i>	0:24:18
Beta Risk	<i>Define the meaning of beta risk and how it relates to test sensitivity</i>	0:38:41
Criterion Differences	<i>Explain the role of a criterion difference when testing hypotheses</i>	0:15:49
Decision Scenarios	<i>Develop a scenario that exemplifies the use of hypothesis testing</i>	0:17:09
Sample Size	<i>Define the statistical elements that must be considered when computing sample size</i>	1:49:57

#### Confidence Intervals

**2:47:17**

		<b>2:47:17</b>
Mean Distribution	<i>Comprehend and characterize the distribution of sampling averages</i>	0:04:21
Mean Interval	<i>Compute and interpret the confidence interval of a mean</i>	0:54:29
Variance Distribution	<i>Comprehend and characterize the distribution of sampling variances</i>	0:21:10
Variance Interval	<i>Compute and interpret the confidence interval of a variance</i>	0:35:52
Proportion Distribution	<i>Comprehend and characterize the distribution of sampling proportions</i>	0:07:22
Proportion Interval	<i>Compute and interpret the confidence interval of a proportion</i>	0:27:02
Frequency Interval	<i>Describe how frequency of defects is related to confidence intervals</i>	0:17:01

#### Control Methods

**4:23:52**

		<b>4:23:52</b>
Statistical Control	<i>Explain the meaning of statistical control in terms of random variation</i>	0:31:37

Control Logic	<i>Explain the logic that underpins the application of a control chart</i>	0:16:21
Control Limits	<i>Reconcile the difference between specification limits and control limits</i>	0:25:34
Chart Selection	<i>Explain how to rationally select a control chart</i>	0:08:07
Chart Interpretation	<i>Interpret an SPC chart in terms of its control limits</i>	0:30:30
Zone Testing	<i>Explain the concept of zone tests and their application to SPC charts</i>	0:43:18
Variables Chart	<i>Characterize the role and purpose of a variables chart</i>	0:08:38
Attribute Chart	<i>Characterize the role and purpose of an attribute chart</i>	0:04:37
Individuals Chart	<i>Construct and interpret an individuals control chart</i>	0:09:58
IMR Chart	<i>Construct and interpret an individual moving range control chart</i>	0:09:01
Xbar Chart	<i>Construct and interpret a control chart for subgroup averages</i>	0:06:33
Range Chart	<i>Construct and interpret a control chart for subgroup ranges</i>	0:10:27
Proportion Chart	<i>Construct and interpret a control chart for sampling proportions</i>	0:11:15
Defect Chart	<i>Construct and interpret a control chart for defect occurrences</i>	0:13:09
Other Charts	<i>Describe several other types of control charts used in Six Sigma work</i>	0:02:00
Capability Studies	<i>Explain the role of capability studies when making process improvements</i>	0:22:00
Control Simulation	<i>Apply common SPC methods to the process simulator</i>	0:10:47

### **Parametric Methods**

**8:19:55**

Mean Differences	<i>Determine if two means are statistically different from each other</i>	1:37:53
Variance Differences	<i>Determine if two variances are statistically different from each other</i>	0:39:34
Variation Total	<i>Compute and interpret the total sums-of-squares</i>	0:16:36
Variation Within	<i>Compute and interpret the within-group sums-of-squares</i>	0:10:53
Variation Between	<i>Compute and interpret the between-group sums-of-squares</i>	0:11:47
Variation Analysis	<i>Explain how the analysis of variances can reveal mean differences</i>	0:32:21
One-Way ANOVA	<i>Construct and interpret a one-way analysis-of-variance table</i>	1:16:36
Two-Way ANOVA	<i>Construct and interpret a two-way analysis-of-variance table</i>	0:20:05
N-Way ANOVA	<i>Construct and interpret an N-way analysis-of-variance table</i>	0:12:49
ANOVA Graphs	<i>Construct and interpret a main effects plot as well as an interaction plot</i>	0:37:24
Linear Regression	<i>Conduct a linear regression and construct an appropriate model</i>	1:17:34
Multiple Regression	<i>Conduct a multiple regression and construct an appropriate model</i>	0:15:59
Residual Analysis	<i>Compute and analyze the residuals resulting from a simple regression</i>	0:18:46
Parametric Simulation	<i>Apply general regression methods to the process simulator</i>	0:31:38

### **Chi-Square Methods**

**3:18:48**

Statistical Definition	<i>Describe how to translate a practical problem into a statistical problem</i>	0:31:53
Model Fitting	<i>Explain what is meant by the term "Model Fitting" and discuss its practical role in Six Sigma work</i>	0:58:32
Testing Independence	<i>Explain how a test of independence can be related to the idea of correlation</i>	1:01:00
Contingency Coefficients	<i>Understand how a contingency coefficient relates to a cross-tabulation table</i>	0:12:53
Yates Correction	<i>Describe the role of Yates correction in terms of the chi-square statistic</i>	0:07:17
Testing Proportions	<i>Test the significance of two proportions using the Chi-square statistic</i>	0:27:13

