

The DMAIC Model

Identifying the Key Drivers of Performance

The Art of Process Mapping

Georgia Tech
College of Management
Six Sigma Green Belt Certification Program
Green Belt 8-Day Program: September 17-20 and October 15-18

Six Sigma Measurement Systems

The Role of Statistical Process Control (SPC)

Hypothesis Testing

Failure Modes and Effects Analysis (FMEA)

Benchmarking Methodology

Defining Performance Objectives and Metrics

Improvement Strategies

Key Steps in the Risk Management Process



EXECUTIVE SUMMARY

Thank you for your interest in Georgia Tech's eight-day **Six Sigma Green Belt Certification Program.** This document provides details on program content, professor profiles, and the registration process.

Georgia Tech is consistently ranked in the Top 10 public universities in the country, and the Georgia Tech College of Management was recently ranked in the Top 25 business schools in the country by *US News and World Report*. Georgia Tech has partnered with Master Black Belt Lee Campe, adjunct professor, to design and deliver both green belt and black belt six sigma certification training. This brochure focuses on the training required to achieve a Georgia Tech Six Sigma Green Belt certification. The program content includes:

- **Module One: Monday through Thursday, September 17-20, 2007**
  - **Day One:** The Focus of Six Sigma Thinking and the DMAIC Methodology
  - **Day Two:** The Define Stage, Voice of the Customer, Analyzing the Problem and Process
  - **Day Three:** Project Scoping Tools, Role of Project Champion, Statistics to Solve Problems
  - **Day Four:** Process Mapping, the Failure Modes and Effects Analysis
- **Module Two: Monday through Thursday, October 15-18, 2007**
  - **Day Five:** Harvesting the Fruit of Six Sigma, the Analyze Phase of the DMAIC Methodology
  - **Day Six:** Improvement by Design, Process of Experimentation, Selecting Improvement Tools
  - **Day Seven:** Importance of Data Collection, Generating and Selecting Solutions—Soft Skills
  - **Day Eight:** Launching the Six Sigma Methodology, Lean Concepts, and Program Wrap-up

The GT professors are master teachers who can translate their research and consulting experiences into practical management tools. Teaching methodologies include:

- Structured multi-media presentations
- Small group discussions and reports
- Timely six sigma case studies
- Videos, simulations, and specialized software
- Innovative small group assignments

There are four easy ways to register for this workshop:

1. Call 404.894.8700 or 1.800.815.7662
2. Register online at www.execinfo.org
3. Send an email to laura.day@mgt.gatech.edu
4. Complete the registration form on page six and fax it to Georgia Tech at 404.894.5603



Georgia Tech's Huang Executive Education Center offers state-of-the-art executive education classrooms at the Technology Square campus in Midtown Atlanta. You can take a virtual tour at www.execinfo.org.



PROGRAM OBJECTIVES

The Georgia Tech **Six Sigma Certification Program (Green Belt)** focuses on the following topics:

- **The Focus of Six Sigma Thinking**
  - The goals of Six Sigma and their relationship to project roles and responsibilities
  - The Performance Excellence Model for Change
  - Maximizing the interaction between Six Sigma and customer needs
- **Improving Processes via the DMAIC Trigger Questions**
  - **D**efine: What are the customer expectations of the process?
  - **M**easure: What is the frequency of defects?
  - **A**nalyze: Why, when, and where do defects occur?
  - **I**mprove: How can we fix the process?
  - **C**ontrol: How can we make the process stay fixed?
- **The Voice of the Customer (VOC)**
  - Developing the Customer Selection Matrix
  - Proven methods for gathering Voice of the Customer (VOC) information
  - The importance of selecting projects effectively and defining the charter
  - Improving the process using the SIPOC Method and Tree Diagrams
- **Defining Six Sigma Project Objectives and Metrics**
  - Techniques for effectively defining and communicating Six Sigma Problem Statements
  - Types of measures and best practices in Performance Metric Reporting
  - Using statistics to identify defects and solve problems
  - Understanding the role of process mapping and cause & effect diagrams
- **Developing Performance Standards and the Relationship to CTQ**
  - The goal of a performance standard and the role of benchmarking
  - Proven methods for collecting, analyzing, and reporting data
  - The importance of hypothesis testing and communicating statistical inferences
- **Failure Modes and Effects Analysis (FMEA)**
  - Identifying causes of specific problems and the ways that a process can fail
  - Using Mini-Tab software to analyze data and generate statistical reports
  - Selecting CTQ characteristics and implementing the COPIS Focus
- **Implementing Improvement Strategies**
  - Incorporating statistical and quality tools to refine the solution
  - The process of experimentation and developing the best experimental design
  - Identifying and implementing a Six Sigma project for your company

