

2012

**Lean Enterprise and Six
Sigma Training Guide**



EMS Consulting Group

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Training Guide

EMS Consulting Group provides training classes and workshops that help our clients increase quality and productivity through lean implementation. Our clients choose us for several reasons:

1. Our training programs are customized to suit the particular needs of our clients. We realize that the one-size-fits-all approach to training does not work; consequently, our clients receive a program that is perfectly suited to their needs. Most training companies are not able to do this.
2. Our trainers are experienced consultants who have implemented the tools and techniques they are teaching. Consequently, they are able to help our clients see the application of the techniques being taught.
3. Our training and consulting programs are aimed at helping our clients become self-sufficient. Unlike our competition, we are in the business of teaching and advising our clients how to implement lean.
4. We have industry-diverse experience and can apply our lessons learned from implementing lean in industries such as the plastics, consumer products, medical device, biotech, aerospace, and capital equipment industries.
5. Our clients pay only for the value they receive. Unlike many other firms, we do not engage in open-ended projects without clearly defined deliverables. Clients know what they're going to pay and what value they are going to receive in return before we even begin our engagements.
6. Several of our programs can be delivered in Spanish, to address the needs of our clients' diverse workforces.

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Client List

Below is a representative list of clients and their respective industries with which EMS Consulting Group, Inc. has provided on-site training and consulting services.

Client	Industry
Adel Wiggins Group	Industrial and Aerospace Products
Alphatec Spine Inc.	Medical Device
American Security Products	Industrial Safes
Amgen, Inc.	Pharmaceutical / Biotech
Bekaert Specialty Films	Window Film
Carl Zeiss Meditec International	Medical Device
The CBORD Group, Inc.	Electronic Security Systems
Dako North America, Inc.	Pharmaceutical / Biotech
Desa International	Fireplaces
Digirad	Medical Device (Capital Equipment)
Edwards Lifesciences	Implantable Medical Devices
Enkeboll Designs	Wood Products
EV3 Neurovascular	Implantable Medical Devices
Farmers Insurance	Farmers
Gen-Probe	Biotech
Integra Life Sciences	Medical Devices
KAPCO VALTEC	Aerospace Products
Meadwestvaco	Consumer and Office Paper Products
Newport Corporation	Semiconductor Parts and Equipment
Nobel Biocare	Dental Implants
Ortho Organizers	Medical Device
Perrin Manufacturing	Plastic Products
QSI Corporation	Electronics
Wilbur Curtis Company	Coffee and Tea Machines
Zimmer, Inc.	Medical Device

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Public Training / Lean Certification Clients

Following is a partial list of companies that have taken our public lean training and/or lean certification programs.

Acorn-Gencon Plastics	Hi Tech Honeycomb
Adel Wiggins Group	ITT Force Protection Systems
Alcoa Fastening Systems	ITW (Illinois Tool Works Inc.)
American Security Products	Jif-Pak Manufacturing, Inc.
Ameron International	Kaiser Electroprecision, Inc.
Arvato Services	Lindsey Manufacturing
B/E Aerospace	MeadWestvaco - Mead Consumer and Office Products
Bearing Inspection Inc.	Mortgage Bankers Association
Bekaert Specialty Films	Oberthur Card Systems
Boeing	PepsiCo, Inc
Bowne and Company	Perrin Manufacturing Company
Carl Zeiss Meditec International	Philips Industries
Castec	Providence Health Systems
Conesys	Quad Graphics
Desa International	Quidel, Inc.
Edwards Lifesciences	RBC Bearings, Inc.
Eldorado Stone	Riedon, Inc.
Electro-Scientific Industries, Inc.	TaylorMade-Adidas Golf
Enkeboll Designs	Technicolor
Everbrite, LLC	Simpletech, Inc
Federal Heath Sign Company	Signs and Services Company
Gimbals Fine Candies	Steelcase
Glenair Inc.	United Plastics Group, Inc.
Goodridge USA, Inc.	Wilbur Curtis Corporation
Headwaters Construction	Zimmer, Inc.

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Courses Included in This Guide

Course #	Course Name
LEA04	Lean Manufacturing Certification Program
LEA01	Introduction to Lean Implementation
VSM01	Value Stream Mapping
LPC01	Lean Production Control and Inventory Management
FLOW01	Creating Continuous Flow Manufacturing Cells
KAI01	Kaizen Events: 5S, Visual Controls, Mistake Proofing
KAI02	Process Kaizen: Quick Changeover and Total Productive Maintenance (TPM)
LEA07	Lean Office Value Stream Mapping
LEA08	Lean Office Certificate Program
LEA09	Lean Manufacturing Certification (Blended Learning)
FLOW02	Continuous Flow and Pull Systems
KAI04	Kaizen Events: Team Facilitation and Problem Solving
MAT01	Material Flow and Kanban Systems
LEA02	Lean for the Executive
LEA03	Creating a Lean Culture
LEA05	Lean Manufacturing for Job Shops
EVM01	Extended Value Stream Mapping and Analysis
VSM02	Creating Mixed Model Value Streams
5S01	5S: Sort, Set-in-Order, Shine, Standardize, Sustain
SMED01	SMED / Quick Changeover
VC01	Visual Controls
STW01	Standardized Work
TPM01	Total Productive Maintenance
LH01	Lean For Healthcare
6SIG01	Six Sigma Green Belt Training
6SIG02	Six Sigma Executive Overview
6SIG03	Lean Six Sigma Black Belt
6SIG04	Lean Six Sigma Green Belt
PROB01	Problem Solving
DFM01	Design for Manufacturability
LPD01	Lean Product Development
LACC01	Lean Accounting

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Lean Certification Program

Description:

Curriculum: LEA04

The Lean Manufacturing Certificate program will assist manufacturers with the challenge of implementing Lean and maintaining continuous improvements. This proven method is a series of eight course modules designed to provide participants targeted technical competencies in lean manufacturing.

Our lean experts will guide you through a series of course work, hands-on projects and simulations. You will learn how to apply each of the principles and tools of lean including Value Stream Mapping, Continuous Flow Manufacturing Cells, Lean Production Control, Level Pull Production, kanban and pull systems, and Kaizen Events and tools. Certification requires the completion of a lean manufacturing project in your own company – to reinforce the learning and achieve real results in your specific environment.

Program Outline:

LEA01	Implementing Lean Manufacturing
VSM01	Value Stream Mapping
LEA07	Lean Office: Value Stream Mapping for Business Processes
KAI01	Kaizen Events: 5S, Visual Controls, and Mistake Proofing
KAI02	Quick Changeover and Total Productive Maintenance (TPM)
FLOW01	Creating Continuous Flow Manufacturing Cells
LPC01	Lean Production Control and Inventory Management
PRJ01	Student In-House Lean Project

Our on-site lean certification programs can be customized to suit the particular needs of the client. We can emphasize, modify, or add modules to ensure that all needed principles and tools are taught in the most applicable way.

