

## **Black Belt in Lean Six Sigma - Online Course**

### **Certification**

On successful completion of this program, Participants will be certified as Lean Six Sigma Black Belts. Certification is awarded by Florida Atlantic University, USA, by achieving the following:

- Complete the online training course, including all exercises and assignments during the course.
- Complete a Black Belt Project.

The Certificate will be sent by post to the successful Participant, it includes the Participants name and course title. Successful Participants also earn 84 PDU's.

### **Overview**

The online Black Belt course is available to Participants for a 12 month period, during this time you have full access to the course content. The course is conducted in three sessions, Candidates are required to complete each of the three sessions in sequence. You can study at your own pace and on your own schedule as long as you fulfill the workload that is assigned weekly. Your online instructor is a Master Black Belt and is available for guidance, discussions and to give you feedback on your course work throughout the duration of the course (email support). The course is delivered using The Blackboard Academic Suite. Blackboard software has become the most popular and proven online learning solution in the world.

### **Role of a Lean Six Sigma Black Belt**

The role of the Black Belt is to define and implement improvement projects and to mentor and guide Green Belts in the completion of their projects. Black Belts manage more advanced Lean Six Sigma projects, and serve as leaders and change agents for projects that span the enterprise. This course will provide the required skills and knowledge to fulfill this role. The Black Belt utilises statistical analysis software to draw valid statistical conclusions, depict relationships, analyse measurement systems, test hypotheses, design experiments, apply statistical process control, and more.

### **Overall Course Goals**

- Teach you how to think differently and do things differently when solving problems and improving processes
- Assess your level of learning through exercises and practical application
- Emphasise application in the real world, not classroom theory
- Complete a project that delivers tangible results and impacts the organizations bottom line. Projects are the core of Lean Six Sigma.
- Develop the skills necessary to use statistical analysis software, and the wisdom to not rely on software unthinkingly
- Prepare you to serve as a Lean Six Sigma coach and mentor for other team members in your organization
- Help you achieve your personal, job and career goals

## Curriculum

The Curriculum is aligned with the recommendations of both the American Society for Quality (ASQ) and the International Society of Six Sigma Professionals (ISSSP), and seamlessly integrates Six Sigma, Project Management, and Lean Enterprise improvement methodologies. The course focuses on service and information systems/information technology, business processes as well as manufacturing processes, and examples from both types of businesses are included.

The Project Management portions of the course are aligned with *A Guide to the Project Management Body of Knowledge (PMBOK)* as published by the Project Management Institute. The course will stress the connection between project management and Lean Six Sigma, and how project managers can and will be more successful when using the Lean Six Sigma approach and Lean Six Sigma tools and techniques.

The Black Belt program consists of a series of lessons, and each lesson has an assignment, deliverable or quiz associated with it. Successful completion of all course assignments along with successful completion of a Black Belt project will result in your certification as a Lean Six Sigma Black Belt. The lesson titles are:

### Session One:

- Introductions and Getting Started
- Minitab 15 and Minitab Quality Companion 2
- Origins of Continuous Improvement Tools
- The 1.5 Sigma Mean Shift
- Black Belt Project Requirements
- Quality Function Deployment
- Design Constraints – Design for “X”
- Taguchi Loss Function
- Robust Design
- Lean Thinking
- The Perfect Business Process
- Theory of Constraints
- Black Belt Project Roles and Responsibilities
- Teams and Team Performance
- Acting as a Change Agent
- Program and Portfolio Management
- Measurement Dashboards
- Benchmarking
- SWOT Analysis
- Benefit Measurement Models
- Introduction to Minitab Quality Companion 2
- Value Stream Mapping

### Session Two:

- The Central Limit Theorem
- Inferential Statistics and Confidence Intervals
- Introduction to Hypothesis Testing
- Converting Attributes Data to Variables Measures
- Measurement Systems Analysis
- Gage Repeatability and Reproducibility Studies
- Measurement Systems Analysis and Destructive Testing
- Determining Sample Size
- Random Sampling and Stratified Sampling
- Data Collection Plan Using Minitab Quality Companion 2