Program Content

Day Plan for Session 1: The Focus of Six Sigma Thinking

7:30-8:00 AM	**Arrival, Networking and Continental Breakfast:** Georgia Tech Classroom 312
8:00-11:30	**Defining Six Sigma and Exploring Six Sigma Goals** The morning session will focus on establishing a solid understanding of the fundamentals of Six Sigma and how corporations use Six Sigma to improve processes and customer responsiveness. Participants will begin the process of developing their skills in using the Performance Excellence Model. Key content areas include: (1) The goals of Six Sigma and the relationship to project roles and responsibilities; (2) The Performance Excellence Model and the connections between strategy, values, and skills; (3) The four major roles in project success; (4) Understanding Six Sigma as both a Measurement System and a Management Philosophy; and (5) A practical look at Six Sigma in your company's culture and an overview of industry best practices.
10:00-10:15	**Break:** An opportunity for participants to discuss and reflect on concepts presented
11:30-12:30 PM	**Lunch and Networking:** Georgia Tech Hotel Executive Dining Room
12:30-2:15	**The Define-Measure-Analyze-Improve-Control (DMAIC) Process** The afternoon session will focus on an in-depth discussion of the DMAIC process and key trigger questions and how they relate to the Green Belt project that participants will implement in your organization. Key content areas, and the trigger questions, include: (1) **Define:** What are the customer expectations of the process?; (2) **Measure:** What is the source and frequency of defects?; (3) **Analyze:** Why, when, and where do the defects occur?; (4) **Improve:** How can we fix the process?; and (5) **Control:** How can we make the process stay fixed? Break: 2:15-2:30
2:15-2:30	**Break:** An opportunity for participants to discuss and reflect on concepts presented
2:30-3:15	**Team Activity: Best Practices in Six Sigma** Program participants, in teams of 4-5 people, work on a Six Sigma assignment that provides an opportunity to practice the tools presented during the early part of the day and begin defining their Green Belt certification project. Break: 3:15-3:30
3:30-5:00	**The Define-Measure-Analyze-Improve-Control (DMAIC) Process** (Continued)

Program Content

Day Plan for Session 2: Components of the DMAIC Method

7:30-8:00 AM	**Arrival, Networking and Continental Breakfast:** Georgia Tech Classroom 312
8:30-Noon	**The Define Stage and The Voice of the Customer (VOC)** The morning session will focus on establishing a solid understanding of the typical components of the Define Phase of DMAIC. Participants will learn the best methods of collecting customer information. Key content areas include: (1) The VOC process and using data scrubbing methodology for analyzing customer feedback; (2) The five steps in the gathering VOC information process; (3) The VOC problems and solutions; (4) Identifying the CTQ (Critical to Quality) of the process, especially in the eyes of the customer; and (5) The most common sources of six sigma projects and the importance of selecting projects effectively.
10:00-10:15	**Break:** An opportunity for participants to discuss and reflect on concepts presented
11:30-12:30 PM	**Lunch and Networking:** Georgia Tech Hotel Executive Dining Room
12:30-2:15	**Problem Statements and Scoping the Process** The afternoon session will focus on developing a team charter which is an agreement between management and the team about what is expected. Participants will build a business case, problem statement, goal statement, scope, and identify roles and responsibilities. Key content areas include: (1) Scoping the process with SIPOC; (2) Defining the project scope and establishing boundaries; (3) Analyzing work processes and improvement opportunities; (4) Overcoming the common problems during the Define Phase; and (5) Aligning six sigma projects with critical business issues and initiatives, especially those that impact the customer.
2:15-2:30	**Break:** An opportunity for participants to discuss and reflect on concepts presented
2:30-3:15	**Team Activity: Best Practices in Six Sigma** Program participants, in teams of 4-5 people, work on a Six Sigma assignment that provides an opportunity to practice the skills and tools presented during the early part of the day related to the Define Phase deliverables. Break: 3:15-3:30
3:30-5:00	**Problem Statements and Scoping the Process** (Continued)