### **Survey Methods**

**2:41:53**

Research Design	<i>Explain how the idea of research design fit with the idea of problem Solving</i>	0:12:54
Information Sources	<i>Explain how the idea of research design fit with the idea of problem Solving</i>	0:09:34
Questionnaire Construction	<i>Describe the role of survey demographics when analyzing closed-form survey data</i>	0:19:24
Formulating Questions	<i>Identify several things that should be avoided when developing survey questions</i>	0:15:22
Question Quality	<i>Explain what is meant by the term "question quality" and how this idea relates to data analysis</i>	0:07:06
Sampling Plans	<i>Describe several different types of sampling plans commonly used in survey research</i>	0:07:14
Data Analysis	<i>Explain how categorical survey data can be analyzed to establish strength of association</i>	1:30:19

<b>Nonparametric Methods</b>		<b>1:19:47</b>
Nonparametric Concepts	<i>Explain the difference between parametric and nonparametric methods</i>	0:06:59
Median Test	<i>Execute a median test on two groups and then determine if the difference is statistically significant</i>	0:48:55
Runs Test	<i>Conduct a runs test to determine if a time series pattern is random</i>	0:08:07
Other Tests	<i>Identify two nonparametric methods other than a median or runs test</i>	0:15:46
<b>Experimental Methods</b>		<b>10:29:49</b>
Design Principles	<i>Understand the principles of experiment design and analysis</i>	0:43:05
Design Models	<i>Describe the various types of designed experiments and their applications</i>	0:13:18
Experimental Strategies	<i>Outline a strategy for designing and analyzing a statistical experiment</i>	0:21:14
Experimental Effects	<i>Define the various types of experimental effects and how they impact decisions</i>	0:24:26
One-Factor Two Level	<i>Configure and analyze a one-factor two-level statistically based experiment</i>	0:38:35
One-Factor Multi Level	<i>Configure and analyze a one-factor multi-level statistically based experiment</i>	0:11:09
Full Factorials	<i>Understand the nature and underlying logic of full factorial experiments</i>	0:19:46
Two-Factor Two Levels	<i>Configure and analyze a two-factor two-level statistically based experiment</i>	2:13:26
Two-Factor Multi Level	<i>Configure and analyze a two-factor multi-level statistically based experiment</i>	0:04:29
Three-Factor Two Level	<i>Configure and analyze a three-factor two-level statistically based experiment</i>	0:51:20
Planning Experiments	<i>Understand the planning and implementation considerations related to statistical experiments</i>	0:29:17
Fractional Factorials	<i>Understand the nature and underlying logic of fractional factorial experiments</i>	1:16:46
Four-Factor Half-Fraction	<i>Configure and analyze a four-factor half-fraction statistically based experiment</i>	0:15:46
Five-Factor Half-Fraction	<i>Configure and analyze a five-factor half-fraction statistically based experiment</i>	0:30:29
Screening Designs	<i>Understand how to select, implement, and analyze a screening experiment</i>	0:16:28
Robust Designs	<i>Explain the purpose of robust design and define several practical usages</i>	1:12:35
Experiment Simulation	<i>Describe how a DOE can be employed when measurement data is not available</i>	0:27:40
<b>DFSS Methods</b>		<b>3:59:09</b>
QFD Method	<i>Explain how quality function deployment can be used to help identify design specifications</i>	0:06:09
Capability Flow-Down	<i>Describe how a capability flow-down can be used as a risk allocation and abatement tool</i>	0:36:23
Capability Flow-Up	<i>Describe how a capability flow-up can be used to analyze the reproducibility of a design</i>	0:25:30
Tolerance Analysis	<i>Demonstrate how the RSS method can be used to analyze assembly tolerances</i>	1:51:55
Monte-Carlo Simulation	<i>Explain how Monte-Carlo simulation can be used during the process of design</i>	0:59:12
<b>Measurement Analysis</b>		<b>1:15:44</b>
Measurement Uncertainty	<i>Understand the concept of measurement uncertainty</i>	0:15:43
Measurement Components	<i>Describe the components of measurement error and their consequential impact</i>	0:15:42
Measurement Studies	<i>Explain how a measurement systems analysis is designed and conducted</i>	0:44:19
<b>Training Project</b>		<b>3:55:41</b>
Project Introduction	<i>Understand the steps to deploy a Training Project</i>	0:06:47
Recognize Phase	<i>Understand the tools used during the Recognize Phase</i>	0:20:39
Define Phase	<i>Execute the steps needed during the Define Phase</i>	0:11:24
Measure Phase	<i>Understand the tools needed during the Measure Phase</i>	0:36:21
Analyze Phase	<i>Become familiar with the tools used during the Analyze Phase</i>	0:39:52
Improve Phase	<i>Become familiar with the tools needed for improvement</i>	1:13:29
Control Phase	<i>Recognize the usage of tools needed for Process Control</i>	0:17:16
Survey Analysis	<i>Execute the techniques to analyze Survey data</i>	0:19:09
Risk Analysis	<i>Understand the tools needed for a Risk Analysis</i>	0:10:44

**Total Video Run Time 119:43:27**