

# Lean Six Sigma Course Offerings



Besides offering hands-on consulting support for Lean Transformation, Daniel Penn Associates offers a full spectrum of courses in Lean and Six Sigma, addressing executives and senior management, managers and supervisors, and operations personnel and support staff. Courses are offered on-site, at your premises, and can be tailored to your specific needs and requirements. We offer both specific courses for immediate needs and certification courses that lead to professional recognition within Lean (Society of Manufacturing Engineers) and Six Sigma (American Society for Quality).

Our instructors are Lean Masters, Master Senseis, and Black and Master Black Belts with 20 or more years experience teaching, facilitating and mentoring to both industry and government.

## Lean Six Sigma Courses

<b>Lean Six Sigma General Overview</b>	A one-day introductory course for anyone wanting to know about lean six sigma.
<b>Lean Six Sigma for Executives</b>	A one-day course for executives, directors, and commanders.
<b>Lean Six Sigma for Champions</b>	A two-day course for leaders that will champion a lean six sigma effort.
<b>Lean Six Sigma for Managers</b>	A five-day course for managers that will be leading and implementing lean six sigma.
<b>Transactional Design for Lean Six Sigma (TDFSS)</b>	A one-day course for anyone wanting to know about transactional design for lean six sigma.

## Lean Courses

<b>Lean Manufacturing</b>	A one-day overview course for managers, supervisors, facilitators wanting to learn about lean.
<b>Lean Enterprise Introduction</b>	A two-day overview course on the lean enterprise for managers, supervisors, and facilitators.
<b>Lean Practices</b>	A five-day course covering the broad spectrum of lean and the seven wastes.
<b>The 6S's: Workplace Organization</b>	A one-day course covering the 6S's and their application to the workplace.

## Six Sigma Courses

<b>Six Sigma Yellow Belt</b>	A one-day course for anyone interested in knowing about or starting to pursue six sigma.
<b>Six Sigma Green Belt</b>	A five-day course leading to a six sigma Green Belt certification.
<b>Six Sigma Black Belt</b>	An 18-day course leading to a six sigma Black Belt certification.
<b>Six Sigma Master Black Belt</b>	A ten-day course leading to a six sigma Master Black Belt certification.
<b>Statistical Process Control (SPC)</b>	A five-day course covering the elements of Statistical Process Control.
<b>Advanced Statistics for Black Belts</b>	A ten-day course for six sigma Black Belts that emphasizes modeling techniques.
<b>Six Sigma Train the Trainer</b>	A ten-day course for belted six sigma individuals desiring train-the-trainer capability and knowledge.

# Lean Six Sigma Course Offerings



## **Design for Six Sigma (DFSS)**

A two-day course covering DFSS and the IDOV (Identify, Design, Optimize, Validate) model.

### **Other Related Courses**

#### **Design of Experiments (DOE)**

A one-day course that covers design, analysis and optimization techniques.

#### **Introduction to Reliability Testing and Analysis**

A five-day course that emphasizes reliability, estimation, and failure mode analysis.

#### **Root Cause Analysis (RCA)**

A one-day course that covers root cause analysis and mistake proofing.

#### **Evolving Quality Systems – ISO**

A one-day course for engineers, manufacturing and quality professionals preparing to go for ISO certification.

## **Lean Six Sigma Courses**

### **Lean Six Sigma General Overview**

Audience: Anyone  
Duration: One day  
Topics: Know what Lean Six Sigma is, why it's needed, what it can do.  
Prerequisite: None.

### **Lean Six Sigma for Executives**

Audience: Executives, Directors, Commanders  
Duration: One-day  
Topics: Know what Lean Six Sigma is, why it's needed, what it can do.  
Understand how Lean Six Sigma enhances a business strategy.  
Know the strategy and phasing of the Lean Six Sigma methodology  
Become familiar with the Lean Six Sigma tools and their application.  
Understand the issues of variability and their impact on decision making.  
Know how to find and remove barriers and constraints.  
Understand a knowledge-based pull system.  
Prerequisites: None.

### **Lean Six Sigma for Champions**

Audience: Senior leaders that will champion a Lean Six Sigma effort  
Duration: Two-days  
Topics: All topics in the Lean Six Sigma for Executives course.  
Know the roles and responsibilities of a Lean Six Sigma Champion.  
Become aligned with the organization's rollout plan.  
Support an effective, accelerated implementation of Lean Six Sigma.  
Know how to select and prioritize projects.  
Be a strong proponent of Lean Six Sigma to help drive business results.  
Prerequisites: None.

