Six Sigma Foundation

Lean Six Sigma Black Belt (LSSMBB)

Certification and Accreditation

The most advanced level of competency for Lean Six Sigma that we provide a reference for. Master Black belts must have knowledge and demonstrable ability on advanced lean techniques. Further, they must have the core-competency to lead, guide multiple lean six sigma teams and projects with minimum management inputs; hence are expected to be result oriented quality professionals with a sense of business strategy along with experience on tactical lean six sigma methods and techniques. Refer the certification and accreditation requirements as well as body of knowledge in this document for details.

Six Sigma Foundation

Prerequisites:

A Lean Six Sigma Master Black Belt Certification being the most advanced certification, may be pursued by professionals with a prior LSSBB certification and atleast 5 yrs. experience on Lean Six Sigma methodologies and quality processes. SSF encourages all professionals serious about process quality, business and data analyses to join this certification program to add value to their career and knowledge about quality processes.

Certification and Examination Guidelines:

1. **General Requirements: Examination System**

    a. SSF Accreditation and compliance mandates an Online Exam System/Format.
    b. Exam Evaluation results need to be processed automatically without human intervention and results to be shared immediately with the candidate after the completion of the exam.
    c. Exam questions need to be randomized per student by the system, i.e.; if 5 students are appearing for the exam from same location/connection they must all be served questions in 5 different orders.
    d. Exam Questions bank needs to comply with SSF Exam focus requirements.
    e. Questions Answer format needs to be MCQ and True/False type.
    f. In Cases of Project Work Evaluation, records of project work must be stored for a duration of 180 days from the final project evaluation with the SSF ATI (Accredited Training Institute).
    g. Exam results (final score for a candidate) must be stored for a minimum duration of 360 days from the date of examination.

2. **General Requirements: Proctoring and others**

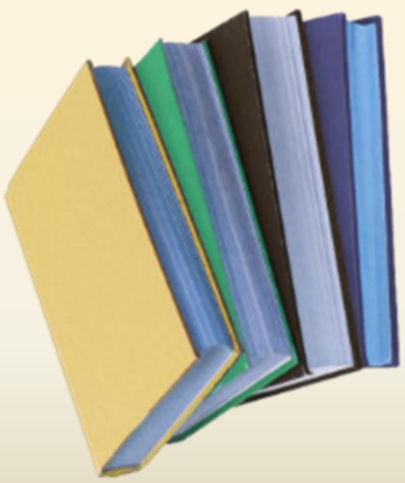
    a. The Examination must be proctored for the entire duration.
    b. Candidate identity must be checked/confirmed prior to examination.
    c. Cell phone use is not to be allowed except for connecting to Wi-Fi hotspot.
    d. Permissible notes allowed are lookup tables and basic reference tables.
    e. Use of calculators and stats software for complex calculations or graphical needs is allowed.
    f. Proctor must confirm that only permissible program types like anti-virus, anti-malware, software firewalls and essential OS services are being run on the

systems of candidates apart from the web-browsers (for connecting to exam portal only; no web-search allowed on the side) for the duration of the exam. Use of any chat-based, social-media platform applications are especially non-permissible during exam.

g. Proctor must not allow discussions between candidates for the duration of the exam, as must he/she ensure no group-work or cheating methods are being employed by candidates.
h. Breaks upto 5 mins at a time may be allowed by Proctor per each hour of the exam (but none before first 30 minutes from the start of the exam) **with the express condition** that a candidate will have to forgo the allowance to change/review answers for any/all questions after returning from the break.
i. In cases where proctoring is having to be done online via a webcam, the candidates must additionally ensure they are not looking off-screen too much or leave web-cam view or interact with other persons for the duration of the exam. A proctor is well within his/her rights to suspend the exam in case of such types of suspicious behavior by candidates. Further the onus for serving a stable web-cam video-feed (minimum 15fps) to the online-proctor from their end is the responsibility of the candidate to comply with remote/online proctoring cases.