Program Content

Day Plan for Session 3: Components of the DMAIC Method

7:30-8:00 AM	**Arrival, Networking and Continental Breakfast:** Georgia Tech Classroom 312
8:30-Noon	**The Role of the Project Champion and Project Scoping Tools** The morning session will focus on understanding the importance of asking the right project questions including "Who is my customer?", "What product features matter?" "What is the scope?", "What are the key processes and defects?" and more. Participants will also learn about the most common mistakes made when determining the project scope. Key content areas include: (1) Project scoping tools including the Pareto Chart, Fishbone Diagram, and Tree Diagram; (2) Defining the project's business and process metrics; (3) The various forms of a problem statement; (4) Developing objective statements and quantifying the opportunity; and (5) Using the S.M.A.R.T. method for finalizing six sigma project problem and objective statements.
10:00-10:15	**Break:** An opportunity for participants to discuss and reflect on concepts presented
11:30-12:30 PM	**Lunch and Networking:** Georgia Tech Hotel Executive Dining Room
12:30-2:15	**The Measurement Phase and Using Statistics to Solve Problems** The afternoon session will focus on the issues of metrics and their importance in DMAIC projects. Participants will identify the different types of data and how data is used to solve problems. Key content areas include: (1) The benefits of measurement; (2) The typical types of measures, data and performance metric reporting; (3) The three disciplines of statistics; (4) Normal distribution, measures of central tendency, measures of variability and determining the sample size; and (5) Using statistics to characterize processes and identifying the common causes of variations.
2:15-2:30	**Break:** An opportunity for participants to discuss and reflect on concepts presented
2:30-3:15	**Team Activity: Best Practices in Six Sigma** Program participants, in teams of 4-5 people, work on a Six Sigma assignment that provides an opportunity to practice the skills and tools presented during the early part of the day. Break: 3:15-3:30
3:30-5:00	**The Measurement Phase and Using Statistics to Solve Problems** (Continued)

Program Content

Day Plan for Session 4: Components of the DMAIC Method

7:30-8:00 AM	**Arrival, Networking and Continental Breakfast:** Georgia Tech Classroom 312
8:30-Noon	**Understanding Processes and Process Mapping** The morning session will focus on establishing a solid understanding of process objectives and process tools common to the Six Sigma methodology. Participants will learn about process mapping, cause and effect diagrams, failure modes and effects analysis, and effective use of Pareto charts. Key content areas include: (1) The five stages of a process; (2) The major benefits of process mapping; (3) Building cause & effect Fishbone Diagrams; (4) Identifying failure modes and the rate of severity of their effect and impact on the customer; (5) Prioritizing the actions that should be taken to improve the process; and (6) Team exercise in developing a process map for a key process within your company.
10:00-10:15	**Break:** An opportunity for participants to discuss and reflect on concepts presented
11:30-12:30 PM	**Lunch and Networking:** Georgia Tech Hotel Executive Dining Room
12:30-2:15	**The Failure Modes and Effects Analysis (FMEA) Tool** The afternoon session will focus on proven tools for identifying why a product or process can fail. The instructor will define key FMEA terms and concepts. Key content areas include: (1) The impact on the customer if the Failure Mode is not prevented or corrected; (2) The FMEA form and its role in documenting process improvements; (3) Defining performance standards and the impact on the requirements and specifications imposed by the customer on a specific CTQ; (4) Evaluating the sources and types of data that need to be collected during the Six Sigma process; and (5) Exploring the two meanings of "sigma" and understanding that as defects go down the Sigma Capability goes up. Break: 2:15-2:30
2:30-3:30 PM	**Team Activity: Best Practices in Six Sigma** Program participants, in teams of 4-5 people, work on a Six Sigma assignment that provides an opportunity to practice the skills and tools presented during the early part of the day. Break: 3:30-3:45
3:45-5:00 PM	**The Failure Modes and Effects Analysis (FMEA) Tool** (Continued)

