Lean Six Sigma Green Belt – LIVE ONLINE

10 – half day sessions 10 am to 2:30 PM EST (2 session per week for 5 weeks) for a total of 5 days. Lean Six Sigma Green Belt Certificate awarded by Thayer School of Engineering at Dartmouth upon successful completion of all requirements)

Day 1: (half day, approx. 4 hours including breaks) Instructor: Jim Whitney, LSSBB

I. Introduction to Lean Six Sigma (LSS) & Use of common LSS Tools

Processes:

- Types: Management, Core, Support

Lean:

- Definition, Values Analysis, Little's Law, Process Cycle Efficiency, Takt Time
- Lessons of Lean

Six Sigma

- Definition
- 6 Causes of Variation

Lean Six Sigma

- Definition

Theory of Constraints

ISO 9001

- Definition
- Relationship to Lean Six Sigma

DMAIC (Define, Measure, Analyze, Improve, Control)

- Start a case study: Learn the DMAIC model in detail through case study and, use of common LSS Tools

Day 2: (half day, approx. 4 hours including breaks) Instructor: Instructor: Jim Whitney, LSSBB

II. DMAIC (Define, Measure, Analyze, Improve, Control)

- Finish the case study from Day 1: Learn the DMAIC model in detail through case study, and use of common LSS Tools

Day 3: (half day, approx. 4 hours including breaks) **Instructor:** Tim King, CMQ/O/CQA

III. Teamwork

LSS Project Teams:

- Power of a Team Approach
- Research on Team Successes & Failures
- Leadership of Teams
- Best Practices from Successful Companies

Types of improvement teams

- Project teams
- Process Ownership Teams

- Kaizen teams
- Quality Steering Teams

Common Team Problems
- Floundering
- Negativity
- Opinions not Facts
- Jump to Solutions
- Magnifying the problem out of control
- Workstyle Clashes

Team Development Stages and How To Move Through Them
- Forming
- Storming
- Norming
- Performing
- Adjourning

Team Guidelines
- The rules of operation
- Effective Communications
- Decision Making Methods

Team Formation:
- Charter Setup
- Defining the project
- Defining the problem to be solved

Effective Team Meetings
- Meeting Roles
- Agendas

- Managing Group Dynamics
- Team Decision Making

Evaluating Team Performance
- Measuring performance against original goals

Day 4: (half day, approx. 4 hours including breaks) **Instructor:** Tim King, CMQ/O/CQA

IV. TOOLS for LSS Project Teams
- Brainstorming
- Affinity Diagram
- Flowcharts
- Decision Matrix

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- Multivoting
- Force Field Analysis
- Risk Analysis
- Tree Diagram
- CTQs

Additional Resources for Further Learning

- Recommended books
- Websites
- Tools

Day 5: (half day, approx. 4 hours including breaks) **Instructor:** Jim Hall, MLSSBB

V. Lean in Detail
Identifying & Evaluating Waste

- Seven wastes
- 5S
- POKA YOKE

Flow

- Definitions & Simulations
- One-Piece Flow
- Batch or Batch Processing

- Considering Set-up & Machine Downtime

Level Loading

- What is it?
- How might you achieve level loading?

Push/Pull Systems/Lead Times

- Push Definition and Example
- Pull Definition and Example
- Establishing Lead Times and setting Goals

Layout the Workflow

- Functional Layout
- Product Layout
- Dedicated Work Cells

Sustaining Continuous Improvement

Day 6: (half day, approx. 4 hours including breaks) **Instructor:** Jim Hall, MLSSBB

VI. Value Stream Mapping

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Visual Management
- Gemba

Types of Maps
- Flowcharts (process maps)
- Value Stream Maps

Value Stream Mapping (VSM) Overview
- What is a VSM?
- When do you use a VSM?