3. Specific Requirements: LSSMBB Certification and Accreditation

a. For LSSMBB certification, a minimum 100 hours of training is mandated for the SSF approved curriculum considering an average class/batch size of 20 students. Relaxation in this criterion is considered for scenarios with lesser batch sizes for an ATI's accreditation requirements at a standard 10% time reduction allowed for batch size of 10 and less and, similarly a reduction of 20% for batch size of 5 or less (including one-on-one sessions). For example, an ATI accepting a batch size of 9 students must still provision for 90 hours of training.
b. Modes of Training allowed are purely Offline or purely Online or Blended (online sessions mixed with offline); however, minimum Instructor Led Hours (live training sessions, and not just videos) need to be provisioned for atleast 30% of the total training duration.
c. Maximum average batch size (3 sessions in a row) considered acceptable by SSF for LSSMBB Accreditation is 30 for Offline Training Sessions and 20 for Online Sessions and Blended Sessions.
d. The LSSMBB exam must have 160 questions to be attempted in 240 mins (4 hrs.) at an average/mean time of 90 seconds or 1.5 mins per question.
e. Pass percentage considered for certification is a score of 60% or above in the exam, along with a successful Project Evaluation.



Lean Six Sigma Master Black Belt

Body of Knowledge

The minimum recommended Body of Knowledge that any ATI needs to be compliant with for Accreditation with the SSF Lean Six Sigma Master Black Belt Level of Certification. Our unique approach to the BOK was designed as a necessary requirement to our equally unique approach of validating SSF ATI's certification exams to democratize Accredited Lean Six Sigma Certifications by reducing costs incurred in training highly competent people resources by organizations.

Curriculum Focus Areas:

The List of recommended (essential) topics to be covered as part of an SSF ATI's Lean Six Sigma Master Black Belt certification training curriculum.

1. **Lean and Project Management**

    a. **Lean**

        i. How Lean and Six Sigma Work together
        ii. Lean Enterprise and models like Hoshin Kanri etc.
        iii. TOC (Theory of Constraints)
        iv. 5S with Audits (explore Non-SPC control mechanisms)
        v. Kaizen, PDCA cycle and concepts of continuous improvements
        vi. Gemba
        vii. Kanban
        viii. Heijunka Techniques
        ix. Poka-Yoke
        x. Metrics in Lean
        xi. VA/NVA Analysis

2. Business Excellence

a. Strategic Thinking

i. Strategic Capability Assessment/Planning and use of Business Intelligence, Process Mining, BPM etc.
ii. Enterprise Change Management Methodologies (Leading Change, Agile Strategy)
iii. Process Action Groups and Best Practices
iv. Business Management Basics and Optimizing Resources (People, Finances, Equipment, Operations), Balanced Scorecard
v. Decision Resolution with Prioritization: Tools like SWOT, Cost-Benefit, Weighted Criteria Matrices, Decision Trees, Cost-of-Delay, Kano Model
vi. Linking Business Goals to Projects
vii. Customer Support/Service Models (Effective Communication/Response/Resolution Mechanisms)

b. Financial Management

i. Financial Management Basics and Objectives
ii. Financial Management Metrics (ROI, NPV, IRR etc.)
iii. Financial Control Best Practices (use best practices from SOX)
iv. Risk Analysis and Monte-Carlo Simulations

c. Project Management

i. Project Selection Considerations
ii. Concepts from Contemporary Project Management Methodologies (PMI's approach etc.)
iii. Risk Plans and Taxonomies
iv. Group Dynamics and Leadership Models
v. Mentoring Techniques
vi. Stakeholder Communication/Management
vii. Project Monitoring and Project Support (with customer Issue Resolution Mechanisms and Best Practices)

d. **Problem Solving**

i. Creative Thinking Techniques: Six Hats, Mind-Mapping, TRIZ
ii. QFD
iii. DFSS Approach with focus on Robustness and Reliability
iv. Digital Transformation and the role of RPA (with use of tools like UiPath etc.)