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Introduction to Lean Implementation

Description:

Course: LEA01

In this interactive learning experience, participants will learn a specific sequence of steps and initiatives comprising a lean manufacturing action plan that real managers in real companies can deploy.

Whether you have implemented some lean initiatives and want more from your program or you are not sure where to begin, this program will enable you to devise a lean manufacturing strategy and action plan for your organization.

Audience:

This course is designed for senior level operations/manufacturing executives, manufacturing and plant managers, production control managers and supervisors, materials managers and analysts, manufacturing and industrial engineers, industrial managers, operations engineers, purchasing personnel, and anyone involved in the changeover to a lean operation.

Outline

- Lean Manufacturing Overview / Benefits
- 7 Wastes
- Implementation Tools: Value Stream Mapping and Kaizen Events
- Operational Stability
- Connecting Flow Through Continuous Flow and Pull
- Standardized Work
- Leveling
- Problem Solving Culture and Methodology / PDCA
- Extending Lean to Suppliers
- Lean Implementation: Strategy and Tactics
- Lean Implementation: Culture and Metrics

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Value Stream Mapping

Description:

Course: VSM01

Value Stream Mapping is a powerful tool for analyzing information and material flow throughout an organization or between organizations and identifying and planning improvements.

In this course, you will learn how to effectively identify and eliminate waste and sources of waste in your organization. Participants in the class will work through a case example. They will create a current state map, analyze the current state map, and create a lean future state. Participants will also be able to ask about their unique situations and learn different ways to apply this powerful tool.

Audience:

This course is designed for manufacturing and plant managers, production control managers and supervisors, materials managers and analysts, manufacturing and industrial engineers, industrial managers, operations engineers, purchasing personnel, and anyone involved in the changeover to a lean operation.

Benefits of Mapping

- The ability to dramatically reduce inventory and improve lead-time.
- Planning and identifying kaizen events for optimum effectiveness.
- The ability for participants from different parts of an organization to gain an understanding of the overall information and material flow.

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Value Stream Mapping (Cont.)

Outline:

- Lean and VSM Overview and Definitions
- Types of Kaizen
- Value Stream Identification
- Types of Value Stream Mapping
- Current State Analysis/Mapping
- Class Exercise: Current State
- Creating a Lean Future State
 - Takt time
 - Build to stock or directly to shipping
 - Single-Piece flow v. Pull
 - Scheduling
 - Heijunka
- Mapping a lean future state
- Class Exercise: Future State
- Implementation Planning

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Lean Production Control and Inventory Management

Description:

Course :LPC01

This course will teach the implementation of a lean production control system in a factory. Learn when to hold finished goods and when to make-to-order; learn how to create and manage a finished goods supermarket; learn how to size supermarkets and trigger production; learn how to control batch processes upstream; and more.

The attendees will work through a case exercise and learn skills they can immediately apply to their workplaces.

Audience

This course is designed for manufacturing and plant managers, production control managers and supervisors, materials managers and analysts, manufacturing and industrial engineers, industrial managers, operations engineers, purchasing personnel, and anyone involved in the changeover to a lean operation.

Benefits

- Higher plant inventory turns
- Less WIP and Finished Goods inventory
- Fewer parts shortages
- Improved on-time delivery to customers
- Higher production output
- Less overtime
- Less expedited production

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Lean Production Control and Inventory Management (Cont.)

Outline

- The benefits of a lean production control system
- Finished Goods Warehouses v. Make-to-Order Operations
- Exercise
- How to Organize and control a finished goods warehouse
- Exercise
- How to schedule a value stream
- Exercise
- How to level production (hiejunka)
- How to convey demand to the pacemaker to create pull
- How to Manage upstream Information and Material Flow
- How to size supermarkets
- Exercise
- How to setup and use Kanban systems
- How to control upstream processes
- Exercise
- How to expand your production control system
- Sustaining and Improving

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Creating Continuous Flow Manufacturing Cells

Description:

Course: FLOW01

Manufacturing cells have been in use in the U.S. for over 10 years; however, many companies still have found limited success in creating one-piece flow. In this workshop, participants will learn how to design manufacturing cells for true one-piece flow. The course is comprehensive in that it covers all facets of this discipline: understanding takt time, physical layout, analyzing standard work and creating standard work charts, line balancing, load-leveling, setting up a system for auditing, and more. Participants will work through two case examples. They will design cells and work through necessary calculations and analysis. Skills will be immediately applicable to the "real world."

Audience:

This course is designed for manufacturing and plant managers, production control managers and supervisors, materials managers and analysts, manufacturing and industrial engineers, industrial managers, operations engineers, purchasing personnel, and anyone involved in the changeover to a lean operation.

Benefits

- Less WIP inventory
- Increased operator productivity
- Shorter lead times
- Ability to better handle fluctuating demand

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Creating Continuous Flow Manufacturing Cells (Cont.)

Outline:

- Lean and Continuous Flow Overview/Definitions
- Benefits of continuous or single-piece flow
- Identifying and selecting product families
- Calculating takt time
- Exercise
- Metrics
- Identifying and recording work steps
- Exercise
- Operator Balancing
- Layout Guidelines
- Equipment Requirements
- Exercise
- Material management
- Troubleshooting flow problems
- Implementation planning
- Work Distributions
- Scheduling/Hiejunka
- Sustaining
- One Piece Flow Simulation

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Kaizen Events: 5S, Visual Controls, and Mistake Proofing

Description:

Course: KAI01

This course will teach the principles of process Kaizen. Process Kaizen events are highly focused continuous improvement activities that can be used to launch 5-S, TPM, Set-up Reduction/Quick Changeover, and/or Cellular Flow implementation projects. This course will teach you how to implement a kaizen activity and will focus on the process kaizen tools of 5S, visual controls, and mistake proofing (poka yoke).

Audience

This course is designed for manufacturing and plant managers, production control managers and supervisors, materials managers and analysts, manufacturing and industrial engineers, industrial managers, operations engineers, purchasing personnel, and anyone involved in the changeover to a lean operation.

Learning Objectives

Learn how to implement a kaizen event. Learn how to apply the tools of 5S, visual controls, and mistake proofing using kaizen.

Benefits

- Improved productivity
- Improved Quality
- Ability to elicit feedback from shop floor level employees (a valuable source of information)
- Improved employee morale
- Fast Implementation / High impact

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Kaizen Events: 5S, Visual Controls, and Mistake Proofing (Cont.)