VSM: Methods & Implementation
- Symbols (Icons)
- Steps to the Present State Map
- The Data Box
- Using Little's Law
- Push, Pull, KANBAN, FIFO
- Steps to the Future State Map
- Putting VSM to Work

Day 7: (half day, approx. 4 hours including breaks) **Instructor: Dr. Ron Lasky, LSSMBB**

VII. Six Sigma: Introduction to Statistics (Minitab will be used in this part of the workshop)
Purpose(s) of Using Statistics
- To Define a problem objectively and precisely
- To make an inference about the population from a sample

- To control a process
- Learning to think statistically

Variation and the Normal Curve
- The Concept of Variation

- The Normal Curve
  - Population vs Sample
  - Central tendency

- Poisson Distribution
- Bi-nomial Distribution

Data and Variation
- Drawing and using Histograms
  - Calculating cell intervals

- Histogram analysis (random, capable, centered, acceptable process)

Day 8: (half day, approx. 4 hours including breaks) **Instructor: Dr. Ron Lasky, LSSMBB**

VIII. Six Sigma: Introduction to Statistics (continued)
Measures of Central Tendency

- Arithmetic Mean (average)
- Media
- Mode

Standard Deviation

- Definition
- The formula

Confidence interval of the mean

- Numerous exercises

Hypothesis testing

- Numerous exercises

Day 9: (half day, approx. 4 hours including breaks) **Instructor: Dr. Ron Lasky, LSSMBB**

IX. Statistical Process Control (SPC)
What is SPC and why use it?

- Definition
- Expected Variation (common cause)
- Unexpected Variation (special cause)
- Precision & Accuracy

- Gage R&R analysis
- SPC Charts
  - Purpose of a control chart
  - The control chart elements
  - X-bar charts (example)
  - R-bar charts
  - X-bar R charts
    - UCL/LCL
    - USL/LSL
- Building an X-bar R chart (examples)
- Interpreting a control chart
  - Shewhart Rules

Types of Data (attribute, variable)

Pareto Charts

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Six Sigma (+/-6 standard deviations)

Why is standard deviation important (Cp & Cpk)?

Day 10: (half day, approx. 4 hours including breaks) **Instructor: Dr. Ron Lasky, LSSMBB**

IX. Introduction to Design of Experiments (DOE)
What is DOE and why use it?

DOE Size

Steps to Conducting a DOE

DOE Example(s) and Exercises using Mini-Tab

Case Study:

ONE case study is required. Choose one of the case studies below, which must be completed within 5 days of the last class. You will receive all the case studies before the workshop begins. You should be working on the case study as the workshop progresses (Do Not wait until the end of all classes). Email your work to the assigned instructor as you complete your work. You will be asked to continue to work on the case study until you have the correct answers or have made progress to the satisfaction of the assigned instructor.
Those who do not return the case study within 5 business days of the last class will not be eligible for the LSS Green Belt Certificate (NO EXCEPTIONS).

Choose only ONE of the following Case Studies:

- Manufacturing
- Financial
- Healthcare

Take Home Exam: (4 to 8 hours)

This take home exam is required. You must show your own original work on the exam and must work independently. Contact the instructor for help and guidance; *do not* contact other participants. You must complete the exam and email it to the instructor within 5 business days of the last session on day 10. *Those who do not return the exam within 5 business days will not be eligible for the LSS Green Belt Certificate (NO EXCEPTIONS).*

This is an open notes exam so you can use all of the material that the instructors have provided to you. The exam will be primarily question and answer format with some of the math that you have learned during the course.

The exam should be completed in 4 to 8 hours. It is a pass/fail exam.

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Required Book Purchase:

The following book is required for this workshop – approximately $25 from Amazon:

Six Sigma Statistics with EXCEL and MINITAB by ISSA BASS, 2007

Fee: $1295 each participant

Sign Up: online only at www.blueskyetrack.com/cart
Note: You will not be considered registered for this workshop until you pay the fee.

For additional information go to:
http://engineering.dartmouth.edu/sixsigma/professionals.html