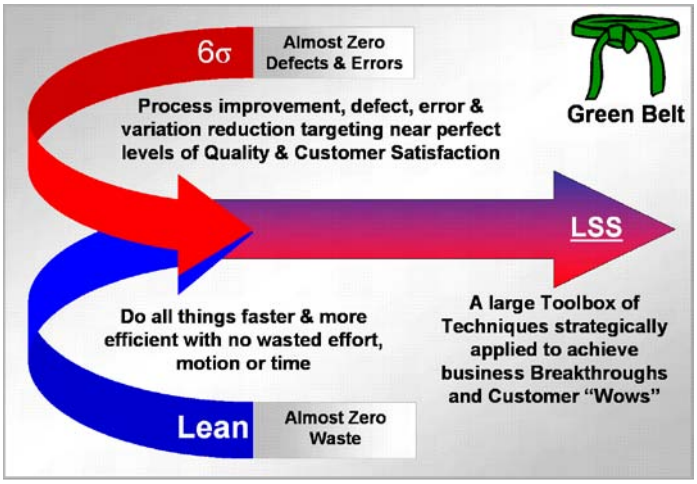
THE CENTER FOR PROFESSIONAL STUDIES



Lean Six Sigma 1

Lean and Six Sigma methodologies combined offers a very large toolbox of techniques that can effectively solve almost any quality improvement, process optimization and waste reduction challenge in business today. These tools are equally applicable in improving manufacturing or transactional business processes. The application of Lean Six Sigma techniques has helped countless companies create serious business breakthroughs in a multitude of industries worldwide.

Participants will gain a working knowledge in LSS concepts and in Minitab data analysis software through extensive practice with practice data files from real Lean Six Sigma projects. Datafit Non-Linear Regression Analysis will also be introduced. Students will learn how to draw the correct conclusions from data analysis. Lean Process Optimization techniques will also be covered and practiced in detail.

- First, the concepts of LSS are discussed in detail and how that the DMAIC (Define, Measure, Analyze, Improve & Control) problem solving techniques are applied to LSS projects. Alignment of the LSS tools to the DMAIC phases will be covered.

- Next, participants will learn how to match up the right LSS tools to different types of projects. The correct strategy of data collection and strategy of data analysis will be covered in detail. Extensive data analysis using Minitab will be practiced.

- Lastly, participants will learn how the techniques of implementing improvements and maintaining the gains once they are implemented. Statistical Process Control (SPC) will also be covered aid in this goal.

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Course Syllabus

I IDENTIFYING INFORMATION

Course:	Lean Six Sigma 1
Prerequisite:	None
Time Frame:	80 total contact hours
Instructor:	David Patrishkoff
	Bachelors and Masters Degrees in Mechanical Engineering
	30 years in the product engineering profession
	20 years in executive management
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II REFERENCE MATERIALS

1. Lean Thinking by James Womack
2. Juran Quality Handbook by Juran and Godfrey
3. Statistical Techniques in Business and Economics by Mason, Lind & Marchal
4. Applied Linear Statistical Models by Neter
5. The Machine that changed the World by Womack
6. Good to Great by Jim Collins
7. The Logic of Failure by Dorner
8. The Trusted Advisor by Maister
9. The Visual Display of Quantitative Information by Tufte

III COURSE GOALS AND OBJECTIVES

1. Understand the DMAIC Problem Solving Methodology
2. Understand the Strategy of Data Collection & Stratification
3. Understand the Strategy of Data Analysis and its sequence of events
4. Understand the Concepts of Lean Manufacturing and Lean Transactional
5. Understand what is means to achieve Lean optimization of a process
6. Understand what is means to achieve Six Sigma process
7. Understand classic Six Sigma Tools
8. Understand which LSS tools to use and when
9. Understand the details of data analysis using Minitab Software
10. Understand how to successfully apply LSS tools
11. Extensive practice of LSS tools through numerous class exercises and projects

IV METHODOLOGY

This course is a Green Belt Level of training in LSS to solve complex business issues and achieve breakthrough improvements. Each module will introduce new material that will prepare the student for the projects to be completed. Students must take and pass an open book exam at the end of the class to qualify for a certificate of successful completion or the optional Green Belt certification if a real company project is successfully completed.

Lectures

Each detailed subject will be presented in a lecture format outlining the theory and standardized accepted methodology. Lecture note outlines will be distributed to the students for each lecture to help the student capture personal notes.

Specific Industry Examples

Real life industry examples will be covered that detail out the application of the theory to demonstrate how different companies apply these tools and techniques. This will give the students a clear understanding of how and why these techniques are utilized at different companies and industries in different manners.

In-Class Assignments

The student will conduct several projects that outline each key principal on in-class projects. These projects will increase in complexity as the students further develop their skills in applying these tools and techniques. The students will present their work to the group for review and discussion. Data analysis exercises will be practiced in class to gain a clear understanding in the use of Minitab Data Analysis Software.

Specific Company Application

We will apply these tools and techniques on a specific current or past company project as a class learning project. This will help the student understand how to apply LSS at their company.