Outline

- What is Process Kaizen?
- Selecting/Prioritizing Kaizen Events to Perform
- Planning a Kaizen Event
- Implementation
 - Training
 - Documenting Current Condition / Current State
 - Brainstorming
 - Creating Future Condition / Future State
 - Hands-on Implementation
 - Reporting and Follow-up
- 5S
 - Description of the 5 Pillars
 - Relationship Between 5S and Flow
 - Implementing Sort
 - Implementing Set in Order
 - Implementing Shine
 - Implementing Standardize
 - Implementing Sustain
- Visual Controls
 - Overview of Visual Factory
 - Elements of the Visual Factory
 - Waste Elimination: Case Examples
 - Benefits of the Visual Factory
 - How to Use Workplace Organization and Standardization: Five Keys to Workplace Organization
 - Overview of Visual Displays and Controls
- Mistake Proofing Techniques

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Kaizen Tools: Quick Changeover (SMED) and Total Productive Maintenance (TPM)

Description:

Course: KAI02

This course will teach the principles of Total Productive Maintenance and Quick Changeover (SMED). TPM and SMED are two essential ingredients in a lean manufacturing program. The TPM system addresses production operation with a solid, team-based proactive program. It helps eliminate losses from breakdowns, defects, and accidents and improves Overall Equipment Effectiveness (OEE). The SMED system for quick changeover is a three-phase system aimed at reducing changeover time on equipment; this allows for smaller batches and less inventory throughout the value stream.

Audience

This course is designed for manufacturing and plant managers, production control managers and supervisors, materials managers and analysts, manufacturing and industrial engineers, industrial managers, operations engineers, purchasing personnel, and anyone involved in the changeover to a lean operation.

Learning Objectives

Learn how to apply key process kaizen tools Total Productive Maintenance (TPM) and Quick Changeover (SMED) to improve equipment uptime and effectiveness and to reduce inventory and lead time.

Benefits

- Improved Productivity / Equipment Uptime
- Improved Quality
- Smaller Batches / Less Inventory
- Improved Ability to Respond to Customer Needs

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Kaizen Tools: Quick Changeover (SMED) and Total Productive Maintenance (Cont.)

Outline

- Overview: Process Kaizen Tools
- Total Productive Maintenance
 - Why TPM is Important
 - The Big Six Losses
 - Measuring and analyzing Overall Equipment Effectiveness (OEE).
 - Autonomous Maintenance/TPM Teams
 - Daily/Weekly Maintenance Tasks
 - TPM and 5S
 - Sustaining/Improving the Program
- SMED/Quick Changeover
 - Why are setup times important?
 - What is the SMED system?
 - Four stages of any setup
 - Analyzing current setups
 - Identifying Internal versus External Setup
 - Converting Internal versus External Setup
 - Streamlining External and Internal Setup steps
 - Setup reduction worksheet
 - Case Studies
 - Implementing the changes
 - Measuring the Improvement

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Lean Office: Value Stream Mapping for Administrative Processes

Description:

Course: LEA07

Business Processes – such as order entry, quoting, scheduling, design and engineering, purchasing and accounting – often eat up from 70% to 95% of the time that goes into the "order to cash" cycle time. In this course, participants will learn how to apply lean principles to such business processes. They will learn how to identify waste in an office environment, how to construct a current state value stream map, how to develop a lean future state value stream map, and how to implement the improvements.

Benefits of a Lean office include reduction of:

- Long lead times (waiting wastes)
- Inventory (queued-up work in your in-basket)
- Over-processing (excess paperwork, redundant approvals)
- Motion (inefficient work area design and layout)
- Defect/mistakes (incomplete/inaccurate information)
- Transportation and motion (complex tracking systems)

Outline:

- Lean/Value Stream Mapping Overview
- The Seven Types of Waste for Administrative Processes
- Current Condition Analysis: Mapping Office Value Streams
- Designing a Current State Map
- Team Exercise: Current State Map
- Characteristics of Lean Administrative Processes
- Creating a Lean Future Condition
- Designing a Lean Future State Map.
- Team Exercise: Future State Map
- Planning and Implementing the Future State
- Process Kaizen Tools for the Lean Office

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Lean Office Certificate Program

Description:

Curriculum: LEA08

The Lean Office Certificate program will assist those who would like to implement lean business processes in environments including customer service, purchasing, planning, accounting, and other service and knowledge-based work environments. This proven method is a series of four course modules designed to provide participants targeted technical competencies in lean.

Our lean experts will guide you through a series of course work, hands-on projects and simulations. You will learn how to apply each of the principles and tools of lean including Value Stream Mapping, continuous flow and pull, 5S, Visual Controls, and Kaizen Events and tools. Certification requires the completion of a lean project in your own company – to reinforce the learning and achieve real results in your specific environment.

Program Outline:

LEA01	Introduction to Implementing Lean
LEA07	Value Stream Mapping for Administrative Processes
KAI01	Kaizen Events: 5S, Visual Controls, and Mistake Proofing
PRJ01	Student In-House Lean Project

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Lean Certification Program – Blended Learning Version

Description:

Curriculum: LEA09

The Lean Manufacturing Certificate program will assist manufacturers with the challenge of implementing Lean and maintaining continuous improvements. This program includes 3 consecutive days of hands-on training including case exercises, simulation, and videos. It also includes supplemental online training that covers additional topics that are part of the body of knowledge required for the certification.

Participants will learn how to apply each of the principles and tools of lean including Value Stream Mapping, Continuous Flow Manufacturing Cells, Lean Production Control, Level Pull Production, kanban and pull systems, and Kaizen Events and tools. Certification requires the completion of a lean manufacturing project in your own company – to reinforce the learning and achieve real results in your specific environment.

The program includes the following training topics:

- Lean Overview (Instructor Led)
- Value Stream Mapping (Instructor Led with Team Hands-on Mapping)
- Kaizen Event Planning and Facilitation (Instructor Led with Team Exercise)
- Team Facilitation and Problem Solving (Instructor Led with Team Exercises)
- Continuous Flow and Kanban Implementation (Instructor Led with Hands-on Simulation)
- 5S (Online)
- Total Productive Maintenance (Online)
- Quick Changeover/SMED (Online)
- Mistake Proofing (Online)
- Problem Solving Tools (Online)
- Lean Metrics (Online)

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Connecting Flow: Continuous Flow and Pull Systems

Description:

Course: FLOW02

Connecting Flow is one the most important concepts of lean and the Toyota Production System. This course will teach the techniques of continuous or one piece flow as well as pull systems including “A” type pull systems (Replenishment pull) as well as “B” type pull systems (Sequential Pull). The course includes a hands-on simulation exercise.

Audience:

This course is designed for manufacturing and plant managers, production control managers and supervisors, materials managers and analysts, manufacturing and industrial engineers, industrial managers, operations engineers, purchasing personnel, and anyone involved in the changeover to a lean operation.

Benefits

- Less WIP inventory
- Increased operator productivity
- Shorter lead times
- Ability to better handle fluctuating demand

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Connecting Flow: Continuous Flow and Pull Systems (Cont.)