3. Core Stats and Six Sigma

a. **DMAIC**

i. SIPOC Analysis and Flowcharts
ii. Project Charter Development
iii. Measurement System Analysis
iv. Data Collection Plan
v. Baselining Process Performance: Capability and Levels, Sigma Levels and Yield with related Metrics
vi. Hypothesis Tests selection
vii. Hypothesis testing on Normal data with common tests
viii. Hypothesis testing on Non-Normal data with common tests
ix. Contingency tables and using Chi-Square test

b. **Advanced Data Analysis**

i. Regression Analysis in Detail (Linear, Quadratic, Exponential)
ii. Multiple Regression
iii. Logistical Regression
iv. Time-Series
v. Multi-Vari Analysis
vi. DOE: Full vs. Fractional vs. PB designs
vii. DOE: Taguchi Methods, Response Surface, Balanced vs. Unbalanced designs
viii. Control Charts selection and rules for process stability
ix. CUSUM and EWMA Charts

Exam Focus Areas:

Exam focus areas are those from where questions are deemed mandatory, so as to ascertain a student's comprehension for key (and minimal) expected knowledge areas along with demonstrable practical ability in order to attain a SSF Lean Six Sigma Master Black Belt Certification from a SSF Accredited Training Institute. This is a less exhaustive list than the Curriculum Focus Area list and is designed primarily to serve as a basic-guideline to validate the exam questionnaires as per SSF norms. On the whole though, the examination system and methodology for SSF ATIs is another area which gets validated separately for accreditation purposes by SSF, which Includes the online examination mechanism, proctoring controls, as well as the Bloom's Taxonomy (cognitive domain) Level expected to be evaluated in an objective manner in addition to the Exam Focus areas (and weightage of questions). Additionally an expected/mandatory requirement for an LSSMBB level is a project evaluation to be done by the ATI to validate a student's ability in a simulated/real work environment to demonstrate his/her competency (unassisted by any mentor) post the examination process. For LSSMBB Certification candidates must clear the exam as well as project evaluation independently. And as certification by itself is inherently a grading, therefore only a non-mandatory guideline for calculating an overall score/grade is proposed here, should the ATI's need the same for any further academic purposes; in such a case they may consider the exam weightage as 70% and practicals weightage (project evaluation) as 30%.

1. **Lean (Exam)**

    a. **Lean**

        i. Mandatory Question Areas: Lean Enterprise and Hoshin Kanri, Concepts of continuous improvements (PDCA, Kaizen), Kanban and Heijunka Techniques.
        ii. Overall Area weightage: 15% (For Exam)
        iii. Bloom’s Taxonomy (2001 revision) Level: Analyze (Maximum Targeted Level for this Area)

2. Business Excellence (Exam)

a. Strategic Thinking

i. Mandatory Question Areas: Enterprise Change Management Methodologies, BPM, Decision Resolution Tools, Balanced Scorecard
ii. Overall Area weightage: 15% (For Exam)
iii. Bloom's Taxonomy (2001 revision) Level: Analyze (Maximum Targeted Level for this Area)

b. Financial Management

i. Mandatory Question Areas: Financial Management Metrics (ROI, NPV, IRR etc.)
ii. Overall Area weightage: 15% (For Exam)
iii. Bloom's Taxonomy (2001 revision) Level: Evaluate (Maximum Targeted Level for this Area)

c. Project Management

i. Mandatory Question Areas: Project Selection Considerations, Concepts from Contemporary Project Management Methodologies, Group Dynamics, Project Monitoring
ii. Overall Area weightage: 10% (For Exam)
iii. Bloom's Taxonomy (2001 revision) Level: Evaluate (Maximum Targeted Level for this Area)

d. Problem Solving

i. Mandatory Question Areas: QFD, DFSS, RPA
ii. Overall Area weightage: 15% (For Exam)
iii. Bloom's Taxonomy (2001 revision) Level: Evaluate (Maximum Targeted Level for this Area)

