ENME466
Lean Six Sigma Strategy & Methods:
Breakthrough Improvement and the DMAIC Process

Professor:

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Office Hours: Will be arranged with each of the teams, or by appointment

Prerequisites:

Statistics course or working knowledge of basic statistics or instructor permission.

Objectives of the Course: This course intends to provide in-depth understanding of Lean Six Sigma and its Define – Measure – Analyze – Improve – Control (DMAIC) Breakthrough Improvement Strategy. Emphasis is placed on the DMAIC process which is reinforced via application of semester long DMAIC projects and case study analysis.
To be in class you need to have taken, or are currently taking, an introductory Statistics course.

Texts & Other Course Materials

- **The Lean Six Sigma Pocket Toolbook: A Quick Reference Guide to 100 Tools for Improving Quality and Speed by Michael L. George, John Maxey, David Rowlands and Mark Price (Aug 1, 2004)**
- The Six Sigma Handbook, Revised and Expanded : The Complete Guide for Greenbelts, Blackbelts, and Managers at All Levels by Thomas Pyzdek ISBN: 0071410155
- The Black Belt Memory Jogger (2002). Six Sigma Academy. ISBN: 1-57681-043-7.
- Lean Sigma: A Practioner's Guide, I. Wedgwood, isbn 0-13-239078-7

Downloads & Useful Internet Links

Quality Function Deployment: at: http://www.mazur.net/publishe.htm READ THE FOLLOWING:

- 9 House of Quality Checks;
- Elicit Service Customer Needs Using Software Engineering Tool;
- Jurassic QFD;
- Voice of Customer Analysis: A Modern System of Front-End QFD Tools;

I Six Sigma: at: http://www.isixsigma.com for useful information.

Class Approach to Learning & Teaching: In order to enhance the value of this course to its stakeholders, active participation from you is expected. Also the course relies on readings to establish key terminology and frameworks and timely review of readings pertaining to the associated lectures is expected. You are valued customers, though not the sole stakeholder, so that your satisfaction with the course is one key objective. You are invited to contact me about course matters at any time, in class or outside the classroom, formally or informally. I value meaningful dialogue with students and believe that it is important to assess their satisfaction with the course and associated learning experience.

Course Performance: Emphasis is placed on development of a thorough understanding of *Six Sigma's DMAIC Breakthrough Improvement Strategy* and its application. Evaluation of participant performance is based on two homework assignments, two competency examinations, and a required team project intended to provide experience with the DMAIC process.

Project Orientation: A primary motivation for requiring a project is that it provides an experience analogous to project requirements associated with *Six Sigma Green Belt* certification. The project is rigorously evaluated and project requirements include direct application of the *Six Sigma Breakthrough Strategy* and associated tools.

Project Presentation / Paper Requirement(s): Specific project paper format requirements will be supplied by the instructor. It is expected that the Measure Report will be a length of *at least* 2500 words, *exclusive of* graphics, tables and appendices. Final Reports (DMAIC) should leverage and build upon the Measure Report and it is expected that the Final Report will be a length of *at least* 5000 words, *exclusive of* graphics, tables and appendices. All papers are expected to be well written **and** thoroughly researched. Final Presentations must be of length 30-35 minutes, inclusive of questions. Written progress reports are to be emailed to the instructor/uploaded to Blackboard by 5PM on Mondays.

Examination Orientation: Jointly considered, two examinations are intended to rigorously and comprehensively probe knowledge that is targeted at a level between that expected of *Six Sigma Green Belts* and *Six Sigma Black Belts*. Resources that you will be allowed to have access to will mirror those permitted during certification exams administered by the *American Society for Quality*.

15%	**Midterm Examination**	**60%**	**Project (see below for breakdown)**
15%	**Final Examination**	25%	*Client feedback and survey about project/team performance*
10%	**Homework Assignments**	25%	*Appropriate use of tools to justify conclusions*
		25%	*Student/team feedback and survey about project/team performance*
		25%	*Professionalism throughout project (client interaction, presentations, reports, etc…)*
		+/-	*Observed team role and participation*

*Note: Homework must be submitted by class time on the day it is due. A printed and electronic copy of Examinations must be submitted by 5PM on the day they are due.
*Note: All work must be shown on all homework assignments and exams. **No work = no credit, no exceptions**.