Outline:

- Lean and Continuous Flow Overview/Definitions
- Connecting Flow: Continuous Flow and Pull Systems
- Benefits of continuous or single-piece flow
- Identifying and selecting product families
- Calculating takt time
- Metrics
- Identifying and recording work steps
- Operator Balancing
- Layout Guidelines
- Equipment Requirements
- Material management
- Troubleshooting flow problems
- Implementation planning
- Work Distributions
- Scheduling/Hiejunka
- Sustaining
- Batch versus Continuous Flow Simulation
- Kanban Systems
- Inventory Management: Creating Supermarkets
- Calculating Trigger Points (Reorder Points) for Replenishment of Supermarkets
- Kanban and Pull Systems Exercise

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Kaizen Events: Team Facilitation and Problem Solving

Description:

Course: KAI04

This course will teach the planning and execution of kaizen events and will emphasize team facilitation techniques to address issues commonly encountered during team activities. The program will also cover basic problem solving tools and techniques that any lean practitioner should have in his or her toolbox.

Audience

This course is designed for manufacturing and plant managers, production control managers and supervisors, materials managers and analysts, manufacturing and industrial engineers, industrial managers, operations engineers, purchasing personnel, and anyone involved in the changeover to a lean operation.

Learning Objectives

- Learn how to plan and facilitate a kaizen event.
- Learn how to facilitate a team and build consensus
- Learn how to utilize basic problem solving techniques of the Toyota Production System

Benefits

- Improved productivity
- Improved Quality
- Ability to elicit feedback from shop floor level employees (a valuable source of information)
- Improved employee morale
- Fast Implementation / High impact

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Kaizen Events: Team Facilitation and Problem Solving

Outline

- What is Process Kaizen?
- Selecting/Prioritizing Kaizen Events to Perform
- Team Facilitation
- Exercise: Team Building
- Planning a Kaizen Event
- Implementation
 - Training
 - Documenting Current Condition / Current State
 - Brainstorming
 - Creating Future Condition / Future State
 - Hands-on Implementation
 - Reporting and Follow-up
- Exercise: Kaizen Event Analysis/Planning
- Brainstorming Tools
- Problem Solving Process: Root Cause Analysis and PDCA
Problem Solving Toolkit

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Material Flow and Kanban Systems

Description:

Course: MAT01

This course will teach the implementation of a lean pull system for purchased parts that ensures that purchased parts are delivered to manufacturing cells efficiently and timely. Attendees will learn how to develop and use a system for planning parts, how to setup purchased parts supermarkets, how to implement kanban, and how to effectively deliver purchased parts to manufacturing cells. Using a case example, participants will make calculations and design a system for handling purchased parts.

Audience

This course is designed for manufacturing and plant managers, production control managers and supervisors, materials managers and analysts, manufacturing and industrial engineers, industrial managers, operations engineers, purchasing personnel, and anyone involved in the changeover to a lean operation.

Benefits

- Lower inventory and increased productivity
- Elimination of operator time retrieving/finding parts
- Higher plant inventory turns
- Less inventory
- Increased safety

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Material Flow and Kanban Systems (Cont.)

Outline

- Lean Overview/Kanban Systems
- Benefits
- The Team
- Material movement within a Facility
- When and Where to begin implementation
- Part Planning
- Exercise
- Purchased Parts Market
 - Sizing/Storage Requirements
 - Logistics
- Setting/Specifying/Managing Inventory Levels
- Exercise
- Pull Signals
- Part Movement/Material Handling
- Exercise
- Standardized Work
- Calculating Kanban
- Exercise
- Sustaining/Auditing

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Lean for the Executive

Description:

Course: LEA02

Lean manufacturing is a way of thinking: a culture of eliminating non-value added activities while responding to customer needs. Lean enables companies to reduce costs and lead times, satisfy customers, and increase profitability and cash flows. This course is designed to teach a management team the principles of lean, key lean metrics and tools, and keys to developing a lean culture. This course is highly interactive and includes brainstorming sessions aimed at developing a go-forward plan.

Audience:

This course is designed for executives, senior staff responsible for initiating and executing significant change projects within their companies.

Learning Objectives:

- Understand the principles and tools of lean manufacturing.
- Learn how to establish financial and non-financial goals and metrics for a lean manufacturing company.
- Develop a high-level plan.

Outline:

- Lean Overview
- Setting Up a Lean Organization / Lean Culture
- Lean Accounting / Goals and Metrics
- Lean Tools: Value Stream Mapping & Flow Kaizen
- One Piece Flow and Kanban
- Kaizen Tools & Continuous Improvement

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Creating a Lean Culture

Description:

Course: LEA03

Despite the level of interest in lean manufacturing, it's easier to find information about the technical side of implementation than people issues. Yet, it is the people issues that often derail lean initiatives. This course addresses the "people systems" and cultural differences needed for implementing and sustaining lean manufacturing. Participants will get a feel for what it is like to work in a lean culture through a practical learning experience. Participants will draw from their own experience working in teams to gain an understanding of what is involved in the change to lean manufacturing.

Audience:

Anyone involved in or responsible for lean manufacturing will benefit including plant managers and staff, lean implementers, executives and managers, and human resources personnel.

Learning Objectives:

- Distinguish between incremental changes and "transformative" changes.
- Detail the people issues involved in a conversion from a mass to a lean production plant.
- Describe a lean culture's values and competencies.
- Understand the human systems of the lean organization.
- Provide experiential learning that is practical and useful.

Outline:

Grasping the Situation
The Case for Change

- The limits of mass production in a time of rapid change.
- Traditional manufacturing culture and values.
- The power of the mental model.
- What happens when you don't know that you don't know.
- Asking the right questions.

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Creating a Lean Culture (Cont.)

Lean Culture Change

- Not an incremental change (Why piecemeal initiatives disappoint)
- Manageable change and self-organizing change
- Initiating "transformative" change
- Not new tools but a different system: Getting outside of the box (traditional mindsets).

People Issues in Implementation

- Transition issues
- Resistance to change
- Changing mindsets
- Monitoring the internal change
- Opportunities for personal change
- Changing roles and structure
- New organizational forms and practices
- Typical challenges

Organizational Learning

- The production system as a learning system
- Information flow and communication patterns
- The factory as a learning organization
- Lean knowledge development and management

Lean Culture-Values and Competencies

- Prioritize value-added work
- Teamwork: Collaborative involvement
- Alignment to common purpose
- Involved and empowered workforce/supportive management
- Commitment to continuous improvement

Human Systems of the Lean Organization

- Team-based work groups
- Policy deployment
- Training and development
- Leadership in the new organization

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Lean Manufacturing for Job Shops

Description:

Course: LEA05

In recent years, custom manufacturers have reduced costs, improved throughput, and increased profitability by using continuous improvement and lean manufacturing principles throughout all areas of their organizations. Job Shops do benefit from Lean - often, they benefit far more than the high-volume repetitive manufacturer. Participants in this workshop will understand the lean manufacturing principles and how they can be effectively applied to provide continuous improvement in the small volume, high variety job shop environments.

Lean Manufacturing for Job Shops is about making gains in the areas of your business that you haven't yet considered improving, like quoting, designing/engineering, tooling, prototyping and more.

Course content includes principles of lean applied in a unique manufacturing environment, including analysis of pre-production processes and principles of 5S, plant layout, visual controls, set up reduction, point of use storage and dynamic scheduling.

