LSSA

lean six sigma academy

LEAN YELLOW BELT SKILL SET

A GUIDELINE FOR LEAN YELLOW BELT TRAINING AND CERTIFICATION

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CONTENT

INTRODUCTION

Within the domain of Lean individuals can be trained and certified at three different levels. These levels are called Lean Yellow Belt (Foundation), Lean Green Belt (Practitioner) and Lean Black Belt (Expert).

Table 1. *Overview of Lean Belt levels*

Belt level	Level
Yellow Belt	Foundation
Green Belt	Practitioner
Black Belt	Expert

The LSSA - Lean Six Sigma Academy® was established in September 2009 with the objective to develop an international recognized certification scheme for all Lean and Lean Six Sigma Belt levels.

Training is provided through 'Accredited Training Organizations' (ATOs). It is recommended that candidates receive training through an ATO to prepare for certification. Alternatively, candidates who wish to self-study have the option to apply directly for certification.

The Lean Yellow Belt certification consists of a theoretical part only. For certification a practical project is not mandatory.

THEORETICAL ASSESSMENT CRITERIA

The assessment criteria for the exam are as follows:

- The exam consists of 40 multiple choice questions.
- The pass mark for the exams is set at 63% (25 marks or more required to pass).
- The duration of the exams is 60 minutes.
- The exams are Open book exams, where a maximum of 2 books are allowed. (eBook or Pdf's are not allowed)
- A calculator is allowed.
- You must be able to identify yourself with photographic ID.

If you pass you will receive a certificate from the LSSA that states you passed the exam.

CONTINUOUS IMPROVEMENT MATURITY MODEL (CIMM)

The LSSA skill sets are based on the 'Continuous Improvement Maturity Model' (CIMM). This is a framework that guides an evolutionary staged approach for process improvement from a very early stage till delivering world class products. CIMM summarizes all best practices elements of many different improvement methods in one framework.

In order to implement the strategy, the organization must continuously simplify, align and improve its processes. CIMM describes the creation of a solid foundation, an improvement culture, stable and predictable processes, capable processes and future-proof processes.

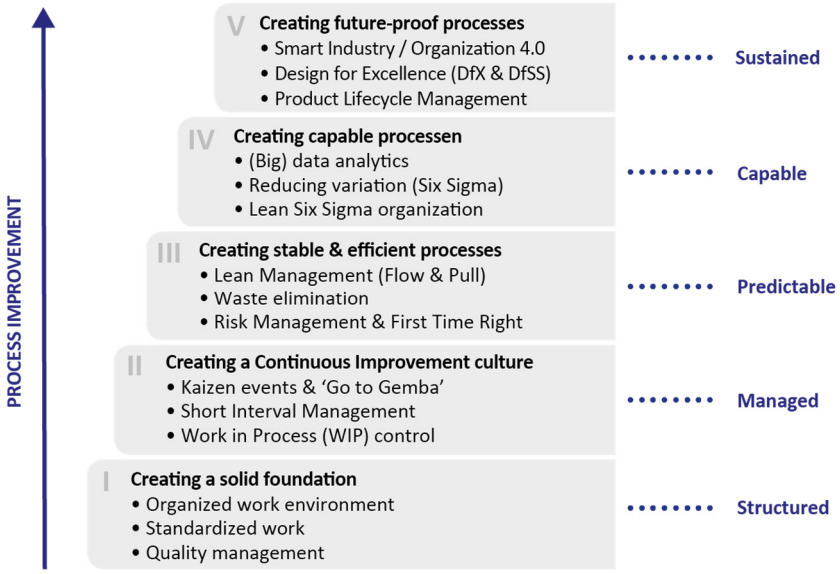

Figure 1 – CIMM Process Improvement (LSSA, 2017)

The following chapters describe the theoretical skill set elements. The structure consists of a number of 'Units', 'Elements' and 'Performance Criteria'.

- **Unit:** The skill set is presented by skill set areas; each called a 'Unit'. The chapters in the book 'Climbing the Mountain' reflect the 'Units' described in this skill set.
- **Element:** Each 'Unit' consists of a number of 'Elements'. The paragraphs in each chapter of the book 'Climbing the Mountain' reflect the 'Elements' in this skill set.
- **Performance Criteria:** Each 'Element' consists of a number of 'Performance Criteria' and each 'Performance Criteria' has an explanation. These describe the tools, techniques and competencies that are required to be achieved by the Yellow Belt.
- **Level of Cognition:** A 'Cognitive Level' has been assigned to each 'Performance Criteria'-description according to Bloom's Taxonomy [Appendix A]. This defines at which level the Yellow Belt is expected to apply the respective tool, technique or skill. This is the minimum level the Yellow Belt must be able to demonstrate in order to be assessed as competent.