- Process Capability Studies
- Process Capability for Attribute and Non-normal Data
- Calculating Descriptive Statistics Using Minitab 15
- Probability Distributions Commonly Used in Six Sigma
- Data Plots Using Minitab 15
- Graphs and Reports Using Minitab 15
- Analysis Capture Tools in Minitab Quality Companion 2
- Cause and Effect Diagram; Cause and Effect Matrix in Minitab Quality Companion 2
- Hypothesis Testing and Confidence Intervals – Minitab 15
- Scatter Diagram and Matrix Plot Using Minitab 15
- Linear Correlation and Linear Regression Using Minitab 15
- Multiple Regression Analysis Using Minitab 15
- Introduction to Design of Experiments
- Organizing and Conducting a Designed Experiment
- Types of Experimental Designs
- A Simple Experimental Design and Analysis
- Taguchi Methods
- Response Surface Methodology

#### Session Three:

- A Simple Experimental Design and Analysis Using Minitab 15
- Experimental Designs
- DOE Planning Worksheet in MINITAB Quality Companion 2
- Shainin/Bhote Techniques – Clue Generation
- Shainin/Bhote Techniques – DOE Optimization
- Shainin/Bhote Techniques – Formal DOE
- Shainin/Bhote Techniques – Transition from DOE to SPC
- Source Inspection and Mistake Proofing by Design
- Process Simulation
- Pugh Decision Matrix
- PDPC Chart
- Force Field Analysis
- Pairwise Ranking
- Introduction to Reliability Testing
- Workplace Organization
- Visual and Audio Management
- Kaizen
- Pull Systems
- Total Productive Maintenance
- Standard Work
- Statistical Process Control
- Advanced SPC Applications and Precontrol
- Process Control and Management Plan
- Project Turnover Meeting
- Project Closure Report Using Minitab Quality Companion 2
- Post-Project Review
- Summary and Review of Black Belt Project Requirements

#### **Who should attend?**

- Candidates who will lead organization wide Lean Six Sigma improvement projects
- Candidates who have the aptitude and desire to become Lean Six Sigma Black Belts
- Professionals working in efficiency improvement and cost reduction roles
- Managers, Supervisors, Project Managers

- Programmers/Systems Analysts
- Candidates wishing to improve their skill sets in a highly relevant subject

#### Individual Gains:

- Career advancement
- Personal growth
- Increased self-esteem and confidence
- Increased level of job performance
- Improved marketability

#### Company Gains:

- Growth and advancement
- Create an improvement environment with proven tools
- Increase level of performance through your most important asset, your employees
- Achieve organizational excellence in business process improvement
- Excellent Return on Investment (ROI)

#### Prerequisites

Candidates for the Lean Six Sigma Black Belt certificate must be previously certified as a Green Belt, or must have completed the Lean Six Sigma Green Belt training program offered by Project Solutions prior to enrolling on this course. Candidates should have strong mathematical skills, are required to utilise statistical analysis software, and are required to learn about and apply:

- Conditional and joint probability
- Probability density functions and probability distributions
- Descriptive statistics (mean, median, mode, standard deviation, variance, standard error of the mean)
- Applied statistics (hypothesis testing, correlation analysis, regression analysis, analysis of variance (ANOVA), confidence intervals, Central Limit Theorem, Design of Experiments)

#### Textbook

The textbook for this course is entitled *Implementing Six Sigma – Second Edition* by Forrest W. Breyfogle III. The textbook is included in the price of the program and is sent by post to the Participants postal address on receipt of payment.

#### Computer Requirements

A computer with Microsoft Excel is required, along with the necessary password/authority to load software. Computer must meet the following system requirements for MINITAB software:

- Operating System – Microsoft Windows 2000 or XP

- Hard Disk Space – 125MB free space available
- Processor – Pentium II or equivalent
- RAM – 256 MB or more
- Screen resolution – 1024 x 768 or higher
- Adobe Acrobat Reader – Version 5.0 or higher

#### Software Requirements

Participants are required to purchase Minitab 15 and Minitab Quality Companion 2. You will be provided with a Florida Atlantic University ID that will allow you to purchase the software at an academic discount from e-academy.com. Detailed instructions on how to make these purchases will be provided upon enrollment. The cost of each of these two pieces of software will vary between \$29 and \$99 depending on the duration option that you select (three months to perpetual).