Through on-site consulting and workshops, EMS Consulting Group can help you and your employees understand, implement and benefit from lean improvements.

Our Lean expert consultants have years of experience in a variety of manufacturing industries. We understand the Job Shop environment. It's your job to share your unique situation with us, and our job to develop a successful lean implementation strategy for you.

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Lean Supply Chain: Extended Value Stream Analysis

Description:

Course: EVM01

This course will teach you how to extend lean manufacturing beyond your four walls into the entire supply chain or extended value stream. In this course, you will learn how to effectively identify and eliminate waste and sources of waste in the entire value stream, which includes suppliers and customers. You will learn how to map a current state extended value stream map, analyze the current state map and associated metrics, and create a future state extended value stream map. Then, you will learn how to implement the future state including identifying and evaluating suppliers, developing and/or changing relationships with suppliers, helping suppliers implement lean through value stream mapping and kaizen, and creating a supplier association that effectively sustains lean throughout the entire supply chain.

Audience:

This course is designed for manufacturing and plant managers, production control managers and supervisors, materials managers and analysts, manufacturing and industrial engineers, industrial managers, operations engineers, purchasing personnel, and anyone involved in the changeover to a lean operation.

Benefits of Extended Value Stream Improvement

- The ability to plan and identify improvements for an entire supply chain.
- The ability to dramatically reduce inventory and improve lead-time throughout the entire supply chain.
- The ability to implement and sustain a lean supply chain that extends to customers and suppliers.

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Extended Value Stream Mapping and Analysis (Cont.)

Outline:

- Lean and VSM Overview and Definitions
- Value Stream Identification
- Extended Current State Value Stream Mapping
- Current State Analysis/Mapping
- Class Exercise: Current State Map
- Types of Waste in an Extended Value Stream
- Creating a Lean Future State
- Mapping a lean future state
- Class Exercise: Future State
- Implementation Planning
- Supplier Selection and Evaluation Techniques
- Outsourcing Evaluation
- Value Stream Mapping at Supplier Sites
- Implementing Kaizen Events at Supplier Sites
- Sustaining and Improving a Lean Extended Value Stream
- Application to Client (on-site training only)

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Lean and Value Stream Mapping for High Mix Low Volume Manufacturing

Description:

Course: VSM02

Many of today's manufacturers are dealing with high-mix, low-volume demand from customers. Thus, they are having trouble implementing the basic principles of lean that often assume a high-volume, low-mix demand model. In this course, participants are taught how to apply the principles of lean and value stream mapping to a high-mix, low-volume environment.

Participants in the class will work through a case example. They will create a current state map, analyze the current state map, and create a lean future state. Participants will also apply the tools to an existing product line (for on-site training only).

Audience:

This course is designed for manufacturing and plant managers, production control managers and supervisors, materials managers and analysts, manufacturing and industrial engineers, industrial managers, operations engineers, purchasing personnel, and anyone involved in the changeover to a lean operation.

Benefits of Mapping

- The ability to dramatically reduce inventory and improve lead-time.
- Planning and identifying kaizen events for optimum effectiveness.
- The ability for participants from different parts of an organization to gain an understanding of the overall information and material flow.

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Lean and Value Stream Mapping for High Mix Low Volume Manufacturing(Cont.)

Outline:

- Lean and Value Stream Mapping Overview and Definitions
- Types of Kaizen
- High mix / Low Volume and Lean
- Types of Value Stream Mapping
- Current State Analysis/Mapping
- Product Families and the Pacemaker Process
 - Choosing Product Families
 - Takt Time
 - Can Equipment Meet Takt Time
 - Defining the Interval
- Flow at the Pacemaker
 - Operator Balance Charts
 - Balancing High-Mix Products
 - Creating Standard Work
- Pitch and Scheduling
 - How to Create Pitch at the Pacemaker
 - Scheduling the Mix at the Pacemaker
- Customer Demand Fluctuations
- Implementation Planning
- Team Activities: Application to Client Products (On-site only)

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5S

Description:
Course: 5S01

5S is a simple but highly effective set of techniques that remove waste from your work environment through better workplace organization, visual communication, and general cleanliness.

This course will clearly position 5S methods within the proper context of Lean and value stream improvement. In order to have products or services flow in small batches; workplace organization, cleanliness, and standardization are absolutely essential. More importantly, you will see the significant role that your employees will play in implementing 5S methods, resulting in a safer workplace.

Learning Objectives:

Upon completion of the session, participants will be able to understand and immediately apply the following 5S concepts in their own workplace:

- **SORT** is the first pillar that helps to clearly distinguish the items needed in a work area from those no longer needed. Red tagging is the activity that eliminates these unneeded items.
- **SET-IN-ORDER** is the second pillar that helps to keep the needed items in the correct place to allow for easy and immediate retrieval.
- **SHINE** is the third pillar that helps to keep work areas, all work surfaces and equipment clean and free from dirt, debris, oil, etc.
- **STANDARDIZE** is the fourth pillar that defines the standard activities, procedures, schedules, and persons responsible for keeping the workplace clean and organized.
- **SUSTAIN** is the last pillar that drives the organization to be disciplined in maintaining these new standards and procedures and in continuously improving the 5S state of the workplace.

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5S (CONT.)

Outline:

- **Introduction**
 - Relationship Between 5S and Flow
 - Getting started with 5S: Overview
 - Description of the Five Pillars
 - Sort
 - Set in Order
 - Shine
 - Standardize
 - Sustain
- **The First Pillar: Sort**
 - Explanation
 - How to Sort
 - Steps in Red-Tagging
 - Accumulation of unneeded Items
 - Red-tagging Suggestions
 - Application #1 – Red-Tagging Activity (Optional)
- **The Second Pillar: Set-in-Order**
 - Explanation
 - How to Set-in-Order
 - Application #2 - Create a 5S Map / Visual Layout (Optional)
- **The Third Pillar: Shine**
 - Explanation
 - How to Implement Shine
 - Application #3 - Design Shine schedules (Optional)
- **The Fourth Pillar: Standardize**
 - Explanation
 - How to Implement Standardized Cleanup
 - Making Sort, Set-in-Order, and Shine a Habit
 - Taking it to the Next Level: Prevention
 - Application #4 - Create visual aids/Checklists (Optional)
- **The Fifth Pillar: Sustain**
 - Explanation
 - How to Sustain 5S Activities
 - Tools and Techniques to Sustain 5S Activities
 - Application #5 - Complete Implementation (Optional)

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SMED / Quick Changeover

Description:

Course: SMED01

This quick changeover (SMED) workshop is based on research developed by Shigeo Shingo, a much-celebrated specialist in the field. Lecture and hands on implementation of the techniques take place at the participants' manufacturing facility. This workshop will educate participants in the theory and techniques used to reduce setup times on equipment and machinery. By using on site equipment as an example for the class, students are immediately able to reduce the setup time in their operation. Typical results include a 50% - 80% reduction in setup time with little or no capital investment.