Program Content

Day Plan for Session 5: Developing Performance Standards

7:30-8:00 AM	**Arrival, Networking and Continental Breakfast:** Georgia Tech Classroom 312
8:30-Noon	**Harvesting the Fruit of Six Sigma** The morning session will focus on performance standards as the requirements or specifications imposed by the customer on a specific CTQ. The goal of a performance standard is to translate the customer need into a measurable characteristic. Participants will learn how to translate the Voice of the Customer into the Voice of the Process. Key content areas include: (1) Understanding that a defect is anything that results in customer dissatisfaction; (2) Best methods for developing concise and clear operational definitions; (3) The best practices in establishing a performance standard and related metrics; (4) Establishing a Data Collection Plan and understanding the benefits of discreet and continuous data; and (5) The best practices in tracking defects for all products and services over time.
10:00-10:15	**Break:** An opportunity for participants to discuss and reflect on concepts presented
11:30-12:30 PM	**Lunch and Networking:** Georgia Tech Hotel Executive Dining Room
12:30-2:15	**The Analyze Phase of the DMAIC Methodology** The afternoon session will focus on establishing an improvement goal directly related to the performance objective and recognizing the patterns in stability, shape, and spread of a process. Key content areas include: (1) Proven tools for analyzing the deliverables and the data; (2) The value of benchmarking methodology and hypothesis testing; (3) Understanding the nature of statistical problems and studying stability using Minitab software; (4) Introduction to hypothesis testing as it relates to both continuous and discrete data; and (5) The best methods for identifying and communicating analysis results and key inferences. Break: 2:15-2:30
2:30-3:30 PM	**Team Activity: Best Practices in Six Sigma** Program participants, in teams of 4-5 people, work on a Six Sigma assignment that provides an opportunity to practice the skills and tools presented during the early part of the day. Break: 3:30-3:45
3:45-5:00 PM	**The Analyze Phase of the DMAIC Methodology** (Continued)

Program Content

Day Plan for Session 6: Improvement by Design

7:30-8:00 AM	**Arrival, Networking and Continental Breakfast:** Georgia Tech Classroom 312
8:30-Noon	**The Links between Six Sigma Projects and Improvement** The morning session will focus on how to use the results of the analysis phase to develop a proposed solution that effectively identifies the improvement strategy, the experiment needed to determine the solution and quantify the financial opportunities. Participants will learn proven tools to identify the resources required for a successful full-scale implementation of the solution. Key content areas include: (1) Develop an improvement strategy to provide a framework for developing a solution systematically and efficiently; (2) Selecting the appropriate improvement tools; (3) Methods for decreasing the time required to achieve six sigma levels of quality; and (4) Innovative small team exercises to discuss and determine the key improvement strategies in your company, especially the issues that significantly impact customers.
10:00-10:15	**Break:** An opportunity for participants to discuss and reflect on concepts presented
11:30-12:30 PM	**Lunch and Networking:** Georgia Tech Hotel Executive Dining Room
12:30-2:15	**The Process of Experimentation** The afternoon session will focus on identifying an experimental project and developing the appropriate performance analysis criteria. The instructor will provide an overview of how to determine solutions, record results, and determine future plans. Key content areas include: (1) Defining the current situation in relationship to the project definition; (2) Identify the key process factors and the performance analysis variables; (3) Generating random designs using the Minitab software; (4) Determine the need for replication and identify the experiment's key learnings; and (5) Best methods for preparing the project report. Break: 2:15-2:30
2:30-3:30 PM	**Team Activity: Best Practices in Six Sigma** Program participants, in teams of 4-5 people, work on a Six Sigma assignment (The Helicopter Modification Exercise) that provides an opportunity to practice the skills and tools presented during the early part of the day. Break: 3:30-3:45
3:45-5:00 PM	**The Process of Experimentation** (Continued)