U1. WORLD CLASS PERFORMANCE

The Unit 'World Class Performance' reviews the general philosophy of Process Improvement. It discusses the overview of different process improvement methods and the history of the most important methods. It also explains why process improvement is needed.

E1. COMPETITIVE STRATEGIES

The Learning Element 'Competitive strategies' explains Operational Excellence, Customer Intimacy and Product Leadership. It also explains how Operational Excellence can be applied to processes in different types of enterprises.

U1.E1.PC1 **Operational Excellence, Customer Intimacy & Product Leadership** **Remember**
Recall that Operational Excellence can be applied to processes in different types of enterprises.

U1.E1.PC2 **Physical vs. Transactional processes** **Remember**
Recall the similarities and differences between physical processes and transactional processes.

E2. HISTORY OF CONTINUOUS IMPROVEMENT

The Learning Element 'History of Continuous Improvement' explains the history of quality management and process improvement.

U1.E2.PC1 **History of continuous improvement** **Remember**
Recall the origins of TQM, Lean and Kaizen.

E3. PHILOSOPHY & PRINCIPLES

The Learning Element 'Philosophy & Principles' explains the values and principles of Lean. Similarities and differences to other improvement methods are also reviewed.

U1.E3.PC1 **Value and foundations of Lean** **Understand**
Understand the value of Lean, its philosophy and goals.

U1.E3.PC2 **Lean principles** **Understand**
Understand that Lean philosophy and principles realize improvements in process lead times and efficiencies.

U2. PROJECT MANAGEMENT

The Unit 'Project Management' outlines the way improvement projects should be executed. It starts with the identification of customers and its requirements. The Unit also covers a number of project management roadmaps, team formation, the project charter and a number of project management tools.

E1. TEAM FORMATION

The Learning Element 'Team Formation' reviews the different role and responsibilities within and around an improvement team. It also reviews how a team is formed.

U2.E1.PC1 **Roles and Responsibilities** **Remember**

Recall the various team roles and responsibilities: Champion, Project leader, and Team member.

E2. PROCESS IMPROVEMENT ROADMAPS

The Learning Element 'Process Improvement Roadmaps' reviews a number of roadmaps, including Plan-Do-Check-Act (PDCA) and Define, Measure, Analyze, Improve and Control (DMAIC).

U2.E2.PC1 **Kaizen Roadmap** **Understand**

Understand the project management methods that are used at the shop floor for Kaizen initiatives e.g. PDCA, A3-report.

E3. VOICE OF THE CUSTOMER (VOC)

The Learning Element 'Voice of the Customer' reviews customer identification (internal/external) and customer requirements.

U2.E3.PC1 **Customer identification** **Remember**

Recall that a project will impact both internal and external customers.

U2.E3.PC2 **Customer requirements** **Remember**

Recall that different customers have different needs, expectations, requirements and desires.

E4. PROJECT CHARTER

The Element 'Project Charter' covers the description of the project such as problem description, objectives, scope, timing and benefits.

U2.E4.PC1 **Problem statement** **Analyze**

Describe a proper problem statement in relation to customer requirements.

U3. LEVEL I – CREATING A SOLID FOUNDATION

The Unit 'Creating a solid foundation' reviews how to achieve a solid foundation for further process improvement programs. This foundation consists of a proper and organized work environment, reliable equipment and standardized work.

E1. ORGANIZED WORK ENVIRONMENT

The Learning Element 'Organized work environment' is about good housekeeping and how to set up a proper and safe work environment in a structured manner.

U3.E1.PC1 **Organized work environment (5S)** **Understand**

Understand how organizing the work environment, by applying 5S (Sort, Straighten, Shine, standardize, Sustain), will improve safety and moral.

E2. STANDARDIZED WORK

The Learning Element 'Standardized work' is about implementing and improving standards.

U3.E2.PC1 **Standardized work and Documentation** **Understand**

Understand that standardized tasks are the foundation for continuous improvement. Interpret standard operating procedures (SOPs) and one-point-lessons.

E3. QUALITY MANAGEMENT

The Learning Element 'Quality Management' is about developing procedures to identify and detect defects. Also preventing mistakes and avoiding problems will be discussed.

U3.E3.PC1 **Quality Management System** **Understand**

Understand quality procedures, the need to be disciplined and to work according procedures.

