

IT 470a
Six Sigma Green Belt
Fall 2008
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I. COURSE NUMBER AND TITLE: IT 470a Six Sigma Green Belt

II. PREREQUISITE:

While there are no formal prerequisites for this course, the student is expected to have a good foundation in math, (application of algebraic formulas) statistical principles, and project management as well as critical thinking skills for objectively reviewing data to determine appropriate customer expectations.

III. DESCRIPTION OF COURSE:

The course will be structured around classroom study, hands on examples as well as a project demonstrating proficiency in the application of Six Sigma tools and techniques. This class will encompass an overview of the Six Sigma methodology for reduction of variation in business and manufacturing processes.

IV. TEXTBOOK: CSSGB PRIMER, Quality Council of Indiana, www.qualitycouncil.com, 2006.

HANDOUTS: As appropriate.

V. COURSE OBJECTIVES:

This course will provide the student with a comprehensive understanding of basics of Six Sigma Green Belt techniques and tools and their application. It will cover the knowledge areas of six sigma green belt. Topics include project scope and definition, DMAIC Problem-Solving methodology, Measures and Metrics, Statistical Methods, Control Charts, Design of Experiments, Reliability, and Failure Modes and Effects Analysis, Process Management, Team Dynamics, statistics and probability, measurement system analysis, and process capability.

VI. INSTRUCTIONAL FORMAT:

This is a weekend format two classes (Saturday and Sunday) for three alternating weekends. There will be classroom discussion with 3 exams and an applied project. The instructor will provide assistance and guidance as required.

VII. EVALUATION:

Exam 1 Chapters II & III (Afternoon, 1 st Sunday)	20%
Exam 2 Chapters IV & V (Afternoon, 2 nd Sunday)	20%
Exam 3 Chapters VI & VII (Afternoon, 3 rd Saturday)	20%
Applied Project	20%
Homework	10%
Class Participation	5%
Attendance	5%

Textbook Material:

Exams will be multiple-choice with approximately 20 questions selected directly from the text. The topics will be covered during in class discussions. The exams will account for 60% of the student's grade.

Applied Project

An applied project demonstrating the application of the Six Sigma tool set will account for 20% of the grade. In order to ensure that students have the necessary flexibility to complete their projects two options will be made available for students: Option 1 – Complete an individual project. Option 2 – Complete a project in a class group not to exceed 3-4 members.

Project Guidelines

It would be most beneficial if the project addresses a “current workplace issue” – however due to the educational aspect of the project this is not a hard requirement. The best projects are “data rich” (i.e. have significant quantifiable data points) and have a limited scope due to the time constraints. Additionally, certain aspects of the project may be embellished due to the educational nature -- the intent is to apply the tools and understand the stakeholder's involvement in a real world application – not to force a six sigma project on your employer.

Homework

Homework problems will be assigned to assist you in development of the concepts. This will consist of textbook problems and additional study and papers/presentations on specific concepts.

VIII. GRADING STANDARDS:

A:	90-100%
B:	80-89%
C:	70-79%
D:	60-69%
F:	<60%

IX. GRADING POLICY: Missed exams have a 20% penalty unless an appropriate, prior excuse is given to the instructor. The missed exam must be completed on the make-up date set by the instructor.

X. ACADEMIC CONDUCT: Cheating on examinations, submitting work of other students as your own, or plagiarism in any form will result in penalties ranging from an **F** on the assignment to expulsion from the university, depending on the seriousness of the offense.

XI. INSTRUCTOR AVAILABILITY:

The best way to communicate with the instructor is by e-mail. The instructor is also available by phone if necessary. Students are encouraged to discuss problems as they arise, before they become major problems. The instructor will also periodically make his self available prior to or after class if you would prefer to meet face-to-face. Please try to schedule these sessions in advance.

