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Days 1 & 2: (2-half days, approx. 4 hours each including breaks) **Instructor:** Jim Whitney, LSS Black Belt

Project Justification – Building the Business Case

- What It Is
- What It can do
- How it all works
- ROI of Quality / Project ROI
- COPQ – cost of poor quality
- Pitching the Case
- An Example

Voice of Customer (VOC)

- Introductions, Learning Objectives, Using E-learning Features
- Voice of the Customer
- VOC – Charter Validation Step 1
- Customer Segment Matrix Exercise
    - VOC – Charter Validation Step 1 (continued)
    - VOC – Charter Validation Step 2
    - VOC – Charter Validation Step 3
    - VOC – Charter Validation Step 4
    - VOC – Charter Validation Step 5
- VOC Case Study: Lean Six Sigma Oil Change
    - Quality Functional Deployment (QFD)
    - Quality Functional Deployment (QFD): Design Requirements
    - Quality Functional Deployment (QFD): Interrelationship Matrix
    - Quality Functional Deployment (QFD): Customer Rating of Competitors
    - Quality Functional Deployment (QFD): Correlation Matrix
    - Quality Functional Deployment (QFD): Performance Targets
    - Quality Functional Deployment (QFD): Analysis & Diagnosis

Days 3 & 4: (2-half days, approx. 4 hours each including breaks) **Instructor:** Tim King, CMQ/O/CQA

- Coaching LSS Teams & Green Belts
    - Principles of team-based project leadership
    - Assessing project team maturity

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  - Role of the Black belt as coach
    - Principles of coaching the team and team leader
    - Coaching the LSSGB on knowledge and skills
  - Launching A LSS team successfully
  - Dealing with common team pitfalls

- Project Control & Change Management
  - Developing and revising the Project Charter
  - Project management Fundamentals
  - Managing personal and organizational change
  - Red-Yellow-Green status and action plans
  - Using the A3 tool to report project status
  - Risk response
  - Managing deliverables: requirements, testing, implementing, passing ownership
  - Managing change at the individual, team and organizational level

Days 5 & 6: (2-half days, approx. 4 hours each including breaks) **Instructor:** Tim King, CMQ/O/CQA

- Advanced LSS Tools
  - 5S area management
  - Quality Function Deployment
  - Visual Management

Days 7 & 8: (2-half days, approx. 4 hours each including breaks) **Instructor:** Jim Whitney, LSS Black Belt

Kaizen Planning
- What is a Kaizen?
- 5s Kaizen Example
- Kaizen Event Flow Example
- When to Kaizen
- When Not to Kaizen
- Chartering a Kaizen
- Typical Focus Areas for Kaizen Events

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- Typical Kaizen Weekly Schedule
- Kaizen Event Agenda -Example

Kaizen Pre-Work Checklists

- Kaizen Pre-work – Why Use a Checklist?
- Pre-Kaizen Checklist – General Logistics
- Pre-Kaizen Checklist – Scheduling Logistics
- Pre-Kaizen Checklist – Site Logistics
- Pre-Kaizen Checklist – Planning Logistics
- Pre-Kaizen Checklist – Team Selection
- Pre-Kaizen Checklist – Safety
- Kaizen Considerations – Logistical Support

Kaizen Follow-up Checklists and Tools

- RACI Charting
- RACI – Brief Definitions
- RACI Chart – Example

Facilitation Guiding Principles

- What is a Facilitator?
- What is a Kaizen Facilitator?
- Kaizen Facilitator – Guiding Principles
- Facilitator Neutrality
- Methodology Focus
- Team Expertise
- Group Autonomy

Day 9 & 10: (2-half days, approx. 4 hours each including breaks) **Instructor:** Jim Hall, LSS Master Black Belt

Failure Mode and Effects Analysis (FMEA)

- Background & Key Elements
- Methodology & Procedures
- Ranking scales

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    - Class Exercise
- Team Considerations
- Specific types of FMEA's
- Example
- In-Class lab

Failure Analysis (FA)

- Definitions & Example
- Root Cause Analysis
- Techniques
- Failure analysis labs
- Problem solving example

Design for Manufacturability (DFM)

- Definitions
- Impacts of DFM
- Basic Principles
    - Communication & Teamwork
    - Techniques
    - Capabilities & Limits
    - Organizational Responsibilities
- Applications
    - Products
    - Services
    - Transactions
- Software Tools
- Beyond Assembly

