



**TRAINING TITLE:**

Six Sigma Green Belt Certification  
(CERT-006)

**OVERVIEW:**

The Six Sigma Green Belt is a professional who operates in support of or under the supervision of a Six Sigma Black Belt, analyzes and solves quality problems and is involved in quality improvement projects.

**TARGET GROUP FOR THE TRAINING:**

This training is aimed at all persons interested in applying improvement techniques to their processes. Attendees will obtain a better understanding of some of the Six Sigma principles required to become a Six Sigma Green Belt and be able to apply the knowledge to real situations.

**LEARNING OBJECTIVES:**

- Identify the most widely used Six Sigma tools and techniques
- Apply the appropriate tools for each situation faced on a daily basis by a Six Sigma Green Belt
- In order to become certified, the participant must complete an improvement project and pass a written exam with a minimum score of 70%.

**MATERIALS:**

Each participant will receive:

- MS PowerPoint presentations
- Certificate of Attendance

**TRAINING DURATION:**

35 contact hours



BEC is authorized by IACET to offer 3.5 CEUs for this program. FULL attendance to the learning event is mandatory to receive CEUs.

**COURSE INSTRUCTOR:**

**Manuel E. Peña-Rodríguez** is a process improvement and training consultant within the textiles, electronics, and FDA-regulated industries with more than 20 years of experience in those fields. Since January 2006, he is fully devoted to consulting under Business Excellence Consulting Inc, focusing on training and implementation of Lean Six Sigma initiatives and CAPA / Root Cause Analysis workshops. He also serves as professor in the graduate program in biochemistry at the University of Puerto Rico, Medical Sciences Campus, in San Juan. Manuel received his J.D. degree from the Pontifical Catholic University of Puerto Rico and his master's of engineering in Engineering Management from Cornell University in Ithaca NY. He is also a licensed Professional Engineer registered in Puerto Rico. Manuel is an ASQ Certified Six Sigma Black Belt, Manager of Quality & Organizational Excellence, Quality Engineer, Quality Auditor, Biomedical Auditor, and HACCP Auditor. He is also a Senior member of ASQ and former Chair of the Puerto Rico ASQ Section. He is the author of the book "*Statistical Process Control for the FDA-Regulated Industry*", published by ASQ Quality Press in April 2013 and co-author (with José Rodríguez-Pérez) of the article "*Fail-Safe FMEA*" published in the January 2012 edition of the ASQ Quality Progress magazine.



**Title:** Six Sigma Green Belt Certification (Day 1)

**Lunch** from 12:00 – 13:00.

**Coffee break:** 15 min. each during morning and afternoon session. Time schedule are rough estimates and may vary consequently.

**Agenda**

8:30 – 9:00	<b>Certification Overview</b>
9:00 – 10:15	<b>Introduction</b> <ul style="list-style-type: none"> <li>• Historical evolution</li> <li>• Quality gurus</li> <li>• Six Sigma definitions</li> <li>• DMAIC model</li> </ul>
10:15 – 10:30	<b>Break</b>
10:30 – 12:00	<b>Project Charter</b> <ul style="list-style-type: none"> <li>• Business case</li> <li>• Problem statement</li> <li>• Goal statement</li> <li>• Project scope</li> <li>• Team members</li> <li>• Milestones</li> </ul>
12:00 – 13:00	<b>Lunch</b>
13:00 – 13:30	<b>Process Map</b> <ul style="list-style-type: none"> <li>• Process map vs. flowchart</li> </ul>
13:30 – 15:00	<b>Value Stream Map</b> <ul style="list-style-type: none"> <li>• Value concept</li> <li>• Application tips</li> <li>• Current state maps</li> <li>• Future state map</li> </ul>
15:00 – 15:15	<b>Break</b>
15:15 – 17:00	<b>Failure Mode Effects Analysis</b> <ul style="list-style-type: none"> <li>• What is FMEA</li> <li>• Objectives</li> <li>• When to perform FMEA</li> <li>• Types of FMEA</li> </ul>



**Title:** Six Sigma Green Belt Certification (Day 2)

**Lunch** from 12:00 – 13:00.

**Coffee break:** 15 min. each during morning and afternoon session. Time schedule are rough estimates and may vary consequently.

**Agenda**

8:30 – 10:15	<b>Cause and Effect Analysis</b> <ul style="list-style-type: none"> <li>• Overview</li> <li>• Steps to construct</li> </ul>
10:15 – 10:30	<b>Break</b>
10:30 – 12:00	<b>Seven Quality Tools</b> <ul style="list-style-type: none"> <li>• Flowcharts</li> <li>• Cause and effect diagrams</li> <li>• Checksheets</li> <li>• Histograms</li> <li>• Pareto charts</li> <li>• Scatter diagrams</li> <li>• Run charts / control charts</li> </ul>
12:00 – 13:00	<b>Lunch</b>
13:00 – 15:00	<b>Descriptive Statistics</b> <ul style="list-style-type: none"> <li>• Common causes vs. special causes</li> <li>• Sample vs. population</li> <li>• Types of data</li> <li>• Sampling overview</li> <li>• Measures of central tendency</li> <li>• Measures of variation</li> </ul>
15:00 – 15:15	<b>Break</b>
15:15 – 17:00	<b>Graphical Methods</b> <ul style="list-style-type: none"> <li>• Histogram</li> <li>• Boxplots</li> <li>• Dotplots</li> <li>• Pareto</li> <li>• Scatterplot</li> </ul>



**Title:** Six Sigma Green Belt Certification (Day 3)

**Lunch** from 12:00 – 13:00.

**Coffee break:** 15 min. each during morning and afternoon session. Time schedule are rough estimates and may vary consequently.