U4. LEVEL II – CREATING A CONTINUOUS IMPROVEMENT CULTURE

The Unit 'Creating a continuous improvement culture' reviews how to create a continuous improvement culture at the shop floor. This Unit reviews setting up and facilitate Kaizen teams. It also reviews a number of problem solving techniques and tools.

E1. KAIZEN

The Learning Element 'Kaizen' reviews how to organize and facilitate improvement teams at the shop floor that work on Kaizen improvement initiatives.

U4.E1.PC1 **Short Interval Management** **Understand**
Participate in Short Interval Management and Scrum sessions.

U4.E1.PC2 **Visual Workplace** **Understand**
Understand the elements of a Visual Workplace and how these can help to control the improved process.

U4.E1.PC3 **Root Cause Analysis** **Understand**
Understand the issues involved in identifying a root cause. Understand problem solving tools.

U4.E1.PC4 **Kaizen events** **Understand**
Participate in Kaizen events and continuous improvement initiatives.

E2. BASIC QUALITY TOOLS

The Learning Element 'Basic Quality Tools' reviews a number of basic quality tools.

U4.E2.PC1 **Visualization of data** **Understand**
Understand the basic principles of Visual management. Interpret diagrams and charts.

U4.E2.PC2 **Basic Quality Tools** **Understand**
Understand basic quality tools: Check sheet, Pareto chart, Bar chart, Pie chart and Time series plot.

E3. BASIC MANAGEMENT TOOLS

The Learning Element 'Basic Management tools' reviews a number of tools that are very powerful in the problem solving process.

U4.E3.PC1 **Brainstorm Techniques** **Understand**
Understand brainstorm techniques: Affinity diagram, 5-Whys and Ishikawa.

U4.E3.PC2 **Decision making** **Understand**
Participate in decision making techniques e.g. Cause & Effect Matrix.

U5. LEVEL III – CREATING STABLE AND EFFICIENT PROCESSES

The Unit 'Creating stable and efficient processes' reviews how the logistical flow of processes can be improved and made more stable, predictable and efficient. This Unit also reviews tools which can be used to visualize and analyze the process flow. This unit also reviews a number of tools and techniques that can be used to improve efficiency, effectiveness, productivity and agility of processes. All Level III Learning Elements and Performance Criteria follow the DMAIC structure.

DEFINE

E1. PROCESS MAPPING

The Learning Element 'Process Mapping' reviews a number of tools to map the process flow that can be used in Lean projects.

U5.E1.PC1 **Process Flow diagram** **Understand**

Understand the importance of process mapping to visualize the flow of activities and decisions within a process.

U5.E1.PC2 **High level process description** **Understand**

Understand the Spaghetti diagram.

MEASURE

E2. LEAN PERFORMANCE

The Learning Element 'Lean Performance Metrics' reviews different types of data, measurement scales and Lean performance metrics. This Element also reviews process flow analysis.

U5.E2.PC1 **Process Flow analysis** **Understand**

Understand Little's Law.

U5.E2.PC2 **Performance metrics** **Remember**

Recall Lean performance metrics e.g. takt time, cycle time and lead time.

U5.E2.PC3 **Defects and Defectives** **Apply**

Calculate process performance metrics (e.g. PPM, DPU and RTY). Describe the difference between a defect and a defective.

E3. MEASUREMENT SYSTEMS

The Learning Element 'Measurement systems' reviews different measurement methods and techniques. This Element also reviews types of data, measurement scales and data collection tools.

U5.E3.PC1 **Metrology** **Remember**
Recall the meaning of metrology.

U5.E3.PC2 **Measurement methods** **Understand**
Understand that there are different measurement methods for continuous and discrete data.

U5.E3.PC3 **Data types** **Remember**
Recall the different types of data and that there is a difference between counting and measuring.

U5.E3.PC4 **Measurement scales** **Remember**
Recall the different measurement scales.

U5.E3.PC5 **Data collection tools** **Understand**
Understand tools for collecting data such as data sheets and check sheets.

ANALYZE

E4. VALUE STREAM ANALYSIS

The Learning Element 'Value Stream Analysis' reviews how to create a Value Stream Map of the current situation.

U5.E4.PC1 **Value Adding versus Non Value Adding** **Understand**
Understand the difference between value added and non-value added activities.

U5.E4.PC2 **Value Stream Mapping (Current State)** **Understand**
Understand that Value Stream Mapping is a technique for identifying waste and non-value added activities.

IMPROVE

E5. REDUCING MUDA (WASTE)

The Learning Element 'Reducing Muda' reviews how to identify Waste in the organization and in the processes.

U5.E7.PC1 **Waste identification (for the Operation)** **Understand**
Identify the 8 types of waste (Muda); Overproduction, Waiting, Transport, Overprocessing, Inventory, Movement, Defects, Unused expertise.