Program Content

Day Plan for Session 7: Generating and Selecting Solutions

7:30-8:00 AM	**Arrival, Networking and Continental Breakfast:** Georgia Tech Classroom 312
8:30-Noon	**The Importance of Data Collection during the Experimental Process** The morning session will focus on establishing goals and expected outcomes for collecting data related to a six sigma project. Participants will learn the process for deciding what to measure and the relationship to the project diagnostics and inferences. Key content areas include: (1) Determining what process or product to monitor to collect the data; (2) Selecting the best measurement tool and determining the appropriate sample size; (3) The steps in the full factorial replicated designs; (4) Interpreting interaction plots and confirming impressions with statistical procedures; 5) Best practices in summarizing and communicating conclusions; and (6) How to use the Experimenter's Checklist tool to ensure the quality of the experimental process.
10:00-10:15	**Break:** An opportunity for participants to discuss and reflect on concepts presented
11:30-12:30 PM	**Lunch and Networking:** Georgia Tech Hotel Executive Dining Room
12:30-2:15	**Generating and Selecting Solutions: The Soft Skills** The afternoon session will focus on generating creative solutions and the best methods of influencing others to support and participate in implementing six sigma solutions. The instructor will provide an overview of proven techniques such as "Think Like a Kid" "Challenge the Rules" "Set a Deadline" "Get Rid of Excuses" and "Slice and Dice." Key content areas include: (1) Proven methods for generating and building creative ideas; (2) Evaluating solutions in a manner that encourages participation and effectively identifies the pros and cons of each alternative; (3) Innovative ways to evaluate and score each option; and (4) Implementing the Solution Prioritization Matrix and effectively communicating the decision. Break: 2:15-2:30
2:30-3:30 PM	**Team Activity: Best Practices in Six Sigma** Program participants, in teams of 4-5 people, work on a Six Sigma assignment that provides an opportunity to practice the skills and tools presented during the early part of the day. Break: 3:30-3:45
3:45-5:00 PM	**Generating and Selecting Solutions: The Soft Skills** (Continued)

Program Content

Day Plan for Session 8: Implementing the Solutions

7:30-8:00 AM	**Arrival, Networking and Continental Breakfast:** Georgia Tech Classroom 312
8:30-Noon	**Launching the Six Sigma Methodology and Pilot Projects** The morning session will focus on how to best develop, pilot, implement, and evaluate your Six Sigma Green Belt project and improvement plan. Participants will now begin the process of using their DMAIC knowledge and skills. Key content areas include: (1) Methods to reduce or eliminate risk; (2) Effectively using the Failure Modes and Effects Analysis (FMEA) tool to identify risk elements and risk types; (3) The steps in the Pilot Program process and using the Deming Cycle of Improvement approach to the Plan-Do-Check-Act process; (4) Understanding the difference between errors and defects; and (5) Identify key mistake proofing as a proactive tool for implementing the Six Sigma project and methodology.
10:00-10:15	**Break:** An opportunity for participants to discuss and reflect on concepts presented
11:30-12:30 PM	**Lunch and Networking:** Georgia Tech Hotel Executive Dining Room
12:30-2:15	**Planning for Quality and Developing Control Strategies** The afternoon session will focus on proven tools that help you make sure that the process stays in control after the solution has been implemented. The instructor will discuss ways to detect process variations. Key content areas include: (1) Developing a Statistical Process Control (SPC) system; (2) Understanding the importance of a documented Quality Plan that ensures that each process requirement stays in conformance; (3) Effectively utilizing SPC charting methods; (4) The five main uses of control charts; and (5) A review of the DMAIC trigger questions and how they relate to your company's high-priority challenges and opportunities. Break: 2:15-2:30
2:30-3:30 PM	**Team Activity: Six Sigma Project Discussions** Program participants, in teams for 4-5 people, continue their discussions on how to best implement a Six Sigma project. Break: 3:30-3:45
3:45-5:00 PM	**Six Sigma Project Review and Program Wrap-up** The instructor provides a summary of the program and hands out the Georgia Tech Six Sigma Green Belt certificates and plaques (project pending).