Learning Objectives:

- How to dramatically reduce set-up times to allow Leveled and Mixed Production.
- Practice quick changeover in a hands-on way.
- How to plan and implement these changes to have immediate positive impact the bottom line.

Outline:

- Why are setup times important?
- What is the SMED system?
- Four stages of any setup
- Analyzing current setups
 - Identifying Internal versus External Setup
 - Converting Internal versus External Setup
 - Streamlining External and Internal Setup steps
- Setup reduction worksheet
- Case Studies
- Implementing the changes
- Measuring the Improvement

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Visual Controls

Description:

Course: VC01

Participants will learn the basic techniques of Visual Factory through lecture, case studies, exercises, discussion, and practice using proven techniques. Completion of this course will enable participants to successfully implement a Visual Factory and measure its progress.

Audience:

This course is designed for manufacturing and plant managers, production control managers and supervisors, materials managers and analysts, manufacturing and industrial engineers, industrial managers, operations engineers, purchasing personnel, and anyone involved in the changeover to a lean operation.

Learning Objectives:

- Learn to use the elements and techniques of the Visual Factory System to organize and control the workplace.
- Recognize how the visual factory will ensure adherence to standards.
- Understand how the visual factory will promote effective communications throughout the organization.

Outline:

- Overview of Visual Factory
- Elements of the Visual Factory
- Five Elements of Production
- Major Wastes
- The Six Control Points
- Waste Elimination: Case Examples
- Benefits of the Visual Factory
- How to Use Workplace Organization and Standardization: Five Keys to Workplace Organization
- Overview of Visual Displays and Controls: The Visual Pyramid

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Standardized Work

Description:

Course: STW01

Using standardized work (STW) procedures helps eliminate defects. Participants will learn how workgroups should be involved in the organization of their tasks and in the elimination of waste. Learn how standardizing work minimizes the seven wastes of manufacturing.

Audience:

This course is designed for manufacturing and plant managers, production control managers and supervisors, materials managers and analysts, manufacturing and industrial engineers, industrial managers, operations engineers, purchasing personnel, and anyone involved in the changeover to a lean operation.

Learning Objectives:

- Explain the purpose and advantages of STW.
- Identify the problems STW will uncover.
- Determine the three elements of STW.
- Complete the STW sheet.

Outline:

- What is STW?
- Five Elements of Production
- Waste
- Strategies of Control
- Benefits of STW
- Pre-Requisites to STW
- Standard-In-Process Stock
- How to Complete the Standardized Work Sheet Showing the location and sequence of:
 - equipment and resources
 - work flow and process flow
 - quality and safety checks
- Roles and Responsibilities
- Implementation

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Total Productive Maintenance (TPM)

Description:

Course: TPM01

The TPM system addresses your production operation with a solid, team-based proactive program. It helps eliminate losses from breakdowns, defects, and accidents.

How TPM Works

- TPM begins by measuring and analyzing your Overall Equipment Effectiveness (OEE). This helps diagnose problems and becomes the measurement to determine the effectiveness of your TPM efforts.
- TPM then introduces the concept of Autonomous Maintenance, with machine operators as key members of the maintenance team. Historically, dedicated, highly skilled maintenance technicians have done maintenance. However, machine operators know their machines better than anyone. They can tell if their machine isn't working perfectly, often from just the sound or feel. They can alert maintenance people and provide excellent information. Also, when they perform routine maintenance and lubrication, they become "process owners" while relieving skilled trades of simple, yet time-consuming jobs.
- TPM shows how equipment can be modified and preventative and predictive tools applied to make daily maintenance quick and easy, without tools or ladders.
- This course will teach you how to recognize the "Big Six" equipment-related wastes and how to minimize them:
 - Setup and adjustment
 - Breakdowns
 - Idling and minor stoppages
 - Reduced speed
 - Startup
 - Defects

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Total Productive Maintenance (Cont.)

Outline

- Why TPM is Important
- The Big Six Losses
- Measuring and analyzing Overall Equipment Effectiveness (OEE)
- Autonomous Maintenance/TPM Teams
- Daily/Weekly Maintenance Tasks
- TPM and 5S
- Sustaining/Improving the Program

Benefits

- Improved machine reliability
- Extended machine life
- Increased capacity without purchasing additional machines or sacrificing additional floor space
- Improved teamwork between machine operators and maintenance people
- Improved safety
- Employees knowledgeable in machine-related processes
- A more involved, creative workforce
- The ability to re-allocate your skilled workforce by having machine operators perform daily and routine maintenance

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Lean for Health Care: Clinical and Administrative Improvement

Description

Course: LH01

This interactive session will translate basic lean principles and its application to achieve the Triple Aim of the nation's health care reform efforts. This two-day workshop will emphasize eliminating wastes throughout the health care continuum including ambulatory and administrative processes, beyond the inpatient settings, using basic lean tools such as Value Stream Mapping, 5S, and A3.

Learning Objectives

At the end of the two-day workshop, the participants will be able to:

- Articulate the key success factors of implementing lean in a health care organization to improve quality and decrease cost of care
- Articulate the 5 principles of Lean, 8 types of waste based on Lean Thinking
- Identify 8 types of wastes in health care organizations
- Create a Value Stream Map for a clinical and administrative processes in the health care setting
- Repeat the steps to create the future state and implementation plan using the VSM as a planning tool
- Apply key kaizen tools to increase efficiency for both clinical and administrative operations.
- Understand the steps to planning and facilitating a kaizen event
- Select appropriate measurement for success

Benefits

- Improved Service and Turnaround time for patients and providers
- Reduction of Errors in Administrative work
- Improved Patient Safety
- Improved Productivity
- Lower Costs

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Outline

- Introduction to Implementing Lean
- Lean Overview and Key Principles
- Lean and Healthcare
- Video
- 8 types of waste for Healthcare (Clinical and Administrative)
- Lean Implementation Tools: Value Stream Mapping and Kaizen Events
- Kaizen Tools for Healthcare
 - Work and Process Observation / Standardized Work
 - 5S: Creating an Organized Work Environment
 - Visual Management
 - Error Proofing
 - Kanban and Materials Management
 - A3 Problem Solving Techniques
 - Six Sigma
- Breakout Session: Simulation (Batch and Queue)
- Breakout Session: Simulation (Continuous Flow/Lean Tool Application)
- Lean Application to Healthcare: Case Examples/Video
- Value Stream Mapping Overview
- Current-State Value-Stream Mapping
 - Current State Mapping Techniques
 - Team Case Exercise
- Future-State Value-Stream Mapping
 - Principles for a Lean Value Stream for Healthcare
 - Takt Time and Performance Checks
 - Continuous Flow
 - Pull Techniques
 - Leveling Work
 - Team Case Exercise
 - Developing and Implementing an Action Plan using PDCA
- Lean Measurements / Metrics for Healthcare
- Final Discussion: Application to Participants

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Six Sigma Green Belt Training

Description:

Course: 6SIG01

Green Belts play an important role in your company's Six Sigma implementation strategy. They are the problem solvers assigned to Black Belt projects. Learn how to apply the right tools at the right time to maximize efficiency in defining, measuring, analyzing, improving, and controlling critical processes to increase cost savings.