U5.E7.PC2 **Waste identification (for the Customer)** **Understand**
Identify the 7 types of customer waste (Muda); Opportunity Loss, Delay, Unnecessary Movement, Duplication, Incorrect inventory, Unclear Communication and Errors.

E6. REDUCING MURI (OVERBURDEN)

The Learning Element 'Reducing Muri ' reviews how to identify overburdening the organization and how to implement flow and work balancing to reduce overburden.

U5.E8.PC1 **Flow** **Understand**
Understand the meaning of Flow.

U5.E8.PC2 **Work balancing** **Remember**
Recall the meaning of Work balancing.

E7. REDUCING MURA (UNEVENNESS)

The Learning Element 'Reducing Mura ' reviews how to identify unevenness in the organization and in the processes. This element also reviews a number of techniques to reduce unevenness.

U5.E9.PC1 **Pull** **Understand**
Understand the meaning of Pull.

U5.E9.PC2 **Volume and Type leveling** **Remember**
Recall the basic principles of volume leveling, type leveling and one piece flow.

E8. VALUE STREAM IMPROVEMENT

The Learning Element 'Value Stream Improvement' reviews how the techniques and tools that reduce Muda, Muri and Mura can be applied in constructing a Future State Value Stream Map.

U5.E10.PC1 **Value Stream Mapping (Future State)** **Remember**
Recall the difference between current state and future state Value Stream Mapping.

CONTROL

E9. FIRST TIME RIGHT

The Learning Element 'First Time Right' looks at how results that have been achieved in process improvement projects can be sustained. This element reviews the following techniques and principles: Process FMEA, Control plan, Jidoka and Poka Yoke.

U5.E11.PC1 **Process FMEA (pFMEA)** **Understand**

Understand the purpose and elements of Process FMEA, including the risk priority number (RPN).

U5.E11.PC2 **Control plan** **Remember**

Recall that a control plan contains elements to verify the process to assure product quality.

U5.E11.PC3 **Jidoka & Poka Yoke** **Understand**

Understand the work has to be stopped when there is a quality problem. Identify opportunities to apply Poka Yoke to avoid quality problems.

APPENDIX A – BLOOM'S TAXONOMY FOR PERFORMANCE CRITERIA

In addition to specifying content, each performance criteria in this skill set also indicates the intended complexity level of the test questions for each topic. These levels are based on 'Levels of Cognition' (from Bloom's Taxonomy – Revised, 2001), and can be used to create learning outcomes for students.

The Taxonomy of Educational Objectives, often called Bloom's Taxonomy, is a classification of the different objectives that educators set for students (learning objectives). The taxonomy was proposed in 1956 by Benjamin Bloom, an educational psychologist at the University of Chicago. During the nineties, Lorin Anderson a former student of Bloom revisited the cognitive domain in the learning taxonomy. Bloom's Taxonomy divides educational objectives into three 'domains': Affective, Psychomotor and Cognitive. This Skill set only notices the Cognitive domain. The 'Levels of Cognition' are in rank order - from least complex to most complex. The Yellow Belt skill set only uses the levels 'Remember' and 'Understand'.

Remember
Recall or recognize terms, definitions, facts, ideas, materials, patterns, sequences, methods, principles, etc. The LSSA uses the following verb at this level: Recall.

Understand
Read and understand descriptions, communications, reports, tables, diagrams, directions, regulations, etc. The LSSA uses the following verbs at this level: Describe, Follow, Identify, Interpret, Participate, Understand.

Apply
Know when and how to use ideas, procedures, methods, formulas, principles, theories, etc. The LSSA uses the following verbs at this level: Apply, Assure, Calculate, Define, Demonstrate, Divide, Eliminate, Empower, Facilitate, Implement, Motivate, Organize, Plan, Prepare, Present, Promote, Propagate, Review, Select, Standardize, Support, Use.

Analyze
Break down information into its constituent parts and recognize their relationship to one another and how they are organized; identify sublevel factors or salient data from a complex scenario. The LSSA uses the following verbs at this level: Analyze, Construct, Design, Develop, Distinguish, Evaluate, Lead, Manage, Translate.

Evaluate
Make judgments about the value of proposed ideas, solutions, etc., by comparing the proposal to specific criteria or standards. The LSSA does not uses this level in their skill sets.

Create
Put parts or elements together in such a way as to reveal a pattern or structure not clearly there before; identify which data or information from a complex set is appropriate to examine further or from which supported conclusions can be drawn. The LSSA does not uses this level in their skill sets.


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