3. **Core Stats and Six Sigma (Exam)**

    a. **DMAIC**

        i. Mandatory Question Areas: Gage R&R, Hypothesis Test Selection, Multi-Vari Analysis, Control Charts Selection (including CUSUM and EWMA).
        ii. Overall Area weightage: 15% (For Exam)
        iii. Bloom's Taxonomy (2001 revision) Level: Evaluate (Maximum Targeted Level for this Area)

    b. **Advanced Data Analysis**

        i. Mandatory Question Areas: Predictive Analytics with Multiple Regression, Logit Model, Time-Series; Advanced DOE concepts and designs like Taguchi Methods, Response Surface, Balanced vs Unbalanced designs.
        ii. Overall Area weightage: 15% (For Exam)
        iii. Bloom's Taxonomy (2001 revision) Level: Evaluate (Maximum Targeted Level for this Area)

4. **Project Evaluation (Practicals) (mandatory for certification; may weigh in for overall grade)**

    a. **Project Planning**

        i. Key Evaluation Areas: Clarity in Business Objectives (SMART approach for Goals), Scoping Clarity, Stakeholder Management (Communication Planning), Detailed WBS for Scheduling, Risk Analysis, Rationale for choosing project, Expected Benefits relating to Product/Process Quality, Customer-Issues and Financial Impact.
        ii. Overall Area weightage: 20% (For Practicals)
        iii. Bloom's Taxonomy (2001 revision) Level: Create (Maximum Targeted Level for this Area)

b. **Project Execution and Management**

i. Key Evaluation Areas: Non Mandatory (but good to have): Documenting current process with detailed SIPOC, Flowchart or VA/NVA Analysis. Use of any supporting analysis employing simple Descriptive Analysis tools and Visual Plots (like Pareto, Scatter Charts etc.) demonstrated/used in the project.

ii. Key Evaluation Areas: Mandatory: MSA (Measurement System Analysis) evaluation, Benchmarks for existing process in terms of Sigma Level, Yield etc.; Data Collection Planning with Data Points/Records and linking to Business Objectives. Evaluate appropriate Normality/Non-Normality considerations for Data. The analysis and improvement phases must demonstrate/employ both Qualitative Analysis/Techniques (like Ishikawa diagrams, Brainstorming, TRIZ etc.) and Quantitative Analysis (Inferential Statistics such as use of hypothesis testing and statistically significance inferences). If Experimentation (DOE) is used then its rationale, execution and recommendations (DOE) needs to be presented with clarity and all the support data and charts. SPC via Control Charts and Response Planning.

Note: The ATI needs to keep in sharp focus that the express purpose of the project evaluation, is to check for the ability of a candidate to achieve a proper solution to a problem rather than usage of tools and plots alone. However, use of software is recommended for visualizations and proper visualization is a bonus.

iii. Overall Area weightage: 60% (For Practicals)

iv. Bloom's Taxonomy (2001 revision) Level: Create (Maximum Targeted Level for this Area)

c. **Project Achievements and Reporting**

i. Key Evaluation Areas: Final Project Reporting and Documentation Clarity. Proper Data Visualization is a must (can use tools like Excel, Minitab, and Tableau etc.). Presentation to Management and/or ATI facilitator with clarity on recommendations and Business Impacts. Discuss Lessons Learnt, what could have been done better etc. and Project Closure report with updation of SOPs (Standard Operating Procedures) linked to the project if possible.

ii. Overall Area weightage: 20% (For Practicals)

iii. Bloom's Taxonomy (2001 revision) Level: Create (Maximum Targeted Level for this Area)

FAQs and Other Info.

For any more info regarding Certification and Accreditation requirements or further BOK related info/guidance please get in touch with SSF at www.sixsigmafoundation.org

For FAQs please visit the SSF FAQ section via the following link:
https://www.sixsigmafoundation.org/faq