### **Lean Six Sigma for Managers**

Audience: Managers and Supervisors with decision authority to apply Lean Six Sigma  
Duration: Five-days

# Lean Six Sigma Course Offerings



**Topics:** Know what Lean Six Sigma is, why it's needed, what it can do.  
Know the strategy and phasing of the Lean Six Sigma methodology  
Become familiar with the Lean Six Sigma tools and their application.  
Understand the issues of variability and their impact on decision making.  
Know how to find and remove barriers and constraints.  
Understand a knowledge-based pull system.  
Understand the eleven key elements of a fully integrated Lean Six Sigma business improvement effort.  
Learn how these key elements are deployed during the Initialization, Execution and Assessment phases.  
Understand 'best practices' and customize a deployment approach that best meets your requirements.

**Prerequisites:** None.

## **Transactional Design for Lean Six Sigma (TDFSS)**

**Audience:** Green Belts, Black Belts

**Duration:** One day

**Topics:** Introduction to Transactional Design for Lean Six Sigma.  
Understand project management, voice of the customer (VOC), and keeping score.  
Three level process maps with control systems.  
Pugh concept selection and lean concepts.  
Failure mode and effects analysis (FMEA).  
Monte Carlo methods and process simulation.  
Process capability prediction and test and validate.

**Prerequisites:** None.

## **Lean Courses**

### **Lean Manufacturing**

**Audience:** Managers, supervisors, facilitators

**Duration:** One day

**Topics:** Understand the terms, terminology, and benefits of Lean Manufacturing.  
Conduct value stream maps of the current state.  
Identify the potentials for reduced waste and improved flow.  
Develop a future state map.  
Participate in the development of a site-specific lean implementation road map.  
Avoid the common pitfalls encountered during lean implementation.

**Prerequisites:** None.

### **Lean Enterprise Introduction**

**Audience:** Managers, supervisors, facilitators

**Duration:** Two days

**Topics:** Lean Overview  
Lean Enterprise methods (Pull Production, Supply Chain Management, Kaizen, Visual Workplace, TPM, Cellular Production, JIT, Quick Change Over) and tools (Poka Yoke, SMED, TOC, Kanban, Andon).  
Value stream mapping and analysis  
Theory of Constraints (TOC) – eliminating constraints and bottlenecks.  
Inspection, In-Station Process Control and Statistical Process Control (SPC).  
Robust Design and Design of Experiments (DOE).

# Lean Six Sigma Course Offerings



Seven sources of waste and methods to eliminate waste.  
Identify and eliminate waste in a small project.

Prerequisites: None.

## Lean Practices

Audience: Anyone

Duration: Five days

Topics: Introduction to Lean and the Seven Wastes.  
Implementing TPM, 5S, and visual control techniques.  
JIT and Kanbans.  
Quick change-overs and error proofing.  
Action workouts.

Prerequisites: None.

## The 6S's: Workplace Organization

Audience: Managers, supervisors, facilitators, operations personnel

Duration: One day

Topics: Understand each of the six S's and how each "S" builds upon the previous "S."  
Apply the 6S's to the work area.  
Develop (or participate in the development of) a 6S implementation road map.

Prerequisites: None.

## Six Sigma Courses

### Six Sigma Yellow Belt Training

Audience: Anyone

Duration: One day

Topics: Understand the Six Sigma culture.  
Know and apply Six Sigma concepts to improving the bottom line.  
Understand and apply the DMAIC phasing and control points to a project.  
Appreciate the need and use of statistics in process improvement.  
Describe a process numerically.  
Use and apply basic graphical tools and charting techniques.  
Understand the relationship between variation and the cost of poor quality.  
Conduct a Measurement System Analysis (MSA) to determine the integrity of data.

Prerequisite: None.

### Six Sigma Green Belt Training

Audience: Students desiring a Green Belt certification.