FACULTY PROFILES



Lee Campe, Six Sigma Master Black Belt

Lee Campe is an experienced Six Sigma instructor with a wide array of expertise in all facets of business. He has extensive experience deploying Six Sigma in transactional environments including sales, human resources, marketing, finance, information management, and manufacturing. Lee is a past Master Black Belt for GE, Johnson & Johnson, JP Morgan Chase, and The Home Depot. Lee played a key role in coaching and mentoring Home Depot six sigma projects that generated over $200 million in savings.

Prior to Home Depot, Lee was the Vice President and Master Black Belt for JP Morgan Chase in New York. His responsibilities included training and coaching Six Sigma Champions, Black Belts, and Green Belts in the DMAIC and DFSS methodologies. During his tenure, Lee trained over 100 Champions and mentored three enterprise-wide projects that identified over $20 million in potential savings.

Lee Campe earned his Executive MBA while serving as a captain in the U.S. Army in Vicenza, Italy. He served for 12 years in the U.S. Army and is a graduate of the elite Army Ranger School. He is an adjunct professor in the MBA program at the Georgia Tech College of Management and is also a visiting professor for the Executive MBA program in Asolo, Italy.



Daniel Stotz, MS in Management (Staff)

Dan Stotz is the Director of Executive Programs for the Business School at Georgia Tech. He is responsible for developing public and custom executive education programs that meet the executive development needs of major corporations. Dan will play the lead role in designing and coordinating each custom program. His major executive education clients include GE Energy, GE Healthcare, EarthLink, NASA, WEG Electric Motors, and Waffle House. In addition to founding an innovative Leadership Institute that provides training for non-profit executives, Dan is a popular speaker in the areas of email marketing and customer relationship management (CRM). Before joining Georgia Tech, Dan was the Manager of Marketing Communications for the University of Michigan Executive Education Center. He earned his Master of Science in Management from Colorado State University.



REGISTRATION FORM

The **Georgia Tech Six Sigma Green Belt Program** is an eight-day certificate program offered in two four-day modules scheduled for Monday through Thursday, September 17-20, 2007 (Module One) and Monday through Thursday, October 15-18, 2007 (Module Two). The program will be held at the Georgia Tech College of Management located in Midtown Atlanta, 800 West Peachtree Street NW.

The certificate program price is $6,500 per person and includes Georgia Tech instructional fees, program binders and materials, case studies, book and simulation licensing fees (when applicable), lunch at the Georgia Tech Hotel executive dining room, morning and afternoon refreshments, parking, and Internet access. **Discounts are available to companies that send three or more employees to the same program.** Call Laura Day at 404.894.8700 for more details.

Note: Special discounts are available for Georgia Tech employees and alumni.

OPTION 1 ☐ **YES,** register me for the Six Sigma Green Belt Certification Program and send an invoice**.**
I will complete this form and fax it to Georgia Tech at 404.894.5603.

Contact Name _____ Organization _____

Street Address _____City _____State _____ Zip _____

Position _____Division/Dept _____

Phone _____Fax _____Email_____

OPTION 2 ☐ **YES,** I am interested in attending the Six Sigma Green Belt Certification Program.
Please call me at _____ so I can provide credit card information.

OPTION 3 ☐ **YES,** I am interested and will go to the Georgia Tech College of Management's web site www.execinfo.org to register online.

For more information: If you have questions regarding program content or if you're interested in learning about available discounts, please contact Laura Day at 404.894.8700 or laura.day@mgt.gatech.edu. Program offerings, content, dates, and prices are subject to change.