Days 11 & 12: (2-half days, approx. 4 hours each including breaks) **Instructor:** Jim Hall, LSS Master Black Belt

Cost Estimating

- How is Cost Estimating Performed?
- The elements of cost

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- Activity Based Costing (ABC)
- Custom Process Based Software: ProfitPro
- Examples using ProfitPro
- Cost: what is important
- Cost modeling a facility
- Continuous Improvement Plan

Product Teardown

- Description and operation
- Dis-assembly:
  - Quality
  - Precision
  - Waste
- Key Materials
  - Molded plastic component
  - Magnet wire & insulation
  - Screw fasteners
- Cost analysis

Statistics Review

- Working with Minitab
- Class will utilize the book: Six Sigma Statistics with EXCEL and MINITAB by ISSA BASS, 2007

Days 13 & 14: (2-half days, approx. 4 hours each including breaks) **Instructor:** Dr. Ron Lasky, LSS Master Black Belt

Scales of measurement

Advanced Stats

- Confidence Interval Review
- Hypothesis Testing Review
- Sample Size
- Type II Error and Power

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- Hypothesis Testing of Variance
- Tolerance and Prediction Intervals
- Tests on a Proportion
- Statistical Inference for Two Samples
- Using Minitab to Solve Advanced Stats Problems
- Sampling Strategies to Determine Quality Levels

Advanced SPC

- SPC Review
- Advanced Gage R&R
- Shewhart Rules
- SPC for Non Normal Data
- Minitab Examples

Days 15 & 16: (2-half days, approx. 4 hours each including breaks) **Instructor:** Dr. Ron Lasky, LSS Master Black Belt

- Technical Estimating
  - Importance
  - Tips
  - Examples

- Intermediate DOE
  - DOE Review
  - Analysis of Variance
  - Blocks
  - Full Factorial DOE
  - Several Minitab Examples

Days 17 & 18: (2-half days, approx. 4 hours each including breaks) **Instructor:** Dr. Ron Lasky, LSS Master Black Belt

- Fractional Factorial DOE
- Taguchi DOE
- Central Composite Design
- Response Curve Methodology

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- Multiple Linear Regression
- Numerous Minitab Examples

Days 19 & 20: (2-half days, approx. 4 hours each including breaks) **Instructor:** Dr. Daryl Santos

- Optimization:
  - Brief overview of optimization methods
  - Linear Programming (LP)
  - Introduction to LINDO (students are expected to have the demo version of LINDO www.lindo.com)
  - Sensitivity Analysis
  - DEA (Data Envelopment Analysis)
  - Integer Programming (IP)

- Scheduling:
  - Basic terminology, notations
  - Fundamental Scheduling Models
  - Complexity of Scheduling Problems
  - Performance Measures
  - Single Machine (aka Single Resource) Scheduling
  - Parallel Resource Scheduling
  - Flow Shop Scheduling

Case Studies: ***Approximately 10 days to complete.***

You will be required to do two case studies online.

Definition of online case studies: (communicate answers and questions via email to the assigned instructor).

Choose two of the case studies below, which must be completed within 5 days of the last class. 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.

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Those who do not return the case studies within 5 business days of the last class will not be eligible for the LSS Green Belt Certificate (NO EXCEPTIONS).

The sample case studies will be provided by Dartmouth and you can select two of the following verticals:

- Manufacturing
- Finance
- Healthcare

Take Home Exam: (approx. 12 to 15 hours)

Exam
This exam is take-home. You must complete the exam and email it to the instructor within 10 business days of the last session on day 20. *Those who do not return the exam within 10 business days will not be eligible for the LSS Black 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.

Pre-requisites for taking the LSS Black Belt Workshop:
A LSS GB certificate from Dartmouth College or from an equivalent source (this may include in-house workshops that are employer sponsored and taught by a qualified instructor(s)). *The workshop must have included introduction of statistics or you must have taken statistics at the college level prior to the LSS Black Belt workshop.*

NOTE ABOUT PRE-requisites: If you are concerned about having the proper pre-requisites for this workshop contact us at ronald.lasky@dartmouth.edu ; we'd be happy to answer any questions for you.

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: $2995 each participant, no refunds after workshop begins. Hurry limited to 20 participants.

Note: You will not be considered registered for this workshop until you pay the fee.

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Sign Up: online only at: www.blueskyetrack.com/cart

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