Audience:

Problem solvers, data analysts, and project team members in manufacturing and service industries.

Objectives

- Introduce the Six Sigma improvement methodology.
- Equip associates with tools to define, measure, analyze, improve, and control critical processes to achieve cost savings objectives.

Outline

- Six Sigma / DMAIC overview
- Six Sigma Teams
 - Teams Overview
 - Team building exercise
- Selecting Six Sigma Projects
 - Defining problems
 - Discussion of Team Project to be solved
- Define Phase
 - Team Project Charter and Work Plan
 - Measurable Customer Requirements
 - High-Level Process Map
 - SIPOC
- Measure Phase
 - Measurement Concepts
 - How to Determine What to Measure
 - Sampling Plans
 - Data Collection Methods and Forms
 - Developing Baseline Defect Measures
- Analyze Phase

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- Data Analysis- Exploring
- Pareto Analysis
- Run Chart,
- Histogram/Frequency Plot
- Cause and Effect Analysis
- FMEA
- Scatter Plot or Correlation Diagram
- Flowcharts
- Advanced Tools
- Improve Phase
 - Generating Creative Solutions- Brainstorming
 - Analyzing and Selecting Solutions- Decision Matrix
 - Pilot Testing
 - Full-Scale Implementation
 - Advanced Improve Tool: FMEA
- Control Phase
 - Discipline
 - Documenting the Improvement
 - Establishing Ongoing Process Measures- Control Charts
 - Building a Process Management Plan
 - Process Dashboards
- Final exam/project

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Six Sigma Executive Overview

Description:

Course: 6SIG02

This overview of the six-sigma methodology fully explores the secret weapon of some of the world's most successful companies. You will have the opportunity to discuss how and why companies have successfully implemented six sigma strategies.

Audience:

Begin your six-sigma implementation now! We are extending this invitation to key people who have been charged with the facilitation, management, and implementation of six sigma projects. Bring your management team to this informative overview.

Objectives

- What are the benefits to your company?
- Learn a methodology that returns over \$100,000 to \$200,000 savings for each project implemented.
- Understand how Six Sigma fits your business strategy.
- Hear actual case studies from practicing Six Sigma companies.

Outline

- Welcome
- Six Sigma Overview
- Case Studies
- Questions and Answers
- Six Sigma Black Belt Training

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Lean Six Sigma Black Belt Certification

Description:

Course: 6SIG03

Black Belts play an important role in your company's Six Sigma implementation strategy. They lead the efforts to breakthrough improvement. This program combines Six Sigma's DMAIC methodology and quality tools with the power of lean manufacturing. Learn how to apply the right tools at the right time to maximize efficiency in defining, measuring, analyzing, improving, and controlling critical processes to improve business performance.

Audience:

Team Leaders/Potential Team Leaders of Lean Six Sigma Efforts,
Manufacturing/Industrial Engineers

Objectives

- Learn how to lead teams using the DMAIC problem solving methodology.
- Equip associates with tools to define, measure, analyze, improve, and control critical processes to achieve cost savings objectives.

Outline

- Lean Six Sigma Principles and Overview
- Lean Six Sigma Implementation
- Project Selection
 - NPV (Net Present Value) Analysis
 - Value Stream Mapping
- Lean Six Sigma Teams
 - Team Facilitation
 - Brainstorming Techniques
- Define Phase
 - Team Project Charter and Work Plan
 - Project Stakeholder Analysis
 - Measurable Customer Requirements
 - Requirements Statements
 - Process Mapping
 - SIPOC

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- Measure Phase
 - Measurement Concepts
 - How to Determine What to Measure
 - Sampling Plans
 - Data Collection Methods and Forms
 - Developing Baseline Defect Measures
 - Process Capability
 - Measurement Systems Analysis/Gage R&R
- Analyze Phase
 - Data Analysis- Exploring
 - Pareto Analysis
 - Run Chart,
 - Histogram/Frequency Plot
 - Cause and Effect Analysis
 - Scatter Plot or Correlation Diagram
 - Multi-Vari Charts
 - FMEA
 - Inferential Statistics Primer
 - Hypothesis Testing: Normal and Non-Normal Data
 - Hypothesis Testing: Discrete Data
 - Hypothesis Testing: Correlation and Regression
 - Design of Experiments Overview
 - DOE: Factorial Designs
 - DOE: Fractional Factorial Designs
 - RSM: Response Surface Methods
- Improve Phase
 - Generating Creative Solutions- Brainstorming
 - Analyzing and Selecting Solutions- Decision Matrix
 - 5S
 - Autonomous Maintenance / TPM
 - Quick Changeover / SMED
 - Line Balancing/Operator Balance Charts
 - Continuous Flow Layouts
 - Kanban/Pull Systems
 - Kaizen Events
 - Pilot Testing
 - Full-Scale Implementation
- Control Phase
 - Control Plan Elements
 - Statistical Process Control

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Lean Six Sigma Green Belt Certification

Description:

Course: 6SIG04

Green Belts play an important role in your company's Lean Six Sigma implementation strategy. They are the problem solvers assigned to Black Belt projects. Learn how to apply the right tools at the right time to maximize efficiency in defining, measuring, analyzing, improving, and controlling critical processes to increase cost savings.

Audience:

Problem solvers, data analysts, and project team members in manufacturing and service industries.

Objectives

- Learn the Lean Six Sigma improvement methodology.
- Equip associates with lean and six sigma tools used to define, measure, analyze, improve, and control critical processes to achieve cost savings objectives.

Outline

- Lean Six Sigma Principles and Overview
- Lean Six Sigma Implementation
- Project Selection
 - NPV (Net Present Value) Analysis
 - Value Stream Mapping
- Lean Six Sigma Teams
 - Team Facilitation
 - Brainstorming Techniques
- Define Phase
 - Team Project Charter and Work Plan
 - Project Stakeholder Analysis
 - Measurable Customer Requirements
 - Requirements Statements
 - Process Mapping
 - SIPOC

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- Measure Phase
 - Measurement Concepts
 - How to Determine What to Measure
 - Sampling Plans
 - Data Collection Methods and Forms
 - Developing Baseline Defect Measures
 - Process Capability
- Analyze Phase
 - Data Analysis- Exploring
 - Pareto Analysis
 - Run Chart,
 - Histogram/Frequency Plot
 - Cause and Effect Analysis
 - Scatter Plot or Correlation Diagram
 - Multi-Vari Charts
 - FMEA
 - Inferential Statistics and Hypothesis Testing Overview
 - Design of Experiments Overview
- Improve Phase
 - Generating Creative Solutions- Brainstorming
 - Analyzing and Selecting Solutions- Decision Matrix
 - 5S
 - Autonomous Maintenance / TPM
 - Quick Changeover / SMED
 - Line Balancing/Operator Balance Charts
 - Continuous Flow Layouts
 - Kanban/Pull Systems
 - Kaizen Events
 - Pilot Testing
 - Full-Scale Implementation
- Control Phase
 - Control Plan Elements
 - Statistical Process Control
- Project Presentations/Certification

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Problem Solving and Root Cause Analysis

Description:

Course: PROB01

This course is designed to help participants master problem-solving and root cause analysis skills, necessary ingredients in any lean manufacturing system. Participants will learn how to write a problem statement, identify facts needed to determine root causes, and develop a plan to implement actions.