Duration: Five-days

Topics: Module 1 Lean Six Sigma... The Journey Begins  
Module 2 What is Lean Six Sigma?  
Module 3 Introduction to Lean and Seven Wastes  
Module 4 Define Phase: Project Definition & Waste Management. Teamwork, Understanding Change, and Voice of the Customer  
Module 5 The Role of Statistics in Process Improvement  
Module 6 Making Sense Out of Data Using Graphical & Measurement Tools  
Module 7 Measurement Systems Analysis  
Module 8 Sampling Distributions and Confidence Intervals  
Module 9 Drawing Conclusions When Comparing Data Sets

# Lean Six Sigma Course Offerings



- Module 10 Process Control and Process Capability
- Module 11 Implementing TPM, 5S, and Visual Control Techniques
- Module 12 JIT and Kanban's
- Module 13 Quick-Changeovers and Error Proofing
- Module 14 Action Workouts
- Module 15 Introduction to Regression Analysis and Modeling
- Module 16 The Control Phase (Realizing and Holding the Gains)
- Module 17 References, Glossary of Terms, and Course Evaluation Forms

Prerequisite: Six Sigma Yellow Belt.

## Six Sigma Black Belt Training

Audience: Green Belts desiring a Black Belt certification.

Duration: Eighteen Days.

- Topics:
- Module 1 Lean Six Sigma... The Journey Begins
  - Module 2 What is Lean Six Sigma?
  - Module 3 Define Phase: Project Definition, Teamwork, and Voice of the Customer
  - Module 4 The Role of Statistics in Process Improvement
  - Module 5 Making Sense Out of Data Using Graphical & Measurement Tools
  - Module 6 Measurement System Analysis
  - Module 7 Standard Work Analysis
  - Module 8 Improving the Flow
  - Module 9 Drawing Conclusions from Sampled Data
  - Module 10 The Control Phase (Realizing and Holding the Gains)
  - Module 11 Understanding Data Distributions and Their Applications
  - Module 12 Sampling Distributions and Confidence Intervals
  - Module 13 Introduction to Regression Analysis and DOE
  - Module 14 Foundations of Design of Experiments
  - Module 15 Introduction to Design and Analysis
  - Module 16 Rules of Thumb
  - Module 17 Using Regression to Analyze DOE Data
  - Module 18 Three-Level Designs
  - Module 19 Extending DOE Concepts to Include Multiple Response Optimization
  - Module 20 Historical Data Analysis
  - Module 21 Putting It All Together: Refocusing on the Big Picture
  - Module 22 Next Steps ... the Journey Continues
  - Module 23 Special Topics
  - Module 24 References, Glossary of Terms, and Course Evaluation Forms

Prerequisite: Six Sigma Green Belt certification.

## Six Sigma Master Black Belt Training

Audience: Black Belts desiring a Master Black Belt certification.

Duration: Ten Days

- Topics:
- Module 1 Six Sigma Definitions & Terminology.
  - Module 2 Define (IDOV vs. DMAIC, VOC, decision tools, project selection).
  - Module 3 Measure (analysis, goodness of fit, transformations to normality).
  - Module 4 Analyze (t-tests, ANOVA, historical data analysis, multiple regression, regression diagnostics, cross-validation).
  - Module 5 Analyze (orthogonality, OFAT, blocking, repetitions vs. replications, variable input, screening vs. modeling, sequential CCDs, attribute responses).
  - Module 6 Improve (multiple response optimization, high throughput testing (HTT), analysis using simulation).

# Lean Six Sigma Course Offerings



Module 7 Control (topics in SPC, sample size, minimizing Type I & Type II errors, short-run SPC).

Module 8 Introduction to Design for Six Sigma (DFSS).

Prerequisites: Six Sigma Black Belt certification

## Statistical Process Control (SPC)

Audience: Green Belts, Black Belts, Engineers, Supervisors.

Duration: Five Days

Topics: Module 1 SPC Basics.  
Module 2 Data Description and Display.  
Module 3 Probability Distributions.  
Module 4 Statistical Inferences.  
Module 5 Process Variability.  
Module 6 Control Charts for Variables.  
Module 7 Control Charts for Attributes.  
Module 8 Other Control Charts.  
Module 9 Measurement System Analysis.  
Module 10 Acceptance Sampling.

Prerequisites: Six Sigma Green Belt or equivalent quality course / experience.