**Agenda**

8:30 – 10:15	<p><b>Measure System Analysis</b></p> <ul style="list-style-type: none"> <li>• Overview</li> <li>• Evaluating results</li> <li>• Metrics</li> </ul> <p><b>Process Capability</b></p> <ul style="list-style-type: none"> <li>• Capability and performance indices (Cp, Cpk, Pp, Ppk)</li> </ul>
10:15 – 10:30	<b>Break</b>
10:30 – 12:00	<p><b>Hypothesis Testing</b></p> <ul style="list-style-type: none"> <li>• Overview</li> <li>• Types of errors</li> <li>• Comparing averages             <ul style="list-style-type: none"> <li>○ 1-sample t</li> <li>○ 2-sample t</li> <li>○ ANOVA</li> </ul> </li> </ul>
12:00 – 13:00	<b>Lunch</b>
13:00 – 15:00	<p><b>Hypothesis Testing (cont.)</b></p> <ul style="list-style-type: none"> <li>• Comparing medians             <ul style="list-style-type: none"> <li>○ Wilcoxon Sign</li> <li>○ Krustal-Wallis</li> </ul> </li> <li>• Comparing variances             <ul style="list-style-type: none"> <li>○ F-test</li> <li>○ Barlett</li> <li>○ Levene</li> </ul> </li> </ul>
15:00 – 15:15	<b>Break</b>
15:15 – 17:00	<p><b>Regression</b></p> <ul style="list-style-type: none"> <li>• Simple linear regression overview</li> <li>• Correlation coefficient, r</li> <li>• Determination coefficient, R<sup>2</sup></li> <li>• Multiple regression</li> </ul>



**Title:** Six Sigma Green Belt Certification (Day 4)

**Lunch** from 12:00 – 13:00.

**Coffee break:** 15 min. each during morning and afternoon session. Time schedule are rough estimates and may vary consequently.

**Agenda**

8:30 – 10:15	<p><b>Design of Experiments</b></p> <ul style="list-style-type: none"> <li>• Overview</li> <li>• DOE terminology</li> <li>• Experimenting with 2 factors</li> <li>• Full factorial experiments</li> <li>• Fractional factorial experiments</li> </ul>
10:15 – 10:30	<b>Break</b>
10:30 – 12:00	<p><b>Statistical Process Control</b></p> <ul style="list-style-type: none"> <li>• Common causes vs. special causes</li> <li>• Properties of the Normal distribution</li> <li>• Control charts overview</li> </ul>
12:00 – 13:00	<b>Lunch</b>
13:00 – 15:00	<p><b>Statistical Process Control (cont.)</b></p> <ul style="list-style-type: none"> <li>• Control charts for variable data             <ul style="list-style-type: none"> <li>○ Individual and moving range</li> <li>○ X-bar and R</li> <li>○ X-bar and s</li> </ul> </li> <li>• Control charts for attribute data             <ul style="list-style-type: none"> <li>○ p chart</li> <li>○ np chart</li> <li>○ c chart</li> <li>○ u chart</li> </ul> </li> </ul>
15:00 – 15:15	<b>Break</b>
15:15 – 17:00	<p><b>Lean Concepts</b></p> <ul style="list-style-type: none"> <li>• Non-value-added activities (MUDA)</li> <li>• Cycle time reduction</li> <li>• Total productive maintenance</li> <li>• Poka-yoke</li> <li>• Continuous flow manufacturing</li> </ul>



**Title:** Six Sigma Green Belt Certification (Day 5)

**Lunch** from 12:00 – 13:00.

**Coffee break:** 15 min. each during morning and afternoon session. Time schedule are rough estimates and may vary consequently.

**Agenda**

8:30 – 10:15	<b>Lean Tools</b> <ul style="list-style-type: none"><li>• The 5 S<ul style="list-style-type: none"><li>○ Sort</li><li>○ Straighten</li><li>○ Shine</li><li>○ Standardize</li><li>○ Sustain</li></ul></li></ul>
10:15 – 10:30	<b>Break</b>
10:30 – 12:00	<b>Lean Tools (cont.)</b> <ul style="list-style-type: none"><li>• Error-proofing</li><li>• Set-up reduction</li><li>• Continuous flow manufacturing</li><li>• Kanban</li><li>• Total productive maintenance</li><li>• Balanced scorecard</li></ul>
12:00 – 13:00	<b>Lunch</b>
13:00 – 15:00	<b>Certification Review</b>
15:00 – 15:15	<b>Break</b>
15:15 – 17:00	<b>Certification Exam</b>