You are expected to function as a responsible team member and evaluations will – in part – address conformance of your performance to that to which you agreed in your team project charter. This includes class attendance and participation. Additionally, peer evaluations *may* result in differential grades for team members on Phase I and Phase II Reports and Presentations.

Green Belt Certification: Through completing this course, everybody has the potential for earning a Green Belt certification. Certifications will be given pending satisfactory completion of the following requirements.

75% of Certification Consideration

85%+ Average Exam Grade
85%+ Average Homework Grade
85%+ Personal Project Score
85%+ Team Project Score

25% of Certification Consideration

Professor/TF Evaluation
- Mastery of Six Sigma skills
- Ability to apply material
- Understanding content outside of project
- Proactive team participation

Cell Phone and Laptop Policy: The use of cellphones and laptops is **not** permitted during class, except by permission for note taking.

Special Needs: Any student with special needs should bring this to the attention of the instructor as soon as possible, but not later than the second week of class.

Schedule:

Week 1: 1/25

Intro to Lean Six Sigma Course; Ice Breakers. Intro to DMAIC and Lean

Intro to DMAIC and Lean (cont). Intro to Professionalism.

Week 2: 2/1

Intro to Define Phase. TQM Lecture
Basic Professionalism.
Overview of Projects. Team Placement Survey.

Hmwk – Stats1 Assigned

Week 3: 2/8

Intro to Lean Principles by Jeffrey Herrmann.
Teams formed
Intro to Define Report
Measure Phase Into
Every team has completed a site visit (talk to Dr. Bigio if problems)
Project Charter Due 1 week after first site visit.

Hmwk Stats 1 Due

Week 4: 2/15

Team Dynamics – Gantt Chart

Measure Phase – Process Maps Fishbone Diagram

Week 5: 2/22

Design of LSS Measure Phase – examples with each team.
Lean Tools

Hmwk Process Map Assignment

Week 6: 3/1

Lean Scenarios

Project Updates Presentation (<15min)

Hmwk – Lean Tools

Week 7: 3/8

Process Capability

Measurement systems. R&R.

Midterm Assigned (Due 8 days later)

Measure Report

Week 8: 3/15 Spring Break

No classes

Week 9: 3/22

Measure Report
Set up debriefs

Process Capability
Measurement Techniques

Week 10: 3/29

Getting to CTQs - Team Debrief set up.
CTQs = func(Xs) - how to set up – how to justify

Measure Presentations
Team Debriefs

Week 11: 4/5

CTQs= F(X) and how to quantify each – present for each team.
Analyze – how to deep dive into each of the CTQs – more detail – new information

Week 12: 4/12

Analyze – Define deep dive info
How to make the case

Week 13: 4/19

Improve Phase – Change Management
Improve Phase – connection to the Analyze results -
Improve Phase – Specific Examples - connections

Stats HW 2 Assigned.

Week 14: 4/26

Control Intro – Visual Displays

Controls – Visual display examples
Stats HW 2 Due

Week 15: 5/3

Presentations – Final Report
Completion Exercise

Week 16: 5/10
Completion Exercise Follow up
Presentations

Final Exam Assigned

Final Report Due (TBD).

Academic Integrity Code:

The Code of Academic Integrity found in the 2015-16 Undergraduate Catalog will be upheld. A synopsis of the University's Policy on Academic Dishonesty can be found online. All work turned in by a student must be the student's own work. One example of academic dishonesty is copying the examination problem solutions of another student. When it appears that Code has been violated, standard university measures will be taken.

"The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit http://www.studenthonorcouncil.umd.edu/whatis.html."

ON EACH EXAM OR ASSIGNMENT you will be asked to write out and sign the following pledge. "*I pledge on my honor that I have not given or received any unauthorized assistance on this exam/assignment.*"