



Introduction to Lean Six Sigma (LSS)

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 be introduced to LSS concepts and also practice data analysis using Minitab software with data files from real Lean Six Sigma projects.

- First, the basics of LSS are discussed 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 discussed.
- 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 is covered in detail. Data analysis using Minitab will be practiced.
- Lastly, participants will learn how the basics of implementing improvements and maintain the gains once they are implemented. Statistical Process Control (SPC) will also be reviewed.



Course Syllabus

I IDENTIFYING INFORMATION

Course:	Introduction to Lean Six Sigma (LSS)
Prerequisite:	None
Time Frame:	40 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 <u>REFERENCE MATERIALS</u>

- 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 why Lean and Six Sigma should be linked
- 9. Understand how to successfully apply LSS tools
- 10. Understand the basics of data analysis using Minitab Software
- 11. Practice the use of LSS tools through class exercises



IV <u>METHODOLOGY</u>

This course is a LSS Overview 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.

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.



V COURSE OUTLINE & ASSIGNMENTS

Module 1

Introduction to LSS and its history Introduction to the different certification levels Introduction to the DMAIC Methodology used in LSS Introduction to the LSS toolbox Introduction to the Define Phase of DMAIC and tools In-Class Assignment, Project Charter In-Class assignment, Lean manufacturing exercise

Module 2

Introduction to the Measure Phase of DMAIC and tools In-Class Assignment, The Strategy of Data Collection In-Class Assignment, 4W Data stratification techniques In-Class Assignment, Value Stream Mapping In-Class Assignment, Time and motion studies In-Class Assignment, The new process Wish List In-Class Assignment, RTY (Rolled Throughput Yield) In-Class Assignment, FTY (First time yield) In-Class Assignment, % VA calculations of a process In-Class Assignment, SIPOC Diagrams In-Class Assignment, Waste identification In-Class Assignment, Spaghetti Charting In-Class Assignment, Minitab Software Basics In-Class Assignment, Gage R & R in Minitab Software In-Class Assignment, Pareto Charting in Minitab PowerPoint lecture PowerPoint lecture PowerPoint lecture PowerPoint lecture PowerPoint lecture Complete & present Complete & present

PowerPoint lecture Complete & present Complete & present

Module 3

Introduction to the Analyze Phase of DMAIC and its toolsPCIntroduction to the Strategy of Data AnalysisPCIn-Class Assignment, 6M Fishbone BrainstormingCCIn-Class Assignment, 5Why Root Cause BrainstormingCCIn-Class Assignment, Various Time Plots in MinitabCCIn-Class Assignment, Data analysis techniques in MinitabCCIn-Class Assignment, Histograms & misc stats in MinitabCCIn-Class Assignment, Data normality tests in MinitabCCIn-Class Assignment, Process Capability in MinitabCCIn-Class Assignment, Matrix Plots in MinitabCCIn-Class Assignment, Regression analysisCCIn-Class Assignment, ANOVA (Analysis of Variance)CC

PowerPoint lecture PowerPoint lecture Complete & present Complete & present



Module 4

Introduction to the Improve Phase of DMAIC and tools In-Class Assignment, Confidence Intervals in Minitab In-Class Assignment, Hypothesis Testing in Minitab Introduction to the Control Phase of DMAIC and its tools In-Class Assignment, SPC charting & Analysis in Minitab Minitab Follow-along, Data Analysis on a LSS Project

Module 5

In-Class Assignment, Data Analysis on a LSS Project In-Class Assignment, Creating a LSS Project Report Project Presentations of Data Analysis & Final Reports In-Class Exercise, the right LSS tools for projects PowerPoint lecture Complete & present Complete & present PowerPoint lecture Complete & present Complete & discuss

Complete & present Complete & present Presentations Complete & present