Outline:

- Basic Problem Solving
 - The Problem Solving Process
 - Types of Problem Solving Tools
 - Quantitative Tools
 - Bar Chart
 - Control Charts
 - Pareto Diagram
 - Trend Diagrams
 - Histogram
 - Scatter-plot Diagram
 - Check Sheet
 - Process Capability
 - Qualitative Tools
 - Flow charts / Process Mapping
 - Cause & Effect Diagram (Fishbone)
 - 5 Whys
 - Affinity Diagram
 - Brainstorming
 - Surveys
 - Case Exercises
- Systematic Root Cause Investigation
 - Reasons for Poor Root Causal Identification
 - Describing and Documenting Non-conformity
 - Immediate/Direct Causes
 - Principle of Multiple Causes
 - Root causes
 - Pareto Analysis
 - Factors for Determining Preventive Actions
 - Case Exercises

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Design for Manufacturability Training

Description:

Course: DFM01

Design for Manufacturability (DFM) enables companies to optimize manufacturability, quality, reliability, serviceability, cost, flexibility, market acceptance, and time-to-market. Several studies have verified that 70% of a product's cost is determined by the design. This course is designed to teach the principles, benefits, and methods of design for manufacturability.

Audience:

This course is designed for manufacturing, supply chain, and design engineering executives; program managers; design, manufacturing, and quality engineers; and anyone in the organization involved in the development of products.

Benefits

- 25% - 30% product cost reductions
- Improved quality
- Improved development time-to-market
- Enhanced ability to understand design-related manufacturing issues
- Giving design engineers, manufacturing engineers, and manufacturing personnel a common understanding of design and manufacturing considerations.

Learning Objectives:

- Learn how to apply the design for manufacturability process.
- Establish goals and metrics for a design for manufacturability workshop.
- Learn the methods of design for manufacturability.
- Learn how to apply the methods.

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Design for Manufacturability Training (Cont.)

Outline:

1. Design For Manufacturability (DFM)

- DFM Overview
- Framework for DFM
- Problems of Traditional Design
- Designing with Concurrent Engineering Teams
- Basis for DFM
- Benefits of DFM

2. DFM Guidelines

- Principles of DFM
- 10 Commandments of Concurrent Engineering
- Material and Process Evaluation
- Tolerances and DFM Impact
- Raw Materials Standardization
- General Guidelines
- Developing Company Specific Guidelines
- Involving Suppliers
- Industry Guidelines for Specific Processes

3. Design For Assembly (DFA)

- Principles of Design for Assembly
- Simplicity - Minimize Part Count
- Standardization - Minimize Part Variety
- Standardization Approach and Method
- Assembly Process Framework
- Design for Parts Feeding & Handling
- Design for Part Orientation
- Design for Location and Insertion
- Design for Ease of Assembly
- Top Down, Uni-Axis Assembly

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Design for Manufacturability Training (Cont.)

- Design for Joining & Fastening
 - *Threaded Fastener Considerations & Guidelines*
 - *Integral Attachment (Snap-Fit Assembly) Guidelines*
 - *Other Fastening Methods and Guidelines*
- Simplify Interconnection
- Avoid Adjustments
- Mistake-Proof Assembly (Poke Yoke)
 - *The Six Mistake-Proofing Principles*
 - *Examples of the Six Mistake-Proofing Principles*

4. Implementing the DFM Process

- Determining Goals
- Management Support
- Establishing Ownership – The Role of the Change Agent
- Developing Product Teams
- Accumulating and Structuring Data
- Developing a DFM Manual
- Educating and Training
- Pilot Project – Jumpstarting with Kaizen
- DFM Assessment
- Publicizing and Encouraging
- Institutionalizing the DFM Process

5. Making DFM Part of the Culture

- Anticipating Resistance
- Shedding “The Old Way We do Business”
- Rewarding Creativity
- Continuous Improvement
- Cross Functional Product Family Teams
- Making DFM part of the Design Process
- Training and Empowering

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Design for Manufacturability Training (Cont.)

6. DFM Kaizen or Workshop (Hands on Training)

- Jumpstarting DFM with Kaizen
- Kaizen participants
- Training and “Thinking Different
- Creating a Baseline
- Brainstorming
- Rate and Group Ideas
- Develop Redesign Concepts
- Analyze and Compare Design Concepts
- Report Out

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Lean Product Development

Description:

Course: LPD01

Lean Product Development is the process by which Toyota develops and releases products. Toyota's engineers are four times more productive than their counterparts according to a NCMS study. This course addresses the elements of lean product development and equips the participants with the ability to implement this system within their organizations.

Audience:

This course is designed for manufacturing, supply chain, and design engineering executives; program managers; design, manufacturing, and quality engineers; and anyone in the organization involved in the development of products.

Learning Objectives:

- Learn the principles of lean product development
- Establish goals and metrics for a lean product development program.
- Learn the methods of lean product development.
- Learn to develop a new product development process based on Lean Product Development.

Outline:

- Lean Product Development Overview
- Goals and Metrics for Lean Product Development
- The Tools Employed
 - Set Based Concurrent Engineering
 - System Designer Entrepreneurial Leadership
 - Responsibility-Based Planning and Control
 - Expert Engineering Workforce
- Applying Lean Product Development at Your Organization

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Lean Accounting and Performance Metrics

Course: LACC01

Description:

Traditional accounting systems do not support or encourage lean practices. In recent years, there has been more interest in and acceptance of the concept of “lean accounting,” which eliminates waste from finance and control systems and supports lean practices throughout the enterprise. This course will cover the methods of modern Lean Accounting using a roadmap to lean accounting implementation.

Benefits

Lean Accounting provides the following benefits:

- It provides information needed for better lean decision making leading to increased profitability.
- It reduces time, cost, and waste by eliminating wasteful transactions and systems.
- It allows identification of the potential financial benefits of lean improvement initiatives and focus on the strategies required to realize those benefits.
- It motivates long-term lean improvement by providing lean-focused information.
- It addresses customer value directly by linking performance measurements to the drivers of value creation.

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Outline:

- Introduction
 - Why is Lean Accounting Important
 - Path to Lean Accounting
- Cell Performance Measures
- Calculating Financial Benefits of Lean Manufacturing
- Eliminating Financial Transactions
- Lean Financial Accounting
- Managing By Value Stream
- Performance Measures and Costing
- Using the Box Score
- Calculating Product Costs
- Sales, Operational and Financial Planning
- Target Costing
- Performance Management

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