Black Belt Certification

Students should bring a real company improvement project to the class that is accepted by their management to be worked on and led by the student. Successful application of the LSS tools.

- Creation of a thorough final report documenting the analysis and improvement work done.
- A letter from the student's company management verifying that the project has achieved its intended improvement goals in the company.
- Instructor approval of the final report.

V COURSE OUTLINE & ASSIGNMENTS

Module 1

Introduction to LSS and its history	PowerPoint lecture
Introduction to the different certification levels	PowerPoint lecture
Introduction to the DMAIC Methodology used in LSS	PowerPoint lecture
Introduction to the LSS toolbox	PowerPoint lecture
The Define Phase of DMAIC and its LSS tools	PowerPoint lecture
In-Class Assignment, Project Charter	Complete & present
The Measure Phase of DMAIC and its tools	PowerPoint lecture
In-Class assignment, The Lean Balance Chart	Complete & present
In-Class assignment, Lean manufacturing exercise	Complete & present
In-Class assignment, Lean transactional exercise	Complete & present

Module 2

The Measure Phase of DMAIC and its LSS tools	PowerPoint lecture
In-Class Assignment, The Strategy of Data Collection	Complete & present
In-Class Assignment, 4W Data stratification techniques	Complete & present
In-Class Assignment, Value Stream Mapping	Complete & present
In-Class Assignment, Time and motion studies	Complete & present

Module 3

In-Class Assignment, Advanced Process Mapping	Complete & present
In-Class Assignment, The C & c new Process Wish List	Complete & present
In-Class Assignment, RTY (Rolled Throughput Yield)	Complete & present
In-Class Assignment, FTY (First time yield)	Complete & present
In-Class Assignment, Total % VA calculations of a process	Complete & present

Module 4

In-Class Assignment, SIPOC Diagrams	Complete & present
In-Class Assignment, Waste identification	Complete & present
In-Class Assignment, Spaghetti Charting	Complete & present
In-Class Assignment, Minitab Software Basics	Complete & present
In-Class Assignment, Gage R & R in Minitab Software	Complete & present
In-Class Assignment, Pareto Charting in Minitab	Complete & present

Module 5

The Analyze Phase of DMAIC and its LSS tools	PowerPoint lecture
Introduction to the Strategy of Data Analysis	PowerPoint lecture
In-Class Assignment, 6M Fishbone Diagrams	Complete & present
In-Class Assignment, 5Why Root Cause Brainstorming	Complete & present
In-Class Assignment, Various Time Plots in Minitab	Complete & present
In-Class Assignment, Data analysis techniques in Minitab	Complete & present
In-Class Assignment, Histograms & misc. stats in Minitab	Complete & present
In-Class Assignment, Process Capability in Minitab	Complete & present
In-Class Assignment, Advanced data charting in Minitab	Complete & present
In-Class Assignment, Stratified data charting in Minitab	Complete & present
In-Class Assignment, Data normality tests in Minitab	Complete & present
In-Class Assignment, Non-normal data distributions	Complete & present

Module 6

In-Class Assignment, Matrix Plots in Minitab	Complete & present
In-Class Assignment, Simple Regression Analysis	Complete & present
In-Class Assignment, Multiple variable Regression analysis	Complete & present
In-Class Assignment, Contour & 3D Plots in Minitab	Complete & present
In-Class Assignment, Logistic Regression analysis	Complete & present
In-Class Assignment, Intro to Design of Experiments	Complete & present

Module 7

The Improve Phase of DMAIC and its LSS tools	PowerPoint lecture
In-Class Assignment, Innovation Techniques	Complete & present
In-Class Assignment, Selecting Solutions	Complete & present
Follow-Along, FMEA	Complete & discuss
Follow-Along, Waterfall Charts	Complete & present
Follow-Along, Converting downtime to Pit Stop Events	Complete & present
Follow-Along, Quick Changeovers	Complete & present
In-Class Assignment, Error-Proofing Techniques	Complete & present
In-Class Assignment, Confidence Intervals in Minitab	Complete & present
In-Class Assignment, Hypothesis Testing in Minitab	Complete & present
In-Class Assignment, Creating 5 How improvement plans	Complete & present
In-Class Assignment, Creating detailed project trackers	Complete & present

Module 8

The Control Phase of DMAIC and its LSS tools	PowerPoint lecture
In-Class Assignment, Common Cause & Special Causes	Complete & present
In-Class Assignment, Interpreting Time Plots & Trends	Complete & present
In-Class Assignment, SPC charting & Analysis in Minitab	Complete & present
In-Class Assignment, VOC vs. the VOP	Complete & present
In-Class Assignment, Visual Controls & SOPs	Complete & present
Minitab Follow-along, Data Analysis on a LSS Project	Complete & discuss
Follow-along, Final Report creation on a LSS Project	Complete & discuss
Case Study, Final Report creation on a LSS Project	PowerPoint lecture

Module 9

In-Class Assignment, Data Analysis on a LSS Project	Complete & present
In-Class Assignment, Creating a LSS Project Report	Complete & present

Module 10

Project Presentations of Data Analysis and Final Reports	Presentations
Follow-along, the right LSS tools for different projects	Complete & present