## Advanced Statistics for Six Sigma Black Belts

Audience: Six Sigma Black Belts

Duration: Five days

Topics: Module 1 Overview of data mining.  
Module 2 Data preparation, visualization, dictionaries.  
Module 3 Modeling (dimensionality, notation and terms, bias-variance tradeoffs, error functions).  
Module 4 Traditional models (linear regression, logistic regression, discriminant, analysis, nearest neighbors, clustering algorithms).  
Module 5 Modern models (classification and regression trees, neural networks, bump hunting, association rules, evaluating and combining models).

Prerequisites: Six Sigma Black Belt certification.

## Six Sigma Train the Trainer

Audience: Green, Black and Master Black Belts

Duration: Ten days

Topics: Day 1 Six Sigma Master Black Belt, Black Belt, Green Belt Roles  
Training Philosophy  
Teaching Basics  
Physical / Logistical Requirements  
Evaluating the Course  
Classroom Observations  
Days 2-10 Review Each Module  
Review Take Aways  
Review Objectives  
Practice Teaching  
Observation / Critique / Feedback

Prerequisites: Appropriate Six Sigma certificate.

## Design for Six Sigma (DFSS) for Managers

Audience: Managers, Supervisors, Leaders

# Lean Six Sigma Course Offerings



Duration: Two-days  
Topics: Know what Design for Six Sigma (DFSS) is and how it differs from Lean Six Sigma.  
Understand the four phases: Identify, Design, Optimize, Validate (IDOV).  
Know the leadership responsibility in deploying DFSS.  
Understand the benefits and vision of DFSS.  
Prerequisite: None.

## Other Related Courses

### Design of Experiments (DOE)

Audience: Black Belts, Managers, Engineers.  
Duration: One day  
Topics: Foundations and overview of DOE.  
Introduction to Design and Analysis.  
Rules of thumb.  
Using regression to analyze data.  
Two-level design summary.  
Three-level design summary.  
Taguchi, variance reduction methods, robust designs, and multivariate charts.  
Randomization and multiple response optimization.  
Prerequisites: Green Belts, Black Belts.

### Introduction to Reliability Testing and Analysis

Audience: Black Belts, Managers, Engineers.  
Duration: Five days  
Topics: Basic statistical concepts (confidence intervals, hypothesis testing).  
Graphical tools (dot plot, histogram, box plot, end count test).  
Reliability concepts (reliability function, hazard function, bathtub curve, censoring).  
Common Reliability Distributions (exponential, Weibull, normal, lognormal).  
Non-parametric reliability (Kaplan-Meier Estimates, comparing survival curves).  
Probability plotting  
Estimation (least squares, maximum likelihood, failure times, probability of failure).  
System failure (series, parallel, R out of N, competing risk model, multiple failure modes).  
Planning reliability tests and sample size.  
Accelerated life testing (linear, equal linear, Arrhenius acceleration).  
Prerequisites: None.

### Root Cause Analysis (RCA)

Audience: Green Belts, Black Belts, Managers, Engineers.  
Duration: One day  
Topics: Understanding why root causes are important.  
Identifying and defining problems.  
Analyzing change and identifying variability.  
Defining and finding the golden nugget (3 P's and Rule of Ten).  
Analyzing data for root causes.  
Identifying contributing events.  
Simple root cause analysis TREE.  
Five W's technique of root cause analysis.  
Mistake proofing.  
Guidelines on conducting individual analysis.

## Lean Six Sigma Course Offerings



Integrating root cause analysis into a total quality philosophy.  
Prerequisites: None.

### **Evolving Quality Systems - ISO**

Audience: Engineers, manufacturing and quality professionals

Duration: One day

Topics: Understanding and determining evolving quality requirements such as ISO 9001:2000.  
(including AS, QS, TS and other standards)  
Increasing awareness for the enterprises quality management system.  
Tools for assessing your quality system and gap analysis.  
Improve corrective action planning and reference resources.  
Selecting a registrar.  
Performing Internal audits.  
Creating a quality system continuous improvement plan.

Prerequisites: None.

Daniel Penn Associates is a minority owned and operated management consulting firm. Our offerings include business process improvement and re-engineering services, spend analysis and strategic sourcing, cost reduction programs, supply chain logistics, lean initiatives, productivity improvement, preventive and predictive maintenance, organizational development, and supplier diversity programs.

Contact us: Daniel Penn Associates, LLC  
430 New Park Avenue  
Hartford, CT 06110  
Phone: 860.232.8577  
Fax: 860.523.9432  
Email: [info@danielpenn.com](mailto:info@danielpenn.com)