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MAJOR TOPICS:

- Six sigma goal
- Lean principles and TOC
- Quality function deployment (QFD)
- Failure mode and effects analysis (FMEA)
- Process management
- Team dynamics
- Six Sigma Tool Set
- Project management basics
- Data and process analysis
- Probability and statistics
- Measurement system analysis
- Process capability

Project Guidelines:

Define

- Identify Sponsor and key stakeholders
- Identify the project team
 - Team members
- Review process steps
- Clarify project
 - Problem statement
 - Goal statement
 - Process output
- Define process boundaries
 - SIPOC
- Define project boundaries
 - Resources
 - Scope
- Determine project timeline
- Identify CTQ Customer Requirements
 - Define the Defect
 - Define defect measure
- Gain Approval of Project Charter

- Develop Define report out

Define Phase Project Report:

- Goal Statement
- Process definition (SIPOC)
- Project plan (Gantt chart)
- Customer Requirements (CTQs)
- Project Scope
- Benefits assessment
- Next Steps and Help Needed

Measure

- Understand detailed process
 - Detailed process map w/ rework loops
- Create Fishbone
 - Tie to defined defect
- Collect Data
 - Ys (results) with Xs (data tags)
- Evaluate Measurement Systems
 - Gage R&R, Attribute MSA
- Describe Process
 - Numerical statistics
 - Graphs: Time/Run, Histograms, Pareto, etc.
 - Create control chart
- Establish Process Capability
 - Calculate DPU, or FTY or P(d)
 - Calculate Zst and Zlt
 - Complete Control vs. Technology chart
- Update Charter
- Develop Measure report out

Measure Phase Project Report:

- Detailed process map
- Data collection fishbone
- Measurement system analysis
- Process statistics and graphs
- Process performance and capability
- Project timeline and status (Gantt chart)
- Next Steps and Help Needed
- Scorecard

The application of the below concepts will be covered in 470b

Analyze

- Analyze Process Flow
 - Critical Path
 - Value-added steps
 - Non value-added steps
 - Opportunities
- Analyze Data
 - Graphical tools
 - Hypothesis Tests
 - Interrelationship Digraph
 - Regression analysis
- Conduct Root Cause Analysis
- Identify and collect additional required data (As appropriate)
- Identify significant Xs
 - Tie to root cause analysis
 - Draw conclusions
- Update charter as required
- Develop Analyze report out

Analyze Phase Project Report:

- Updated project charter
- Process flow analysis
- Data analysis
- Root cause analysis
- Significant X identification
- Current Benefits Assessment
- Project timeline and status (Gantt chart update)
- Next Steps and Help Needed
- Scorecard

Improve

- Determine Levels of Response
- Develop solution options
 - Improve control of significant root causes
 - Re-design process to obtain required capability
 - Perform DOE as required
- Evaluate options and select final solution
 - Prioritization matrix
 - Affinity Diagrams
- Determine measurement system for improved process
- Perform FMEA or Risk Assessment and develop Risk Abatement plan
- Create implementation plan
- Obtain buy-in / support for improvement actions
- Conduct pilot / testing to verify results

- Implement improvements
- Collect data to verify improvement

Improve Phase Project Report:

- Current charter
- Solution options and evaluation results
- Description of solution and how it impacts the process
- Risk management plan or FMEA
- Implementation plan & methods to standardize new process.
 - Include measurement system for new process
- Pilot / test results
- Full scale implementation results
- Benefits assessment
- Project timeline and status (Gantt chart update)
- Next Steps and Help Needed
- Scorecard

Control

- Perform Capability Analysis of improved process
 - Control vs. Technology chart
- Develop and Implement a Control Plan
- Complete Project Closure Package
- Document Results
 - List best practices
 - Identify lessons learned
- Communicate push leverage opportunities to applicable process owners
- Hand off project to process owner
 - Create follow up action plan
- Develop Final report out

Control Phase Project Report:

- Before / After
- Final Control vs. Technology chart
- Process control plan
- Project closure package
- Push leveraging opportunities
- Final Project Scorecard
- Project Summary